Research Trends in Humanities RTH 13 (2026) – ISSN 2284-0184
Sezione BEC Bio-Education & Cognition

AI and the Transformation of Teaching Functions: Teachers' Perceptions[1]

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Introduction

The rapid spread of Artificial Intelligence (AI) technologies is redefining the ways in which individuals relate to one another, communicate, and learn. The educational environment – traditionally grounded in the relationship between teacher and learner – is now immersed in complex digital ecosystems in which algorithmic and generative tools (Panciroli & Rivoltella, 2023; Sibilio, 2014) increasingly act as mediators of access to information, content production, and the organization of teaching practices.

In the face of such technological and social transformations, it becomes urgent to reflect not only on the technical functioning of these new technologies but, above all, on the impact they will have on epistemological, cognitive, and educational structures.

In educational contexts where the introduction of AI challenges the very nature of the educational experience, it becomes necessary to consider the role it assumes in teaching and learning processes – in terms of widened access to content, personalization of learning pathways, and the support it can offer to instructional design. Alongside the benefits that AI may bring to social and educational settings, it is essential to highlight several critical issues, such as the risk of cultural homogenization, the flattening of human creative thinking, the weakening of critical thinking, and the erosion of the educational relationship.

Within this landscape, the teaching profession is not diminished but rather redefined, as AI requires new digital, design-based, socio-emotional, and reflective competencies – skills that are indispensable for guiding students, the citizens of tomorrow, within a complex informational ecosystem increasingly shaped by digital and algorithmic dimensions, without losing sight of the human dimension.

This research is situated within this scenario and aims, through an initial analysis, to investigate how teachers perceive, use, fear, or value AI. Specifically, the purpose of this study is to explore teachers' perceptions and attitudes regarding artificial intelligence in educational settings, with the objective of identifying emerging educational priorities, paying particular attention to the transformations perceived in their professional roles and in students' learning processes.

Through an exploratory mixed-methods design, this initial investigation seeks to contribute to the understanding of ongoing transformations, to identify emerging training needs, and to outline possible future directions for the development of a pedagogy capable of engaging critically with new

[1] Nadia Carlomagno authored sections "Theoretical Framework", "Research design and methodology" and "Conclusions". Valeria Vadalá authored sections "Sample", "Data collection", "Results" and "Discussion". Arianna Ricciardi authored sections "Introduction", "Artificial intelligence in educational contexts" and "Critical issues and future perspectives".

technologies, while at the same time preserving the centrality of relationships, embodiment, and human experience within educational processes.

Theoretical Framework

This research is grounded in the enactivist–interactionist paradigm, which approaches educational processes from a situated, embodied, and relational perspective (Varela, Thompson & Rosch, 1991; Blumer, 1969; De Jaegher, Di Paolo & Gallagher, 2010; Di Paolo & Thompson, 2014). From this standpoint, cognition is understood as the result of continuous processes of structural coupling in which the subject and the environment co-evolve and, through negotiation between knower and known, generate shared meanings. Cognition is therefore embodied action (Caruana & Borghi, 2016) and emerges from the dynamic encounter between organism and environment (Maturana & Varela, 1980).

Recent neuroscientific research similarly supports the view that cognitive processes develop in close continuity with motor and perceptual systems (Gallese, 2007; Gallese & Sinigaglia, 2011). Perception itself, being action-oriented, is enacted by a body that anticipates, simulates, and shapes its relationship with the world (Berthoz, 2011). Reinforcing the idea that perception cannot exist independently of an acting body (Berthoz, 2011; Parisi, Camera dei Deputati, 2025), knowledge must be understood as an emergent and co-constructed process that unfolds within a continuous dialogue among mind, body, and organism (Frauenfelder et al., 2018).

In the educational field, the body is increasingly recognized as a medium through which meaningful and shared learning is generated (Gallagher & Lindgren, 2015; Rivoltella, 2017; Carlomagno, 2022), since it is in the encounter with others that motor simulation and affective resonance processes are activated (Gallese & Morelli, 2024). These dynamics shape relational experience, highlighting that what is learned always emerges within the intersubjective space of encounter.

Teacher and learner, within their educational relationship, constitute a dynamic and co-evolving system grounded in the interdependence of their bodies, intentions, and horizons of meaning (De Jaegher & Di Paolo, 2007). From a structural perspective, this process is analogous to the functioning of the mirror neuron system (Gallese, 2007; Rizzolatti & Sinigaglia, 2006), which shows how the mere observation of another's action activates motor and intentional representations that support relationship-building, empathy, and the co-construction of meaning.

These premises invite the educational community to move beyond reductionist, separative, and simplifying models in order to address contemporary complexity by valuing uncertainty and embracing paradigms that conceptualize teaching and learning as interconnected dimensions – *unitas multiplex* (Morin, 1993) and *simplex didactics* (Sibilio, 2014; 2023; Berthoz, 2011). From this perspective, teaching must be imagined as a dynamic, adaptive, and non-linear process (Carlomagno, 2022), capable of *« deciphering a formative complexity that can be addressed through the elaboration and decision-making among alternative opportunities»* (Sibilio, 2015).

The pervasive presence of digital technologies intersects with this complexity, risking an impoverishment of meaningful experience, embodiment, and consequently learning, by diminishing the generative power of the body in action (Carlomagno et al., 2021).

Drawing on the bio-educational tradition (Frauenfelder, 2018), attention is directed toward the urgency of hybridizing different bodies of knowledge (Carlomagno, 2022), in order to establish a pedagogy capable of responding to technological and cultural transformations through the lens of digital humanism (Floridi, 2022) a pedagogy that can orient innovation according to criteria of

responsibility, meaning, and human centrality, fostering *«a conception of the world that is the product of an irreducibly and irreplaceably human vision»* (Camera dei Deputati, Parisi, 2025).

In this sense, Actor Network Theory (Latour, 2005) offers additional interpretive tools, showing how knowledge emerges from socio-material networks composed of human and non-human actors (actors/actants), and how every educational context is shaped by distributed interactions among bodies, tools, environments, and practices.

