THE FUTURE OF AI IN STUDENTS' PERCEPTIONS: AN EMPIRICAL INVESTIGATION OF CHALLENGES, RISKS AND OPPORTUNITIES

IL FUTURO DELL' INTELLIGENZA ARTIFICIALE NELLE PERCEZIONI DEGLI STUDENTI: UN'INDAGINE ESPLORATIVA TRA SFIDE, RISCHI E OPPORTUNITÀ

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ABSTRACT
Studies on students' perceptions of Artificial Intelligence and its use in educational settings are few and rather recent. Considering this scenario, an exploratory study was chosen with the aim of collecting students' opinions on artificial intelligence, its risks, challenges and opportunities. Forty semi-structured interviews were conducted with secondary school students in the Campania context. The interviews were examined in the light of the Grounded Theory paradigm there emerges a Representation of Artificial intelligence in terms of advantages, criticalities and challenges.

Gli studi sulla percezione dell'Intelligenza Artificiale e sul suo utilizzo in ambito educativo sono pochi e piuttosto recenti. Alla luce di ciò si è scelto di realizzare uno studio esplorativo con l'obiettivo di indagare le opinioni degli studenti sull' Intelligenza artificiale. Sono state effettuate 40 interviste semi-strutturate con studenti di scuola secondaria di secondo grado nel contesto campano. Le interviste sono state analizzate secondo il paradigma della Grounded Theory in cui è emersa una rappresentazione dell'Intelligenza Artificiale in termini di vantaggi, criticità e sfide.

KEYWORDS
Artificial Intelligence, students, advantages, criticalities, digital morality
Intelligenza Artificiale, studenti, vantaggi, criticità, moralità digitale

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Introduction

Since John McCarthy, in the 50s, coined the term "artificial intelligence" (McCarthy, Minsky, Rochester, Shannon, 1995) considerable progress has been made in different fields, demonstrating the potential of AI in optimizing complex operations and automating various daily tasks. Currently, AI is defined as the set of computer systems capable of engaging in human-like processes, such as learning, adapting, synthesis, self-correction, and the use of data for complex computing tasks (Popenici, Kerr, 2017). Education and education are key areas where AI can make a significant impact, presenting innovative solutions to improve the learning process of students and increase the effectiveness of teachers. Artificial intelligence also finds a wide range of applications in education such as the development of personalized learning systems, designed to foster the growth of students' skills; automatic assessment systems to assist teachers in analysing students' knowledge, simplifying the assessment process; and facial recognition algorithms to gain insights into student behaviors, allowing for a deeper understanding of classroom dynamics (Remian, 2019) Teachers are increasingly turning to AI-assisted instructional strategies. AI-powered teaching and learning solutions, such as Serious Games and simulations, can provide students with more engaging and effective learning methods. (Alharbi, Alrajhi, Cristea, Bittencourt, Isotani, James 2020).

For these reasons, considerable attention has been paid to the role that AI can play in the field of education and education. Artificial Intelligence in Education, AIEd). The goal of AIEd, specifically, is to foster teaching and learning, supporting and improving human thinking through teaching strategies based on activities conformed to the uniqueness of the student (Luckin, Holmes, Griffiths, Forcier, 2016; Pitrella, Re, Perna, 2023).

In particular, the IEA includes the design, application and evaluation of tools, as well as teachers' competences on the use of AI in education. The particularly interesting contribution by Xia and colleagues (2023) reviewed the literature from 2012 to 2021, providing a comprehensive overview of the integration of AI in education, identifying the roles of AI technologies in major educational domains, AIEd learning outcomes, and key challenges. According to the authors, most empirically evaluated AI solutions include tools and systems designed for upper secondary school and university education. These solutions are essentially configured as tools to support the teacher, from the point of view of the teaching process and assessment, and the student in terms of motivation to study and learning potential (Pitrella, Gentile, Città, Re, Tosto, Perna, 2023).

