# INTELLIGENZA GENERATIVA: UNA POSSIBILE RIDEFINIZIONE DELL'INSEGNAMENTO E DELLA VALUTAZIONE FORMATIVA. UN'INDAGINE TRA I DOCENTI IN FORMAZIONE

# GENERATIVE INTELLIGENCE: A POSSIBLE REDEFINITION OF TEACHING AND FORMATIVE ASSESSMENT. A SURVEY AMONG TEACHER TRAINEES

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**ABSTRACT**

AI is transforming education, but adoption remains uneven. Among teachers (INDIRE, 2025), 52.4% use AI for language simulations and automated tests, while 14% reject it. A study of 293 teachers in Abruzzo reveals a preference for active methods, with limited advanced AI use. Strong correlations exist between role-playing/automated assessment (Rho=0.718) and problem-solving/adaptivequizzes (Rho=0.635). Learning outcomes depend on this integration, but training gaps and lack of guidelines persist.

L'IA sta trasformando l'istruzione, ma la sua adozione è disomogenea. Tra i docenti (INDIRE, 2025), il 52,4% utilizza l'IA per simulazioni linguistiche e test automatizzati, mentre il 14% la rifiuta. Uno studio su 293 insegnanti in Abruzzo, rivela una preferenza per metodi attivi, con un uso limitato di IA avanzata. Si osservano forti correlazioni: role-playing/valutazione automatizzata (Rho=0,718) e problem-solving/quiz adattivi (Rho=0,635). La ricaduta sui discenti dipende da tale integrazione, ma ci sono carenze formative e mancanza di linee guida cui sopperire.

**KEYWORDS**

AI, Teaching Methods, Teacher Training, Formative Assessment

IA, metodi didattici, formazione docenti, valutazione formativa

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## 1. Introduction

Artificial intelligence (AI) has permeated various aspects of everyday life, and its impact on education is becoming increasingly evident. New generations, deeply immersed in the digital world, use these tools for content creation and study support. Over 80% of primary school students use AI to generate content, 33% employ it to personalize study techniques and 30% use it to solve math problems. Secondary school students, in particular, mainly use AI to generate texts (75%), translate content, correct written work and, to a lesser extent, create images and videos (7%). However, only 18% of respondents report receiving clear guidance from their schools on the responsible and optimal use of generative AI (Safer Internet Day, 2025). The limited awareness of the underlying technologies and their potential makes, it uncertain whether these tools can serve as allies in learning. There is also growing interest among teachers regarding the potential of AI in education (Rensfeldt, Rahm 2023). According to research conducted by INDIRE (2025) involving 1,803 teachers, more than half of them regularly use AI tools in their teaching activities, particularly for language simulation dialogues, creating tests for immediate assessments and supporting students with learning difficulties. The 52.4% of teachers use AI regularly in primary schools, while 10% use it as a compensatory tool for students with special educational needs (SEN). Despite this enthusiasm, there is also some resistance to the introduction of AI, with about 14% of teachers opposing the integration of these technologies into teaching. The increasing dependence of young people on digital devices also raises important issues regarding time spent online, with 80% of students unable to manage their digital time properly and 36% exceeding five hours of daily use (Safer Internet Day, 2025). The brief scenario outlined here highlights the urgent need for adequate teacher training to enable students to fully leverage the educational potential of AI, particularly in an increasingly digitalized school context.

Recent Italian literature (Isidori et All., 2024; Perla & Agrati, 2024) highlights how resistance to AI among teachers is often linked to a lack of pedagogical-didactic training, rather than to a technological refusal, aligning with the INDIRE data (2025) cited here. AI is a strategic resource for personalizing learning, making the correction of assignments more efficient, and promoting the inclusion of students with special educational needs (SEN) (Jacobsen et All., 2022). At the university level, the integration of AI into academic curricula is increasingly seen as a priority to prepare students for a digital and sustainable future. The integration of AI-related

