BETWEEN ENTHUSIASM AND RESISTANCE: PERCEPTIONS OF AI IN TEACHER EDUCATION

TRA ENTUSIASMO E RESISTENZA: PERCEZIONI DELL'IA NELLA FORMAZIONE INSEGNANTI

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ABSTRACT
This contribution explores pre-service teachers' perceptions of AI, analyzing the factors (familiarity, limitations, ethical concerns) that influence its acceptance and use. The study adopts a convergent mixed-methods research design. The results highlight both enthusiasm and uncertainty, underscoring the need for critical reflection on the human-AI relationship and on ethical and inclusive models – such as UDL – to enhance the integrative (and non-substitutive) function of AI.

Il contributo esplora le percezioni dei futuri insegnanti sull'IA, analizzando i fattori (familiarità, limiti, questioni etiche) che ne influenzano l'accettazione e l'uso. Lo studio adotta un disegno di ricerca a metodi misti convergente. I risultati evidenziano sia entusiasmo che incertezza, sottolineando la necessità di una riflessione critica sul rapporto uomo-IA e su modelli etici e inclusivi - come l'UDL - a potenziamento della funzione integrativa (e non sostitutiva) dell'IA.

KEYWORDS
Artificial Intelligence, Teacher Education, Educational Ethics, Innovation, Universal Design for Learning
Intelligenza Artificiale, Formazione insegnanti, Etica Educativa, Innovazione, Universal Design for Learning

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1. The Evolution of Artificial Intelligence and Education: Towards New Literacies

Although artificial intelligence was originally defined in 1956 as the "science and engineering of making intelligent machines" (McCarthy, 2007), it has since evolved into a complex ecosystem of machine learning, algorithmic development, and natural language processing, aimed at simulating and enhancing human cognitive abilities (Akgun & Greenhow, 2022; Wang, 2019).

AI is increasingly regarded as a transformative force comparable in scope to the advent of the Internet, poised to revolutionize the world as we know it. Today, AI permeates sectors such as the arts, medicine, business, and education (Ng et al., 2021).

The widespread adoption of "smart" devices, including virtual assistants that aid in daily activities, music or video searches, recipe suggestions, and content recommendations, has led to a scenario where, according to the Childwise Report (2019), one in four children aged 5 to 16 lives with a virtual assistant. Given that AI systems are now integrated into the smartphones and applications we use daily, this percentage is expected to rise.

However, the routine use of intelligent devices does not imply an understanding of the underlying mechanisms, nor of the ethical issues they raise (Ghallab, 2019; Burgsteiner et al., 2016). A strong AI literacy is crucial to avoid two opposite risks: on one hand, uncritical dependence, and on the other, unjustified fear.

Recent studies show that early exposure to AI learning fosters self-efficacy and persistence in academic pursuits (Song et al., 2023), while also preparing young people for future roles as AI designers and developers (Kim et al., 2023). Conversely, a lack of AI literacy not only prevents individuals from becoming AI designers (Ghallab, 2019; Burgsteiner et al., 2016) but also promotes misconceptions (such as viewing AI as a technological panacea) (Cave et al., 2019) and exacerbates excessive fears, ultimately reducing interest in AI-related professions (Bewersdorff et al., 2023).

2. Teacher Training in AI: Between Trust and Familiarity

The integration of artificial intelligence (AI) into the contemporary educational system raises fundamental questions about the role of teachers and the need for targeted and continuous professional development. AI promises to revolutionize teaching through tools capable of personalizing learning, optimizing assessment processes, and supporting classroom management (Holmes & Tuomi, 2022; Perla

& Vinci, 2024). However, its effectiveness crucially depends on the preparation of the teaching staff, not only in terms of technical skills but also regarding attitudes, professional beliefs, and trust in technology.

Recent studies (Perla, Agrati & Beri, 2025; Chounta et al., 2022) show that prior familiarity with digital tools is an important predictive factor for the adoption of AI: teachers already exposed to educational technologies are more inclined to experiment with new solutions and less intimidated by the complexity of intelligent systems. This familiarity, combined with the perceived usefulness and ease of use of technology, fits into well-established theoretical models of technology adoption, which emphasize the mediating role of self-efficacy between innovation and teaching practice.

