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Artificial Intelligence and Inclusion: Teachers in training usefulness perception and adoption perspectives

Filippo Bruni [1] **and Emiliana Murgia[2],***

[1] Università del Molise 1, Italy; filippo.bruni@unimol.it
[2] Università di Genova 2, Italy; emiliana.murgia@edu.unige.it
[*] Correspondence: emiliana.murgia@edu.unige.it

Abstract: The use of Artificial Intelligence to support inclusion is an area that is receiving increasing attention internationally. The study explores trainee teachers' perceptions of technology, Generative Artificial Intelligence and its inclusive application in an educational context. Data were collected through an online questionnaire administered to 91 students in 2024 Spring. On the one hand, what emerges is an overall good level of familiarity with Artificial Intelligence technologies and tools, although there is much room for improvement. On the other hand, there is an unusual centrality of ChatGPT for information retrieval and a significant gap between the declared usefulness of Artificial Intelligence for inclusion and the intention to use it in the classroom.

Keywords: artificial intelligence; inclusion; in training teachers' perception.

1. Introduction

Since the term Artificial Intelligence (AI) was first used in 1956, AI has had mixed fortunes. Underlying its current success and the attention it continues to generate is the increasing amount of data inherent to digital culture and the consequent need to reduce the complexity involved in its management. AI aims to "reduce the complexity of the physical world to backwards-looking informational mechanisms or to symbolic, computable models" (Cabitza, 2021, pp. 9-10). Moreover, the recent availability for the general public of Large Language Models with the possibility of using, partly free of charge and without any specific knowledge, generative artificial intelligence capable of producing texts (such as Chat GPT or DeepSeek) and images (such as Midjourney) have created a great deal of attention.

Without entering into the questions of an exact definition and a complete listing of AI applications, we would like to point out the relationship between AI and the

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theme of inclusion (UNESCO, 2020) in the educational context. Inclusive processes (Roscoe et al., 2022; Cachat-Rosset & Klarsfeld, 2023) indicate an approach based on the fundamental principle of promoting access to education in universal terms, avoiding discrimination and offering everyone equal opportunities to participate (Lo Piccolo & Pasqualetto, 2024). In this sense, two preliminary remarks are appropriate. The first is to recall the risk of overestimating the technological dimension without giving adequate space to the socio-economic context (Cesaroni, 2024). The second observation concerns the complexity of the factors relating to inclusion. It is worth mentioning "the growing awareness of the distinction of *inclusive* rather than *special* education" (Knox, Wang & Gallagher, 2019, p. 3, Pagliara, Bonavolontà & Mura, 2024): the theme of difference linked to disability is certainly central, but further aspects must be kept in mind, such as those linked to interculturality (Mohammed & Watson, 2019, Salas-Pilco, Xiao & Oshima 2022). After all, in terms of instructional design and didactics, inclusiveness is a transversal trait that characterises them in their entirety. As shown by Universal Design for Learning, a didactic that is not inclusive is hardly acceptable.

Entering into the more specific area of the uses of AI with inclusive logic, it may be helpful to distinguish between AI as a tool, AI as a moderator, and AI as the environment (Pagliara et al., 2024). AI as a tool can point to the most punctual uses, especially by teachers, in the materials' design and preparation phase. Individualisation and personalisation processes require adapting teaching materials, such as simplifying texts or preparing tailor-made assessment tests. Instructional design itself, with the implicit planning and adoption of strategies and formats, can be supported by AI (Mohammed & 'Watson, 2019; Fiorucci & Bevilacqua, 2024; Almufareh et al., 2024, pp. 4-6). AI as a mentor refers to using AI technologies to facilitate and enhance interactions in teaching/learning processes, e.g., through automated feedback. An AI-guided Chat can be used as a tutor capable of supporting teaching activities in an individualised manner by interactively calibrating interventions from the perspective of adaptive learning (Lo Piccolo & Pasqualetto, 2024). Finally, continuing the logic of adaptive learning, AI as an environment implies "the establishment of an educational eco-system wherein AI is integrated into the entirety of the learning experience, rendering the environment itself more intelligent and responsive to students' needs" (Pagliara et al., 2024, p.13).

