

Generative Artificial Intelligence at school: University students perceptions and visions at Learning Sciences Faculty

Emiliana Murgia* e Filippo Bruni**^

Abstract

This study explores the attitudes and perceptions of preservice teachers regarding applications of Generative Artificial Intelligence, with particular reference to ChatGPT and their use in school. Functional elements emerge for professors, teachers' trainers, instructional designers. There is interest and appreciation of the potential, caution in considering use in the classroom, and incomplete awareness of the specific characteristics. The ability to adapt texts is not perceived. Instead, confidence emerges in the reliability of the results when searching for information with the disbelief that they can be alternative tools to traditional search engines. The participants agree on the need for systematic and widespread training, which should involve preservice teachers, in-service teachers, and students.

Keywords: Generative Artificial Intelligence, Artificial Intelligence perception, Preservice teachers, ChatGPT, teachers training.

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1. Introduction

Artificial intelligence (henceforth AI) continues to receive increasing attention from the scientific community and public opinion, the media and

* Università di Genova. E-mail: emiliana.murgia@edu.unige.it.

** Università del Molise. E-mail: filippo.bruni@unimol.it.

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institutions this is also shown by the legislation enacted by the European Union with the AI Act (European Parliament 2024). The term, first used in 1956, is «the science of making machines do things that would require intelligence if done by men» (Minsky 1968, p. V). Compared to a history of over sixty years, what constituted a turning point was the availability of generative AI. Thanks to Large Language Models, people now can use – partly free of charge and without any specialised knowledge – generative artificial intelligence capable of producing texts and images.

So much attention – from various fields – also concerns the relationship between AI and education, which now constitutes a specific field of research (AIED, Artificial Intelligence in Education). Undoubtedly, a broader framework exists for understanding how AI can modify learning processes and social practices. However, it is limited to the threefold articulation of «educating with AI, AI and to AI» (Panciroli and Rivoltella, 2023, pp. 7-9). It is not only a question of reasoning about how AI is trained, but also of understanding, on the one hand, what tools are made available for the design and management of learning processes and, on the other hand, of addressing AI as a field of learning linked to specific knowledge and skills. Moreover, it is perhaps this last aspect, that of AI literacy (Ranieri et al., 2023, p. 33), that is the most delicate: forms of critical awareness are needed in the belief that «the development of AI [artificial intelligence] should be human-controlled and centred on people» (UNESCO, 2019, p. 4).

2. Theoretical Framework

Considering the potential impact of this research, the investigation into students' and teachers' perceptions of AI is a venture of great significance. Three pivotal aspects of this exploration can be highlighted.

In more general terms, considering the consistent interest – if not even enthusiasm, albeit offset by considerations regarding risks and ethically condemnable uses – by the research and the media professionals, it may be appropriate to ask whether the perception of those who work in the field of Education is on the same wavelength. As is well known, «algorithms cannot be seen» (Rivoltella & Rossi, 2024, p. 74), and AI is present in a multiplicity of applications without its role being immediately apparent for users: uses with low levels of awareness are possible (Murgia & Bruni, 2023). Investigating perceptions – locally and on a broader basis – can provide general insights into the context before any subsequent intervention.

It is crucial to remember that the history of educational technologies has been interpreted as a succession of evolutionary steps, all characterised by an initial enthusiasm followed by a phase of disillusionment (Cuban, 1986). Understanding these historical patterns is crucial for informed decision-making in AI in education. The emergence of AI is linked to the exponential growth in the amount of data (Floridi, 2014): how to avoid seizing the opportunity for fast, automatic, and effective procedures to deal with otherwise unmanageable amounts of information (Manovich, 2020). If this is one of the reasons for the success of AI, how it will be used in education will also result from expectations and interactions with users. The specific educational dimension, motivations, expectations and resistances can provide several valuable insights for developing effective ways of using AI within the design strategies adopted.