1. The exploratory study

In the scientific landscape, studies concerning students' perception of Artificial Intelligence and its use in educational environments are few and rather recent (Latham & Goltz, 2019; Kim et al., 2020; Ma & Siau, 2018; Popenici & Kerr, 2017; Sangapu, 2018; Shar, 2019; Yufei et al. 2020; Zawacki-Richter et al. 2020). Considering that in the future of education and training machines could clearly influence teaching and learning processes, it seems useful to explore the opinions and attitudes of students about the role that Artificial Intelligence (AI) should play in formal and non-formal educational contexts.

In light of this scenario, it was decided to carry out an exploratory survey with the aim of exploring students' opinions about Artificial Intelligence, the meanings attributed to its use together with the risks, challenges and opportunities related to it.

Therefore, 40 semi-structured interviews were carried out with secondary school students in the Campania context, aged between 14 and 18. The selection of participants was made by theoretical sampling. It was decided to carry out an analysis of the content of the interviews (Krippendorff, 2013) adopting Grounded Theory (Glaser & Strauss, 1967) as a theoretical and methodological substrate, with specific reference to the constructivist epistemological paradigm (Charmaz, 2005).

The research question that guided the exploratory study is the following:

- What are the opinions and meanings attributed by students regarding Artificial Intelligence and its use?
- How do students use Artificial Intelligence?

The semi-structured interview was built through the definition of a series of thematic areas, considered most significant for the context and for the research phenomenon.

The stimulus questions present in the semi-structured interview are reported:

- How would you define Artificial Intelligence?
- Do you use Artificial Intelligence in your daily life? If not, why? If so, How do you use Artificial Intelligence in your life?
- Do you use Artificial Intelligence at school? If not, why? How do you use Artificial Intelligence at school?
- Are there any risks in the use of Artificial Intelligence? What?
- Are there opportunities in the use of Artificial Intelligence? What?
- Do your teachers use artificial intelligence? If so, how?

2. Data analysis and formulation of macro-categories

It was decided to carry out a qualitative analysis of the textual corpus with the support of the NVivo software (Richards, 1999) whose structure is designed to facilitate the management and exploration of materials without sacrificing the details and nuances of the original documents and, above all, without sacrificing the added value of the researcher. The indexing function is not realized as a purely mechanical operation, nor as a neutral device, but as a conceptual space where the researcher weaves networks of meanings, ideas, theories, establishes links, adds comments, constructs categories. In other words, knots are established. In the same way, the coding procedure is not assimilated to a simple task of labeling the text, it is a process of theorization and the categorization itself has the purpose of discovering and organizing ideas and themes, of creating links between ideas and data (Richards, 1999; Pacifico & Coppola, 2010). The choice to use Nvivo (Richards, 1999) has made it possible to systematize and categorize the collected material, having Grounded Theory as a theoretical reference in order to build analytical categories starting from the data, respecting the phenomenon studied, following the indications that come from it.

The analysis work was divided into the following phases:

- Fine-tune the categories: the categories take shape and above all a name, not only as a title but as an extended definition that makes them explicitly understandable.
- Connect categories: the categories produced emerge together with the relationships that connect them, thematize the type of relationship.
- Develop categories based on the properties and size of each,
- Place the categories in a hierarchical relationship by identifying macro-categories.
- Identify the core category: the central category that represents the main organizing concept of a research area that can be identified inductively, proceeding in the work of hierarchizing the categories that emerged from the data. Integrate and delimit the theory, delimiting the scope of the theory and focusing the research question (Glaser & Strauss, 1967).

Through the categorization functions of the collected material provided by Nvivo, a series of sets have been formulated, i.e. macro-categories thus enucleated that will then be deepened in the following paragraphs:

- Representations of Artificial Intelligence
- The uses of Artificial Intelligence in daily life
- The uses of Artificial Intelligence in learning and teaching processes

- The advantages of Artificial Intelligence
- The critical issues of artificial intelligence

The analysis of the data and the formulation of the categories took place through the process of triangulation of the researchers (Denzin, 1978) in order to validate the results of the research and to ensure greater reliability of the data.