A dual relationship can thus be established between AI and inclusion (Roscoe et al., 2022, p. 360). On the one hand, AI makes a more accurate and faster analysis of students' needs, learning levels, and contexts possible, providing possible answers in real-time. On the other hand, an inclusive approach can provide a useful critical tool against AI. Technology can be a resource, but it can also turn into an obstacle, both in general terms of the digital divide and, in the specific case of AI, the reference is to the data bias for its training: the data used can express Western cultural values and biases without adequately reflecting existing diversity (Mohammed & Watson, 2019; Fosch-Villaronga & Poulsen, 2022). Hence, there is an understandable need to promote the transparency of algorithms and avoid reproducing or amplifying existing inequalities (Lo Piccolo & Pasqualetto, 2024).

Suppose the perspective is to maintain decision-making capabilities in the human domain (Porayska-Pomsta & Rajendran, 2019). In that case, one possible path for research is to survey teachers' and prospective teachers' perceptions of AI. Investigating perceptions regarding knowledge, use and expectations regarding AI can have a

threefold significance (Murgia & Bruni, 2024): to understand the greater or lesser alignment between widespread enthusiasm in public opinion and actual interest on the part of teachers; to understand interests and expectations related to the educational use of AI (e.g. teachers with more expertise in the use of AI express more positive perceptions regarding its teaching effectiveness, Di Martino, 2024); to define the most appropriate ways of training teachers about AI. In this sense, increasing attention is being paid both at the international and national levels (see De Marco, Di Padova & Dipace, 2024; Di Martino, 2024; Petrucco, Favino & Conte, 2024; Toci, Nencioni, & Rossi, 2024, just to mention a few).

2. Materials and Methods

2.1. Methodology

We designed this study to understand teachers' perceptions of the usefulness of generative AI (GAI) in an educational context and to support inclusion better. This study is embedded within a broader quantitative research framework to examine teachers' perceptions of generative AI in education (AIED), their envisioned applications in the school setting, and the potential opportunities and risks they anticipate.

With this objective, we have collected quantitative data via an online questionnaire. The instrument was self-completed online by 91 participants who answered close-ended questions in Spring 2024 during the academic year 2023/2024. Applying the CAWI methodology (Computer-Assisted Web Interview), participants self-compiled the questionnaire (Attwood et al., 2020; Sanusi et al., 2024) generated with Google Forms with solely closed-ended questions. Collected data were analysed to obtain the primary descriptive statistical information.

2.2. Research Questions

RQ1: What is the knowledge and awareness of AI, GAI and AIED among preservice/early teachers?

RQ2: Which perspective of adoption do they envision in their future as a teacher?

RQ3: To what degree of usefulness and in what terms do teachers foresee GAI as a technology supporting inclusion processes in an educational context?
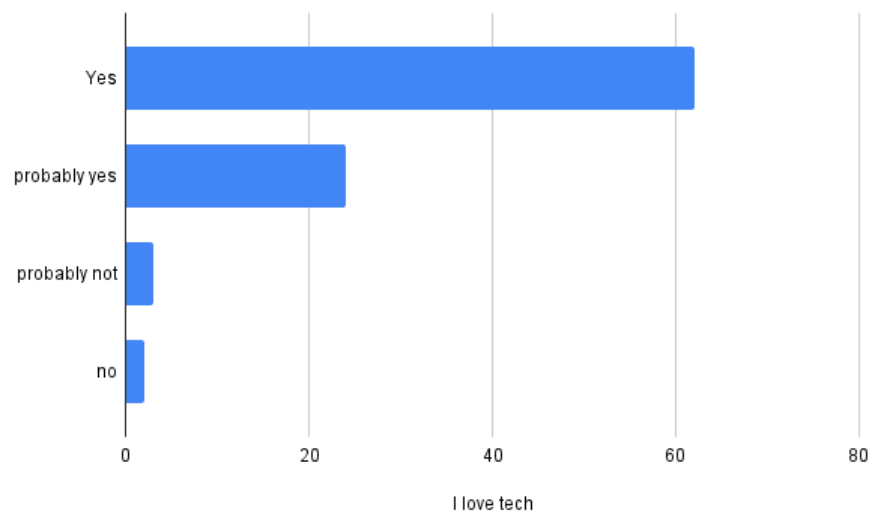
2.3 Participants

The questionnaire was shared with 91 participants during the lessons of the course to gain the certification of Special Education Teachers (*docente di sostegno* in the Italian School System) for the primary school (67 on top of 91) and preschool (24 participants) at the university of Molise, in Southern Italy. Among them, most were female (85 on top of 91). Their ages span from 24 years to over 50; on the gender side, 93.4% declared to be female. They all have a university degree: 12 on top of 91 have achieved a bachelor's degree, while the others have a master's degree. From the teaching experience point of view, 49 have up to two years of teaching experience as a substitute, 29 have more than 2 years, and 13 have no experience at all.

