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Personalizzazione didattica e intelligenza artificiale: impatti, sviluppi e criticità in educazione

Personalized education and artificial intelligence: towards a new culture of education

Educazione personalizzata e intelligenza artificiale: verso una nuova cultura dell'educazione

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ABSTRACT

This contribution proposes a reflection on the fundamental role that schools are called upon to play: designing learning environments capable of stimulating students' intelligence, encouraging their encounter with structured knowledge, training operational and cognitive skills, and encouraging them to adopt original strategies in solving complex problems. Understanding the grammar of AI therefore becomes an essential skill, and educational institutions can play a crucial role in fostering critical literacy towards automation processes, laying the foundations for algorithmic pedagogy. Rather than perceiving AI as a threat, schools must seize the opportunity for a collaborative approach, using AI itself as a lever to stimulate creativity, support writing activities, verify information, and simulate innovative and complex teaching scenarios.

SINTESI

Questo contributo propone una riflessione sul ruolo fondamentale che la scuola è chiamata a svolgere: progettare ambienti di apprendimento capaci di stimolare l'intelligenza degli studenti, favorire il loro incontro con conoscenze strutturate, allenare competenze operative e cognitive e incoraggiarli ad adottare strategie originali nella risoluzione di problemi complessi. Comprendere la grammatica dell'IA diventa quindi una competenza essenziale e le istituzioni educative possono svolgere un ruolo cruciale nel promuovere un'alfabetizzazione critica verso i processi di automazione, gettando le basi per una pedagogia algoritmica. Piuttosto che percepire l'IA come una minaccia, la scuola deve cogliere l'opportunità di un approccio collaborativo, utilizzando l'IA stessa come leva per stimolare la creatività, supportare le attività di scrittura, verificare le informazioni e simulare scenari didattici innovativi e complessi.

KEYWORDS: artificial intelligence, personalized education, educational innovation

PAROLE CHIAVE: intelligenza artificiale, istruzione personalizzata, innovazione educativa

[1] This contribution is the result of the joint work of the authors. However, Alberto Fornasari can be credited with writing the Introduction, paragraphs 1 and 2, and the Conclusions, while Rosa Minerva can be credited with writing paragraphs 2.1., 3, and 4.

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Introduction

One of the main educational challenges of the near future concerns the acquisition of the skills needed to interact effectively, consciously, and critically with artificial intelligence (AI). The increasing integration of intelligent technologies in everyday life, work, learning, and entertainment requires not only greater ethical sensitivity but also careful reflection on how individuals and institutions relate to AI systems (Minerva & Corallo, 2024). It therefore becomes imperative to define a sound regulatory framework and foster constant awareness-raising to fully exploit the transformative potential of AI in the school and educational context.

The conscious use of artificial intelligence is a key strategic resource for improving the quality of education and promoting the development of new skills in students. In 2022, the European Commission, with the collaboration of experts in AI, ethics, education, and data processing, published the "Ethical Guidelines for Educators on the Use of AI and Data in Teaching and Learning" and updated the European e-skills framework (DigComp 2.2) to include specific references to AI and data management (Ranieri, 2024). These initiatives aim to support students and citizens of all age groups in using new technologies critically and responsibly, fostering a balanced and thorough understanding of the potential and limitations of AI.

The spread of generative AI is significantly modifying teaching methodologies, evaluation processes, and educational personalization practices, supporting teaching professionalism in multiple activities: from lesson planning to the preparation of evaluation tools and administrative and document management (Fornasari, Minerva & Battisti, 2024). Moreover, thanks to customized tutoring and in-depth analysis of student performance, AI makes it possible to propose increasingly precise and timely educational interventions (Moriggi, 2023). However, this evolution poses the need to address ethical issues such as educational equity, human supervision, and the protection of students' personal data with rigor and care (Rivoltella, 2020).

Despite the increasing diffusion of AI-based technologies in European schools, empirical research on their real educational effects is still scarce, thus imposing a cautious, critical, and evidence-based approach. In this perspective, the need emerges for a new literacy called "AI literacy," which integrates established skills (media literacy, information literacy, and data literacy) articulated in 4 key dimensions: linguistic, critical, ethical, and expressive (Ranieri, Cuomo & Biagini, 2023). At the international level, several studies emphasize the centrality of AI literacy as a skill for contemporary citizenship (Ng, Leung & Chu, 2023; Holmes, Bialik & Fadel, 2019), highlighting its link with critical training and understanding of algorithmic mechanisms. The contemporary educational challenge consists not only in developing a critical approach to AI but in building a real AI culture capable of training students competent in understanding its languages, logics, and operational mechanisms (Panciroli & Rivoltella, 2023).

