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Perception on artificial intelligence to support teaching: first results of an exploratory survey

La percezione sull'intelligenza artificiale a supporto della didattica: Primi risultati di una indagine esplorativa

di

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Abstract:

International studies analyzing AI in its different contexts of application, not least the educational one, in which its impact in teaching-learning processes is explored in depth, are several (Luckin, 2018; Holmes et alii, 2019) and all of them reflect on the effect it can have in terms of teachers' skills and what are the benefits and risks consequent to its use (Celik et al., 2022; Ji et al., 2023; Nirchi, 2023, Salas-Pilco et al., 2023). Precisely by starting from the analysis of the weight that AI has on the training and professionalism of teachers, this study aims to analyze the perceptions of new hires in the use of different AI solutions to design and organize their teaching, intercepting which elements are considered positive and capable of improving educational action and which ones, on the other hand, are considered negative and fuel resistance to its use in teaching.

Keywords: AI, newly hired teachers, teachers' perceptions, AI risks and benefits.

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Abstract:

Gli studi internazionali che analizzano l'AI nei suoi diversi contesti di applicazione, non ultimo quello educativo, nel quale si approfondisce il suo impatto nei processi di insegnamento-apprendimento, sono diversi (Luckin, 2018; Holmes *et alii*, 2019) e tutti riflettono la ricaduta che essa può avere in termini di competenze dei docenti e di quali siano i vantaggi e i rischi conseguenti al suo utilizzo (Celik et al., 2022; Ji et al., 2023; Nirchi, 2023, Salas-Pilco et al., 2023). Proprio partendo dall'analisi del peso che l'AI ha sulla formazione e professionalità dei docenti, questo studio si pone come obiettivo quello di analizzare la percezione dei neoassunti nell'uso di differenti soluzioni AI per progettare e organizzare la propria didattica, intercettando quali sono gli elementi ritenuti positivi e in grado di migliorare l'agire educativo e quali quelli invece ritenuti negativi e che alimentano delle resistenze ad un suo impiego nella didattica.

Parole chiave: AI, docenti neoassunti, percezione dei docenti, rischi e benefici dell'AI.

1. Introduction

The growing development of digital innovation cannot but affect the educational world as well. We live in a world increasingly connected and permeated by technologies, to the point that the pervasiveness achieved by digital tools allows us to live constantly online (Floridi, 2015), and it is precisely within this dimension of constant connection that Artificial Intelligence (henceforth AI) is assuming a predominant role. There are many international studies analyzing AI in its various contexts of application, not least educational, in which its impact in teaching-learning processes is explored (Luckin, 2018; Holmes et al., 2019) and reflected on how it can represent a major challenge for teachers (Celik et al., 2022; Ji et al., 2023; Nirchi et al., 2023, Salas-Pilco et al., 2023). Indeed, it is from an analysis of the weight AI has on teacher education and professionalism that its significant role in: redefining teaching methodologies and tools; enabling the acquisition of those digital skills necessary to govern the rapid changes to which society is subjected, especially from a technological point of view (Hwang & Chen, 2023); personalizing the training proposal from the needs of their students, thus achieving positive outcomes from the point of view of interest and motivation toward the content delivered (Chan, 2023); and easily accessing a rich repertoire of digital resources, which can be a valuable aid in the design of the training intervention (Glaser, 2023). In the wide range of studies in the literature on AI, those investigating teachers' perceptions of its use in teaching represent a limited number (Chounta et al., 2022; Pitrella et al., 2023). This essay will report the first outcomes of an exploratory survey¹ conducted on newly hired teachers' perceptions about the employment of AI as a support to the instructional process (Zhang et al., 2023). Specifically, we have mainly analyzed two main ways of integrating AI in education: as a topic to be explored in school, to develop

¹ The investigation that is still in progress is conducted under the scientific responsibility of the author based on the partnership between the University of Roma Tre and Indire (for whose institution the scientific responsibility is Dr. Giuseppina Rita Jose Mangione)

knowledge, skills and awareness in future generations; and as a tool to support the teacher to improve the analysis, enhancement and effectiveness of the students' learning process and their own teaching actions.