Alongside these aspects, ethical issues related to the use of AI are also gaining prominence. As highlighted by Touretzky and Gardner-McCune (2022) and further addressed by the recent recommendations of the European Commission (2024/1689), attention must be paid to student privacy, algorithmic transparency, and the risk of discriminatory bias, particularly regarding facial recognition systems and automated assessment. These concerns underscore the need for training that is not exclusively technical but also includes a solid literacy in AI principles, a reflective approach to its educational use, and a critical awareness of the ethical and social implications it entails.

As Perla and colleagues (2024) point out, only a well-prepared and critically aware teacher can use AI effectively and transformatively, fully exploiting its potential without neglecting pedagogical and ethical responsibilities.

In this sense, initial and ongoing teacher training must become a strategic device to foster teachers' professional autonomy, cultivate trust in their own abilities, and encourage a pedagogical vision in which AI does not replace but rather amplifies the human dimension of teaching.

Within this transformative perspective lies the challenge of inclusion: to ensure a truly equitable and accessible adoption of AI, it is necessary to reflect on how to design learning environments that proactively respond to the diversity of students.

3. AI and Inclusive Education

The adoption of artificial intelligence (AI) in education cannot be separated from a critical reflection on the value of inclusion, which is now considered one of the most urgent and cross-cutting challenges in global education. Several international initiatives, such as the AI4K12 framework based on the "Five Big Ideas" of AI

(Touretzky et al., 2019) and UNESCO documents (2022), have provided guidance on what should be taught regarding artificial intelligence.

However, as highlighted by Su et al. (2022), Yang (2022), and Gibellini et al. (2023), there remains a lack of clear guidelines on how to teach AI in a way that is equitable, meaningful, and accessible to all students, especially considering the growing heterogeneity of today's classrooms.

In response to this gap, the Universal Design for Learning (UDL) pedagogical framework emerges as a highly valuable theoretical and operational resource. Grounded in the principles of flexibility, accessibility, and the appreciation of individual variability (Basham et al., 2010), UDL rejects the "one-size-fits-all" approach and promotes the design of learning environments that anticipate diverse needs from the outset.

Its three core principles—providing multiple means of representation, expression, and engagement—naturally align with the potential of AI, which, through data analysis and adaptive intelligent systems, can offer personalized learning pathways, real-time feedback, and targeted supports for students with diverse educational needs.

Nevertheless, this synergy demands careful instructional design, fully aware of both the benefits (such as increasing participation and reducing barriers) and the risks, including technological dependency, homogenization of learning experiences, or fears of being "assessed" by automated systems.

In this context, the evolution of the concept of inclusion—from the simple integration of students with disabilities to a broader vision embracing all dimensions of diversity (cultural, linguistic, cognitive, emotional)—places a new social responsibility on education systems.

Designing with AI from an inclusive perspective therefore means embracing a pedagogy oriented towards justice, sustainability, and equity, as advocated by UNESCO's "new social contract for education."

Existing frameworks, such as AI4K12, TPACK, and emerging UDL-based models, provide fertile ground for articulating this vision but require substantial investment in teacher training and educational research.

Only through such efforts can AI truly become a tool at the service of all learners, contributing to the creation of a school environment that welcomes, values, and supports the growth of every student, without exceptions.

4. A Study on Perceptions of AI in Initial Teacher Education: Research Design

This study presents the results of an exploratory research project conducted in 2025, involving 161 students enrolled in the Bachelor's Degree Program in Primary Teacher Education at the University of Foggia.

The primary objective is to investigate the current level of understanding among future teachers regarding the potential and risks associated with the use of AI in education, with the aim of outlining a targeted training pathway that addresses their specific needs.

In particular, the research seeks to identify the types of training required—technical, methodological, critical, and ethical—and the competencies that future teachers will need to develop in order to effectively integrate AI tools into their teaching practices.

The main research questions that this study aims to answer are:

- What is the level of familiarity and perceived preparedness among future teachers regarding the use of digital technologies and artificial intelligence in educational contexts?
- What are the ethical attitudes and perceptions of future teachers towards the role of AI, particularly concerning whether it is viewed as a complementary tool or a potential substitute for the teacher?
- What opportunities, risks, and training needs do future teachers identify for the critical and ethical use of AI in inclusive education (UDL)?