Third, it is essential to define the AI literacy framework, which refers to the set of competencies related to understanding and using AI; but it is equally important to have, as with any instructional design, the picture of the starting situation not only in terms of knowledge and skills already acquired but also concerning motivations and expectations. Investigating perceptions of AI becomes, in the logic of designing teaching/learning pathways, all the more practical the more attention is paid to the specificities of contexts/groups and the rapid evolution of AI-related applications and the practices of those who teach.

In a recent systematic review on university students' perceptions of ChatGPT, the international scarcity of work on this topic was pointed out: «limited breadth of the literature [...], which does not allow for a more extensive systematic review» (Di Grassi et al., 2024, p. 7). The indication should be noted (although there may be signs of a reversal). However, it may be helpful to take up the reflections long ago developed on the topic of perceptions of technologies in education: success by students in educational pathways, however undetermined, is nonetheless influenced by teachers' perceptions of learning and teaching (Cope & Ward, 2002). In the more specific relationship with technologies, with observations now going back more than thirty years, the role of the perceived usefulness of a technology and its relative ease of use has been noted in driving first the intention to use it and then its actual adoption (Davis, 1989). Thus, there is a framework that can guide research on the perception of AI.

Within that framework, an initial issue that needs to be noted is the diversity of the samples whose perceptions are surveyed, including geographical diversity. The first group to be surveyed are teachers: preservice teachers of English as a foreign language in the school system (China) (An et al., 2023), (Vietnam) (Cong-Lem et al. 2024), and in the university setting (Indonesia) (Sumakul et al., 2022), teachers in multiple subject areas (China) (Chan & Lee,

2023), and preservice teachers in secondary school predominantly in the STEM area (Nigeria) (Sanusi et al., 2024). A second group surveyed are students: secondary school students (Turkey) (Demir & Güraksın, 2022) or students from multiple generations belonging to broader age groups (17-28 years of age) (China) (Chan & Lee, 2023). A third group, which is worth reporting separately, is students preparing to be teachers, as in Attwood, Bruster and Bruster (2020) (USA), Murgia & Bruni (2023) (Italy), Syahrin & Akmal (2024) (Oman).

Another issue concerns the scope-which may be broader or limited to specific issues of perception: AI as a whole (Demir & Güraksın, 2022), generative AI in teaching and learning processes (Chan & Lee, 2023), AI as an object of teaching in the school system (Sanusi et al., 2024), the use of AI as a tool to support the teaching of a specific discipline (An et al. 2023, Attwood, Bruster and Bruster 2020), risks and benefits associated with AI about teaching English as a foreign language (Sumakul et al., 2022), students' misuses of AI and especially ChatGPT, a language generation model developed by OpenAI (Cong-Lem et al., 2024), specific tools such as ChatGPT (Murgia and Bruni 2023; Di Grassi et al., 2024; Syahrin and Akmal, 2024), AI as an object of instruction in the school system (Sanusi et al., 2024).

3. Research design

This quantitative research is focused on understanding AI, particularly generative AI (GAI) and AI in Education (AIED) perceptions of preservice teachers. The instrument used to collect the data is a self-completed online questionnaire with close-ended questions.

3.1 Study Context

The investigation occurred among 133 second-year students at the Faculty of Learning Sciences at the University of Molise during the second semester of 2023/2024. The faculty prepares students to become pre-and primary school teachers.

3.2 Aim and research questions

Guided by the results of other investigations, we aim to explore the perceptions, knowledge, and attitudes of the students at the Learning Sciences Faculty – in other words, preservice teachers – toward AI in general, generative AI, and its use in educational contexts. Specifically,

RQ1: What is the perception of AI, GAI and AIED among preservice teachers?

RQ2: Do teachers perceive the need for AI and GAI literacy for teachers and students?

RQ3: What perspective of use do they envisage in their professional future as teachers?