With respect to this second dimension, the idea that AI tools can act as teachers' personal tutors suggests a potential change in the way we conceive of education and transmit knowledge. In light of this, we found it important to analyze teachers' perceptions of making use of different AI solutions to design and organize their teaching, intercepting which elements are considered positive and able to improve educational action and which, on the other hand, are considered negative and fuel resistance to its use.

2. Teachers' perceptions about AI between potentials and risks in its use

Knowing what newly hired teachers think about the use of AI in their educational action is certainly an important aspect in order to understand what a proper integration of AI in the educational context can be (Mingyeong & Lee, 2023; Moriggi, Pireddu, 2024) and what actions can be taken to accompany this process. Since this is a rather recent research topic (Chounta et al., 2022; Pitrella et al. 2023), in order to fully understand what the possible obstacles to its possible use might be, it is necessary to start from past studies that return us to a certain skepticism and resistance on the part of teachers to the use of AI in the educational field, (Istenic et al, 2021), compared instead with a predilection for more traditional teaching methodologies and strategies (Tallvid, 2016); a skepticism that can be traced mainly to the fact that they see AI more as a threat to their role as teachers than as a benefit to educational action (Luckin et al., 2016). From this scenario, as a result, it becomes important in terms of research to analyze which aspects of AI, more than others, make it possible to overcome these potential obstacles to its use in education and consequently foster widespread confidence in teachers, especially newly hired teachers who are an important target of research, in order to accomplish this task of AI training and to foster its integration into educational practices. To do this, it becomes crucial to understand how competent they feel they are with respect to AI and what risks and/or benefits may have a bearing on its effective and responsible use. With regard to risks, reference is mainly made to: a constant reliance by students on AI to perform their learning tasks (Sullivan et al., 2023); a limitation in the development of critical thinking (van den Berg & du Plessis, 2023); and a difficulty in recognizing the authorship of what is produced by AI and what is produced by students. In terms of benefits, on the other hand, AI can have a positive spin-off in: giving students valuable help in understanding complex concepts; providing students with appropriate feedback to understand how to improve their learning (Baidoo-Anu et al., 2023; Nikolic et al., 2023) and to teachers in confirming the effectiveness of their own instructional action; personalizing educational content and improving the overall quality of learning (Baidoo-Anu et al., 2023); reducing the amount of time it takes for teachers to carry out their own instructional action; and facilitating the construction of verification tools for tracking learning (Herft, 2023).

3. Research on perceptions of newly hired teachers conducted by Roma Tre-INDIRE

Before going into the specifics of the research on the perceptions of new hires, it is necessary to briefly refer to how the AI research began. As specified earlier, the survey referred to in this essay is

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part of a larger research study that began in 2023 as an *international scoping review*, the outcomes of which were presented at the *First International Congress of the University of Serbia* (Nirchi et al., 2023) and as part of which the research team² had the opportunity to think about two aspects: artificial intelligence as an *opportunity* and as a *challenge*. Regarding the opportunities since Artificial Intelligence (AI) represents a disruptive technology for education, we wondered whether it was capable of rethinking teaching and learning processes, supporting personalization activities, democratic access to resources, and the creation of immersive, inclusive and adaptive environments; but also whether it could offer teachers new opportunities to design and manage teaching, gain specific skills, address ethical and social issues related to the use of AI in the classroom, and maintain an active and critical role in the educational process. With regard to AI as a challenge, it cannot be applied to multiple contexts without the necessary technological knowledge, and it must also be taken into account that not all teachers are in favor of AI because of the fear of having to change the way schooling is done. The aim of the scoping review was precisely to ascertain the impact of AI in the educational context with reference to teaching practices and teachers' skills.