Artificial Intelligence (AI) today appears as a set of technologies capable of learning data patterns, generating content, recognizing structures, generalizing, and supporting decision-making. In the educational field, Large Language Models (LLMs) are the most impactful generative systems, based on deep neural networks (Bender et al., 2021; Bommasani et al., 2021), capable of producing texts, simulating reasoning, suggesting strategies, and offering explanations in highly natural, almost human-like language.

These technologies, deeply embedded in our daily lives, whether consciously or not, must be considered as new actors of the contemporary landscape, or rather as new non-human actors. These actants (Latour, 2005) differ from humans in several key respects: they do not feel emotions, as emotions do not correspond to anything they can access in the world (Parisi, Camera dei Deputati, 2025), and without a body, they cannot perceive. These actants do not understand the world; instead, they predict the next word based on statistical correlations learned from massive datasets. Their apparent "intelligence" is the outcome of linguistic simulation devoid of embodied experience (Bender et al., 2021).

In educational contexts, distinguishing between simulation and understanding is fundamental because it clarifies the limits and possibilities of generative AI. These systems do not truly comprehend the meaning of what they produce: their functioning is based on the extraction of recurring patterns (Bender et al., 2021). This enables them to generate texts that are contextually appropriate relative to the input they receive, yet not meaningful from a human standpoint, as they lack genuine semantic understanding (Floridi, 2022).

Artificial Intelligence in Educational Contexts

In the field of education, AI opens scenarios of strong inclusion and productivity, in terms of: 1) expanded access to knowledge and unlimited materials – explanations and examples available in real time, reducing cognitive and linguistic barriers (Luckin et al., 2016); 2) personalization of learning pathways – AI offers immediate feedback and adaptive scaffolding (Holmes et al., 2022; Laurillard, 2014); 3) support for creativity – AI can facilitate brainstorming, reformulations, and the generation of alternatives (Creely et al., 2023; Santoianni, 2024).

Many teachers recognize in the advent of AI a generative disruption, capable of questioning established practices, bringing to light new training needs, and stimulating deep reflection on the meaning of being teachers today (Holmes et al., 2022; Agrati & Beri, 2025). It is necessary to emphasize that despite the numerous opportunities offered by AI, it is not possible, in any way, to imagine replacing the educational relationship between teacher and student.

Poor use of AI could lead to replacing fundamental learning processes, such as analysis, research, writing, and interpretation, generating dependency and loss of agency (Camera dei Deputati, Sadin, 2025), thus representing a true cognitive delegation. Moreover, AI models overrepresent certain cultures and marginalize others, producing a flattening of perspectives and reducing the creative component (Bender & Gebru, 2021), causing cultural homogenization.

AI also generates content that is not always reliable (bias), sometimes nonexistent or misleading, causing the propagation of partial, distorted, or unverified data presented as "plausible" truths,

making uncritical use by students and teachers problematic (Bender et al., 2021; Bommasani et al., 2021; Floridi, 2022).

Recent research identifies a reduction in the expressive variety of students and the impairment of their ability to develop an authentic voice, due to the stylistic and argumentative homogeneity produced by generative AI models (Bender & Gebru, 2021; Bommasani et al., 2021), thus forcefully raising a relevant issue in terms of educational authenticity.

The conscious use of AI indeed requires capacities for discernment, emotional regulation, collaboration, empathy, responsibility, and critical awareness; all skills that AI does not possess and cannot teach, but which assume great value in such a complex and unpredictable digital environment. According to analyses by the OECD (2021) and CASEL (2022), which investigate key competencies for learning in the 21st century, AI amplifies the importance of socio-emotional skills in educational systems.

These observations directly dialogue with current considerations in special pedagogy (Borsini & Giaconi, 2025), which highlight the urgency of guaranteeing the primacy of the human being over the tools and technological environments they create (Besio, Pinnelli & Sibilio, 2025). This principle directs education toward the protection of embodiment, presence, and relationship, particularly in contexts where technology tends to simulate forms of communication and interaction that, however, do not possess any affective or experiential depth of embodied educational relationships.

It is in this scenario that our research is situated, aiming, through an initial analysis, to investigate the perceptions, experiences, competencies, and attitudes of teachers and future teachers regarding the knowledge and use of artificial intelligence in educational contexts.

Research design and methodology

The research undertaken can be classified as an exploratory and descriptive cross-sectional study, aimed at investigating teachers' perceptions and attitudes in relation to artificial intelligence in the educational context, with the objective of defining the imminent educational urgencies, paying particular attention to the transformations perceived in their teaching role and in students' learning modalities.

It is configured as a mixed-methods design of the convergent type – *concurrent triangulation design* – (Creswell & Plano Clark, 2011) in which quantitative data (closed-ended items on a five-point Likert scale) and qualitative data (open-ended responses) were collected simultaneously through two questionnaires, analyzed in parallel, and subsequently integrated to obtain a more complete and articulated understanding of teachers' perceptions of artificial intelligence (Trinchero, R., Robasto, D., 2019; Ponce, 2015).

The data were collected through the administration, carried out using the Google Forms tool, of two anonymous semi-structured interviews, each structured with a combination of closed and open questions aimed at analyzing teachers' use of AI tools in personal and professional life contexts. In particular, the closed-ended questions were designed to collect standardized and comparable information, allowing for descriptive statistical analysis and an exploration of possible correlations between variables through a five-point Likert scale in which a score of 1 indicates "strongly disagree" and a score of 5 "strongly agree." The open-ended questions, instead, made it possible to explore themes, perceptions, and personal considerations, offering the opportunity to deepen and contextualize participants' responses.

Sample

The reference sample consists of 88 teachers who, in the academic year 2024-2025, are enrolled in the Specialization Course for Teaching Support for Students with Disabilities at Suor Orsola Benincasa University.