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3. *Results*

Before delving into the relationship between AI and inclusion, two preliminary areas were examined: participants' familiarity with technologies and with AI. Concerning technologies, the participants in the research show a high level of appreciation of them, confirming a high level of familiarity: combining the positive responses (yes, 68,1% and probably yes, 26,4%), we have 94.5% of participants who perceive themselves as people who have a positive attitude towards the technologies, leaving only a tiny proportion (5.5) showing little appreciation (see figure 1).

Figure 1. Participants' self-perception of them as pro-technology people.


The participants' positive attitude toward AI is also confirmed, even at a lower level. Only 11% state that they know perfectly well what AI is, a percentage that appears to be minor, especially if one considers both the attention given to it in the media and the training courses activated, but combining the positive answers (yes, perfectly; yes, quite a bit) it reaches 81.3%. No one claims to ignore AI, but a residual share of 18.7% claim to have only a vague idea about it (see Figure 2).

**Figure 2.** Participants' knowledge of AI
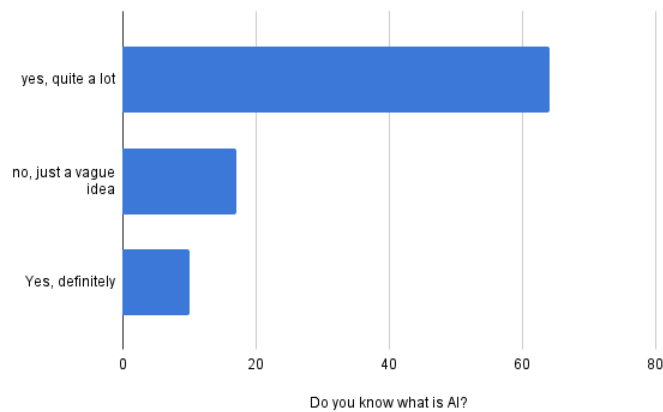
Regarding the practices of AI use, there is a drop in the level of declared knowledge: only 55.6% claim to have used AI-based applications. Although the answers may be affected by the fact that AI algorithms may not be perceived, as they operate in a way that is not visible to the user, there is still a share of 18.9% (almost identical to those who claim to have a vague idea of AI) who say they have never used it. Furthermore, 25.6% of the participants say they are unaware of any use (Figure 3).

**Figure 3.** Have you ever used an AI-based application?
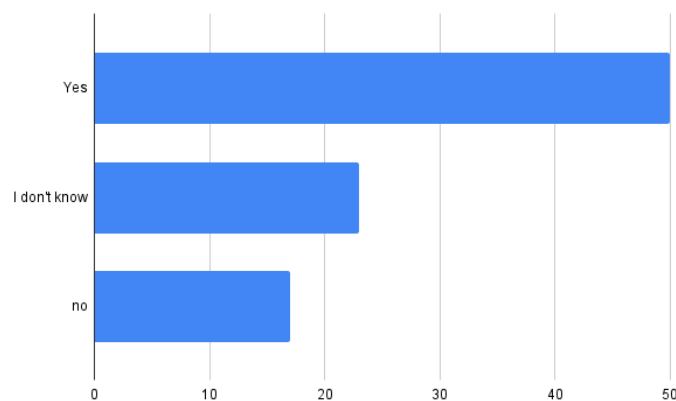
We have lower data when switching to a specific, renowned AI tool,   ChatGPT. Slightly more than half of the participants (53.8 %) have heard of it (see Figure 4)

