# AI in the class: Uses, doubts, challenges and perceptions of a sample of teachers from different nationalities

*Giovanna Cioci*[*]

**Abstract**
In the post-digital context (Jandric et al., 2018; Ranieri and Bonaiuti, 2024; Eugeni, 2015), Artificial Intelligence has become a pivotal technology across many fields, including education (Hwang, Chang, 2023). This study examines teachers' use of AI, analyzing its applications, perceptions, and impacts on pedagogy. Through a questionnaire administered to N = 133 teachers, the findings reveal a limited familiarity with AI, although educators recognize its potential to personalize learning and enhance administrative efficiency. Concerns persist regarding the potential erosion of teacher authority, the risk of superficial learning, and the ethical implications of AI usage. The research emphasizes the need for targeted teacher training and a thoughtful reflection on the consequences of AI adoption in educational settings (Panciroli and Rivoltella, 2023).

**Key words:** Artificial Intelligence, Teaching practices, Risks, Cognitive Devolution, Humanization

*First submission: 09/09/2024, accepted: 03/12/2024*

## 1. Introduction

AI's integration into the media has revolutionized various human activities, as shopping, travel, medical diagnostics, automation of repetitive tasks, home automation and financial trading. In essence «AI is seen as a catalyst in our daily lives, a tool to save time and effort» (Manovich, 2020, p. 31). Education has also become fertile ground for AI experimentation, as schools must grapple with both the opportunities and risks that AI can present (Timms, 2016). While not yet widely adopted, the use of chatbots, personalized learning materials, and the automation of certain processes has the potential to reshape the educational landscape (Hwang and Chang, 2023). The implications are far-

[*] Dottoranda presso l'Università degli studi "G. d'Annunzio" di Chieti-Pescara. E-mail: giovanna.cioci@unich.it.

Doi: 10.3280/ess2-2024oa18439

reaching: not only are activities evolving, but so too are students' ways of learning and the role of teachers. Educators are now required to navigate the present with the understanding that pedagogy is a practical science, deeply informed by shifting socio-economic and political contexts (Sarsini et al., 2017). This study investigates how teachers are employing AI, as well as their perceptions and beliefs about its role in education. To this end, a self-administered questionnaire was distributed through both Italian and international Facebook groups.

## 2. Background

The use of AI in education is vast and extends far beyond chatbots (Cunningham-Nelson et al., 2019, Hwang and Chang, 2023). It encompasses various forms of interaction aimed at multiple educational purposes, including intelligent tutoring systems, educational robotics, and educational data mining for performance prediction (Chen et al., 2020). AI provides students with constant support that «does not tire, nor does it need to sleep or eat, so AI can provide learning that is always on, personalized, and inclusive, freeing up teachers to design the lesson approach» (Luckin et al., 2022, p. 25).

However, the intentionality of the teacher, who is responsible for the design and selection of tools, methods, and materials, lies between the existence of these tools and their actual use. Exploring teachers' perceptions of AI is crucial, as evidenced by the TAM model regarding technology (Davis et al., 1989), which shows that educators more inclined to use AI tend to possess a positive sense of self-efficacy and a student-centered pedagogical background (Choi et al., 2023. To fully realize AI's potential in education (Lo, 2023), it is essential for both teachers and students to become familiar with the technology, as lack of knowledge can generate fears and resistance (Celik, 2023; Sharma, Kawachi, and Bozkurt, 2019; Pentucci, 2018). At the same time, AI must be properly trained and customized for educational use (Knox, 2020).

Research indicates that AI can enhance administrative efficiency, personalize educational content, facilitate assessment and feedback, and overcome language barriers (Chounta et al., 2022). Mogavi and colleagues (2024) highlight AI's ability to boost student self-efficacy and motivation, although concerns persist about the risk of superficial learning and the loss of interpersonal and critical thinking skills. This cautious attitude is also evident in other studies (Kim and Kim, 2022), with the primary fear being that AI, through its advanced support capabilities, could diminish the authority of teachers, relegating them to mere supervisors. Alwaqdani (2024) emphasizes

concerns about teacher training, potential job replacement, and the erosion of creativity and critical thinking, as well as the fallibility of AI.

Other studies raise concerns about the potential for student laziness (Kaplan-Rakowski et al., 2023, p. 329), referring to an over-reliance on machines to solve academic problems. Related to this is the issue of cheating, which must be countered by designing tasks that require creative and critical thinking rather than mechanical solutions (Kooli, 2023).

Teacher training is another significant factor (UNESCO, 2023, p. 20). As with digital technology use in education (Joo, Park, and Lim, 2018), AI training is necessary to ensure its effective integration into educational practices (Al Darayseh, 2023). A supportive learning environment is also essential (Kim, 2024), as is a socio-political context that promotes responsible AI use throughout the entire school ecosystem (Bezjak, 2024). Teachers must be equipped to create pathways for AI literacy and ethics for students. Panciroli and Rivoltella (2023, pp. 7-10) distinguish three key actions: educating with artificial intelligence, educating artificial intelligence – ensuring that AI is trained to operate fairly and ethically (algoretics) – and educating about artificial intelligence, fostering critical thinking about AI outputs and promoting its correct use.

Finally, the profound educational implications must be considered. If AI is to play a decisive role in educational processes, it is crucial to understand the depth at which it operates. Yau et al. (2023) identify six levels, ranging from the transmission of information to intellectual development. These levels span from transmissive teaching methods to student-centered approaches, where interaction with AI stimulates critical thinking, thus contributing to cognitive development.