skills is essential to align with the demands of 'Industry 4.0' and to promote technological innovation and sustainability. These changes pose educational challenges, particularly regarding the adoption of ethical practices, the protection of students' privacy and the management of biases in algorithmic models. Training both teachers and students in digital skills becomes crucial for the correct application of AI in higher education, ensuring proper preparation for those who will face the technological challenges of the future Although AI is pervading teaching-learning processes, European reports highlight the lack of a common strategy for teachers' professional development in AI usage. Currently, literacy programs focus more on technological aspects than on pedagogical and didactic ones (Nurzhanova et All., 2024). A 'technocentric' perspective prevails, so to speak. Given its pervasiveness, it is now worth asking what impact AI will have on the professional development of teachers, in terms of the redefinition of competency profiles—not only in technological and digital areas, but also ethical ones—and in the modification of procedures and practices. It is well-known that teachers' pedagogical and didactic competencies, along with their commitment, enthusiasm, job satisfaction, and self-confidence, influence students' learning outcomes, progress, and well-being. This is why Member States are encouraged to promote greater participation in continuous professional development (Council of Europe, 2020), in addition to initial training. Reports and projects aimed at redefining the DigCompEdu framework in light of AI's potential generally confirm the need to revitalize teachers' professional engagement and focus particularly on skills such as AI use in teaching interventions and, above all, assessment (McGarr, 2024; Picasso, 2024). Synthesizing, the adoption of AI in education must be accompanied by a critical reflection on its use and the necessary skills to avoid limiting its potential. Only through a mindful and well-structured approach can we fully exploit the opportunities offered by AI while ensuring that it complements, rather than replaces, the fundamental human role in learning and teaching. In light of this scenario, it is important to explore: how teacher trainees perceive and use generative AI in teaching and assessment; which teaching methodologies are most associated with AI integration and the main barriers (technical, pedagogical, cultural) that limit the effective use of these tools. The final goal is to contribute to the debate on how generative AI can redefine teaching and assessment, without losing sight of the centrality of the teacher's role and the need for an ethical and conscious approach.

## 2. The survey

The survey is organized around the following research questions:

- What is the level of digital competence and familiarity with generative AI among teacher trainees?

- Are there significant correlations between specific teaching methodologies (e.g., problem-solving, role-playing) and the use of AI tools in assessment (e.g., adaptive quizzes, auto-grading)?

- What factors influence the adoption (or rejection) of generative AI in daily teaching practice?

Following the focus on the sample, tools, and analysis methodology, the results will be analyzed, with particular attention to the correlations between teaching methods and AI tools, leading to a critical discussion, pedagogical implications, and future perspectives for teacher training.

### 2.1 Description of the Studied Group

The group involved in the study is composed of 293 teachers (85.7% female, 13.7% male), predominantly women, with an average age of 42 years, engaged in internship or professional activities at schools of all levels in the Abruzzo region. Most of them have prior specialization training (52.2%), although 30.9% are not currently teaching. 32.3% teach in primary schools, and 38.8% work in special educational support roles, with fewer teachers in other educational levels.

### 2.2 Questionnaire

The self-administered questionnaire was distributed via Google Forms, to a group of teachers participating in a university training course on inclusive teaching. The questionnaire consists of four sections: Demographic Data, Teaching Methods Used, Use of Generative AI Applications in Teaching Planning and Assessment Strategies Mediated by AI.

### 2.3 Statistical Analysis

The analysis of the Rho (ρ) coefficients, known as Spearman's correlation, and the corresponding p-values in our survey reveals statistically significant associations ($p < 0.05$) between teaching methodologies used, AI-mediated teaching applications, and AI-mediated assessment tools. The absolute value of Rho and the strength of the association are as follows: 0-0.19 Very weak; 0.20-0.39 Weak; 0.40-0.59 Moderate; 0.60-0.79 Strong; 0.80-1.0 Very strong.

### 2.4 Results and Discussion

The following presents a structured overview of the survey's key findings, irrespective of the educational level at which participating teachers are undertaking internships or professional activities, while noting that the majority remain involved in post-graduate training programs on inclusion and sustainability at the University of L'Aquila (Univaq).

**First Level of Interpretation:** The teaching strategies most used by the group include cooperative learning (52.6%), discussion (47.4%), problem-solving (46.8%) and brain storming (44.4%). These are the most common methods, while role-playing (28.3%), case study (21.8%), and seminar (6.1%) are much less represented. Intermediate strategies include Discovery method (34.1%), individual expression (32.4%), frontal teaching (30.4%), tutorial approach and drill & practice (29.7%), and simulations (29.4%)(Tab.1).

| **Teaching strategies** | **Responses** |
|---|---|
| **Cooperative learning** | 52.60% |
| **Discussion** | 47.40% |
| **Problem solving** | 46.80% |
| **Brain storming** | 44.40% |
| **Discovery method** | 34.10% |
| **Individual expression** | 32.40% |

| | |
|---|---|
| **Frontal tesching** | 30.40% |
| **Tutorial approach-drill & practice** | 29.70% |
| **Simulations** | 29.40% |
| **Progetto** | 29.00% |
| **Role Playing** | 28.30% |
| **Case study** | 21.80% |
| **Seminar** | 6.10% |