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**Figure 4.** Have you ever heard of ChatGPT?
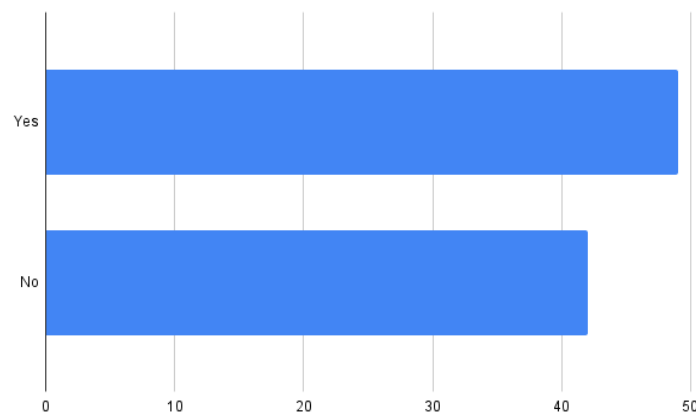
When asked whether they knew what ChatGPT is, 43.3% said they had not heard of it. Only 10% claim to have perfect knowledge of it, joining the share who answered 'yes, quite a lot' comes to 40 per cent. A large majority (60%) declare that they do not know or have a vague idea of ChatGPT (Figure 5)

Figure 5. Do you know what ChatGPT is?
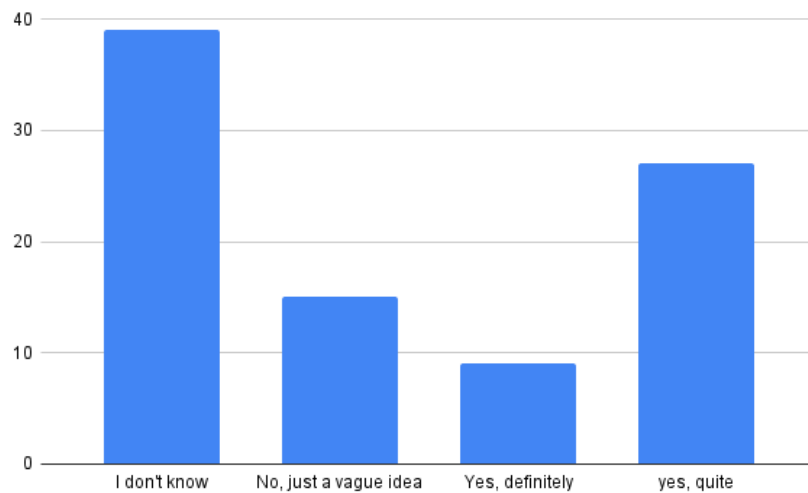
The data presented so far work as the premise for examining perceptions regarding the relationship between AI and inclusion, where none of the participants strongly favour ChatGPT as an inclusive tool. The option with the highest number of choices (76.2%) is 'yes enough', contrasted by 23.8% who do not believe in the usefulness of ChatGPT for inclusion (fig. 6).

Figure 6. Usefullness perception of GAI in supporting inclusion at school
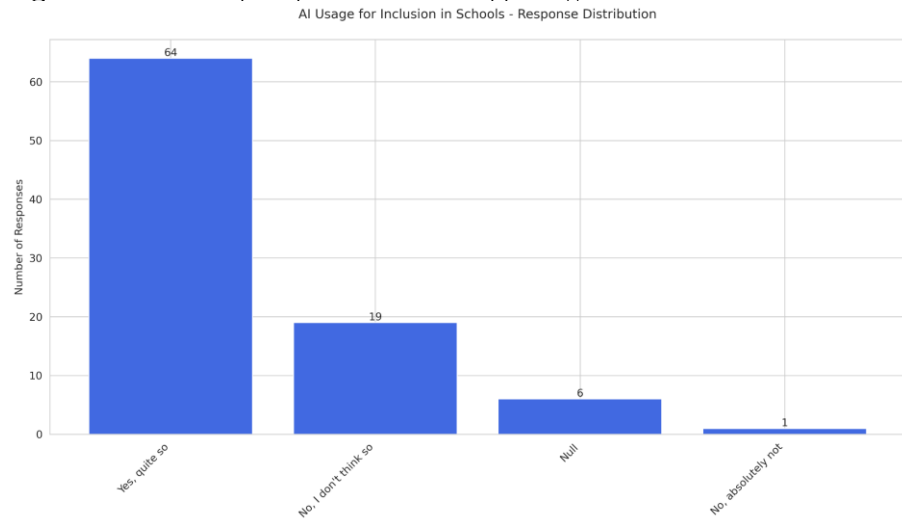
In terms of inclusive uses, participants perceive it helpful in supporting inclusion by using GAI to seek information: the prevailing one, the search for information, with 67.1%, is not reported in the international literature. A use, much better known in inclusive terms, such as supporting the personalisation of activities, comes in second place with 37.6%. In third place, with a slightly lower percentage (36.5%), comes word processing. The fourth and last option receiving a significant share of endorsements (11.8%) is learning the Italian language (Figure 7).