## 3. Methodology

The data were collected through a self-administered questionnaire (Trinchero, 2004), distributed via Facebook groups of both Italian and international teachers from december 2023 to may 2024. Following a demographic section, six open-ended questions were presented regarding the use of AI: 1) in educational activities, 2) in non-educational (but still school-related) activities, 3) in evaluation processes, 4) the risks identified by teachers, 5) activities that may become obsolete, and 6) an overall assessment of AI in education. Finally, a checkbox question asked respondents to select three expressions that best define AI.

Although the sample size is relatively small (N = 133), the questionnaire's design, with very open and unconstrained questions, allowed for a high level of

informative power on the issues being explored (Malterud et al., 2016). The data were analyzed using reflexive thematic analysis, following Braun and Clarke's (2022) method, with the aim of first identifying codes and then organizing them into broader themes. Each question was analyzed individually, followed by a reflection on the similarities across the results. The analysis was facilitated by the quali-quantitative analysis software MAXQDA 2022. Additionally, the codes were transformed into binary (0-1) format to allow for cross-tabulation with some demographic variables, following a cross-over procedure (Hitchcock and Onwuegbuzie, 2020). This latter operation was performed using SPSS software v. 28.00.

### *3.1 Sample Description*

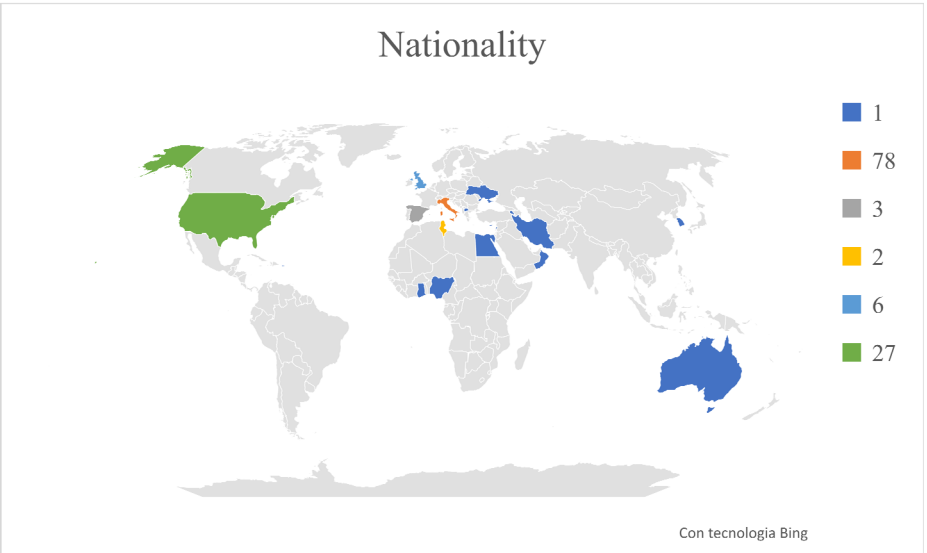
The sample consists of N = 133 respondents, aged between 26 and 65 years, with a mean age of M = 50,14. The reported years of service range from 1 to 43, with a mean of M = 20,12. Most respondents fall within the higher percentiles, between the 50th and 75th percentiles: 37,6% are between the ages of 46 and 55, and 30,8% are between 56 and 65. In terms of years of service, the distribution is more balanced, though there is a predominance (32,3%) of teachers reporting between 21 and 30 years of experience.

*Tab. 1 - Mean and percentiles – Age and years of teaching service*

| | | Age | Years of teaching service |
|---|---|---|---|
| N | Valid | 133 | 132 |
| | Missing | 0 | 1 |
| Mean | | 50,14 | 20,12 |
| Std. Deviation | | 9,177 | 10,602 |
| Percentiles | 25 | 44,00 | 11,00 |
| | 50 | 51,00 | 20,00 |
| | 75 | 58,00 | 28,00 |

The sample shows a predominance of teachers working in lower secondary (36%) and upper secondary schools (36%), while preschool teachers (2,3%) and university professors (6%) are significantly underrepresented. This imbalance in the sample, while limiting its representativeness, paradoxically serves as a strength by allowing for more focused and context-specific reflections, given that this study does not aim for generalizability due to the small and non-statistically selected sample.

Since the survey was distributed through Facebook groups worldwide, the geographic distribution of respondents is also noteworthy: the majority are Italian (78), with a substantial group of U.S. participants (27) and British respondents (6), as well as a presence of participants from Asia and Africa.




*Graph. 1 - Nationality - planisphere*

## 4. Results

Table 2 presents the codes and themes identified in the responses to the first question, which pertained to the educational activities in which AI is employed.

The first code registers N = 28 occurrences, indicating that 21% of respondents do not employ Artificial Intelligence in their teaching practices. Notably, these respondents are predominantly teachers with less experience (32,3%), from upper secondary schools (23%), and aged between 45-55 years (28%).

The remaining respondents report using AI in various activities, such as personalization and the production of artifacts (generative AI assists with the creation of quizzes, presentations, mind maps, and images). Regarding "activities," these range from gamification to exercise correction, from character animations to foreign languages. In terms of "writing," AI is employed for text simplification based on the age of the recipients and for summarizing topics.