The study adopts a convergent mixed-methods design (Creswell & Plano Clark, 2017), which involves the integrated collection and analysis of both quantitative and qualitative data to comprehensively explore future teachers' perceptions of AI in educational settings.

Data collection was carried out through the administration of CAWI (Computer Assisted Web Interviewing) questionnaires, organized into two phases:

Phase 1: Structured Questionnaire (Quantitative Data) — Participants answered multiple-choice and closed-ended questions (N = 161; response rate: 97.5%), including items using a 5-point Likert scale. This approach enabled the identification of general trends, levels of familiarity, and prevailing attitudes towards AI.

Phase 2: Open-Ended Questions (Qualitative Data) — Participants also responded to open-ended questions (N = 161; response rate: 86.3%) aimed at exploring in depth their opinions, concerns, and perceived training needs regarding the use of AI in inclusive education, framed by the Universal Design for Learning (UDL) approach.

5. Questionnaire Structure

The questionnaire explored future teachers' perceptions of artificial intelligence, investigating three main areas.

The first area concerns familiarity with and perceived preparedness for the use of digital technologies and AI, assessing both the level of comfort in using technological tools and the adequacy of the training received.

The second area examined ethical attitudes and perceptions regarding the role of AI, analyzing participants' willingness to delegate evaluative tasks, their considerations about the undeclared use of AI for motivational purposes, their relationship with AI-generated suggestions, their views on the emotional monitoring of students, and their openness to the partial or total replacement of the teacher by AI systems.

The third area focused on the opportunities, risks, and training needs related to the integration of AI in inclusive education, identifying both the potential of AI to enhance accessibility and personalize learning, and the ethical, pedagogical, and practical challenges it entails, along with the necessity to develop critical and operational competences for the conscious use of emerging technologies.

Objectives	**Purposes**	**Questionnaire Items**	**Type of question**
Inquiry Object 1. Exploring the Level of Familiarity and Perceived Preparedness in the Use of Digital Technologies and AI in Inclusive Education	Exploring the Level of Perceived Preparedness and Familiarity in the Use of Digital Technologies and Artificial Intelligence in Teaching	1 How comfortable do you feel using digital technologies in general? 2 To what extent do you believe your training so far has prepared you to use ICT in teaching? 3 To what extent do you believe your training has prepared you to use artificial intelligence in teaching?	1. Likert Scale Question (1 = Not at all comfortable, 5 = Very comfortable) 2. Likert Scale Question (1 = Not at all prepared, 5 = Very prepared) 3. Likert Scale Question (1 = Not at all prepared, 5 = Very prepared)
Inquiry Object 2. Analyzing Ethical Attitudes and	Investigating whether AI is perceived as a valuable support to the educational	4 If an AI system could automatically correct assignments and write evaluations for you, would you be tempted to delegate the process to it?	4. Multiple Choice Question 5.Multiple Choice Question

Perceptions Regarding the Complementarity or Replacement of the Teacher by AI	relationship or whether concerns arise regarding its potential substitutive role. Exploring future teachers' sensitivity to the ethical implications of using AI for evaluative, motivational, and emotional tasks.	5 If an AI system could generate a perfect motivational speech for students, rich in simulated empathy and encouraging words, would it be ethical to use it without disclosing its artificial nature? 6 If an AI system were capable of anticipating a student's difficulties and suggesting exactly what to say to motivate them, should the teacher follow its suggestions to the letter? 7 If an AI system could monitor students' emotional reactions through a camera and adapt the lesson content in real time, how would you perceive this? 8 If students could attend an entire lesson generated by an AI system and interact with a chatbot instead of a human teacher, do you think they would notice the difference? 9 If an AI system analyzed your teaching methods and suggested improvements based on statistical data, would you accept modifying your teaching style according to its recommendations? 10 If a school decided to replace teachers with AI-generated holograms that replicate their style and voice exactly, what would your reaction be?	6.Multiple Choice Question 7.Multiple Choice Question 8.Multiple Choice Question 9.Multiple Choice Question 10. Multiple Choice Question
Inquiry Object 3. Investigating Opportunities, Risks, and Training Needs	Observing Perceptions of Opportunities and Risks and Analyzing	11 Considering the principles of UDL and an approach to teaching that addresses the diverse needs of students, what do you believe are the main concrete opportunities that AI could offer to make learning more inclusive? Conversely, what	11. Open-ended question