Figure 7. Frequency of GAI support activities mentioned.
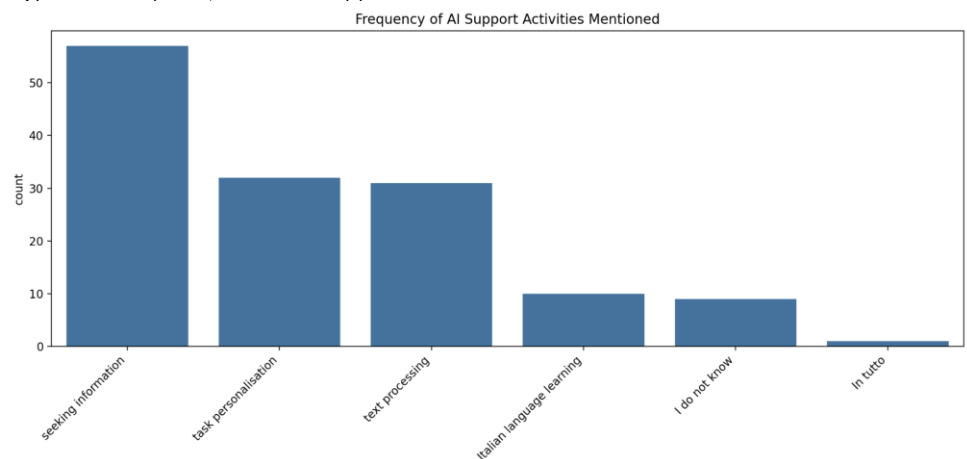
Our analysis of participants' foreseen usefulness of GAI in supporting inclusion revealed distinct patterns in their preferences. The co-occurrence matrix visualisation demonstrates the interconnected nature of these preferences.

The data on the activity selection show a balanced distribution between single and multiple activity selections, with 42 responses by participants who selected only one activity they envision to be useful in supporting inclusion at school, 30 selecting two activities, 11 selecting 3 activities, and one selecting four activities.

Figure 8. Distribution of the number of activities selected per response.
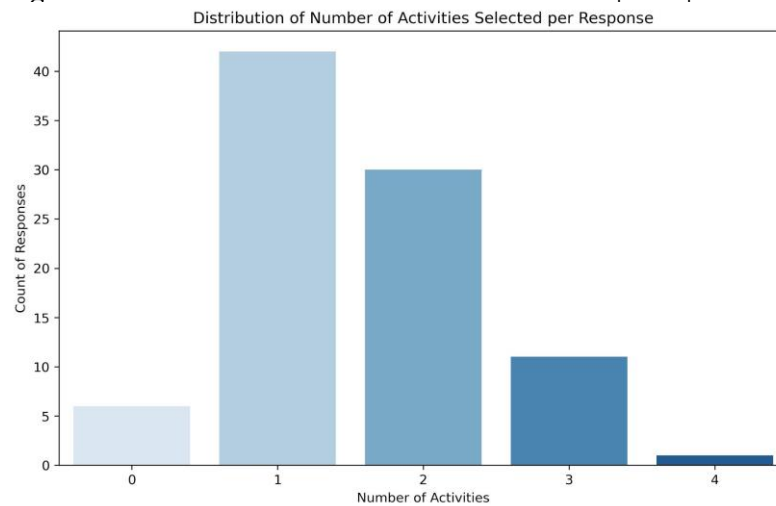
Looking at the combinations patterns, interestingly, *seeking information* is the activity with the most combinations (22). In contrast, the others have comparable numbers (*seeking information-text processing* has 13 responses, t*ask personalisation* 10, *I do not know* 8, *seeking information-task personalisation*, *text processing* 8).

Figure 9. Co-occurrence of participants' responses about activities.