*Tab. 2 - Codes and themes – didactic activities (question 1)*

| | |
|---|---|
| **do not use** | Do not use - do not use because they are small |
| **personalization** | tool for self-correction and metacognition, support for individual study |
| **functional activities** | programming, email, design, for preparing lessons, drafting projects, organizing UDAs |
| **material production** | teaching materials, creating images, creating a board game, creating web artifacts, creating quizzes, mind maps, presentations, creating an intelligent object |
| **activities** | civic education activities, group work, improving writing, creating scenarios for debates, gamification for engagement, laboratory activities, correcting exercises, animations, English activities, explaining complex topics |
| **on texts** | creative writing, topic synthesis, text simplifications |
| **specific AI activities** | creating chatbots, to create characters to interact with, reflection on the credibility of information, useful for fact-checking |

*Tab. 3 - Contingency table School level – do not use*

| | | | School level | | | | | Total |
|---|---|---|---|---|---|---|---|---|
| | | | preschool | primary | middle school | high school | university | |
| **Do not use** | 0 | Count | 3 | 20 | 38 | 37 | 6 | 104 |
| | | % within school level | 100,0% | 83,3% | 79,2% | 77,1% | 75,0% | 79,4% |
| | 1 | Count | 0 | 4 | 10 | 11 | 2 | 27 |
| | | % within school level | 0,0% | 16,7% | 20,8% | 22,9% | 25,0% | 20,6% |
| **Total** | | Count | 3 | 24 | 48 | 48 | 8 | 131 |
| | | % within school level | 100,0% | 100,0% | 100,0% | 100,0% | 100,0% | 100,0% |

| |
|---|
| Rewriting journal articles to make them suitable for students |
| I am using AI to adjust reading levels of text, create vocabulary lists, create IEP goals, and create lesson plans. |
| Text Leveler Tool |
| Take any text and adapt it for any grade level to fit a student's reading level / skills |

Lastly, specific AI activities include the creation of dialogues with historical figures and those related to media education, particularly in verifying the credibility of information. Additionally, there are considerations beyond the scope of the question, such as time-saving, which is a recurring theme throughout the dataset.

| |
|---|
| It saves time |
| With the appropriate adjustments and correct guidance, significant results can be achieved in a short time |
| [...] in order to minimize time wastage |
| [...] I spend significantly less time. |
| In a short period, I obtain a solid framework on which to build my work<br>Rubrics and lesson planning save time and effort |

Regarding non-teaching activities, N = 29 teachers report not using AI for any such tasks. The remaining respondents primarily employ it for planning, both at the micro level (lesson plans) and the meso level (creating learning units), as well as for generating rubrics and quizzes. AI is also used for administrative or bureaucratic tasks, such as meeting minutes, reports, or emails.

| |
|---|
| Lesson plans, leveled readings and creating assessments. |
| I use it for more the backend of lesson planing and creating worksheets. |
| Create lessons, ideas for unit plans, summarise and create questions for videos and texts. |
| Class preparation, rubrics, worksheet preparation: I really use a lot of time doing these and I think that AI can really help me |
| I use it for lesson planning- lesson planner, unit planner, YouTube question generator, vocabulary |
| I also use it for reports, since it helps me reduce the amount of time I dedicate to them |
| Lesson creation, educational content, documentation. In a short period, I obtain a solid framework on which to build my work |

The idea-generating function is also noteworthy: AI is used as a springboard to spark the creative process, with teachers subsequently refining the output through further prompts or making autonomous adaptations.

| |
|---|
| I use ai as a thought trampoline, something to bounce ideas off, something to create an example of a video or essay to see if I like where my ideas are going and what I might expect to get back from students |

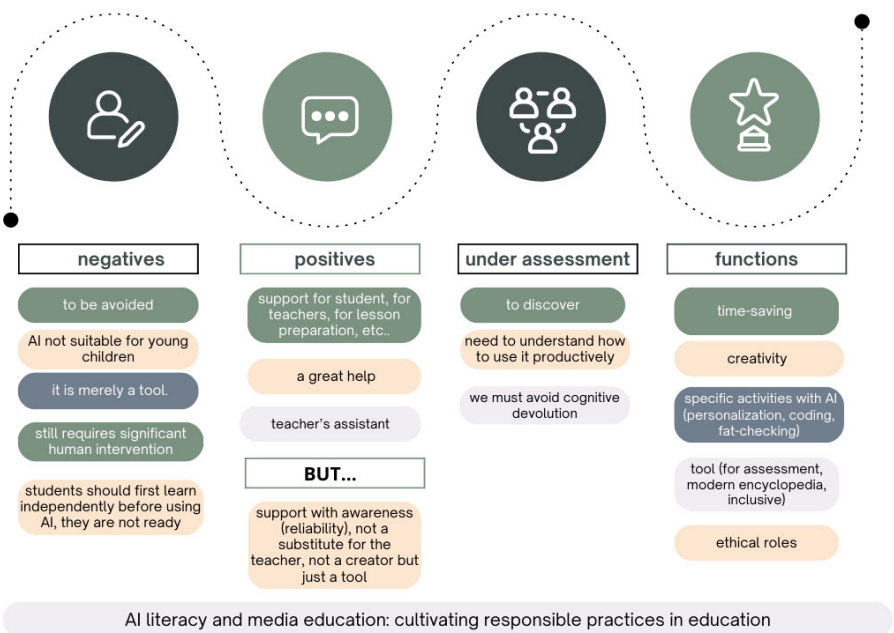
With the fourth question, addressing the risks associated with AI, a more evaluative and reflective stance replaces the descriptive one. Regarding cognitive risks, teachers believe that if students increasingly rely on Artificial Intelligence to solve their problems or complete tasks, they will fail to develop the necessary skills. This could gradually lead to a decline in cognitive and creative functions, a form of "cognitive devolution" to AI. Additionally, teachers emphasize the need to educate students on the conscious and ethical use of AI, particularly with respect to the issue of plagiarism. A final concern pertains to privacy management, as students are not fully aware of the risks associated with sharing their personal data with AI systems.