for the Critical and Ethical Use of AI in Inclusive Education (UDL)	Perceived Training Needs for the Critical and Ethical Use of AI in Inclusive Education, in Light of the Principles of Universal Design for Learning (UDL)	are the major risks or significant challenges (pedagogical, ethical, practical) to be considered when using AI for this purpose? 12 Considering your current level of preparation and the challenges discussed, what would you specifically need (knowledge, practical skills, guided experiences, support) during your training pathway to feel capable of using AI critically, ethically, and effectively in support of truly inclusive teaching (UDL)?	12. Open-ended question

Table 1. Research Design: Objectives, Purposes, and Questionnaire Elements

6. Data Analysis and Participants

The data analysis was conducted separately for the quantitative and qualitative components, followed by integration during the interpretative phase in accordance with a methodological triangulation approach.

Quantitative Analysis: Quantitative data, collected through a structured questionnaire, were analyzed using Microsoft Excel to identify general trends, levels of familiarity, and prevailing attitudes through descriptive statistics and inferential tests (such as the χ^2 test of independence).

Qualitative Analysis: The qualitative analysis aimed to explore participants' perceptions regarding the opportunities, risks, and training needs related to the critical and ethical use of AI in inclusive education. Open-ended responses were examined using Qualitative Data Analysis (Creswell, 2013), inspired by Grounded Theory (Charmaz, 2008)—a bottom-up procedure that facilitates understanding of the phenomenon under investigation by uncovering meanings emerging from participants' narratives. Specifically, the coding process followed the typical three-phase structure (an illustrative table is provided):

Open coding – initial categorization of textual data into meaningful units, assigning preliminary labels;

Axial coding – identification of recurring macro-categories emerging from the meaningful units, along with frequency counts;

Selective coding – hierarchical organization of macro-categories to reveal core categories that encapsulate shared meanings and connect identified patterns.

A total of 158 prospective teachers participated in the survey, predominantly female (N = 149; 94.3%) compared to male participants (N = 9; 5.7%). The majority (N = 107; 67.72%) were aged between 19 and 25 years and reported no prior teaching experience (N = 141; 89.2%). A substantial portion of participants (N = 117; 74%) indicated having already used AI-based tools, such as Large Language Model (LLM) chatbots like ChatGPT.

It should be noted that only a selection of questionnaire items is considered in the present study, specifically focusing on areas related to perceived familiarity, ethical attitudes toward AI, and training needs for inclusive AI-integrated teaching. Remaining items will be analyzed in subsequent publications.

7. Results and Discussion: Quantitative Data Analysis

7.1 Perceived Familiarity and Preparedness

Quantitative results indicate a general sense of ease among students in using digital technologies (mean score = 3.96 out of 5). However, this familiarity appears to be more attributable to individual predispositions than to specific training received during their academic program. In fact, participants reported limited preparedness both for using ICT in teaching (mean score = 2.95) and, to an even greater extent, for integrating artificial intelligence into instruction (mean score = 2.89).

7.2 Critical and Value-Based Representations of AI: Quantitative Data Analysis

Participants' critical and value-based representations of AI were examined using items that described hypothetical scenarios. The resulting data revealed complex and, in some cases, polarized views. In general, there was a noticeable caution toward the use of AI in educational settings, often accompanied by ambivalence between enthusiasm for its potential and concern about its perceived risks.

A notable example concerns attitudes toward delegating task grading to AI: 50% of respondents (N = 78) rejected the idea, believing that assessment is an inherently human process, while the remaining 50% were in favor—48% (N = 75) supported AI delegation for repetitive tasks, and an additional 2% (N = 3) cited time-saving as the primary benefit.

Another emerging trend was the willingness to adapt one’s teaching approach to effectively integrate AI suggestions for improved learning outcomes. Specifically, 62.8% of respondents (N = 98) were open to modifying their teaching style based

on AI-generated suggestions, while another 27.5% (N = 43) indicated conditional acceptance, contingent upon proven effectiveness.