3.3 Participants, procedures and instruments

The participants are 133 students in their second university year, with a moderate age spread: 73,2% between 20 and 22 years with a standard deviation -SD- of 4.74 years; most participants have similar education – the majority have a high school degree (63%) and 27% participants share low or no teaching experience (83,2% have no experience; SD 0.75, respectively). They have a relatively consistent rate of technology appreciation (63,9%, SD of 0.56). On the other hand, streaming, messaging, social media, and online shopping use frequencies have SDs ranging from 0.24 to 0.81, indicating some variation in usage patterns.

The data was collected during the second semester of 2023/2024 by participants self-completing an online questionnaire (Attwood et al., 2020; Sanusi et al., 2024). The instrument was constructed from previous interviews (An et al., 2023; Murgia & Bruni, 2023) and has as a reference a TPACK framework (Carey et al., 2024) that was adapted according to the survey research questions.

The questions are phrased to collect quantitative data; in most cases, Likert-type attitudinal scales measured on a 4-level continuum were used.

The survey gathers data tackling different aspects linked to the research questions:

- biographical information (age, gender) and contextual information (year of attendance at single-cycle master degree program in Primary Education, work experience in school);
- relationship with technologies in terms of perception and usage habits concerning the most common technologies (streaming, social networks, online shopping)
- specific knowledge of Artificial Intelligence, both in terms of self-perception and in terms of defining it and awareness of its use
- ChatGPT (three sections of the questionnaire) with collection of information regarding knowledge of the application, self-perception of knowledge, experience

- envisioning the use at school, perspective of introducing LLMs such as ChatGPT into the teacher's work. In particular, one section is devoted to the sentiment generated by the idea of using it in the school context in general and about the different types of activities, considering both the perspectives of teacher-users and student-users.
- the likelihood of adopting generative artificial intelligence tools at school and the perceived importance of activating specific training paths for teachers and students.

Before access to the data analysis linked to the research question, the results were analysed in terms of reliability, in general, and per each focus: 1) AI and GAI perception in an educational context, 2) AI literacy and 3) Envisions for the future. The general Cronbach- α is 0.826, indicating good internal consistency, whereas the values of each area are 0.861, 0.940 and 0.897, respectively. Such results indicate good internal reliability and consistency. A descriptive analysis of the dataset gave interesting insights. The central tendency measures (mean, mode, and median) and correlations were investigated (see Fig. 1).