The next question concerns activities that will become obsolete. Respondents focus on "time-filler" activities, those stemming from pedagogical schemes, routines, or formats (Pentucci, 2018), as well as mechanical and repetitive tasks such as summaries or translations. In general, activities where students are not creative and play a passive role will be replaced. The same fate awaits functional tasks, such as meeting minutes, assessments, and planning.

The final question is dedicated to a concluding reflection. To facilitate readability and make the situation described by the codes immediately visible,

a graphical representation is provided, where the themes are further grouped into broader categories.

| |
|---|
| The risk could be an over-reliance on it at the expense of personal creativity. |
| Students must be guided in the critical use of the tool so that it is useful and not just a shortcut to work even more superficially than they already do. |
| Yes, I see a decreased lack in critical/analytic thinking which will lead people to rely on AI for definitive answers. Students are already bombarded with information and they believe AI is always right, when we know this is not the case. |
| Yes. A decrease in independent and critical thinking from students. |
| Yes—any shortcut will be a temptation for the work of developing skills…so students are often using AI, not even reading what they submit, and not even aware of what they know and don't know but seeing text as enough regardless of relevance. Many teachers I work with are exhausted and overworked and also don't care to assess the quality or relevance either, so any words are accepted for full credit. This is a perpetuating cycle where students think they're then doing "all" they need to do, and the message is wrongly reinforced that the content doesn't matter—only completion and surface level style. |
| Uncontrolled use by those, students or teachers, who are unaware of the type of tool, confusing it for a guru or a place to plagiarize from. |
| Students need to be guided in the critical use of the tool so that it is useful and not just a shortcut to working even more superficially than they already do.<br>People completely trusting it and not using it as a tool. |




*Graph. 2 - Theme and codes question 6*

The negative judgments are decisive, with a clear need for control: AI is not to be trusted, and therefore a strong intervention by teachers is still necessary.

| |
|---|
| Absolutely to be avoided. Students already rely too much on technology without any critical thinking, filtering, or reasoning.<br>It's a double edged sword. |
| I think it has its place…we need to be out in front, not behind. |
| It's really difficult to know, it can be very beneficial for students and teachers, but also really dangerous at the same time, so I'd say it's just a source of help that needs to be continuously checked. |

There are also many positive opinions, which fall under the theme labeled "support": AI is seen as an important aid for teachers, as it helps to speed up many tasks. However, there is a "but." AI is considered merely a tool, not a replacement for teachers; it is essential to raise students' awareness that AI should be used as a support, not as a problem-solver or a creator of original content.

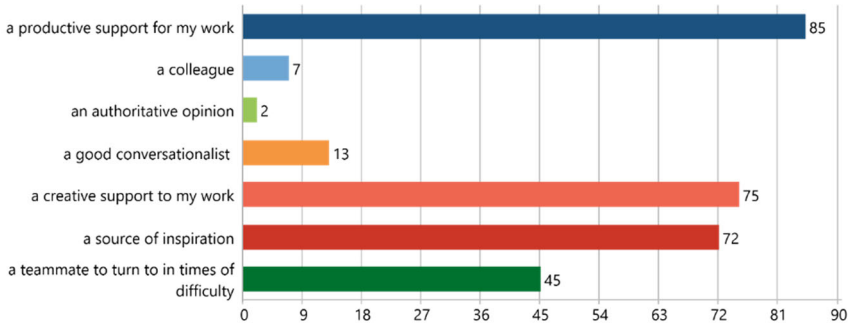
| |
|---|
| AI can become an ever-present teacher to help answer doubts, uncertainties, etc. A modern encyclopedia. |
| I consider AI an excellent aid in the educational field, especially as a support for preparing lessons, creating differentiated programs, and improving inclusion.<br>AI is an important tool that can be used as a teacher assistant because students can use it as a 24/7 teacher. It can be used to get feedback, create things, and much more. |
| As a time-saver for teachers in England where "extra tasks" appear to be never-ending, AI can definitely provide opportunities to save precious moments trawling the internet/making resources. |

Another group responds in a more descriptive manner, highlighting the functions of AI, such as time-saving. From an ethical perspective, AI can be seen as an inclusive tool, thanks to its ability to personalize learning, and democratic, as it makes knowledge (albeit mediated) accessible to everyone. However, this is always accompanied by the need for conscious use, guided by media education principles.

| |
|---|
| The use of AI in education can help teachers quickly diversify the content they propose, meeting the needs of all students. |
| It gives you a personalized learning experience, figures out what you need to learn, and offers feedback with e-learning solutions. |
| Intelligent use of AI could stimulate the ability to analyse the truthfulness of given information. |
| It is a great tool when properly used. Like everything, it should be balanced out. |
| I believe it is a great opportunity for the democratization of education, as it will allow students in difficulty and from disadvantaged backgrounds to achieve good learning outcomes. |

Finally, teachers were asked to select up to three expressions from a list that, in their view, best define Artificial Intelligence.