Participants were also asked whether a teacher should follow AI-generated motivational prompts designed to anticipate and address student difficulties. A total of 48.7% (N = 76) expressed willingness to do so, provided it genuinely helps the student, while 2.56% (N = 4) trusted the AI based on its access to larger datasets. A further 5.13% (N = 8) would follow such prompts only if the student remained unaware of AI involvement, likely to preserve the integrity of the teacher-student relationship.

This emphasis on human interaction was further confirmed by 43.59% of the sample (N = 68), who disagreed with following AI prompts in such scenarios, stressing the irreplaceable value of direct human interaction in education.

The importance of authentic presence in teaching was also reflected in students' perceptions: when asked whether they would notice if a lesson were entirely generated by AI and mediated by chatbots instead of a human instructor, 67.3% (N = 105) answered affirmatively, reinforcing the perceived value of genuine teacher presence in the learning process.

Another critical area concerned the use of webcams to monitor students' emotional reactions for real-time lesson adaptation by AI. On this issue, 44.23% (N = 69) perceived such a feature as a violation of privacy, while 37.82% (N = 59) viewed it as an opportunity to improve teaching.

Finally, in response to a question regarding AI-generated motivational speeches used without disclosing their artificial origin, 58.33% of respondents (N = 91) considered such use a form of emotional manipulation. This outcome highlights a strong sensitivity to the ethical implications of AI integration in educational processes.

7.3 Complementarity vs. Replacement: Chi-Square Test of Independence (Quantitative Data)

An inferential analysis was conducted to explore whether AI is perceived positively only when framed as complementary to human educational activity. The analysis focused on two specific items: one assessed reactions to the possibility of teachers being replaced by AI tools, while the other measured willingness to accept AI-generated suggestions for teaching improvement.

A chi-square test of independence was applied to determine whether the hypothesis—that rejection of AI as a teacher replacement is rooted in concerns over diminished educational relationships—was supported by the data.

The results revealed a statistically significant relationship ($\chi^2 = 24.69$; $df = 9$; $p < 0.01$) between openness to accepting AI-generated suggestions and rejection of the idea that AI could replace teachers, with participants considering such substitution detrimental to the quality of the educational relationship.

8. Results and Discussion: Qualitative Data Analysis

8.1 Thematic Analysis of Open-Ended Responses

The qualitative analysis of open-ended responses, conducted using Grounded Theory methodology, enabled the exploration of participants' critical and value-based representations of artificial intelligence in inclusive education. The data revealed a complex and, at times, polarized landscape, marked by a tension between enthusiasm for the opportunities offered by AI and caution regarding perceived risks.

Among the most frequently recognized opportunities was AI's capacity to personalize learning—mentioned in 65 instances—by tailoring educational pathways to the specific needs of students. Particularly relevant was also the enhancement of accessibility for students with disabilities, cited in 54 cases, as well as the provision of immediate feedback, noted 24 times, which was seen as beneficial for supporting personalized learning trajectories.

In parallel, participants expressed numerous concerns regarding the risks associated with AI use. The digital divide, referenced in 29 occurrences, was perceived as a potential source of exclusion for students with limited access to technology. Significant concerns were also raised about data privacy and security, with 35 mentions, and the risk of excessive student dependency on technology, highlighted in 38 responses. Furthermore, 18 participants voiced apprehension about the diminishing centrality of the teacher's role, warning against a shift toward automated teaching that could devalue the importance of human educational relationships.

In terms of training needs, participants emphasized the necessity for greater practical integration of AI into teaching practices—cited in 19 instances—calling for concrete and operational training initiatives. The importance of experiential learning, capable of offering hands-on and lab-based activities, emerged in 32 responses. Particular attention was devoted to ethical awareness, mentioned in 35 cases, and to the development of critical thinking skills, which 43 participants identified as essential for engaging thoughtfully with intelligent technologies.

Through axial coding, the emergent concepts were reorganized into four main macro-categories. The first, Skills and Training, consolidates evidence highlighting the urgency of developing operational, reflective, and ethical competencies for conscious AI integration in education. The second, Risks, encompasses both technical aspects—such as algorithmic bias and privacy violations—and pedagogical concerns, including learning path standardization and potential marginalization of the teacher's role. The third macro-category, Training Needs, outlines the demand for blended theoretical-practical learning paths that foster critical management of technologies. Lastly, the fourth category, Inclusion, highlights AI's potential to enhance personalized learning and remove barriers for students with specific educational needs.