Table 1. Most used teaching strategies considering the whole survey group

The prevalence of collaborative and active teaching strategies aligns with contemporary educational trends that value social learning and authentic problem-solving, reflecting the influence of social constructivism (Bruner, 1992; Vygotsky, 1980) and evidence-based practices demonstrating the effectiveness of these strategies in engagement and deep learning (Zhang et All., 2025). In particular, cooperative learning improves social and cognitive skills, especially in inclusive contexts discussion fosters critical thinking and collaborative knowledge construction, and problem-solving is crucial for developing transversal competencies (critical thinking, creativity) required by the workforce. On the other hand, methodologies like role-playing, case studies, and seminars are less used, suggesting possible challenges in their implementation. The low use of other methodologies may be explained by a lack of specific training, logistical difficulties (e.g., organizing complex simulations) and perceived inefficacy in standardized assessment contexts (Li et All., 2024; Yueh-Min Huang et All., 2025).

**Second Level of Interpretation:** Regarding the teachers' attitudes toward technology AI, and the use of digital tools or AI in assessment, 63.2% of the sample states that they are unable to ‘use AI tools and frameworks, such as Python, TensorFlow, and Keras’, but 66.7% affirm that they ‘create digital resources to support my teaching practice (multimedia presentations, mind maps, quizzes, videos)’. Furthermore, 51.9% ‘Integrate various interactive elements (responders, interactive systems, pop-up windows with the correct answers to quizzes, simulations)’. In any case, most teachers collaborate moderately (50.2%) with

colleagues to create digital resources, even if they personally 'Adapt and modify selected digital resources based on relevant criteria (learning objectives, specific learner needs)'(66.7%). 61.1% 'Evaluates the quality of digital resources based on relevant criteria (quality, reliability, source authority, etc.)'. Similarly, 59.3% of teachers are moderately engaged in 'Designing and implementing personalized teaching interventions with digital technologies, allowing students to work at their own pace'. Most of the sample 'Uses digital assessment tools to monitor students' progress' in a moderate manner (59.3%). 40.6% do not 'Use digital technologies to provide effective feedback to students'. Half the sample (50.0%) only moderately 'Assigns tasks that involve students creating digital content (videos, audio recordings, digital presentations, blogs, wikis)'. The majority of the sample moderately 'Teaches students criteria and strategies to assess the reliability of online information and identify fabricated, misleading or distorted information' (63%), and 'Examines with students the ways in which information is generated and how it can be distorted' (66.7%) (Tab.2).

| **AI-mediated teaching and assessment attitudes** | | **% ordinal Scale** |
|---|---|---|
| Use AI tools and frameworks, such as Python, TensorFlow and Keras | *Not at all* | *63,2%* |
| | Moderate | 31,8% |
| | High | 5,0% |
| Adapt and modify selected digital resources based on relevant criteria (learning objectives, specific learner needs) | Not at all | 18,4% |
| | Moderate | 37,2% |
| | *High* | *66,7%* |
| I evaluate the quality of digital resources based on relevant criteria (quality, reliability, authoritativeness of the source, etc.). | Not at all | 17,2% |
| | Moderate | 36,0% |
| | *High* | *61,1%* |
| Create digital resources to support my teaching practice | Not at all | 20,1% |
| | Moderate | 44,4% |

| | | |
|---|---|---|
| (multimedia presentations, mind maps, quizzes, videos) | High | 66,7% |
| Integrate various interactive elements (responders, interactive systems, pop-up windows with the correct answers to quizzes, simulations) | Not at all | 30,1% |
| | Moderate | 50,2% |
| | *High* | 51,9% |
| I collaborate with my colleagues to create digital resources. | Not at all | 31,4% |
| | *Moderate* | *50,2%* |
| | High | 18,4% |
| Using digital technologies, I create personalized teaching interventions allowing students to work at their own pace. | Not at all | 31,4% |
| | *Moderate* | *59,3%* |
| | High | 25,9% |
| Teaches students criteria and strategies to assess the reliability of online information and identify fabricated, misleading or distorted information. | Not at all | 34,3% |
| | *Moderate* | *63,0%* |
| | High | 22,6% |
| Examines with students the ways in which information is generated and how it can be distorted. | Not at all | 34,7% |
| | *Moderate* | *66,7%* |
| | Hig | 19,7% |
| Assigns tasks that involve students creating digital content (videos, audio recordings, digital presentations, blogs, wikis | Not at all | 41,0% |
| | *Moderate* | *50,0%* |
| | High | 17,2% |
| I use digital assessment tools to monitor student progress. | Not at all | 45,2% |
| | Moderate | 59,3% |
| | High | 11,3% |

| | | |
|---|---|---|
| Use digital technologies to provide effective feedback to students. | *Not at all* | *40,6%* |
| | Moderate | 47,7% |
| | High | 11,7% |