AI is primarily seen as a productive support, and the contingency tables that cross these results with demographic variables reveal a substantial homogeneity across groups in their responses, with one notable exception. AI is considered a creative support predominantly in primary education (66,7%), whereas it is viewed mainly as a "productive support" by secondary school teachers (70%).




*Graph. 3 - Bar chart checkbox question*

## 5. Discussion of Results

### *5.1 Time Savings*

Across various questions, teachers consistently referenced the time savings afforded by Artificial Intelligence. This applies both to strictly educational activities (such as personalized feedback, simplification of teaching materials, increased frequency of assessment opportunities, and the creation of quizzes and assignments) as well as to functional tasks. There is a clear sense of relief regarding the time saved in carrying out these administrative and bureaucratic duties (Surugiu et al., 2024), which are often perceived by teachers as particularly burdensome and frustrating. Tasks such as lesson planning, micro and macro-level project design, in which AI systems – customized for educational use and trained with governmental guidelines for learning outcomes – have become highly efficient and productive.

The idea of gaining time for other tasks, particularly to focus more on student interaction («AI can already automate grading homework, evaluating essays which allows instructors to spend more time with students one-on-one,» Chen et al., 2020) and on innovation and experimentation, appears to be one of the most favorably viewed aspects of Artificial Intelligence.

One of the most interesting time-saving aspects concerns assessment (Kamalov et al., 2023): AI enables the scaling up of both formative and summative assessments, significantly increasing the opportunities to provide feedback (Ranieri et al., 2024). This is because AI relieves teachers from a range of time-consuming tasks related to the design and execution of assessments, which would otherwise be unsustainable if repeated daily. By digitizing the entire process, through tools that can record student responses, AI can also manage datasets to produce analyses aimed at understanding the

longitudinal progress of the class. Working with learning analytics allows teachers to collect a wealth of information, which can be used to identify educational needs, adjust instructional planning, and refine methodologies and tools used. Furthermore, if these results are shared with students, it gives them the opportunity to reflect on their learning, self-regulate their study methods, and communicate their self-identified needs to the teacher (Giannandrea, Ferrari and Laici, 2024). In this way, assessment becomes another avenue for learning (Giannandrea, 2019).

Thus, AI, by saving time, initiates a chain of positive effects that ultimately benefit the student.

### *5.2 Humanization*

Another interesting aspect that emerged from teachers' statements is the strong conviction that AI cannot replace educators. On one hand, this belief is supported by a series of apocalyptic theories fueled by sensationalist journalism (Floridi, 2022), interventions by prominent technologists like Bill Gates and Elon Musk, and an archetypal fear of humans feeling the need to defend themselves from their own creations (Cristianini, 2024). On the other hand, this underlying need stems from a tendency among respondents to humanize the machine. The «ghosts» of Artificial Intelligence are always lurking, forming a heavy legacy that not only accompanies but precedes its advancement (Pireddu and Moriggi, 2024, p. 16).

This is evident both in the way AI is addressed, often as if it were a subject rather than a tool, and in the refrain that "AI is just a tool," which reflects a reluctance to admit that creativity and reasoning are not "exclusively human prerogatives" (Pireddu and Moriggi, 2024, p. 17). The question arises: why is there a persistent need to emphasize that a technological application is merely a machine?

AI's ability to respond in conversational terms, to even make jokes, and to semantically interact in ways that are often coherent and similar to human dialogue leads to its perception as an assistant with human traits – almost a competitor. The capacity for dialogue is far from trivial; the machine must track interactions, reprocess them, and reuse them even after several exchanges. Essentially, it must be able to «imitate human behavior» (Cristianini, 2024, p. 20). While AI is often thought of as «intelligent», in reality, it is simply a tool for «artificial communication» (Esposito, 2022, p. 11).

When instinctual reactions give way to educational media awareness, rationality intervenes, clarifying that behind tools like ChatGPT, for instance, there is no human subject (aside from those randomly reviewing responses) (Pireddu and Moriggi, 2024), but rather a probabilistic language model.

Specifically, a «low cross-entropy probabilistic language sequencer» (Accoto, 2024, p. 63), trained on textual material, yet capable of learning from its mistakes.

It is precisely this latter characteristic that makes AI so fearsome (Cristianini, 2024): the more it errs, the more it improves, largely through interaction with humans. This creates the perception that it is destined for autonomous growth and potentially in conflict with human beings, who feel the need to fortify boundaries and reaffirm their ontological exclusivity. In the educational field, teachers emphasize to students that AI's role will always remain secondary to the control of classroom dynamics, which firmly rests in their hands. In the end, this deep-seated concern may not be entirely irrational, especially when even governmental institutions have felt the need to reiterate this (UNESCO, Beijing Consensus, 2019, point 12: «Be mindful that teachers cannot be replaced by machines»).

### *5.3 Cognitive devolution*

In addition to concerns about AI potentially replacing teachers, there are also more strictly pedagogical fears. Teachers repeatedly expressed the belief that relying on Artificial Intelligence to solve problems could lead to cognitive devolution – that is, allowing machines to solve problems for students could weaken their reflective and logical abilities, which, if increasingly underutilized, might atrophy over time.

The neuroplasticity of a child's brain allows for improved performance through the exercise of cognitive functions, which drives learning (Dehaene, 2019). If students are not asked to solve math problems or translate from a foreign language, consistently outsourcing these tasks to machines, they will lose the skills associated with such tasks.