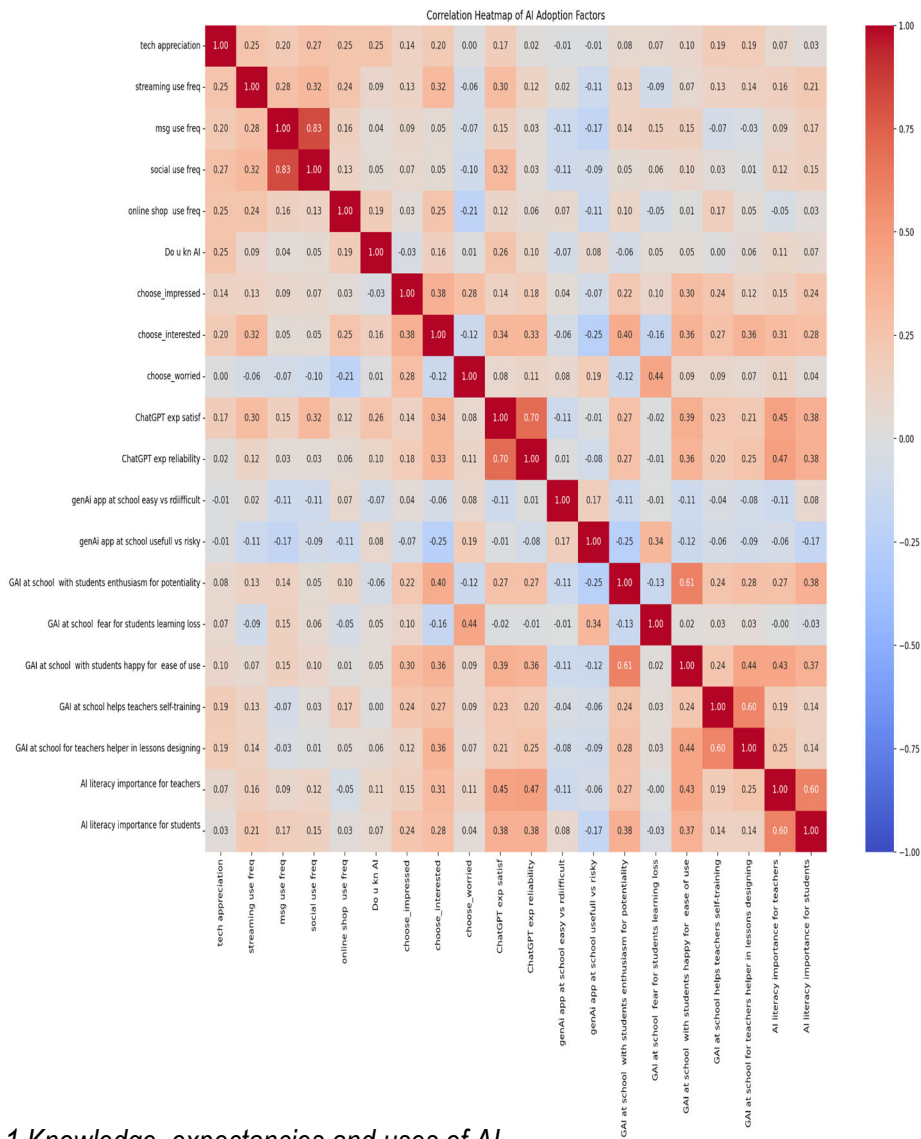
4. Data Analysis and Findings

As said before, this investigation was run using a questionnaire with closed-ended questions; therefore, the data collected are only quantitative.

The correlation analysis (Fig. 1) highlights that on ChatGPT Experience, satisfaction with ChatGPT is closely linked to its perceived reliability (correlation = 0.70), underscoring the importance of trust in AI applications. That allows us to infer that positive experiences with AI tools will likely enhance user confidence and acceptance.

Moreover, on the side of AI in Education, participants express enthusiasm for AI's potential for use with students, mainly when tools are user-friendly (correlation = 0.61). However, there is a balanced view, with moderate concerns about AI's risks and impact on learning.

The third correlation underscores the need for comprehensive educational programs on AI literacy. Interviewed preservice teachers recognise the importance of AI literacy for teachers and students (correlation = 0.60), highlighting all stakeholders' shared responsibility and commitment to enhance understanding and effective use of AI technologies.



4.1 Knowledge, expectancies and uses of AI

The students have at least a general idea of artificial intelligence (AI), particularly the generative AI apps. They were involved in a lecture about AI in general, and they tested an app to generate text and images before answering the questions. That could have impacted their answers to the survey. Still, the data remains significant because of the lecture’s limitations (it was general and did not went deep into the topic nor mention their use in education).

It is important to note that concern about AI use does not prevail even slightly (68 answers vs 65): much more marked is “being impressed by AI” (109 vs 23 out of 133 total answers) and interested in its use (74 vs 58 out of 133). In educational terms, one can thus imagine a high level of motivation and an opportunity to mark, at least with a minimum of attention, risks and misuse of AI.

By now, the awareness that we are dealing with AI is high (75.2 per cent), but ultimately, 25 people chose “do not know” and 9 “no”, meaning that the invisibility of algorithms is still causing worries.

4.2 ChatGPT in School Settings

Data about the ChatGPT tool confirms that ChatGPT outputs satisfied expectations (74 answers on levels 3 and 4, plus 25 on 133 on level 4 -being four the maximum satisfaction). The answers are more spread on the reliability of the outputs (64 on 133 answers on level 3, 43 on level 2, 14 on level 4 and 9 on level 1). [chart 8].