Data collection

The first part of the first questionnaire, which was completed by 76 teachers (12 people did not respond to this first survey), is dedicated to collecting demographic and socio-demographic information, with the aim of defining the profile of the participants and adequately describing the reference sample, while the second part of the first questionnaire is aimed at analysing the detection of teachers' perceived digital competences and their use, both in personal and professional contexts.

The second questionnaire, which was completed by 88 teachers and also divided into two sections, included a first part in which participants were asked to reflect on their relationship with artificial intelligence tools and on the interaction dynamics that involve them in everyday life, and a second part that aimed to explore in a targeted way the perception and attitudes of teachers and future teachers toward Artificial Intelligence in the professional context. The instrument is composed mainly of closed-ended questions on a 1 to 5 Likert scale – where a score of 1 indicates "strongly disagree" and a score of 5 indicates "strongly agree" – integrated with open-ended questions that allow participants to express personal experiences, doubts, and expectations.

Quantitative data obtained from the closed-ended questions were analyzed using descriptive statistics. The score 1 (strongly disagree) and score 2 (disagree) were summed, and score 4 (agree) and score 5 (strongly agree) were summed. It was not possible to apply inferential analyses aimed at exploring differences or associations between variables because the data were collected only at baseline and were aggregated by categories and not paired individually.

Qualitative data derived from the open-ended questions were instead explored through a thematic category-based analysis.

Results

From the data collected in the first part of the *first questionnaire*, regarding personal and socio-demographic information, the following insights emerge: overall, the sample is predominantly composed of professionals or future professionals in the educational and school sector, with a strong territorial concentration and a mature age profile. Specifically: The sample that took part in the first survey consists of 76 respondents. The average age recorded is 46.7 years (Chart 1).

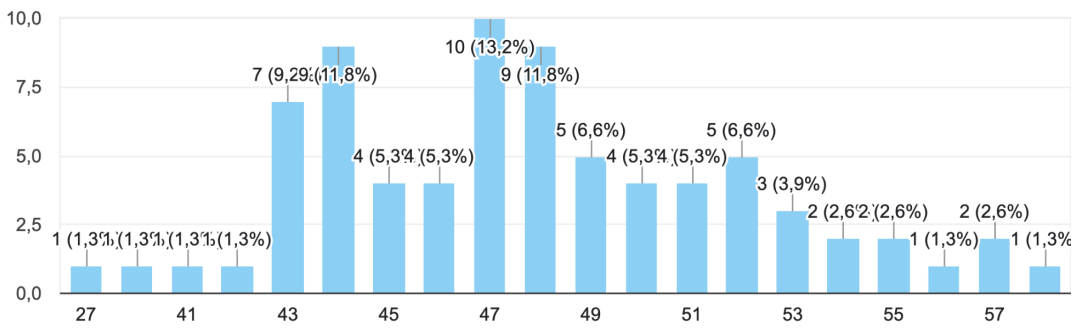

Chart 1
The gender distribution shows a strong female predominance: 98.7% of the sample is composed of women, while only 1.3% are men (Chart 2).

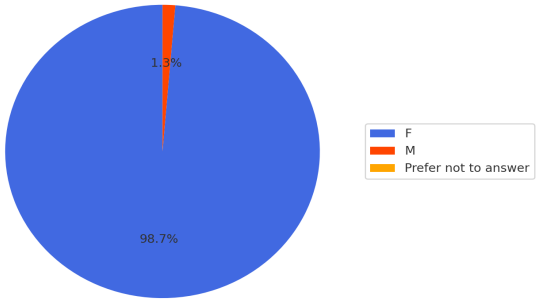

Chart 2
Regarding geographical origin, the distribution indicates a sample that is highly concentrated in the Campania region. The majority of participants reside in Campania (93%), while small percentages come from Calabria, Lazio, and Emilia Romagna (Chart 3).

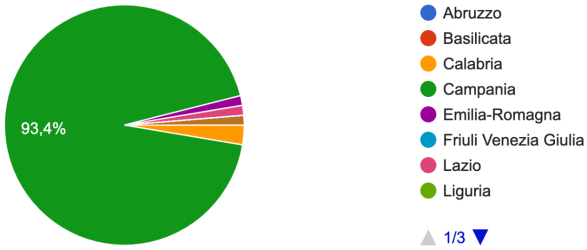

Chart 3
Subsequently, the questionnaire continues with sections dedicated to assessing perceived digital skills, the use of educational technologies, and opinions regarding the introduction of artificial intelligence in academic contexts. These sections are also primarily based on five-point Likert scales or closed multiple-choice questions.

1) Skills and attitudes toward digital technologies

In the second part of the *first questionnaire*, aimed at analyzing the assessment of teachers' perceived digital skills and their use of technology in both personal and professional contexts, participants were asked to answer the question: *"Overall, how do you evaluate your computer skills?"* They were instructed to assign a score from 1 to 5, where 1 indicates 'poor' skills, 2 'fair' skills, 3 'adequate' skills, 4 'good' skills, and 5 'excellent' skills (Chart 4).

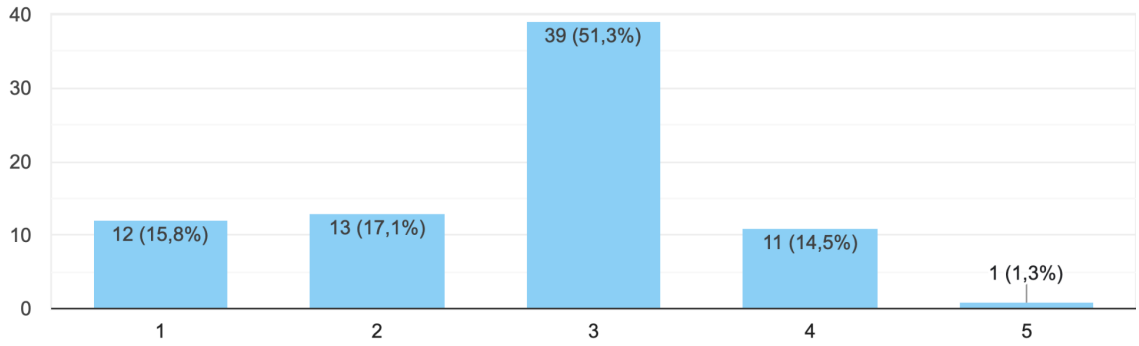

Chart 4

The results show that more than half of the sample (51.3%) perceive their computer skills as adequate, while 17.1% describe them as fair and 15.8% as poor. A smaller proportion consider their skills to be good (14.5%) or excellent (1.3%). Overall, the findings reveal a predominantly intermediate perception of digital preparedness, with only a minority identifying themselves as having high levels of competence.