At this point, the path diverges: it is necessary to determine whether this presents a problem or simply reflects an evolution in education. If, for instance, more mechanical tasks such as summaries, translations, or information retrieval are destined to disappear (as suggested by responses to question 5), it is not necessarily a cause for concern. Future students may be engaged in new classes of problems that surpass procedural operations, leading to the creation of more complex outputs.

Two examples illustrate this: if the traditional practice of translation is abandoned, AI could still support language learning by using chatbots to engage students in real-time conversations, enabling them to learn the language in context rather than through static methods tied to grammar instruction (Pokrivcakova, 2019). Similarly, if information retrieval is delegated to AI, students will need to develop a far more complex skill: the ability to evaluate

that information, also known as data literacy (Rivoltella, 2024). This advanced critical competency is foundational to the profile of an active citizen, crucial for making informed personal, political, and social decisions (Rivoltella, 2020). Thus, the question is not whether Artificial Intelligence will make us intellectually poorer, but rather how it will change the way we learn, navigate the information age (Floridi, 2014), and act within postmodernity – where technology, even if obstinately rejected by some, remains ever-present, concealed among objects (Eugeni, 2015), and inseparable from analog life.

### *5.4 Lack of trust and the need for intervention*

Even when Artificial Intelligence is praised by teachers, it always seems to be accompanied by a "but." Few embrace it unconditionally; most place restrictions or at least conditions that reflect a general lack of trust. The issue is not only ethical but also substantial, stemming from the hallucinations observed in the outputs generated by various applications. Cristianini (2024) reports on an experiment with a dataset, TruthfulQA, created to test ChatGPT4: the results showed that humans answered correctly 94% of the time, while ChatGPT 4 only 60%.

Some teachers, in fact, criticize the lack of autonomy in generative models: if constant intervention is required to fine-tune the results, what is the point of Artificial Intelligence? Why produce work that always needs supervision?

Beyond content accuracy, outputs must also be contextualized for the specific class. A well-known program, MagicSchool AI, advises newly registered teachers to:

- use the 80-20 method, leveraging AI for the initial work and adding the final touches to review reliability and contextualize (the 20%);
- rely on their own judgment;
- protect privacy.

It is within this 20% that the key issue lies: it is, once again, a matter of time and opportunity. In today's increasingly complex school environment, with ever-growing demands in terms of planning, training, diverse student needs, and new educational challenges, saving 80% of the workload could make a significant difference. It is one thing to create a project report from scratch and another to tailor its specific details to the initial situation.

This brings us back to media-education reflection: we are facing an entirely new educational paradigm that encourages the exploration of new operational pathways and ways of thinking. The approach must evolve, and so too must the reflection on opportunities and areas of application. For example, to ensure privacy, meeting minutes from a class council, which contain highly confidential information, should not become material for AI reprocessing. AI

operates in a black box where the data it consumes is often beyond the full understanding of users, particularly with tools that are not open access and whose internal workings remain largely unknown.

### *5.5 The idea to get started*

Comments related to this observation are not widespread, but they are significant. Braun and Clarke (2016) state that a code appearing even just once can sometimes be more informative than others that occur multiple times. Some teachers noted that AI provides that initial "jump off the diving board" needed to start an activity, offering inspiration when a blank canvas inhibits progress, becoming an operational assistant in the creation of an intellectual work. In this case, the roles reverse: AI provides the initial spark, and then the teacher intervenes with their own creativity.

This could raise other ethical concerns, particularly around authorship. If the initial idea comes from AI, to whom should the credit for the final project go? Moreover, considering that models like ChatGPT work by reprocessing textual training data, the generation of output is, in reality, still a reproduction of pre-existing material.

Setting aside judgment on this issue, which is, after all, the subject of study in other epistemologies (UNESCO, 2023, p. 19), attention should instead be focused on AI's creative value (Pireddu, 2024). It might be unexpected for a mathematical and probabilistic model to be considered creative, yet many teachers assert this with confidence. AI not only plays an interesting role in aesthetic and cultural analysis (Manovich, 2023), but it is also artistically generative (Manovich, 2020). In schools, AI's creativity is linked to the generation of images or videos, as well as the design of innovative, engaging, and motivating educational pathways. Indeed, when appropriately trained and customized, these tools can generate content that assists teachers in advancing experimentation. Having a tool to spark ideas and foster reasoning can also serve as an incentive for methodological and educational innovation, even when teachers lack the necessary institutional support or sufficient training.

## 6. Conclusions

In conclusion, teachers' perceptions of the use of Artificial Intelligence in education are multifaceted and nuanced. On the one hand, many educators value the time-saving benefits that AI offers, streamlining administrative and instructional tasks such as creating learning materials and managing assessments, thereby allowing them to devote more attention to direct

engagement with students. This relief, stemming from the reduction of administrative burdens, is seen as a positive outcome of AI's introduction, which is widely regarded as a tool that enhances educational efficiency.

However, concerns also emerge regarding the over-humanization of AI, with some teachers feeling the need to reaffirm their central role in the educational process. While AI's ability to mimic human-like behavior raises questions about its potential impact, educators are generally aware that AI remains a tool, not a replacement for teachers. The fear of a cognitive devolution reflects the apprehension that excessive reliance on AI may erode students' critical thinking skills, although many believe that the real challenge lies in integrating AI to foster new modes of learning rather than merely replacing traditional tasks.