While the majority find the use of ChatGPT in school settings easy or easy enough (27 answered 1 = easy, 53 answered 2), it is essential to note that this perceived ease of use does not fully alleviate concerns about potential dangers or risks (50 out of 133 chose harmful enough, 26 chose harmful, and only nine picked ‘useful’). This balance underscores the need for a cautious approach, highlighting the importance of careful consideration when implementing ChatGPT in educational settings.

Perplexities and resistance emerge, especially in use with students; it does generate “a small quantity of anxiety” for 73 out of 133, while only 16 and 6 declared “anxiety” or “much anxiety”, respectively. The potentialities of its use at school have reached 51 preferences, but the answer “a bit” has the highest rate (53 on 133). The same happened with the questions about adverse consequences on learning and the appreciation for ease of use (51 and 56 on 133, respectively).

A predominantly cautious attitude also emerges concerning the support ChatGPT can give to those who teach (Fig. 2): to the question ‘How much do you think that ChatGPT can help teachers in 1- self-training; 2- document writing 3- instructional design 4- preparing and correcting the assignments 5- supporting distressed students 6- assessing?’, the most chosen option is ‘a bit’ to activities 1, 2, 3, 4 and 6 (70, 53, 57, 59 and 55, respectively). Interestingly, the participants envision meaningful opportunities to use ChatGPT in ‘helping distressed students’ (51 on ‘definitely yes’ plus 12 on ‘much’), offering a ray of hope in its potential to support students in need.

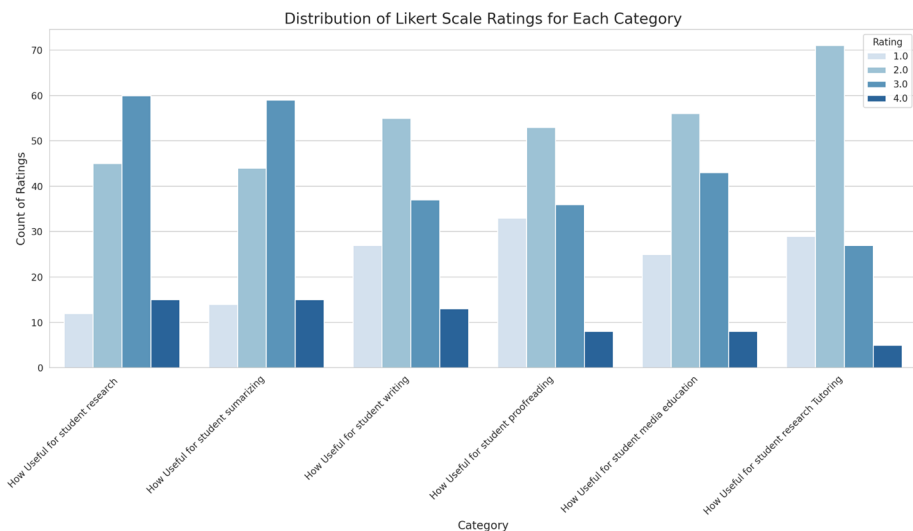


Fig. 2 - Perception of usefulness in different tasks: from left, researching, summarising, writing, proofreading, media education, research tutoring

Regarding students' educational use of ChatGPT, cautious openness is emerging. There's a sense of more potential when use by teachers. In questions about the use of "online search" and "summaries," the prevailing response is "definitely yes" followed by "a little" (60 and 59 on 133, respectively). The choice "a little bit" stands out in "text production" (55/133 vs 37/133 who chose "definitely yes"), "text correction" (53/133), and "media education" but, above all, in "tutoring" where it gathers as many as 71 preferences, with a decidedly conspicuous concentration. It would be interesting to conduct a qualitative study to understand the reasons for this, but it cannot be ruled out that ChatGPT may be feared as an alternative to the teaching function. This cautious openness underscores the potential benefits of ChatGPT in student education.