The co-occurrence matrix reveals strong associations between *seeking information*, *task personalisation*, and *text processing*, suggesting these activities are often envisioned as complementary in supporting inclusive education.

When asked whether they intend to use AI and Chat GPT as teachers in their classes, the answers are generally negative: options 1, 'not at all likely' and 2, 'not very

likely,' account for 68.6% of the participants, and the option 'very likely' is chosen by only 2.3% of the participants (Figure 9).

Figure 10. How likely will you be to adopt GAI apps while working with students?
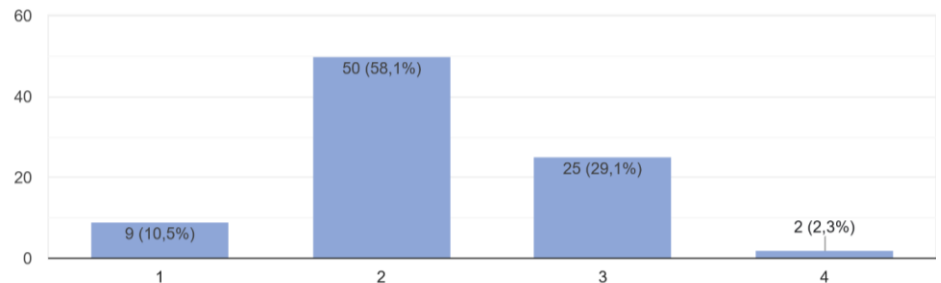
4. Discussion

The findings indicate if and where ChatGPT is considered valuable for schools in supporting inclusion. The data on activity selection show a balanced distribution between single and multiple activity selections, which aligns with the participants' general perception of mild usefulness (Figure 6). Educators perceive AI support for inclusion through singular and multi-faceted approaches. The strong preference for information-seeking capabilities, particularly when combined with task personalisation and text processing, indicates a practical approach to implementing AI in inclusive education settings. *Personalisation of activities* comes in second place, even if it is much better known as an inclusive practice in educational context. Surprisingly one of the most intuitable options linked to text simplification and testing, the *word processing*, is in third place among the preferences expressed by participants.

The equal distribution between single and multiple activity selections suggests a nuanced understanding of AI's potential role in educational inclusion. Participants' predictions of the usefulness of GAI in supporting inclusion revealed distinct patterns in their preferences. Information seeking is the highest-rated option with the highest combination rate with other activities.

The combination pattern shows that information seeking has the highest number of combinations, while the others have comparable numbers. This is interesting if we consider that at the time of the data collection, OpenAI had not released SearchGPT yet and that the model available was not meant to serve as a search tool. Nonetheless, it was perceived as useful as a search tool.

The co-occurrence matrix reveals strong associations between information seeking, task customisation and text processing, suggesting that these activities are often viewed as complementary in supporting inclusive education.

The results suggest that educators perceive AI support for inclusion through both single and multi-faceted approaches. Another insight is the decreasing trend from a more general familiarity with technologies to knowledge and practices of AI use to end with knowledge related to ChatGPT. Participants need to widen their knowledge and use of GAI tools, as there is an understandable gap between potential interest and still limited knowledge and practices, as these tools rapidly evolve and

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invade user populations inside and outside schools. A second aspect which deserves more attention is the educational uses: the use of ChatGPT for information retrieval is an element that points to a gap - compared to more widespread and more relevant uses with inclusive approaches - that should be investigated and that may reside in usage practices that have not yet been analysed. A third and final aspect relates to the significant gap between the declared belief in the usefulness of ChatGPT for inclusion processes on the one hand and the equally declared intention not to use it in teaching/learning processes on the other. This discrepancy should be investigated qualitatively to understand its reasons.

5. Conclusions

In conclusion, what emerges is a picture that, on the one hand, shows overall good levels of knowledge and practice of AI, but with wide margins for improvement, especially about tools such as ChatGPT; on the other, it shows uses that are not always relevant and, above all, a distance between the intuition of educational usefulness of AI and the actual intention to use it. On the other hand, given the high speed of evolution of AI tools, the equally fast changes in user practices, and the specificities of the user groups surveyed, the limitations of this work are intuitable. Reiterations of the research, identification of larger samples, and more representative contexts are indispensable to gain more significant data to drive professionals when designing AI literacy training courses for teachers.

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