We started from the UNESCO framework (UNESCO, 2023) regarding teachers' AI competencies composed of 18 competencies divided into 6 dimensions (human-centered mindset, AI ethics, AI knowledge base, AI skills, AI pedagogy, and professional development), analyzed through 3 areas: understand, apply, create. The *scoping review* revealed some advantages that AI has with respect to certain areas, namely as: supporting teachers in the process of planning and teaching, of improving the quality of instructional delivery; automatic feedback that AI can give teachers with respect to the way they teach through tools such as M-Powering teachers, based on natural language processing; and being able to employ machine learning as a tutoring system. In the face of these outcomes (Nirchi et al., 2023) we questioned what it meant to employ AI for newly hired teachers. We started with the transformative process that began in 2020, referring to the communication of the “Council on European Teachers and Trainers for the Future” (Council, 2020) which reiterated that newly hired teachers should receive additional guidance and mentoring to facilitate the start of their careers and help them cope with the specific needs they face. The question the Council posed was: can the three main elements highlighted as common in many international *induction* models (mentoring, participation in courses and classes, team teaching) as well as other recurring activities (use of a logbook or portfolio) benefit from a conscious and planned use of generative AI in teacher *induction* training in Italy? From these assumptions, we initiated an exploratory survey on the perceptions of newly hired teachers. The idea we started from was that because AI tools can act as personal mentors to teachers, there is a need for a change in the way we conceptualize education and transmit knowledge. The aim of the research was to analyze teachers' perceptions of the use of different AI solutions to design and organize their teaching, intercepting which elements are considered positive and able to improve educational action and which ones are considered negative and fuel resistance to its use.

² The research team consists of: Stefania Nirchi (Roma Tre) and Giuseppina Mangione (INDIRE) as research directors and Conny De Vincenzo (Roma Tre), Maria Chiara Pettenati and Micol Chiarantini (INDIRE).

4. Methodology

4.1 Participants

Participating in the survey (through May 23, 2024) were 1580 teachers who are part of the 46.300 newly hired teachers currently at the end of their probationary year. The mentor teachers are part of 33.451 who are mentoring them. Both groups were directed to the questionnaire page, implemented on Limesurvey and open from March 29, 2024 to May 23, 2024, through the new-hire environment (found on the INDIRE website³). Participation was on a voluntary basis. Given the high participation in the survey, it was decided to still leave the questionnaire open until July 31, 2024.

4.2 Tools

The proposed questionnaire for teachers consists of 33 items taken, translated and adapted from the Teachers' trust in AI-based EdTech (Nazaretsky et al., 2022).

The questionnaire consists of three sections. The first section collects contextual information, while the second section consists of a 15-item scale aimed at investigating teachers' perceptions about the use of AI in education. Participants are asked to express their degree of agreement on specific statements using a 6-point Likert scale. The third section of the questionnaire includes a multiple-choice question in which teachers are asked to self-assess their competence in using AI, choosing from six response options ranging from adaptation to familiarity with the tool. Some of the dimensions investigated are those that are taken up by international studies and pertain to the educational spin-offs that AI can have. Specifically, the newly tenured teacher will be asked to comment with respect to:

Benefits attributed to AI:

- *Class and Behavior Management*: as a support for teachers in managing student and/or whole-class behavior;
- *Assistive Technology*: as an aid to promote access to more equitable education for students with BES (e.g., through reading passages to visually impaired students);
- *Teaching Programming*: AI can be used to teach students programming skills;
- *Gamification*: to facilitate the use of educational games to make teaching more engaging and fun;
- *Adaptive Learning*: to make teaching more personalized to each student's knowledge, skills and abilities, thus improving learning effectiveness;
- *Lesson Planning*: as support for teachers in planning their teaching and lessons;
- *Assessment*: AI can be used to evaluate student evidence;
- *Diagnosis*: AI can support teachers in diagnosing difficulties in reading and learning, enabling early intervention.
- *Analysis and interpretation of learning data*: AI can assist in the analysis and interpretation of learning test outcomes and thus enable improvements in the educational process.