With the strengths and weaknesses of using ChatGPT as a teaching tool (Fig. 3), in terms of interpretation, there is a broad position of those waiting and with a certain mistrust or at least an attitude of extreme prudence. In the strengths, caution prevails over "offers a starting point for the drafting of administrative documents" and "is able to give adequate answers to the age of the pupils" (76 and 73 out of 133). A more balanced answer on "saves time in finding materials to prepare lessons" where the "little" is counterbalanced by "definitely yes" (64 vs 52). There seems to be a broad consensus on the perceived usefulness of the ease of interaction and retrieval of information ("it is easier to interact and find

adequate answers than traditional search engines” with 58 preferences for “a bit” and 58 for “definitely yes”).

On the weak points, a cautious attitude emerges, with 74 and 71 preferences out of 133 on “a little” for options ‘is not completely reliable’ and ‘favours plagiarism’. Regarding the statement ‘does not help creativity’, there seems to be more in agreement with 40 preferences on ‘much’, 39 on ‘definitely yes’, and 38 on ‘a little’, suggesting that ChatGPT is perceived as a danger to students’ creative expression. A certain level of concern is also caused by the lack of complete transparency of the application: 48+10 participants agree that ‘the sources from which it takes the information are not clear.’ while 56 “a bit” agree.

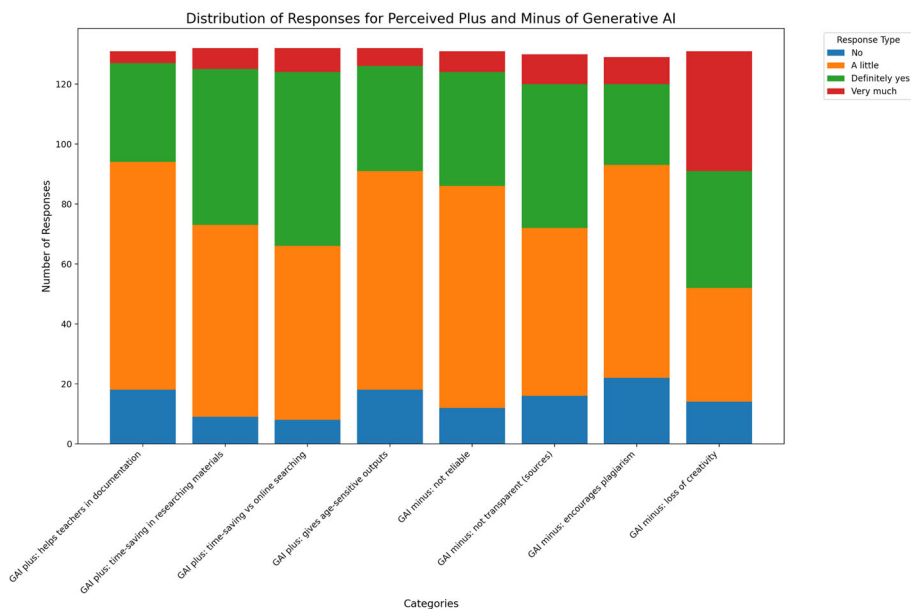


Fig. 3 - Perception of GAI plus and minus. From left, plus in teachers’ documentation, plus time-saving vs online searching, plus age-sensitive outputs. Minus lacks reliability, transparency of sources, plagiarism, and loss of creativity

All this finds consistent development in the willingness to adopt GPT Chat in class to work with students (Fig. 4). On a Likert scale from 1 = no intention to 4 = maximum intention, the value 2 with 69 answers got the highest number of preferences, followed by the values 1 and 3 that collected the same number of choices.

Data show a similar situation, with a slight change, in the intention of using it for lesson preparation and self-updating, where 72 have attested on level 2, 31 on level 3, and 22 on level 1.