In response to the prompt: *"I am interested in actively keeping myself informed about new technologies and trends in the IT sector"* (Chart 5).

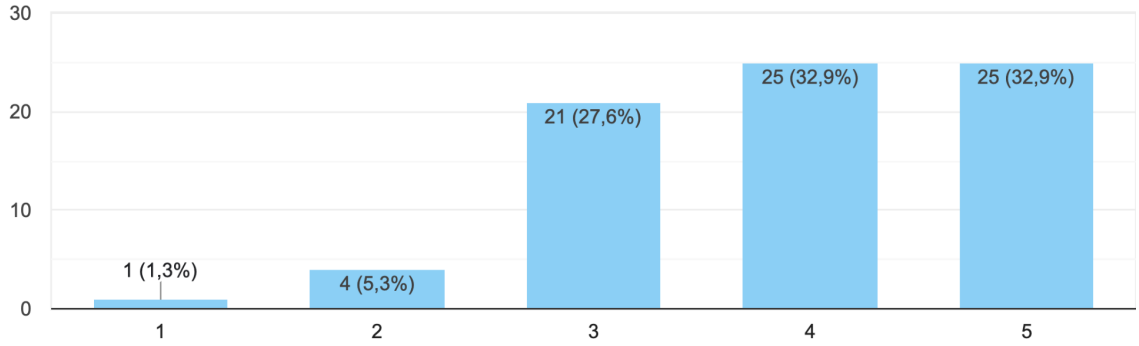

Chart 5

The results show a generally positive attitude, represented by 65.8% of the sample. 27.6% fall at an intermediate level, and only 6.6% express little or no interest. This indicates that, even with perceived skills that are not high, the sample reports strong motivation for updating their knowledge.

Regarding the statement: *"I enjoy actively experimenting with new technologies"* (Chart 6)

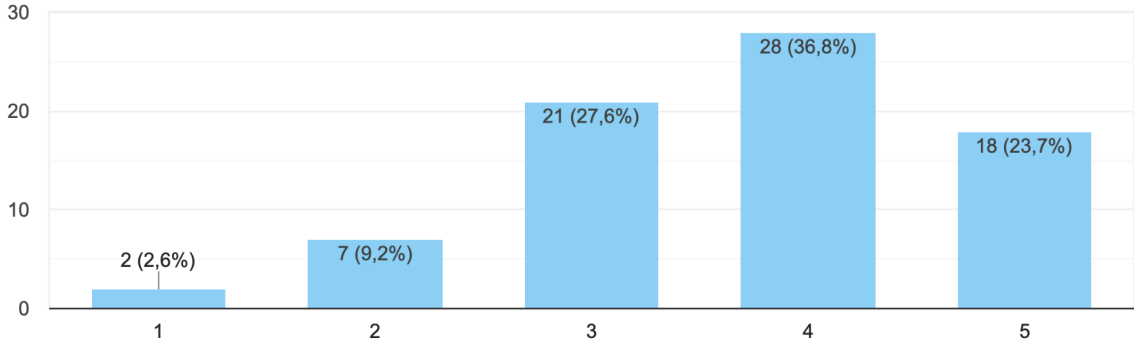

Chart 6
60.5% of the sample indicate a positive rating. An additional 27.6% position themselves at an intermediate level. Only 11.8% express disagreement. The data highlight a good inclination toward experimentation, suggesting openness and curiosity toward technologies.

Regarding the statement: *"I have a good technical knowledge of computers and digital devices"* (Chart 7).

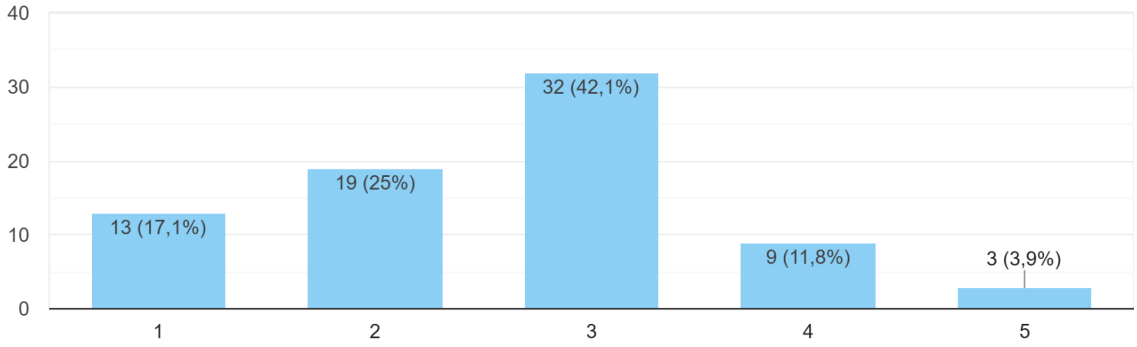

Chart 7
Participants' responses indicate technical knowledge considered very low (42.1%) and adequate or moderate (42.1%). Only a minority report very high level (15.7%). Overall, the perception reflects a functional basic digital literacy, but not a specialized one.

2) Use of digital devices

To the question: *"Which digital devices do you use regularly? (You can select multiple answers)"* (Chart 8).