³ 2024/<https://neoassunti.indire.it/>

Disadvantages attributed to AI:

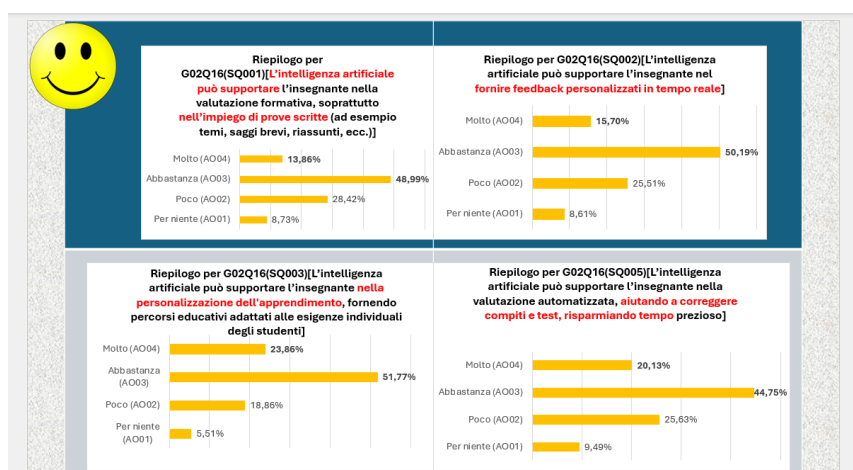
- *Quality of human interaction:* AI does not keep the educational relationship alive;
- *Lack of emotional support:* AI does not allow for emotional support of the struggling student in his or her learning process;
- *Impact on learning:* there is no evidence on the long-term impact of AI on student learning;
- *Poor teacher training:* teachers are poorly trained in the use of AI tools for teaching.

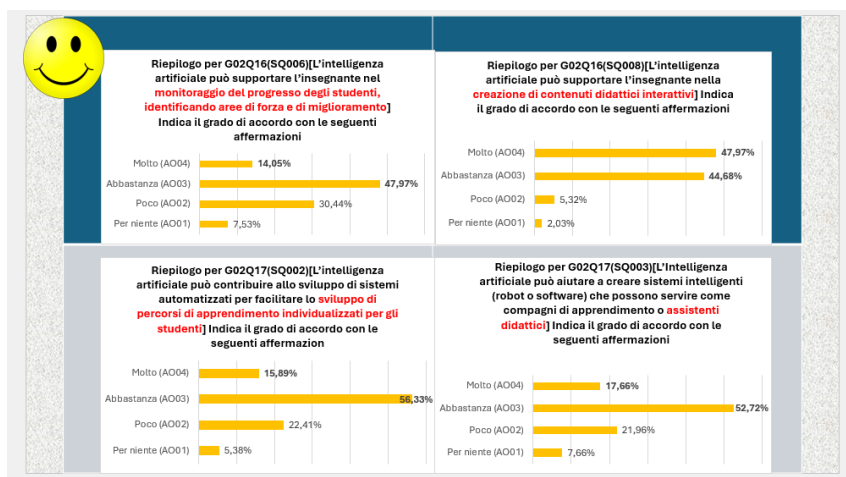
A careful analysis of the perceptions of newly appointed teachers with respect to the possible applications of AI will enable us to continue the research, building together possible use scenarios in different school contexts and looking critically at the ongoing process of technological transformation.

5. Discussion

From the analysis of the responses to the questionnaire, these are teachers who have an average age of 44 years; they are 76% women who teach mainly in Lombardy and Lazio. The sample is 85% represented by teachers in training and probationary years (so-called new hires); 88% are mentor teachers of new hires. With respect to the dimensions investigated by the questionnaire, what emerges from the responses in terms of benefits is (Fig. 1) that AI can: be a support to teaching in the use, for example, of written tests for 63% of respondents; provide personalized feedback in real time (66%); help personalize learning for (76%); facilitate the correction of assignments and tests, saving considerable time for 65% of teachers; and help teachers monitor the progress of learners, highlighting strengths and weaknesses for 62% of respondents. There is also a very high percentage in creating interactive learning content for 93% of teachers; in helping individualize learning paths for 72%. Artificial intelligence can be a learning companion for students and a valuable teaching assistant for 71% of teachers.