8.2 Core Category: Toward a Hybrid Educational Relationship (Selective Coding)

The core category that emerged from the selective coding phase is "Beyond the Binary: The Hybrid Educational Relationship." This category conceptualizes the integration of AI in the classroom as a transformation of the teaching interaction into a hybrid educational relationship—one in which human, technological, ethical, and pedagogical dimensions coexist and interrelate. In this scenario, the role of the teacher shifts from that of a mere content transmitter to an active builder of meaningful connections among students, knowledge, intelligent technologies, and the broader educational context. Alongside the role of curriculum maker, the teacher also assumes that of a critical negotiator of AI's pedagogical involvement.
The category "Beyond the Binary" encapsulates this transition: AI does not replace the teacher but interacts with them, and educational relationships are grounded in conscious, intentional, and inclusive hybridizations.

Open Coding	Axial Coding
Critical Thinking (43)	Skills and Training
Ethical Awareness (35)	
Experiential Learning (32)	
Integration of AI into Teaching Practices (19)	
Theoretical Insight (13)	
Practical Skills (25)	
Learning Standardization (2)	Risks
Cognitive Overload (6)	
Erosion of the Teaching Role (18)	
Student Dependency on Technology (38)	
Algorithmic Bias (20)	

Digital Divide (29)	
Data Privacy and Security (35)	
Lack of Teacher Training (13)	Training Needs
Teacher Support (16)	
Student Autonomy through Feedback (24)	Inclusion
Personalized Learning (65)	
Accessibility for Students with Disabilities (54)	
Multimodal Content (15)	
Educational Games and Interactivity (12)	

Table 2. Axial Coding of Qualitative Data Based on Open Coding Categories with Frequency Counts

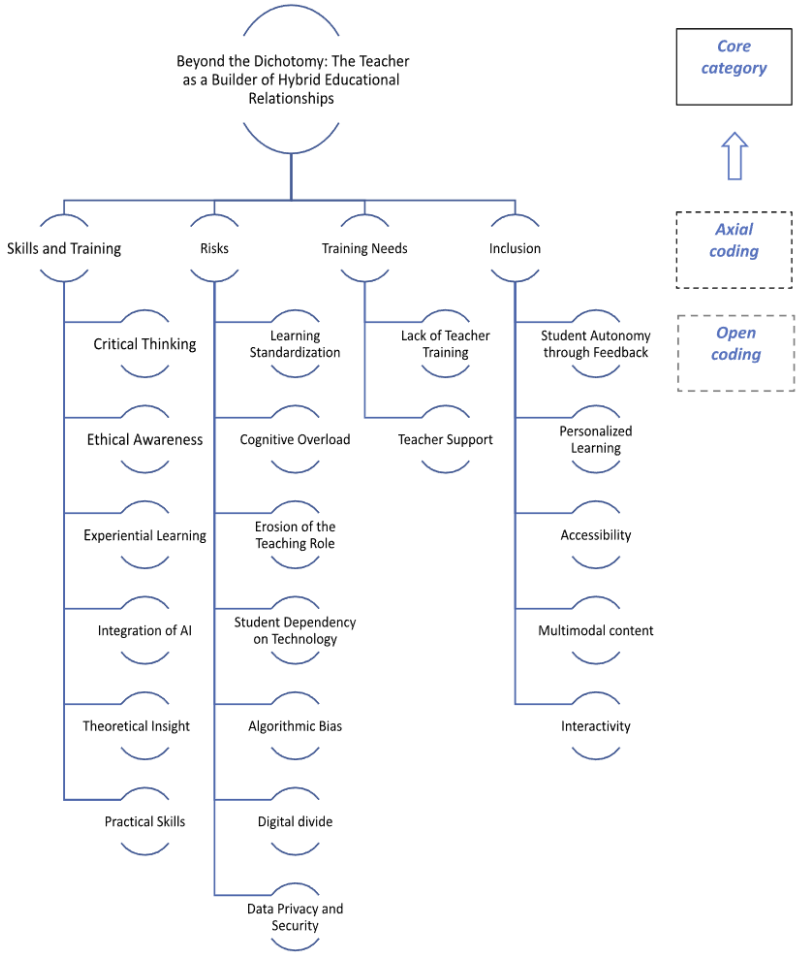

Figure 1. Hierarchical Structure of Core, Axial, and Open Coding Categories

9. Beyond the Dichotomy: The Teacher as a Builder of Hybrid Educational Relationships

The exploratory study conducted at the University of Foggia provided a multifaceted picture of perceptions, familiarity, and training needs related to the use of artificial intelligence (AI) in inclusive education. The research, based on a convergent mixed-methods design, combined quantitative and qualitative data to develop a deeper understanding of the phenomenon.