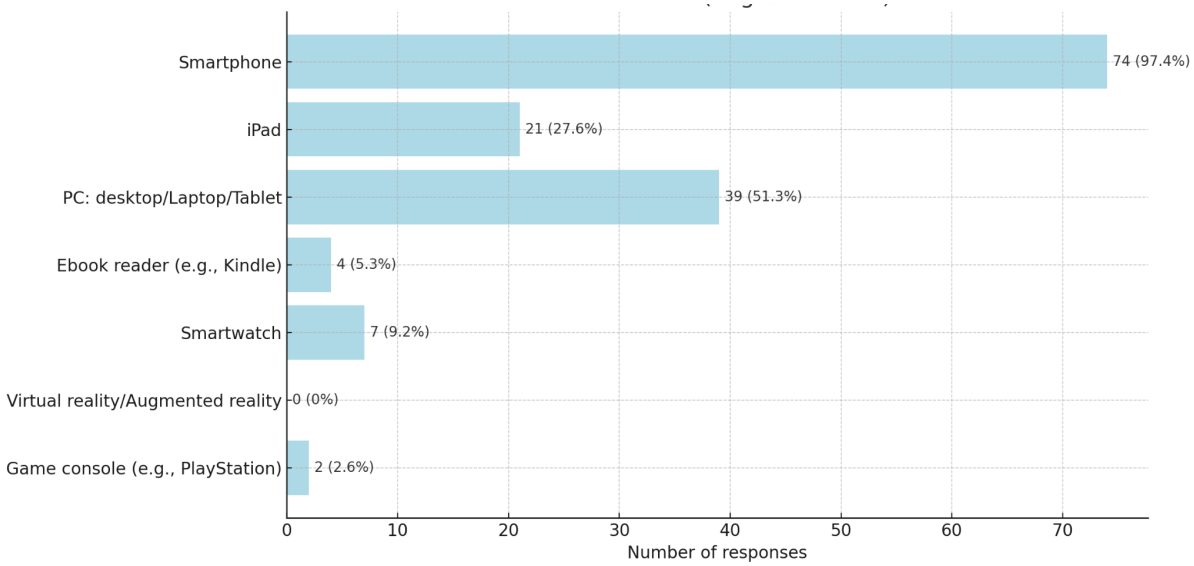

Chart 8

The results show that the smartphone is the most used device (30.7% of selections), followed by the laptop (26.1%), the tablet/iPad (12.4%), and the desktop PC (10.5%). Devices such as smartwatches (4.6%) and e-book readers (2.6%) are less common. Overall, the use of personal and mobile devices prevails.

Regarding the statement: *"I am familiar with the following IT concepts (You can select multiple answers)" (Chart 9).*

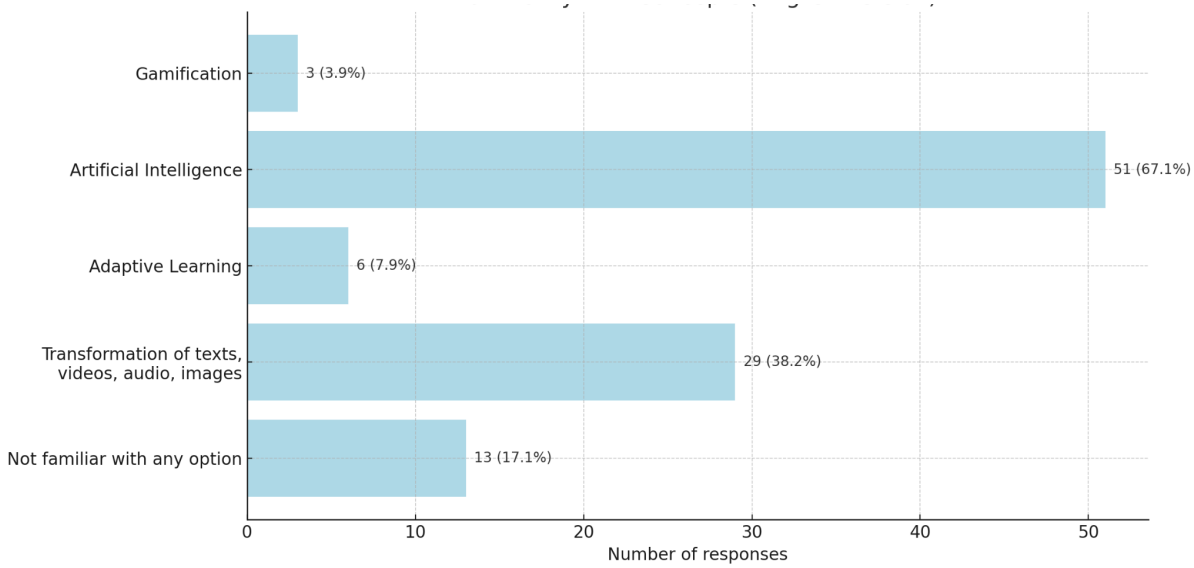

Chart 9
Participants show greater familiarity with concepts that are more widespread and present in the media. In particular, Artificial Intelligence is the most recognized term (25.9% of selections). Following, with similar percentages (15.3% each), are concepts related to the transformation of videos, sounds, and images, probably because they are more commonly used in daily life. Knowledge of text transformation is more limited (10.1%), while more specialized concepts such as adaptive learning (2.6%) and gamification (1.6%) are less known. A total of 6.9% report not being familiar with any of the proposed concepts.