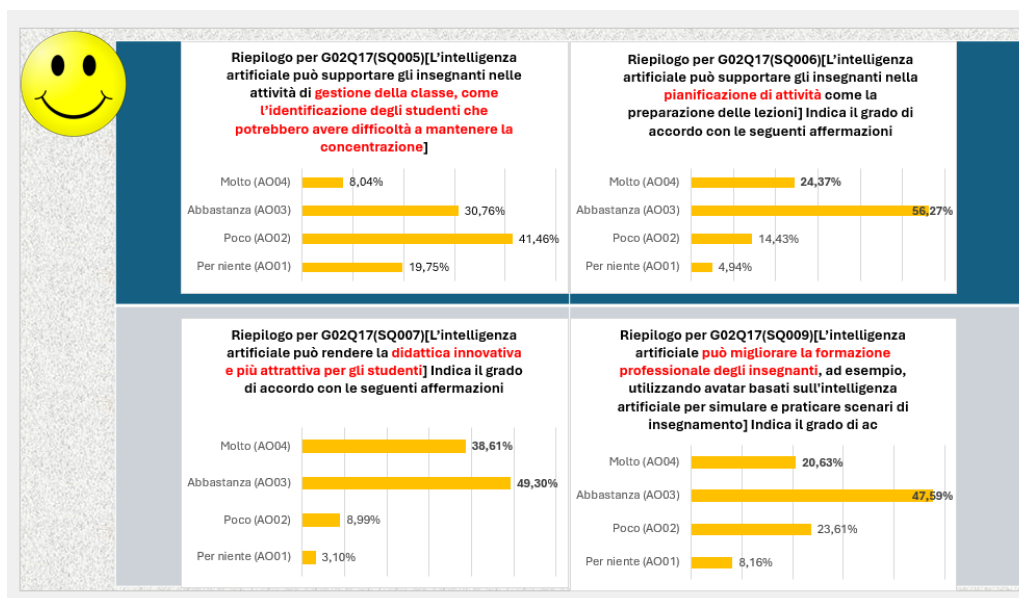
Fig. 1 – Vantaggi nell'uso dell'AI





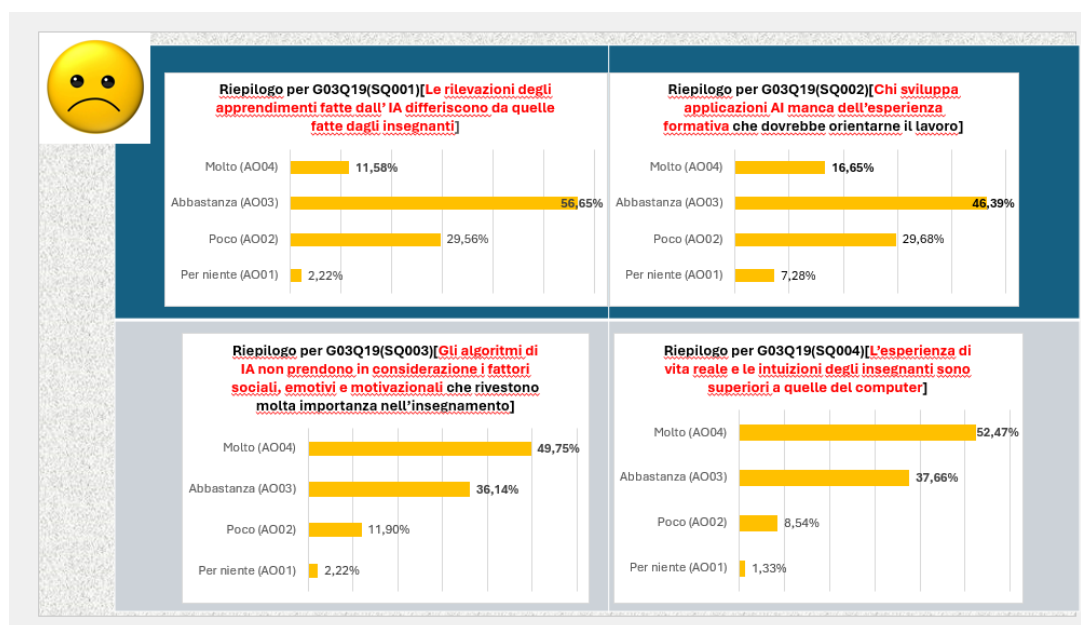
Additional benefits (Fig. 2) of AI are also found by teachers in: planning teaching activities (such as, for example, lesson preparation) for 80% of respondents; making teaching more innovative and attractive for 88%; more inclusive for 84% of respondents; and making them grow a lot professionally (68%). On the other hand, it does not seem that AI can be helpful in being able to manage the classroom better for 61% of teachers, especially in supporting children to maintain concentration (in this case they consider teacher support important). However, teachers recognize AI as a valuable tool to keep their subjectivity under control, especially in the construction of testing and its evaluation for 70%; without reducing their autonomy and control over the learning process (57%). For 74% of them, there is no risk that with AI there will be a need for fewer teachers; thus, they recognize the full potential of AI in education and give a strong answer (given the high percentage) about the prejudice we often hear about the machine replacing teachers.