Lastly, the lack of full trust in AI – particularly the need to review and correct its outputs – suggests that many teachers still perceive limitations in the technology's reliability. Nonetheless, the general sentiment is that AI can provide valuable preliminary support, especially in fostering pedagogical innovation, enabling teachers to explore new ideas and creative approaches in their practice.

For the future, building on these considerations from this exploratory study, several themes could be investigated with a more reflective and in-depth approach, such as the time-saving benefits, the excessive humanization of AI and the risk of cognitive devolution.

## References

Accoto C. (2024). Protomedialità. Un azzardato orizzontare. In S. Moriggi (ed.). *Postmedialità. Società ed educazione*. Raffaello Cortina Editore.

Akgun S., Greenhow C. (2022). Artificial intelligence in education: Addressing ethical challenges in K-12 settings. *AI and Ethics*, 2(3): 431-440. DOI: 10.1007/s43681-021-00096-7.

Al Darayseh A. (2023). Acceptance of artificial intelligence in teaching science: Science teachers' perspective. *Computers and Education: Artificial Intelligence*, 4. DOI: 10.1016/j.caeai.2023.100132.

Alwaqdani M. (2024). Investigating teachers' perceptions of artificial intelligence tools in education: potential and difficulties. *Education and Information Technologies*. DOI: 10.1007/s10639-024-12903-9.

Bezjak S. (2024). Perceptions and Perspectives: Understanding Teachers' Attitudes Towards AI in Education. *Development*, 23, 25.

Braun V., Clarke V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, 3(2): 77-101.

Braun V., Clarke V. (2022). *Thematic Analysis: A Practical Guide*. Sage Pubblication.

Celik I. (2023). Towards Intelligent-TPACK: An empirical study on teachers' professional knowledge to ethically integrate artificial intelligence (AI)-based tools into education. *Computers in Human Behavior*, 138. DOI: 10.1016/j.chb.2022.107468.

Chen L., Chen P., and Lin Z. (2020). Artificial Intelligence in Education: A Review. *IEEE Access*, 8: 75264-75278. DOI: 10.1109/ACCESS.2020.2988510.

Choi S., Jang Y., and Kim H. (2023). Influence of Pedagogical Beliefs and Perceived Trust on Teachers' Acceptance of Educational Artificial Intelligence Tools. *International Journal of Human-Computer Interaction*, 39(4): 910-922. DOI: 10.1080/10447318.2022.2049145.

Chounta I. A., Bardone E., Raudsep A., and Pedaste M. (2022). Exploring Teachers' Perceptions of Artificial Intelligence as a Tool to Support their Practice in Estonian K-12 Education. *International Journal of Artificial Intelligence in Education*, 32(3): 725-755. DOI: 10.1007/s40593-021-00243-5.

Cristianini (2024). *Machina Sapiens. L'algoritmo che ci ha rubato il segreto della conoscenza*. il Mulino.

Cunningham-Nelson S., Boles W., Trouton L., and Margerison E. (2019). A review of chatbots in education: practical steps forward. In 30th annual conference for the australasian association for engineering education (AAEE 2019): educators becoming agents of change: innovate, integrate, motivate (pp. 299-306). Engineers Australia.

Dahene S. (2019). *Imparare. Il talento del cervello, la sfida delle macchine*. Raffaello Cortina Editore.

Davis F. D., Bagozzi R. P., and Warshaw P. R. (1989). Technology acceptance model. *Journal of Management Science*, 35(8): 982-1003.

Esposito E. (2022). *Comunicazione artificiale. Come gli algoritmi producono intelligenza sociale*. Bocconi University Press.

Eugeni R. (2015). *La condizione postmediale*. La Scuola.

Floridi L. (2014). *La quarta rivoluzione. Come l'infosfera sta trasformando il mondo*. Raffaello Cortina Editore.

Floridi L. (2022). *Etica dell'intelligenza artificiale. Sviluppi, opportunità e sfide.* Raffaello Cortina Editore.

Giannandrea L. (2019). Valutazione, feedback, tecnologie. In P. C. Rivoltella and P. G. Rossi (Eds.), *Tecnologie per l'educazione* (prima edizione). Pearson.

Giannandrea L., Ferrari S., and Laici C. (2024). Tecnologie per la riflessione e l'autovalutazione. E-portfolio, feedback, open badge. In P. C. Rivoltella and P. G. Rossi (Eds.), *Tecnologie per l'educazione*. Pearson.

Hitchcock J. H., Onwuegbuzie A. J. (2020). Developing Mixed Methods Crossover Analysis Approaches. *Journal of Mixed Methods Research*, 14(1): 63-83. DOI: 10.1177/1558689819841782.

Hwang G. J., Chang C. Y. (2023). A review of opportunities and challenges of chatbots in education. *Interactive Learning Environments*, *31*(7): 4099-4112. DOI: 10.1080/10494820.2021.1952615.

Jandrić P., Knox J., Besley T., Ryberg T., Suoranta J., and Hayes S. (2018). Postdigital science and education. *Educational philosophy and theory*, 50(10): 893-899.

Joo Y. J., Park S., and Lim E. (2018). Factors influencing preservice teachers' intention to use technology: TPACK, teacher self-efficacy, and technology acceptance model. *Journal of Educational Technology & Society*, 21(3): 48-59.