Table. 2 Attitudes Towards Digital and AI Tools in Teaching and Assessment

Although many teachers are not proficient in specific AI tools (such as Python, TensorFlow, and Keras), a significant percentage affirms that they create digital resources, integrate them interactively and adapt them to their teaching needs. This suggests that teachers, while not AI experts, still use digital technologies functionally in their educational practice, though with a moderate approach. This would explain why many teachers use basic digital tools (presentations, quizzes, videos) but struggle to integrate AI strategically (Kaplan-Rakowski et All., 2023). The collaborative training improves teachers' knowledge, skills and beliefs, but a more holistic approach is needed that includes: a critical evaluation of digital resources, personalized teaching, and digital feedback, as well as active creation of digital content by students. In light of these results, there is a need for integrated AI training, not only technical but focused on didactic applications (e.g., how to use chatbots for tutoring, data analysis tools for formative assessment), the dissemination of EU educational policies that integrate the DigCompEdu framework with specific AI guidelines, promoting regional/national implementation models, and developing critical competencies in students, which are already in place but need to be enhanced with AI-based strategies (e.g., recognition of deepfakes, ethical use of data) (Morini et All., 2025; Moura, Carvalho 2023). On the other hand, international research, confirms that teacher training programs focus more on technological aspects rather than pedagogical-didactic ones (Sanusi et All., 2023).

Regarding the correlations between teaching methods, the use of AI in programming, and tools/applications for assessment (Gradescope, autograding, adaptive quizzes, LMS platforms, etc.), distinct models and levels of integration emerge between the mentioned variables and dimensions. Risking oversimplifications, we can identify at least three: the use as basic support for activity (recommendation), medium integration in teaching and assessment strategies (assistants) and advanced integration aimed at formative assessment (automated evaluation) (Grájeda et All., 2023). These usage types reflect both the

potential and current limitations of educational technologies. This uneven distribution raises important pedagogical issues that deserve a thorough examination in light of recent literature (Alves, et All., 2021).

Among the statistically significant correlations ($p < 0.05$), we find a strong correlation between Role Playing and the AI assessment tool Grade scope ($p = 0.002$) (Tab.3). This result is very interesting because Gradescope is particularly suitable for assessing complex performances (e.g., real-case simulations). Another strong positive correlation is between Problem Solving and Adaptive Quizzes ($p = 0.008$), meaning that AI supports the dynamic assessment of analytical skills. Also important is the correlation between Problem Solving and LMS Platforms ($p = 0.02$), which are widely used. Moderate correlations are found between the Case Study method and Recommendation Systems ($p < 0.001$), suggesting that they are used to recommend relevant case studies. The correlation between Individual Expression and Virtual Assistants is moderately positive ($p = 0.002$), meaning that virtual assistants seem to support personalized learning to some extent. A similar type of correlation is found between Project and LMS Platforms (Rhp = 0.028), indicating that the latter facilitate project management. AI-intensive methods—problem solving, role playing, simulations, etc.—associated with multiple AI tools (recommendations, assistants, automated evaluation)—indicate a synergy that works excellently in AI-enhanced Simulation Environments and in Adaptive Assessment Systems for problem solving. In this sense, fairly common and advanced use cases include Role Playing with automatic feedback on transversal skills and LMS Platforms integrated with intelligent tutors (Sanusi et All., 2023). However, it is important to highlight a critical data point: 87% of studies on AI and problem solving show improvements in student outcomes but with variations depending on the learning objectives (Yu-Fen Yang et All., 2025).