To the question: *"Before this questionnaire, had you ever heard of AI in education?"* (Chart 10)

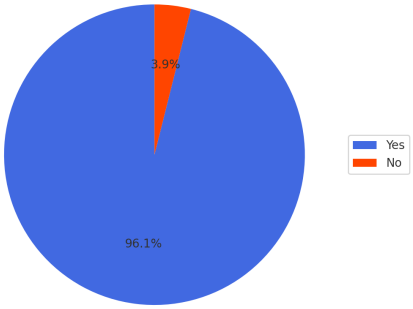

Chart 10
Almost all participants report having already heard about Artificial Intelligence applied to education: 96.1% answered 'Yes,' while only 3.9% stated they had never heard of it.
Participants were then asked to specify the sources from which they had learned about AI. Most participants became acquainted with Artificial Intelligence through informal channels, particularly via *friends/family/acquaintances* (60.5%) and *social media* (51.3%), which were the most cited sources. Traditional media (newspapers and magazines – 43.4%) follow, while more structured sources such as university lectures (27.6%), workplace training (19.7%), and specific courses (5.3%) were reported less frequently.
The *second administered questionnaire*, divided into two sections, included a first part in which participants were asked to reflect on their relationship with artificial intelligence tools and the interaction dynamics involving them in everyday life (where predominantly neutral data emerged) and in their professional life (where particularly significant data emerged). For each statement, participants were asked to indicate their level of agreement using a 5-point Likert scale, where 1 corresponds to 'strongly disagree' and 5 to 'strongly agree.'
The second section of the questionnaire, on the other hand, explores how participants perceive artificial intelligence within their professional practice. In particular:
To the question *"I believe that the introduction of AI in school contexts requires new professional skills for teachers",* 27.3% of participants expressed disagreement, 19.3% remained neutral, and 53.5% expressed agreement, suggesting that a significant portion recognizes the urgency of acquiring new skills.

Participants were then asked to indicate, in order of importance, three skills they considered most urgent. These responses were grouped into the following *main thematic areas* (Table 1):

Thematic area	Urgent skills reported by participants
Digital and technological skills	Digital competence, IT skills, technological skills, conscious use of digital tools and AI, design of safe digital environments, management of technological tools.
Teaching and pedagogical skills	Adapting lessons to students' needs, co-designing inclusive activities, teaching responsible and critical use of AI, pedagogical and methodological skills, continuous updating on educational technologies.
Relational and socio-emotional skills	Empathy, emotional intelligence, communication and relational skills, supporting and welcoming students, nurturing human relationships in the classroom, managing group dynamics.
Cognitive and transversal skills	Critical thinking, problem solving, creativity, discernment, reflection, patience and collaboration, digital and multimedia literacy.
Linguistic skills	Knowledge of foreign languages, communication skills, ability to explain to students the risks and proper use of AI.
Organizational and methodological skills	Organization, lesson planning, selection and adaptation of digital tools to educational objectives, time and resource management.

Table 1

To the question *"Do you think AI is changing the way students learn?"* 79.5% of participants expressed agreement, while 10.2% respectively took neutral or disagreeing positions, indicating widespread recognition of AI's impact on learning. The emerging benefits and risks can be grouped into the following themes (Table 2):

	Theme	Motivation
Benefits	**Efficiency and immediacy**	Rapid access to information and answers, faster studying, personalization of learning based on the student's style.
	Benefits – if AI is used correctly	Possibility of personalized support, expansion of cognitive horizons, and stimulation of curiosity if AI is integrated with informed teaching strategies.
Risks	**Cognitive and creative limitations**	Risk of reduced critical thinking, creativity, and motivation, decreased engagement in research and study, and dependence on AI-generated answers.
	Relational and social impact	Reduction in interaction with classmates and teachers, decreased interpersonal communication, and reduced collaborative work.

Table 2
To the question *"I believe that AI requires paying new attention to communicative and relational dynamics in the classroom"*, the majority of participants fully agreed (43.2%), 33% remained neutral, and a minority disagreed (23.9%). Participants were then asked to justify their responses, which were grouped into main thematic areas. The emerging benefits and risks can be categorized into the following themes (Table 3):

	Theme	Examples of responses
Between benefits and risks	**Change in educational dynamics**	"Yes, because the educational system has changed," "Students often ask AI and no longer their teachers," "It changes the way young people learn and interact."

Between benefits and risks	**Need for teacher guidance and mediation**	"The teacher must guide the correct use of this dynamic," "The teacher must give appropriate indications for using digital tools properly," "It requires self-criticism and new communicative skills."
Benefits	**Opportunity for enrichment**	"It allows students to engage in more argumentation," "It improves access to information and personalizes learning," "It introduces new ways of interacting and using digital tools."
Risks	**Risks for relationships and communicative skills**	"It can cause a regression in the ability to communicate with others," "It does not offer authentic relationships," "It distances young people and undermines the social dimension of the classroom group."

Table 3

To the question *"I believe that AI requires teachers to develop new socio-emotional and relational skills"* 50% of participants agreed, 32.9% disagreed, and 17% remained neutral. For the question, 'I believe that AI requires teachers to develop new digital and technological skills,' responses show a clear prevalence of agreement: 68.2% of participants agreed, 15.9% indicated a neutral position, and 16% disagreed. These results confirm the widespread perception of the need for technological upskilling.

To the statement "I believe it is possible to maintain an authentic educational relationship in a school context that uses AI" responses show a varied distribution: 39.8% disagreed, 27.3% were neutral, and 32.9% agreed. Open-ended responses highlight different perspectives, which can be grouped into thematic areas. The emerging benefits and risks can be categorized into the following themes (Table 4):

	Theme	**Examples of responses**
	Mindful use as support	"It is possible to create human relationships through intelligent use of technological tools," "AI can support

Benefits		teaching without replacing human contact," "It depends on how and to what extent AI is used."
Risks	**Limits to authentic relationships**	"There is no authenticity," "AI cannot replace the educational relationship," "It does not allow interpersonal relationships."
Between benefits and risks	**Central role of the teacher**	"Authenticity depends on how the teacher uses them," "The teacher must guide their use and keep the focus on students' needs," "The educational relationship remains a human process based on trust, listening, and presence."
Between benefits and risks	**Balance between technology and human interaction**	"It depends on dosage and awareness," "Use it as support without replacing human relationships," "It can be an enrichment, not a nullification of the educational relationship."

Table 4

To the question *"Can artificial intelligence help diversify teaching strategies?"* responses show that 31.8% of the sample agreed, 44.3% were neutral, and 23.9% disagreed. Open-ended responses highlight four main thematic areas. The emerging benefits and risks can be grouped into the following themes (Table 5):

	Theme	**Examples of responses**
Benefits	**Support for diversification**	"It makes it possible to offer different materials and adapt levels of difficulty," "It is possible to create different and simplified methodologies," "It makes teaching more flexible, personalized, and inclusive."