The data collected show that future teachers generally feel comfortable using digital technologies (average score of 3.96 out of 5), though they reveal a significant gap in training both in the use of ICTs more broadly (average score 2.95) and in the application of AI in teaching (average score 2.89). This discrepancy highlights the need to rethink teacher education pathways to incorporate not only technical skills but also critical and ethical competencies aimed at fostering responsible and informed use of AI.

Analysis of items related to ethical attitudes revealed a noteworthy ambivalence: while a substantial portion of the sample expressed openness to integrating AI as a tool to support teaching (e.g., 62.8% would be willing to accept AI-generated suggestions to improve their teaching methods, provided the suggestions are valid), there was strong resistance to the idea of replacing human educational relationships with AI-mediated interactions. In response to the question of whether they could recognize a difference between a lesson taught by a human teacher and one entirely conducted by AI, 67.3% of students answered “yes, immediately,” emphasizing how irreplaceable the human connection is perceived to be.

Furthermore, qualitative analysis of open-ended responses identified three main macro-categories: enthusiasm for the use of AI in promoting inclusivity, critical and ethical concerns about potential misuses of technology, and specific training needs for effectively hybridizing AI within educational practice. Data triangulation confirmed that AI is predominantly accepted in a logic of complementarity and personalization. This was also supported by the results of the χ^2 test ($\chi^2 = 24.69$; $df = 9$; $p < 0.01$), which revealed a significant association between the acceptance of AI tools and the rejection of the idea of replacing the teacher.

The study’s findings emphasize that the use of artificial intelligence in school education must be approached critically and reflectively, preserving the centrality of the educational relationship and positioning AI as a means of enhancing teaching practices—particularly for inclusion—rather than as a substitute for teachers.

More specifically, the results show that future teachers recognize the potential of AI in supporting educational processes, while reaffirming the primacy of

interpersonal relationships and empathetic communication as essential components of teaching and learning. Consistent with findings in the literature (Holmes et al., 2022; Luckin, 2018), the data suggest that integrating AI does not imply replacing the educational relationship, but rather redefines its nature, reorganizing roles and forms of interaction within hybrid learning environments.

The analysis confirms that technological familiarity and perceived usefulness (Chounta et al., 2022) are significant predictors of positive attitudes toward AI adoption. However, concerns remain regarding algorithmic transparency, data protection, and the risk of discriminatory biases (European Commission, 2024/1689; Touretzky & Gardner-McCune, 2022), which act as moderating variables in the propensity to integrate AI into educational practices.

In this scenario, the teacher's role is redefined as a designer of hybrid educational environments, capable of integrating human and artificial elements within pedagogical frameworks oriented toward inclusivity and ethical responsibility (Rose & Meyer, 2002; Basham et al., 2010; UNESCO, 2022). The adoption of Universal Design for Learning (UDL) principles emerges as a priority strategy to ensure that the use of AI does not exacerbate educational inequalities but instead supports teaching practices that effectively address student diversity.

Overall, the evidence gathered underscores the need for initial and ongoing teacher training programs to promote robust AI literacy—extending beyond technical skills to include a critical understanding of its ethical and social implications (Williamson & Eynon, 2020; Perla, Agrati & Beri, 2025). Further longitudinal research is recommended to analyze the evolution of AI acceptance over time and assess the effectiveness of specific training interventions, with the goal of better understanding how professional identities are transforming in educational ecosystems increasingly shaped by technological integration.

Author contributions

The contribution represents the result of a collaborative effort by the authors. Specifically, Viviana Vinci is the author of the paragraphs 2, 4, 5, 8, 9; Pierangelo Berardi is the author of the paragraphs 1, 3, 6, 7. Both authors made contributions to the article and have reviewed and approved the submitted version.

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