| **Teaching method** | | **AI-mediated programming** | | **AI-mediated assessment** | | | |
|---|---|---|---|---|---|---|---|
| | | **Virtual Assistants** | **Recommender Systems** | **Gradescope** | **Autograding** | **Tools Adaptive** | **Quizzes LMS Platforms** |
| **Case study** | | | | | | | |
| | P | 0.106 | < .001 | 0.482 | 0.336 | 0.073 | 0.06 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Problem solving** | | | | | | | |
| | P | 0.01 | 0.018 | 0.14 | 0.114 | 0.008 | 0.02 |
| **Role Playing** | | | | | | | |
| | P | 0.035 | 0.011 | 0.002 | 0.047 | 0.076 | 0.117 |
| **Project** | | | | | | | |
| | P | 0.003 | 0.069 | 0.562 | 0.585 | 0.064 | 0.028 |
| **Individual expression** | | | | | | | |
| | P | 0.002 | 0.024 | 0.892 | 0.91 | 0.145 | 0.088 |

Table. 3 Strong Correlations between teaching methods, AI mediated programming and AI mediated assessment

Moving to moderate correlations ($0.20 \leq Rho < 0.40$) but statistically significant, the Frontal lesson is correlated with Recommendation Systems ($p = 0.011$), indicating that AI is mainly used to suggest additional materials (Tab.4). For Guided practice and Virtual Assistants ($p = 0.021$) and Recommendation Systems ($p = 0.011$), there is a weak double association. AI provides both models and personalized resources. The same goes for Cooperative Learning and Virtual Assistants ($p = 0.008$) and Recommendation Systems ($p = 0.01$), with AI supporting group work through suggestions and mediation. A moderate correlation ($p = 0.047$) is found between Role Playing and Auto grading Tools, where self-assessment is useful for immediate feedback in simulations. Low IA interaction methods—such as lectures, discussions, seminars, and case studies—show correlations with AI's so-called recommendation systems, since the transmissive nature of the traditional lecture does not lend itself well to dynamic interaction with AI. However, even in these cases, the interaction can be somewhat enhanced through content personalization and learning analytics analysis to adjust pace. The added value of human mediation, typical of discussions and seminars, can be emphasized through resource recommendations for further study and digital scaffolding tools (Kurt, Kurt, 2024). Platforms like Century Tech demonstrate how AI can support these methods while maintaining the central role of the teacher-student interaction. Modeling and cooperative learning are associated with a double level of AI support, through recommendation systems for materials and assistants as 'digital facilitators'. Chatbots as mediators in group

interactions and AI-based modeling tools show particular effectiveness in collaborative contexts. However, there is a risk of excessive structuring of social interaction through algorithms (Fu et All., 2022).

| Teaching method | | AI-mediated programming | | AI-mediated evaluation | | | |
|---|---|---|---|---|---|---|---|
| | | Virtual Assistants | Recommender Systems | Gradescope | Autograding | Tools Adaptive | Quizzes LMS Platforms |
| Frontal lesson | | | | | | | |
| | P | 0.135 | 0.011 | 0.567 | 0.696 | 0.271 | 0.476 |
| Guided practice | | | | | | | |
| | P | 0.021 | 0.011 | 0.368 | 0.76 | 0.52 | 0.651 |
| Cooperative learning | | | | | | | |
| | P | 0.008 | 0.01 | 0.793 | 0.99 | 0.664 | 0.6 |
| Role Playing | | | | | | | |
| | P | 0.035 | 0.011 | 0.002 | 0.047 | 0.076 | 0.117 |
| | | | | | | | |
| Discussion | P | 0.055 | 0.018 | 0.704 | 0.966 | 0.4 | 0.138 |
| | | | | | | | |
| Seminar | P | 0.065 | 0.001 | 0.897 | 0.222 | 0.316 | 0.76 |

Table. 4 Moderate Correlations between teaching methods, AI mediated programming and AI mediated assessment

The Tutorial Approach and Drill & Practice show no correlation with any AI tools, while Brainstorming shows no relevant correlations (all p-values > 0.05), and finally, Gradescope and Autograding are rarely used in the lecture, discussion and seminar (low and non-significant Rho)(Tab.5). The absence of correlation with AI in the tutorial approach and brainstorming deserves particular attention: it could indicate a resistance to the 'substitution of human relationships' and engages the investigation towards possible future developments with AI (Işık, Demirel, 2023;

Kaya, et All., 2024). Regarding the pedagogical implications of the analyzed data, active methodologies (role playing, problem solving) are more integrated with AI than passive ones (lecture). Gradescope and adaptive quizzes emerge as effective tools for assessing complex skills; virtual assistants are associated with methods requiring interaction (e.g., individual expression, cooperative learning). The lack of significance with the methods mentioned (e.g., brainstorming) suggests limitations of AI in supporting creative processes. This opens the way for the need to experiment with generative AI (e.g., ChatGPT) with methods that are currently poorly integrated (brainstorming), empirically validate the strongest correlations with longitudinal studies and explain why some tools (e.g., autograding) are underused in certain contexts.