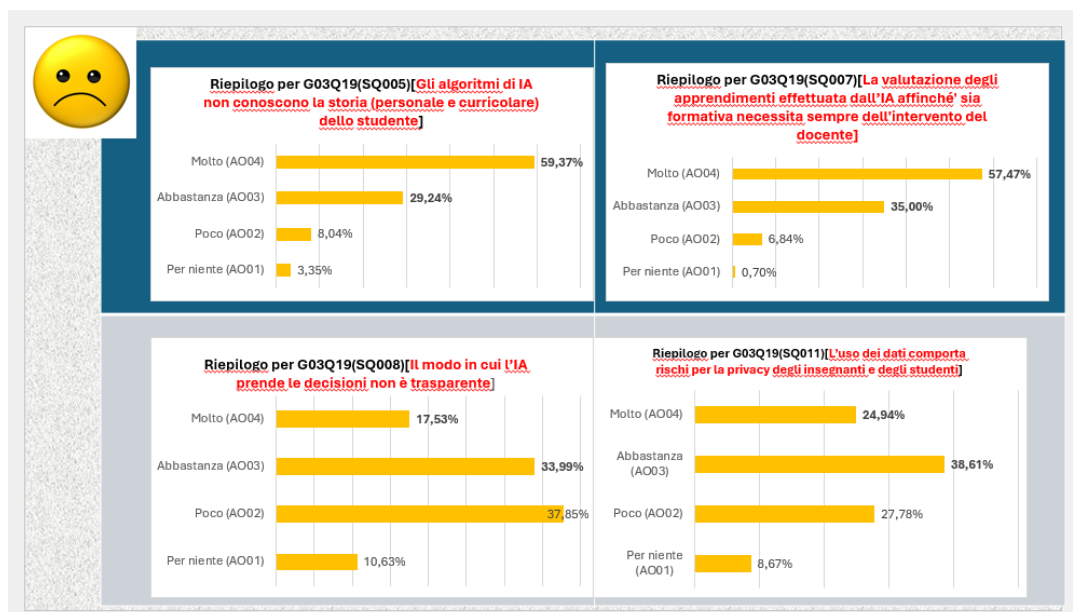
Fig. 2 Ulteriori vantaggi all'impiego dell'AI



However, there are also elements of mistrust (Fig. 3) that need to be reflected on, especially after this research, when we go to return the outcomes and start a research-training path in schools. The reasons for mistrust mainly relate to the fact that according to teachers: the learning surveys, made by employing AI, might differ too much from those made by teachers for 68%, this is because according to teachers those who develop AI applications do not have the right training experience for 63%; but also because AI does not take into account the affective-motivational dimensions of students for 86%. An interesting figure is the one who believes that teachers' experience and insights are superior to those of a computer (90%). Further disadvantages can be traced to the fact that AI algorithms do not know the personal and curricular history of each student 88%; for 92%, student assessment, for it to be formative always needs the teacher; the way decisions are made by AI is not always transparent for 51%, so much so that 83% state that this distrust can only be overcome by knowing how AI makes decisions; there is also some concern about the use of data and thus the risk in terms of privacy for 64% of teachers.