In this perspective, teaching is not limited to passively receiving technological innovations but integrates them in a strategic and conscious manner, creating a dynamic and interactive learning environment (Rivoltella, 2025). The new media become tools for enhancing the educational process, promoting personalized and flexible teaching capable of responding to students' individual needs and stimulating their active participation (Minerva, Fornasari & Conte, 2024). Learning, in fact, is not reduced to simply accessing information: it is fundamental to be able to understand, interpret, and apply it to transform learning into knowledge. Critical thinking allows one to go further, as it involves analyzing, synthesizing, and evaluating content (Buckingham, 2020). This entails a constant process of reflection and didactic refinement, in which teachers evaluate the effectiveness of the technologies used and adapt their strategies to maximize the educational impact (Rivoltella, 2020).

In light of these premises, this paper analyzes the relationship between personalized teaching and artificial intelligence, outlining a pedagogical and ethical perspective on the use of AI in educational contexts. The paper is divided into 4 sections: the first is dedicated to the conceptual definition of AI and its ethical framework; the second focuses on the main educational applications and references to AIED; the third deals with the ethical challenges related to transparency and Explainable AI; and, finally, the fourth section reflects on the role of teachers in building new educational alliances between humans and machines.

1. What is not AI

Usually, when introducing a topic, one starts with a definition, considering it the easiest way to build a discourse around the concept to be explored. However, in the case of AI, the issue is more complex: arriving at an agreed definition is far from simple, for several reasons. If we let ourselves be guided by curiosity and Google the first available definition, we would find the one given on Wikipedia, according to which AI, "in its broadest sense, is the ability or attempt of an artificial system (typically a computer or automation system) to simulate a generic form of intelligence." This is certainly a legitimate definition but not entirely satisfactory, as can be guessed from the terms used. An ironic note, widespread among computer scientists, suggests that AI consists of "all those things that computers do not yet know how to do," indicating how the field is constantly evolving: activities once considered to be the prerogative of artificial intelligence now fall within the sphere of general computing (Redaelli, 2025). Although this definition cannot be taken in the strict sense of the word, it does provide some useful clues: it confirms, in fact, that AI is a constantly evolving discipline, characterized by constantly changing, increasingly complex and ambitious goals (Rivoltella & Rossi, 2024).

"For the present purpose, the problem of artificial intelligence is viewed as that of making a machine behave in ways that would be called intelligent if it were a human being behaving that way" (McCarthy, Minsky, Rochester, & Shannon, 2006). These words were written in the context of a research project presented at Dartmouth College, in New Hampshire (USA), by those who can be considered the

pioneers of artificial intelligence: John McCarthy and his colleagues, among the first to use the expression artificial intelligence to define a field of study aimed at building systems capable of imitating human behavior. It is important to emphasize that artificial intelligence is never confused with human intelligence, which is characterized by the ability to reflect and attribute meaning to one's actions. AI, on the contrary, acts on the basis of programs and algorithms, even very sophisticated ones, but lacking awareness (Cucchiara, 2021). If, therefore, one wants to propose a useful definition of AI, it may be effective to resort to an expression borrowed from philosophy. As Luciano Floridi (2022) states, it is an *agere sine intelligere*: artificial intelligence is a technology capable of performing actions without being intelligent. In AI, Floridi explains, "it is the result that counts, not whether the agent or its behavior is intelligent. Therefore, AI does not know the ability to reproduce human intelligence, but the ability to do without it" (Floridi, 2022).

2. For a pedagogical ethics of the virtual

AI is transforming our world in ways that few could have predicted. From sophisticated machine learning algorithms powering search engines to systems driving autonomous vehicle prototypes to intelligent services also introduced in education, it is generating new forms of automation in instructional systems (Perrotta et al., 2021; Selwyn, 2019). Educational applications range from intelligent tutoring systems to automated assessment tools and technologies for personalizing learning paths (Ranieri et al., 2024). The increasing spread of artificial intelligence, also in educational contexts, inevitably raises ethical questions. The ethics of AI is a central issue when discussing the possibility of "educating" AI, i.e., bending it in some way to respect norms and human beings (Panciroli & Rivoltella, 2023).