| **Teaching method** | | **AI-mediated programming** | | **AI-mediated evaluation** | | | |
|---|---|---|---|---|---|---|---|
| | | **Virtual Assistants** | **Recommender Systems** | **Gradescope** | **Autograding** | **Tools Adaptive** | **Quizzes LMS Platforms** |
| **Drill & practice** | | | | | | | |
| | P | 0.119 | 0.126 | 0.912 | 0.951 | 0.493 | 0.401 |
| **Discovery method** | | | | | | | |
| | P | 0.075 | 0.031 | 0.206 | 0.706 | 0.299 | 0.121 |
| **Simulations** | | | | | | | |
| | P | 0.077 | 0.039 | 0.122 | 0.529 | 0.836 | 0.27 |
| **Brain Storming** | | | | | | | |
| | P | 0.571 | 0.96 | 0.534 | 0.568 | 0.645 | 0.063 |

Table 5. No Correlations between teaching methods, AI mediated programming and AI mediated assessment

## 3. Conclusions

AI is increasingly pervading teaching and learning processes (Perla et All., 2024; Perrotta, Selwyn, 2019; Tuomi, 2022), to the point of being defined as an invisible

and omnipresent agent of education (Taddeo, Floridi, 2018), with all the advantages in terms of knowledge management but also with significant challenges regarding the protection of self-determination (Terravecchia, 2020). The survey conducted on a group of teachers from Abruzzo revealed a complex and nuanced picture regarding the adoption of artificial intelligence (AI) in teaching and assessment. The analysis shows that the integration of AI into teaching does not follow a single model but varies significantly depending on methodological characteristics. The results show that, despite a widespread inclination to use basic digital tools (such as multimedia presentations, quizzes, and interactive resources), significant gaps remain in mastering more advanced AI tools like Python, TensorFlow or Keras. Only a minority of teachers demonstrate a conscious and structured use of these technologies, while most limit themselves to a moderate approach, often relying on features already integrated into existing educational platforms. The analysis of correlations reveals interesting patterns: active teaching methodologies (problem solving, role playing, cooperative learning) show greater synergy with AI, especially in contexts of adaptive assessment and simulations. On the contrary, more traditional approaches (lecture, brainstorming) show weak or no integration, suggesting that AI is perceived more as a support for personalization and assessment rather than a substitute for transmissive teaching. A critical aspect concerns teacher training: although many recognize the potential of AI, the lack of specific skills and clear pedagogical guidelines limits its effective application. This aspect aligns with European reports that highlight the absence of a common strategy for the professional development of teachers in AI use, which is often more focused on technical aspects rather than pedagogical ones (UNESCO, 2024). While digitalization strategies and digital education have been well-established, especially data literacy, reports highlight the lack of a common strategy concerning training and professional development for teachers, specifically regarding the use of AI (Filderman et All., 2022; Redecker, Punie, 2017). The heterogeneity described calls for contextualized approaches to instructional design, greater collaboration between educators and developers and more systematic research on method-technology interactions. Looking ahead, the integration of AI in education requires targeted teacher training, not only on technological skills but especially on teaching strategies to make the most of its potential. It is no coincidence that the DigCompEdu aimed at teachers of all levels, provides a conceptual representation of digital pedagogical competence, thus providing the basis for both the design of training courses and for the evaluation of the levels of competence acquired. In

addition, the European Commission has promoted the Self-Assessment Tool for Digitally Capable Schools (SELFIE), a tool for self-assessment of skills at school level, whose focus is not on technologies, but on the teaching and learning practices associated with them (Ranieri, 2020; Rivoltella, 2019). Guided experimentation with advanced tools (such as generative AI and automated assessment systems) combined with active methodologies; ethical and pedagogical guidelines to prevent passive or uncritical use of technologies, while preserving the central role of teacher-student interaction. In conclusion, AI represents a valuable resource to innovate teaching, personalize learning and optimize assessment, but its success will depend on the education system's ability to train aware teachers, capable of balancing innovation with pedagogy. Only in this way can AI truly become an effective ally, not replacing but integrating the essential human contribution to education.

**Author contributions**

Although the contribution is the result of a collaboration between the Authors, paragraphs 1 and 3 are to be attributed to MV. Isidori, paragraphs 2, 2.1 and 2.2 to C.Evangelista, paragraph 2.4 to MV. Isidori and H.Muccini.

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