	Inclusion and personalization	"It supports personalized pathways," "It can adapt content to students' different levels," "It can suggest activities tailored to each child."
Risks	**Limits and role of the teacher**	"Do not let it condition teaching," "I am the one who decides the strategies, AI only offers a suggestion," "It depends on the context and on how it is used."
	Risk of replacing the teacher's competence	"AI cannot create empathetic relationships with students," "It does not replace field experience," "It is only a support; the strategy comes from the teacher."

Table 5

To the question *"Does artificial intelligence help students learn according to their own cognitive style?"* the response distribution appears more polarized compared to other items. Positions of strong disagreement are substantial: 48.8% of teachers stated they disagreed, indicating that nearly half of the sample believes AI is not truly capable of adapting to students' different cognitive styles. A proportion of 23.9% remained neutral, signaling some uncertainty or still limited experience with AI-based adaptive tools. On the other hand, 27.3% agreed. These data suggest that, although part of the sample recognizes the potential of AI as a support for personalized learning pathways, a critical or cautious perception still prevails regarding the technology's ability to understand and respect students' cognitive peculiarities.

Regarding the administration of open-ended questions, aimed at obtaining predominantly qualitative results, in response to the question about aspects of AI in *which teachers feel less prepared*, participants mainly indicated areas related to practical use, technical knowledge, integration with existing digital tools, and the creation of personalized content. Some teachers reported difficulties in formulating correct prompts, fully understanding how the systems work, and leveraging AI's potential in inclusive contexts. A few teachers, on the other hand, stated that they had no need for further training, as they already considered themselves sufficiently prepared. Overall, the analysis of the results reveals a widespread need for training and support to use AI safely, effectively, and consciously within educational contexts.

Teachers were then asked *about their concerns regarding the use of AI in teaching*.

From this question, concerns emerged regarding the risks of dependency and the flattening of students' creative thinking, the possible replacement of human contact and the teacher-student relationship, the reduction of active student participation, and the reliability of generated information. Some teachers fear that excessive use could reduce students' motivation and impoverish learning, while others recognize the potential of AI if integrated and guided by the teacher. These concerns focus primarily on the loss of creativity, the reduction of the educational relationship, and the risk of homogenizing learning processes (Table 6).

Area of concern	Examples of responses
Technological dependence	"I fear that AI may lead to an excessive dependence on technology at school," "Continuous use."
Reduction of creativity and critical thinking	"Lack of creativity," "Losing the value of the teacher–student relationship," "Lateral thinking is lost."
Loss of relationships and human interaction	"That it completely replaces human relationships," "A limitation in peer communication," "There will no longer be direct interactions."
Reliability and quality of content	"Risk of incorrect or incomplete information," "Possible errors or incorrect information from AI."
Fear of improper or complex applications	"Simple and fast use," "Fear that it may generate activities and content that are difficult to manage and not coherent with the planning," "That it may get out of hand if poorly managed."

Table 6

On the other hand, in response to the question *"What excites you about the use of AI in teaching?"* participants expressed enthusiasm, highlighting curiosity, interest in new tools, the possibility of generating more engaging content, and the opportunity to receive quick and accurate responses. Some teachers emphasized the chance to use AI to design more detailed and organized activities, experiment with alternative teaching approaches, and support students' educational needs (Table 7).

Area of concern	Description	Examples of Responses
Support for teaching	AI is seen as a useful tool to help the teacher in organizing the lesson, finding information, or proposing activities.	"It can help me," "They only allow support," "It can happen, it has happened to me," "It can help me obtain additional information," "It can process test results, students' responses, participation in digital activities."
Stimulus for creativity and new perspectives	AI suggests innovative ideas and different perspectives without replacing the teacher's creativity.	"It can be a source of new ideas," "Yes, because it can offer me something I don't know," "It stimulates my ideas," "It does not replace human creativity but simplifies and stimulates it," "It can certainly provide me with food for thought," "Simulations and complex scenarios."
Personal and professional learning	AI makes it possible to explore new concepts, acquire information quickly, and broaden knowledge.	"Everything is gained through experience," "Yes, because one never stops learning," "Yes, because it analyzes a great deal of information in a short time and helps to see problems and solutions from different perspectives," "It opened up a world I didn't fully know."
Perceived limitations and critical issues	Some teachers highlight limitations of AI, such as its inability to replace human contact, adapt to complex contexts, or generate truly unique insights.	"I believe instead that it limits my perspectives," "I don't think AI can offer me that," "The teacher's critical oversight is always necessary," "If used continuously, I believe it may lead to a reduction in collective creativity."

Need for training and technical knowledge	Need to further explore the proper use of AI, operational methods, and its educational potential	"I would like to deepen my knowledge in various areas", "Technical knowledge", "In practical use", "Not much", "Technical understanding of the tools", "I still lack confidence in the technical aspects of AI and would like to better understand how to correctly apply it in preschool education".
Inclusion and personalization	AI can support the design of inclusive or personalized activities based on students' needs	"It offers perspectives on teaching and activities for students with difficulties", "Yes, because it can help me learn something I don't know", "Considering AI can also broaden perspectives".

Table 7
Overall, the quantitative and qualitative data suggest that teachers primarily perceive AI as a tool for support and enrichment, capable of providing information, stimuli, and new perspectives, but always within a framework in which educational responsibility and the central role of the teacher remain essential. The need for training, critical awareness, and thoughtful integration of the technology emerges as a key element for the effective use of AI in teaching.

Discussion

The results emerging from the two semi-structured questionnaires administered to teachers offer a complex and ambivalent picture of teachers' and prospective teachers' perceptions, experiences, and competences regarding the knowledge and use of artificial intelligence in educational contexts. Although almost the entire sample reports having already heard about AI in education, the data show a predominantly superficial and unstructured understanding, characterized by the prevalence of informal sources (social networks, friends, social media) over forms of professional or academic learning. This discrepancy between broad exposure and limited knowledge translates into unstable representations, often polarized between overly optimistic expectations about AI's transformative potential and fears concerning the risks of technological dependency, loss of relational authenticity, or weakening of cognitive skills.