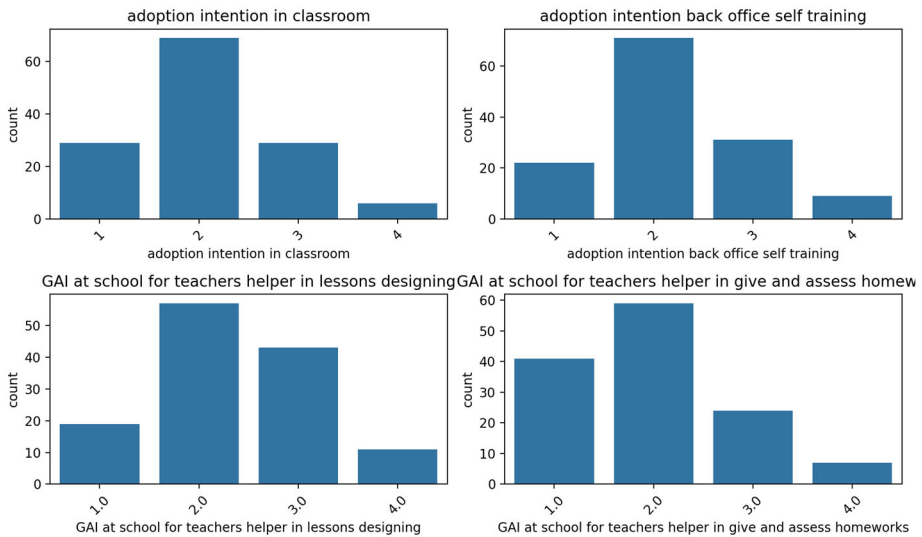


Fig. 4 - Preservice teachers' willingness to GAI adoption in school settings

4.3 AI Literacy: Expectations and perceptions on the need for training

In the light of a debate between desire and mistrust, which could be linked to the dual role of currently being a student and, at the same time, a future teacher, or also to reduced knowledge and teaching experience, the need to acquire/have appropriate skills becomes more urgent. When asked, 'How important do you think it is for in-service teachers to have AI skills?' respectively, 47 and 42 participants answered 3 and 4 (on the same Likert scale from 1 to 4, where 4 is the maximum agreement). The values decrease when it comes to the perceived need to train the students compared to train the teachers. To the question, 'How important do you think it is for students to have skills in relation to artificial intelligence?' The answers are almost equally distributed between the values 2 (50 answers) and 3 (52), and only 24 participants seem to be firmly convinced of the value (option 4). It would be essential to look at the causes of these problems in greater depth. The idea that informal and non-formal learning methods are sufficient may again be a concern.

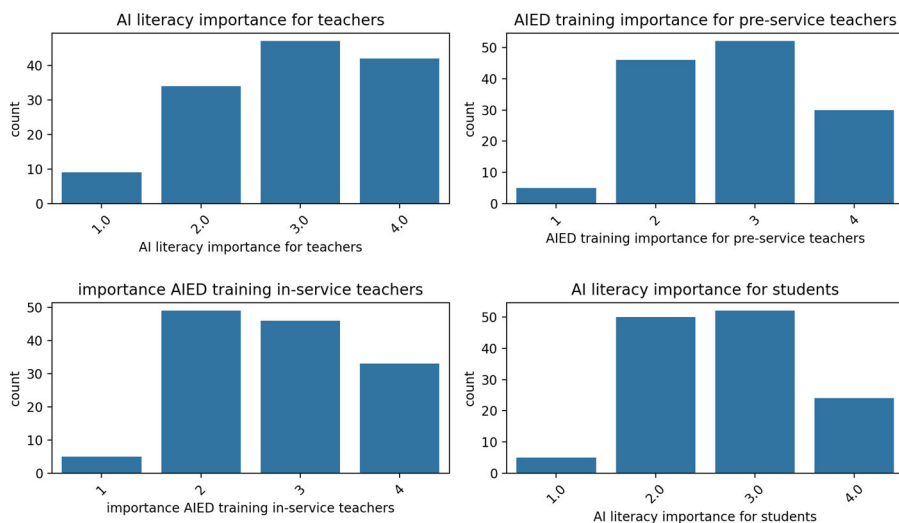


Fig. 5 - AI Literacy importance at a glance: from a preservice teachers' perspective