Aldous Huxley, a British writer and philosopher, published the dystopian novel Brave New World in 1932, in which he imagined a future in which technology, through psychological conditioning, genetic engineering, and other sciences, radically reshapes society by exerting widespread control over individuals. "Educators, in fact, tried to give their dormant pupils an intellectual education. But intellectual activity is incompatible with sleep. [...] in other words, to condition conduct by verbal suggestion at a time of diminished psychological resistance" (Huxley, 1972, p. 194).

Huxley's narrative constitutes a warning against a naive use of technology: excessive automation, in fact, risks reducing the educational act to a merely receptive experience. Despite its dystopian dimension, the author's perspective reaffirms that learning is not the same as accumulating notions but implies the ability to understand, interpret, and critically evaluate them. Transposed into the educational sphere, this reflection leads to a substantial discussion on the nature, purpose, and modalities of education.

Artificial Intelligence in Education (AIED), a discipline developed in the last century with the intention not to replace the teacher but to relieve him/her of the

most repetitive tasks, restoring the authentic role of facilitator of knowledge through the targeted use of technologies (Bonaiuti & Dipace, 2022), fits into this perspective. AIED integrates contributions from psychology, pedagogy, and neuroscience, configuring itself as an inherently interdisciplinary field of research. Among the most dynamic study trajectories today are*:* Educational Data Mining, which applies machine learning algorithms and recommendation systems to the analysis of learning processes; Education Data Clustering, used to explore and group large datasets from school contexts; Intelligent Adaptive Learning Systems, which, through the unsupervised analysis of "digital traces" (Milliron, Kil, Malcom & Gee, 2017) left by students, allow their performance to be predicted and these predictions to be correlated with different cognitive styles, thus offering a more granular and scalable understanding of the educational pathway. The profiling resulting from these techniques makes it possible to personalize the contents in relation to the age and abilities of the students and to implement formative assessment *in itinere*, thanks to timely and targeted feedback (Ranieri et al., 2023).

The origins of AIED can be traced back to the 1970s, when the behaviorist psychologist Burrhus F. Skinner, as early as 1968, criticized the ineffectiveness of traditional methods and the punitive emphasis on student failure. He pointed out the teacher's difficulties in managing classes that were heterogeneous in terms of learning styles and rhythms and invited, *ante litteram*, to overcome the obsession with "finishing the syllabus" to build a tailor-made educational path based on a balanced cooperation between man and machine (Skinner, 1968).

Skinner identified 3 decisive obstacles to truly effective teaching. Firstly, he pointed out the risk of the student slipping into a condition of passivity and becoming "an object of instruction," especially when audiovisuals were used as mere transmission channels (Minerva et al., 2024). The recent spread of recorded video lectures and vocal presentations, intensified during the pandemic, has made this issue even more evident, often neglecting the cognitive load and learning time of students (Panciroli & Rivoltella, 2023).

Secondly, the American psychologist highlighted the delays in formative feedback: late corrections deprive the student of the original context of the exercise and prevent the teacher from intervening promptly to support or redirect learning, a limitation that remains in systems still tied to summative assessment and little inclined to consider error as an opportunity for growth (Rivoltella, 2025). Lastly, he denounced the cultural inertia of schools, little inclined to embrace innovation: recurrent polemics against the "methods of pedagogues," nostalgia for a school focused exclusively on merit and content, and the contrast between the students of yesterday and those of today are still current examples (Rivoltella, 2025).

From these findings came the proposal of planned teaching and teaching machines: devices that guided the student through trial and error, providing immediate feedback and "positive reinforcement" (Skinner, 1968). Although some feared excessive costs, the replacement of teachers, or a mechanistic reduction of learning, Skinner replied that the machines would only lighten repetitive tasks,

leaving intact the educational interaction, the irreplaceable core of the teaching role (Panciroli & Rivoltella, 2023).

2.1. Transparency and explainable AI

However, the crucial question remains: can artificial intelligence really enhance teaching in full compliance with ethical principles? Prominent among these principles is transparency, or explainable AI, as defined at the Asilomar conference (2017)[2] and included by Floridi in the broader principle of explainability, alongside accountability. Explainable AI (XAI) is a recent area of research, increasingly central to machine learning (ML) and deep learning (DL). Its goal is to clarify what happens inside the *black boxes* of data and algorithms during the construction and execution of AI models, making decision-making criteria transparent (Panciroli & Rivoltella, 2023). In this way, it enables people "to effectively understand, trust, and manage the emerging generation of artificially intelligent partners" (Gunning, 2017).