The high percentage of participants claiming to know about AI does not correspond to an actual understanding of key concepts. The low familiarity with fundamental notions indicates that many teachers engage with AI without solid technical or pedagogical foundations. This "cognitive asymmetry" between subjective perception of knowledge and objective competence is particularly significant when interpreted through the enactive-interactionist paradigm, which sees knowledge as

emerging from the dynamic relationship with the environment. If AI is therefore perceived in a vague and fragmented way, its educational use can only be discontinuous, intuitive, and not guided by pedagogically meaningful criteria.

The sample of teachers interviewed expresses a positive attitude toward technologies and a good willingness to experiment with new tools. However, this does not correspond to actual operational mastery: self-perceived digital skills are mostly "sufficient," and technical knowledge of AI is modest; consequently, uncertainty emerges regarding how to integrate AI into inclusive educational pathways. This asymmetry between motivation and concrete competence suggests a need for targeted training capable of converting declared interest and openness into pedagogical practices grounded in effective methodologies.

Participants acknowledge that AI is changing students' learning processes and that this transformation requires the acquisition of new professional competences. AI acts as a new socio-technological actant (Latour, 2005), capable of reorganizing educational interaction networks and redefining roles, responsibilities, and professional needs. However, the data analysis reveals mixed feelings: on one hand, teachers perceive opportunities related to personalization, access to content, and instructional flexibility; on the other hand, they fear a loss of agency, relational authenticity, and cognitive quality in teaching-learning processes.

This tension aligns fully with the paradigm of *complexity* (Morin, 1993) and the paradigm of *semplessity* (Sibilio, 2023), which describe educational systems as spaces of ongoing negotiation among constraints, opportunities and adaptation.

The open-ended responses in the questionnaires clearly show that teachers need technical training on the use of AI and a structured training framework that goes beyond basic technical skills.
Teachers request:

- critical literacy, to interrogate AI not only as a tool but also as a cultural artifact with ethical, cognitive, and social implications;
- instructional design competences, to integrate AI into inclusive, meaningful learning scenarios aligned with educational aims;
- socio-emotional competences, considered crucial for managing the relational and communicative transformations brought about by AI in school contexts;
- metacognitive and reflective competences, necessary to critically evaluate AI-generated solutions, discern reliable information, and adapt teaching according to specific contexts.

In this sense, AI also seems to act as a "reflective device," capable of revealing fragilities and ambivalences within contemporary teaching professionalism.

Concerns about the loss of relational authenticity or excessive delegation to algorithmic systems show how AI functions as a catalyst for broader questions about the meaning of educational presence, the centrality of the teacher as an epistemic mediator, and the formative value of human interactions in learning processes.

The data collected suggest that the integration of AI in educational contexts cannot be viewed merely as technological innovation or simple instrumental updating; rather, it requires a deeper redefinition of teachers' professional identity, a reorganization of instructional models, and a rethinking of educational relationships in increasingly hybrid and complex ecosystems. Teachers' requests to develop digital, relational, and metacognitive competences indicate an awareness – albeit still partial and uneven – that the teaching profession must keep pace with the times, continuously update itself, and evolve in order to maintain a central role in a society where artificial intelligence is becoming increasingly pervasive.

Conclusions

The research conducted offers an overview of how a sample of teachers perceives artificial intelligence in terms of both personal and professional use. It highlights how AI has now become an essential component of the educational landscape, while at the same time revealing a school system in transition, in which teachers are still constructing their role and professional identity in the face of rapid technological evolution. What emerges is not so much a clear-cut judgment on AI, but rather a collective need for orientation, understanding, and meaning (Panciroli C., Rivoltella P.C., 2023).

Teachers operate within a rapidly evolving technological environment, yet they still lack a stable framework within which to interpret AI in a fully informed way. The absence of significant socio-emotional data does not represent a limitation of the study; rather, it indicates that teachers do not yet perceive the impact of AI on the affective and relational dimensions of teaching, despite the literature emphasizing the importance of these aspects for the construction of an authentic educational experience (Sibilio, 2023). The data suggest an urgent need for training not only in terms of technical skills, but also in the capacity to critically interpret the role of technology in cognitive, inclusive, and relational processes.

The perception of AI primarily as a tool for efficiency, without full awareness of its ethical and relational implications, confirms what several authors argue regarding the need to develop critical thinking and digital responsibility (Floridi, 2014). Teachers are not called to "compete" with technology; rather, they must renegotiate their role within a complex network of human and non-human interactions (Latour, 2005), maintaining their fundamental centrality within the educational dimension.

Critical issues and future perspectives

The study presents several limitations that must be acknowledged. First, the sample involved is not representative of the entire teaching population: it is geographically concentrated and characterized by high homogeneity in terms of age and professional profile, which limits the generalizability of the results. Moreover, the predominant use of self-report questionnaires exposes the research to distortions typical of self-report methodology (Creswell et al., 2011), such as the overestimation or underestimation of one's competences and beliefs.

Another limitation concerns the absence of broader methodological triangulation: although qualitative analysis is present, it was not complemented by interviews or focus groups that could have enriched the interpretative depth. Finally, AI is a rapidly evolving field, which inevitably renders some results provisional: what currently appears as a lack of competence or awareness may change quickly in relation to the evolution of tools and educational contexts.

Considering these limitations, future research could expand the sample by including teachers from different school levels and geographical areas, to observe possible variations in the perception, knowledge, and use of AI. Another promising area of investigation concerns the socio-emotional aspects of the educational-technological relationship, which did not emerge significantly in this study.

Assessing how AI influences motivation, trust, the educational relationship, or intersubjective dynamics would make it possible to understand more deeply how technology becomes embedded within the embodied and relational processes of learning, in line with embodied and enactive perspectives (Varela, Thompson & Rosch, 1991).

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