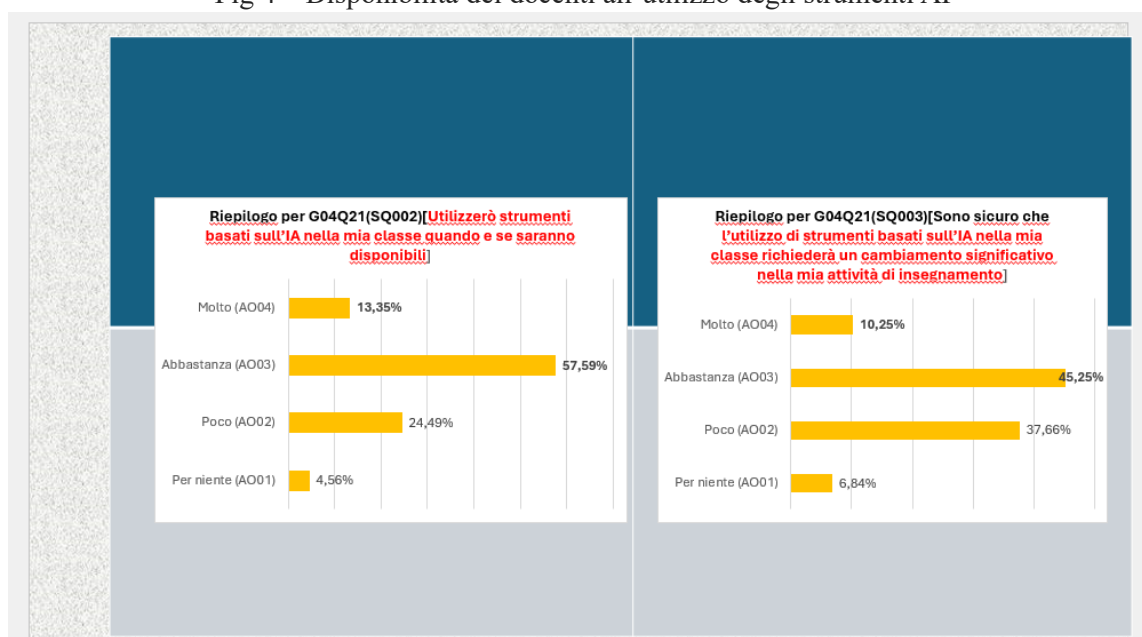
Fig. 3 – Elementi di sfiducia sull'impiego dell'AI





In the last part of the questionnaire, we surveyed willingness to work with AI (Fig. 4): 70% of teachers are willing to use AI tools in the classroom when, and if, they become available; however, 55% are aware that it will result in a significant change in their teaching activities.

Fig 4 – Disponibilità dei docenti all'utilizzo degli strumenti AI



Conclusion

At the end of this analysis on the first data that emerged (while waiting to be able to work on the larger sample reached at the close of the questionnaire) and keeping in mind the many studies that have been taking place in recent years on AI in education (Panciroli, Rivoltella, 2024), we can agree that AI can provide answers to our questions and can be for a high percentage of our reference sample,

a valuable aid in the field of teaching. However, in order for this support to be meaningful and thus for the answers AI provides us with to be useful and valid, we need to know how to ask the right questions, and this presupposes that the actors involved, teachers and students, are protagonists in this process, a process that also requires the development of non-cognitive skills (think of the competence of working in a team, of learning to learn, of problem solving...). There is still so much to be discovered, there is still much to be regulated, and there is so much training to be done, but even the very first data from our research return us a strong interest on the part of teachers to learn more and better about the benefits of AI in education, but they also return us a desire to be accompanied in this process of knowledge, providing them with the coordinates of the journey that is possible in studying AI.

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