According to Panciroli and Rivoltella (2023), the application of explainable AI systems in educational contexts produces benefits that are reflected in the entire educational ecosystem. Foremost, it promotes agentiveness, since the transparency of algorithms allows teachers, students, and developers to co-design educational activities, understand the AI decision-making process, and evaluate its adoption.

This same transparency improves the quality of teacher-student interactions: when teachers clearly explain the logic driving automatic recommendations or assessments, learners interpret their own learning path and the methodologies employed with greater awareness.

At the same time, the comprehensibility of algorithmic models makes it possible to develop a tiered AI literacy program that builds the ability to critically examine these technologies in cognitive, ethical, and operational terms. This involves, for example, understanding how AI processes data, reflecting on the implications of its decisions, and knowing how to use it consciously in educational processes.

Finally, clarity about the purposes and collection of data reinforces institutional accountability and trust on the part of all involved, showing how AI can contribute to improving the quality of education without sacrificing students' rights.

These 4 areas show how the visibility and explainability of intelligent systems constitute a specific topic of study in education: an evolution, in an algorithmic key, of the reflections already initiated at the time of mainstream media, whose target audience remains the entire school community (Panciroli & Rivoltella, 2023).

3. Building new educational alliances with artificial intelligence

Isaac Asimov, in the short story *The Feeling of Power* (1959), imagines a society so dependent on calculators that it has lost the ability to perform simple arithmetic

[2] https://it.wikipedia.org/wiki/Conferenza_di_Asilomar_sulla_IA_Benefica.

operations. The discovery, by a group of civil servants, that calculations can still be done in their heads or on paper is greeted with amazement and the hope of a "liberation from machines."

> Congressman Brant arched his eyebrows.
>
> "Is that right?"
>
> "Check for yourself, congressman".
>
> The congressman took out his pocket calculator, brushed his fingers twice over its knurled edge, looked at the dial, and put it back in his pocket. He said, "And would this be the phenomenon you have called us here to admire? An illusionist?"
>
> "Much more, honourable. Aub has memorised some operations and can calculate on paper."
>
> "A paper calculator?" said the general. He looked disappointed.
>
> "No general," said Shuman, patiently.
>
> "It is not a paper calculator. Simply a piece of paper. General, will you be so kind as to propose any number?"

(Asimov, 1959, pp. 1–2).

The text, while narratively ironic, recalls a concern that is still relevant today: the atrophy of basic skills due to habituation to digital technologies. The advent of generative systems such as ChatGPT has expanded this concern to further domains, from writing, programming, and economics, raising questions about the future of education (Moriggi, 2023). Which skills will remain indispensable, and which will instead become mediatable or replaceable by AI? Will it be more important to know how to write a contract or to obtain, through a well-structured prompt, a qualitatively equivalent contract? And what new skills will emerge in a labor market characterized by rapid automation?

In the field of educational guidance, it is becoming increasingly difficult to predict the jobs of tomorrow; this reinforces the need for teaching focused on transferable skills, problem-solving, critical thinking, creativity, and collaboration, without sacrificing a solid basic education and citizenship skills. The contrast between knowledge and skills is therefore misleading: the goal is to integrate disciplinary knowledge with the ability to consciously use technological tools, including AI applications (Moriggi & Pireddu, 2024).

On this basis, a constructive debate on the use of AI to support students should be set up, clearly defining its purpose, mode of use, and evaluation criteria. Tools such as generative language models can, for example, act as personalized tutors, text editors, or problem-solving assistants, as long as their use is guided by pedagogical principles that promote autonomy, responsibility, and the development of critical thinking (Panciroli & Rivoltella, 2023).

The use of digital technologies is sometimes interpreted as a sign of educational impoverishment because schools, since their origins, have favored what Howard Gardner calls a "uniform conception" of intelligence (Gardner, 1983). Although the US and Italian educational contexts show significant differences, his reflection highlights a structural trait of education systems: favoring only certain learning

modes to the detriment of others. IQ tests, for example, almost exclusively measure linguistic and logical-mathematical skills, ignoring spatial, musical, bodily-kinesthetic, interpersonal, and intrapersonal skills. Although criticized and reworked, the theory of multiple intelligences has the merit of reminding us that education must adapt to the specific needs of each student and that there are many paths to address the same content (Gardner, 1999).