Kamalov F., Santandreu Calonge D., and Gurrib I. (2023). New Era of Artificial Intelligence in Education: Towards a Sustainable Multifaceted Revolution. *Sustainability (Switzerland)*, 15(16). DOI: 10.3390/su151612451.

Kaplan-Rakowski R., Grotewold K., Hartwick P., and Papin K. (2023). Generative AI and Teachers' Perspectives on Its Implementation in Education. *Journal of Interactive Learning Research*, 34(2).

Kim J. (2024). Leading teachers' perspective on teacher-AI collaboration in education. *Education and Information Technologies*, 29(7): 8693-8724. DOI: 10.1007/s10639-023-12109-5.

Kim N. J., Kim M. K. (2022). Teacher's Perceptions of Using an Artificial Intelligence-Based Educational Tool for Scientific Writing. *Frontiers in Education*, 7. DOI: 10.3389/feduc.2022.755914.

Knox J. (2020). Artificial intelligence and education in China. *Learning, Media and Technology*, 45(3): 298-311. DOI: 10.1080/17439884.2020.1754236.

Kooli C. (2023). Chatbots in Education and Research: A Critical Examination of Ethical Implications and Solutions. *Sustainability (Switzerland)*, 15(7). DOI: 10.3390/su15075614.

Lo C. K. (2023). What Is the Impact of ChatGPT on Education? A Rapid Review of the Literature. *Education Sciences*, 13(4). DOI: 10.3390/educsci13040410.

Luckin R., George K., and Cukurova M. (2022). *AI for school teachers*. CRC Press.

Malterud K., Siersma V. D., and Guassora A. D. (2016). Sample Size in Qualitative Interview Studies: Guided by Information Power. *Qualitative Health Research*, 26(13): 1753-1760. DOI: 10.1177/1049732315617444.

Manovich, L. (2020). *L'estetica dell'intelligenza artificiale: Modelli digitali e analitica culturale*. Luca Sossella Editore.

Manovich L. (2023). *Cultural analytic. L'analisi computazionale della cultura*. Raffaello Cortina Editore.

Mogavi R. H., Deng C., Kim J. J., Zhou P., Kwon Y. D., Metwally A. H. S., ... and Hui P. (2024). ChatGPT in education: A blessing or a curse? A qualitative study exploring early adopters' utilization and perceptions. *Computers in Human Behavior: Artificial Humans*, 2(1), 100027.

Panciroli C., Rivoltella P. C. (2023). *Pedagogia algoritmica. Per una riflessione educativa sull'intelligenza artificiale*. Scholé.

Pentucci M. (2018). *I formati pedagogici nelle pratiche degli insegnanti*. FrancoAngeli.

Pireddu M., Moriggi S. (2024). *L'Intelligenza Artificiale e i suoi fantasmi: Vivere e pensare con le reti generative*. Il Margine.

Pireddu, M. (2024). La scatola nera di Dürer. Apprendimento automatico, immaginazione, postmedialità. In Moriggi, S. (ed). *Postmedialità. Società ed educazione*. Raffaello Cortina Editore.

Pokrivcakova S. (2019). Preparing teachers for the application of AI-powered technologies in foreign language education. *Journal of Language and Cultural Education*, 7(3): 135-153. DOI: 10.2478/jolace-2019-0025.

Ranieri M. Bonaiuti G. (2024). La didattica postdigitale. In P.C. Rivoltella, P.G. Rossi (eds.), *Nuovo agire didattico*. Scholé.

Ranieri M., Cuomo S., and Biagini G. (2024). *Scuola e intelligenza artificiale. Percorsi di alfabetizzazione critica*. Carocci.

Rivoltella P.C, (2020). *Nuovi Alfabeti. Educazione e culture nella società post-mediale*. Scholé.

Rivoltella P.C. (2024). *Nuovi alfabeti, nuove culture*. In P.C. Rivoltella and P.G. Rossi (eds.). *Tecnologie per l'apprendimento*. Seconda edizione. Pearson.

Sarsini D., Cambi F., Mariani A., and Giosi M. (2017). *Pedagogia generale. Identità, percorsi, funzione*. Carocci.

Sharma R. C., Kawachi P., and Bozkurt A. (2019). The landscape of artificial intelligence in open, online and distance education: Promises and concerns. *Asian Journal of Distance Education*, 14(2): 1-2.

Surugiu C., Gradinaru C., and Surugiu M.-R. (2024). Artificial Intelligence in Business Education: Benefits and Tools. *Amfiteatru Economic*, 26(65), 241. DOI: 10.24818/EA/2024/65/241.

Timms M. J. (2016). Letting artificial intelligence in education out of the box: educational cobots and smart classrooms. *International Journal of Artificial Intelligence in Education*, 26: 701-712.

Trinchero R. (2004). *I metodi della ricerca educativa*. Laterza.

UNESCO (2023). *Guidance for generative AI in education and research. In Guidance for generative AI in education and research*. UNESCO. DOI: 10.54675/ewzm9535.

UNESCO (2019). *BEIJING CONSENSUS on artificial intelligence and education*. https://en.unesco.org/themes/ict-education.

Yau K. W., Chai C. S., Chiu T. K. F., Meng H., King I., and Yam Y. (2023). A phenomenographic approach on teacher conceptions of teaching Artificial Intelligence (AI) in K-12 schools. *Education and Information Technologies*, 28(1): 1041-1064. DOI: 10.1007/s10639-022-11161-x.