5. Discussion and Limitations of the study

The overall picture that emerges is highly articulated, showing how potential and risks, expectations and fears are intertwined: on the one hand, significant levels of interest in AI and the didactic usefulness of tools such as Chat GPT is arising, on the other hand, resistances and perplexities appear to need to be taken into account. Concerning the limits of the research, it should be recalled that: a) the peculiarity of perception remains subjective beyond the survey instruments. In this sense, a series of prejudices linked to specific aspects of the digital dimension could also play a role, as well as the fact, already mentioned, that AI often operates in a way that is not perceived, making its actions scarcely perceptible to those who use it; b) the rapid evolution of perceptions themselves is linked as much to the evolution of instruments as to the development of interactions. As far as the didactic dimension is concerned, technologies and teachers' interaction are related to different ways of conceiving the role of the teacher in different instructional architectures; c) the specificity of cultural, social and economic contexts. Further research perspectives can be pointed out: the opportunity of recursive surveys on a scale that is not only local but also national, with possible in-depth qualitative investigations to grasp in greater depth the motivations of the processes underway.

6. Conclusions and Implications for Policy and Practice

From this exploration of the knowledge of AI, initial information is now widespread. In this sense, even with concise training courses, achieving the goal of a first elementary level of knowledge is possible. Being impressed by the potential of AI and being interested in its use constitute widely shared elements that can support, in motivational terms, training proposals. Furthermore, a significant correlation exists between satisfactory experience and trust in the outputs. This is a crucial point to consider when designing courses about AI Literacy, highlighting that this application can hallucinate and occasionally give wrong or non-reliable output. In this sense, it might also be appropriate to privilege the use of AI linked to preparatory classroom teaching activities: understanding and experimenting with how AI can support the teacher might be the best premise for how students in the classroom can subsequently use it.

Regarding ChatGPT, there is some discrepancy between an overall positive view, linked to the reliability of the answers, and a view related to educational use, with attitudes of greater caution emerging. More specifically, before entering the classroom, it is considered helpful for the teacher's action to support students in difficulty, the drafting of documents and planning, but not for self-teaching and the assignment and correction of homework. The participants must perceive the feature of adapting texts to different language literacy levels, which is very useful in a classroom where the student's age does not guarantee a homogeneous literacy level. Instead, confidence emerges in the reliability of the results when searching for information with the disbelief that they can be alternative tools to traditional search engines. The primary source of concern in the classroom used by the teacher is the negative impact on learning. Mistrust also occurs when participants consider the student's use of ChatGPT at the school. More in-depth, they revealed doubts about the usefulness of ChatGPT in supporting the production and correction of texts: it would be helpful to investigate further the idea that teaching must involve learning the procedures associated with writing comes into play. Not only the teacher's use but also the students' use is perceived as a source of concern. The realisation and correction of texts with the support of Chat GPT generates perplexity. The reasons for such perplexity should be further investigated: in addition to the fear of excessive forms of facilitation, the idea that text processing processes are skills that must be possessed and practised without delegating them to AI tools might play a role.

Similarly, the diffidence towards possible tutoring activities could be read not in terms of support but in the logic of an alternative to the teaching function. A specific note concerns creativity: ChatGPT is seen as something other than a

tool that fosters it. Following the example offered by Munari (1977) with xerographs, it would be worth considering forms of use that are eccentric to the usual ones.

Concerning AI literacy and the expectations and perceptions of training needs, preservice teachers, in-service teachers, and students emerge as overall open and interested.

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