The need for personalized education now finds a concrete ally in assistive technologies (AT). These devices and software, designed to make hardware and digital content truly accessible, embody the principles of Universal Design for Learning, which recommends diversification of input, output, and engagement (Meyer, Rose & Gordon, 2014). Thanks to artificial intelligence, AT are transforming from "one-off" solutions into dynamic systems capable of learning and responding to learners' needs (Bianquin et al., 2022; Holmes, Bialik & Fadel, 2019), flowing into true modular toolkits for inclusion (Morrison, 2006).

The term "assistive technologies" indicates, in fact, all applications designed *ad hoc* to make hardware or software products accessible and usable by people with disabilities. The development of such solutions often involves the *ex post* creation of person-machine interfaces to the original product (Panciroli & Rivoltella, 2023). Before the spread of AI, the most common aids included screen readers, Braille displays, OCR systems, and alternative pointing devices to the mouse. The benefits of AT affect not only those with congenital or chronic disabilities but also those who face temporary limitations or want additional support. Today, in an ever-changing landscape, AI solutions such as robotics for continuous assistance and highly usable voice assistants, such as Siri or Alexa, are emerging to act as facilitators within inclusive pedagogical approaches (Besio, 2021; Panciroli & Macauda, 2020).

Generative artificial intelligence (GAI) can become a decisive ally both for the customization of materials prepared by the teacher and as a digital tutor for the student. Thanks to chatbots based on language models, students can fill in gaps, obtain additional explanations, and flexibly manage their study time.

According to Gardner, the purpose of teaching is to promote understanding, not to classify students (Gardner, 1983). To achieve this, the teacher must devote more time to observing the cognitive processes of the class and providing targeted feedback, revising the traditional pattern – explanation, homework, assessment – in favor of methodologies that promote deep understanding. Generative models accelerate this transformation that is already underway: in a "flipped" approach, the study of materials (including multimedia) takes place at home, while practical activities take place in the classroom, under the gaze of the teacher, who can thus gather valuable evidence for feedback (Panciroli & Rivoltella, 2023; 2024).

Classes, moreover, are increasingly heterogeneous. Guiding each student to reflect on his or her own learning style and to develop metacognitive processes is therefore essential so that he or she can independently apply the correctives suggested by the teacher (Gardner, 2005). In this sense, GAI integrated into

assistive tools or in adaptive learning environments is a key resource to make education truly inclusive.

4. The skills of the future

A recurring fear among teachers is that they will be replaced by artificial intelligence systems. This issue has already been addressed in the *Beijing Consensus on Artificial Intelligence and Education* (2019), a document from which UNESCO[3] drew the guidelines *AI and Education: Guidance for Policy-makers*[4]. Although conceived before the spread of generative models such as ChatGPT, these guidelines identify essential principles for the ethical use of AI in schools while protecting teachers and students. This is the basis for the more recent *AI Competence Framework for Teachers* (Miao & Cukurova, 2024), designed to support teachers in developing the skills needed to integrate AI into teaching practice. The crucial issue, therefore, is the training of teaching staff. Alongside operational skills, sound critical thinking is essential to assess the educational impact of AI systems (Panciroli & Macauda, 2021). The UNESCO framework distinguishes 5 competence domains (UNESCO, 2024a):

- a human-centered mindset: focusing on human agency, accountability, and social responsibility;
- ethics of AI; promoting ethical principles and responsible use;
- AI foundations and applications; providing the knowledge, understanding, and skills needed to create and use AI;
- AI pedagogy; supporting teachers in leveraging AI for innovative teaching methods;
- AI for professional development; outlining teachers' capacities to leverage AI for driving their own lifelong professional development.

Each competence is divided into three levels of mastery: acquire (basic skills to evaluate, select, and use AI in an ethical and responsible manner), deepen (strengthen the ability to integrate AI into classroom practices), and create (explore and devise innovative solutions and methodologies).

Based on these guidelines and the related skills framework, it is possible to outline operational guidelines consistent with UNESCO recommendations and with experiments already conducted. Generative artificial intelligence tools, for example, can speed up the production of teaching materials, from multimedia presentations to the adaptation of content for students with special educational needs, and facilitate both formative and summative assessment through automatically generated quizzes or rubrics (Rivoltella, 2025). Such applications allow the teacher to focus time and energy on the activities with the highest pedagogical value, enhancing teaching effectiveness and offering "timely

[3] https://unesdoc.unesco.org/ark:/48223/pf0000368303.
[4] https://unesdoc.unesco.org/ark:/48223/pf0000376709.

feedback" (Panciroli & Rivoltella, 2023) that guides planning and fosters continuous improvement.

At the same time, students must be able to move critically not only among AI tools but also in the entire digital ecosystem in which they leave traces and build identities. To this end, UNESCO has published the *AI Competency Framework for Students*, which outlines 4 fundamental areas of competence, each divided into 3 progressive levels: understand, apply, and create (UNESCO, 2024b):

- human-centered mindset; maintaining human control over AI systems;
- AI ethics; operating with respect for transparency and inclusiveness;
- AI techniques and applications; operational use of tools;
- AI system design; designing and innovating AI-based solutions.

These skills complement, but do not replace, other fundamental literacies such as online research and critical evaluation of sources. Indeed, the way of doing research is changing thanks to AI-enhanced engines (Bing, Copilot, Perplexity, SearchGPT), which aggregate results, indicate sources, and allow for summary or in-depth queries. Such potentials raise questions about selection criteria and algorithmic bias, issues that students must learn to critically address (Ranieri et al., 2024).

Therefore, digital literacy, critical thinking about AI, and responsible digital citizenship should form the core of any contemporary curriculum. Only in this way can the introduction of technologies, generative or otherwise, be translated into an effective enhancement of teaching-learning processes, rather than a mere technological ornament (Cavalli, Ferri & Moriggi, 2023), i.e., an accessory use of technologies without any real pedagogical and transformative impact.

According to Rivoltella (2025), a learner is competent to the extent that he/she knows how to activate heuristic problem solving: when faced with a novel situation-problem, he/she elaborates a strategy drawing on his/her prior knowledge and skills. The real crux is not to choose between a "competence-based curriculum" and a "content-based curriculum" but to create the conditions for the pupil to develop both dimensions: encountering knowledge, exercising procedural skills, and receiving formative feedback. Piaget already emphasized this in *Where Education Goes* (2001): "The purpose of intellectual education is not to repeat ready-made truths, but to learn to conquer them for oneself, even at the cost of time and effort." The same applies to generative artificial intelligence models: they do not serve to store content for us but to support the often long and iterative process through which we construct new knowledge. This is the opposite of the "oracular" view of AI, which is as widespread as it is misleading (Roncaglia, 2023).

Conclusions

The path traced in this contribution has highlighted how the relationship between personalized teaching and artificial intelligence requires reflection of a pedagogical and ethical nature. After analyzing the potential of AI in education and the principles that should guide its use – transparency, explainability, and

accountability – the need to redefine the roles of teachers and students within increasingly complex digital ecosystems has emerged.

Schools, therefore, should not fear artificial intelligence but integrate it as a tool for educational cooperation. AI can stimulate creativity, support writing, verify statements, generate scenarios, and construct examples: sophisticated uses, never substitutes, in which human intervention remains central. Delegating the passive execution of tasks to machines would mean surrendering, once again, to the "dictatorship of answers" (Rivoltella, 2025). The appropriate perspective is a cooperative one: the question initiates dialogue, dialogue refines the answers, and human intelligence directs and enriches the interaction with the algorithm.

In this scenario, the teacher must take on the role of system director: governing the flow of information, selecting and mediating tools, and providing continuous feedback (Selwyn, 2019). The adoption of a single technology is not an end in itself but a means within a dynamic and adaptive educational system, capable of responding to the needs of the context, the group, and the individual student. AI also helps to break down space-time barriers: students can access explanations and content at any time, modulating their own study rhythms. Intelligent agents connect physical and digital environments, promoting self-regulation, metacognitive reflection, and autonomy (Holmes et al., 2019). Artificial intelligence does not replace teaching but amplifies its potential. It is up to schools to choose whether to accept it passively or guide it consciously. Only in this way can education remain human, even in the age of algorithms (Rivoltella, 2025). Schools today face a crucial ethical question: teachers who are not always trained in innovation must prepare the new generations for an unprecedented digital transition, much more radical than the old futuristic visions of flying cars, as it is based on a fabric of pervasive connections and generative artificial intelligence systems.

If institutions do not take responsibility for guiding students through this change, they risk building a fragile "do-it-yourself" digital education, mediated by smartphones, web multinationals, chatbots, and low-cost services, without adequate safeguards. In other words, they would be left to navigate without a compass in an unregulated ocean, while schools, unprepared to deal with the impact of generative AI, would relinquish their educational mandate in a sector that is crucial for the citizens of the future.

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