3. Representations of Artificial Intelligence

According to the opinion of the students interviewed, Artificial Intelligence is represented at the same time as a topic to be explored at school to acquire knowledge, skills and competencies in the world of the future and as a tool for analysis, enhancement and improvement of learning in various life contexts. For some students, in fact, "*Artificial intelligence is a topic that is not yet well known but that it would be appropriate to deepen at school*" and again "*a fundamental issue on which, however, training and awareness are needed*". According to the interviewees, "*artificial intelligence is used a lot but little is known about its implications, its potential and for this reason it is necessary to train". Most of the respondents to the exploratory study highlight a* gap between the widespread use of AI by adults, children and adolescents and the full knowledge of how it works: "*Everyone uses Artificial Intelligence, with their smartphones, when they use social networks, when playing online games but I don't think there is yet an awareness of what it really* is". AI is also represented as a tool that supports and allows the acquisition of a wealth of knowledge and skills across all age groups: "*A child, an adult, an elderly person uses AI because it is a tool that helps them learn new topics, learn new things, such as a foreign language*". According to the participants, Artificial Intelligence is also configured as a "tool capable of improving learning at school, at home and at work with a click, immediately, and at any time of the day". Some of the participants represent artificial intelligence as a set of tools capable of transforming our habits and simplifying our way of life, making the home smart: "*If I think, for example, of my habits and those of my family at home, I think of how and how much artificial intelligence is necessary for us, such as Amazon Alexa and Google Assistant",* "At home we use appliances through Artificial Intelligence and this makes everything more convenient". Artificial Intelligence is also represented as a tool capable of making everyday life accessible: "*My father taught my grandparents to use assisted driving to prevent accidents from happening when they travel*"; "*For my uncle the voice assistant is fundamental, being blind this makes his life easier and makes him more autonomous*".

4. The uses of Artificial Intelligence in daily life

During the interviews, the participants reported the predominant use of Artificial Intelligence as a valid tool for carrying out homework and a support tool to improve one's learning**: "***For almost a year I have been using Artificial Intelligence to study, both alone and with my friends when we study at home because it helps us answer many questions about study subjects*"; "*I often use AI because it helps me better understand the concepts of scientific subjects and remember them*." AI is also used "to create texts of various types and find new ideas to create something new", as a co-creation tool. Most respondents use CHAT GPT **"***to receive assistance when it comes to carrying out projects on specific disciplines and doing homework faster*" and "*it is used when I need to correct grammatical errors in a text***".** Most of the participants in the exploratory study say that they are also experimenting with the use of Artificial Intelligence in teaching: "*At school almost all my teachers use AI to create interactive quizzes or concept maps". Some of the interviewees report the* educational experience of gamification during the evaluation moments: "*often the science teacher uses Kahoot and we have to fill out quizzes in the form of a game and a challenge*". The use of AI at school would make teaching "*more fun and engaging*". Other tools particularly used in teaching would be Padlet and ThingLink. In this regard, some of the participants narrate their teaching experiences: "*when we use Padlet in the classroom we can brainstorm and create multimedia projects together*";*with ThingLink we experience lessons that are more interactive and engaging because the content is transformed into a digital format*". Therefore, the use of AI, according to the participants, would make learning and teaching processes more attractive, engaging and interactive.

5. The advantages of using Artificial Intelligence

All the participants in the study identified the advantages of using Artificial Intelligence as the personalization of learning, the possibility of making teaching more flexible and attractive and effective as well as capable of filling the gaps and enhancing the strengths of each one: "*For me it is important to use AI at school because it helps me to get feedback on how I am learning and how I can improve*", "With AI at school there is not just one way to learn and one way to teach, you experiment with several and this also helps classmates who have learning difficulties"; "*If there are things I didn't understand at school, I can use chatbots and virtual assistants at home at any time of the day*." AI would therefore make it possible to manage learning times in correlation with the needs of the student,

constituting tutoring that is always available and present. Some of the students interviewed highlight as a further advantage "*the possibility of having materials to study and learn in a diversified way according to everyone's needs*", highlighting the inclusive scope of AI. Alongside the possibility of adapting the teaching paths and study materials, the attractiveness and dynamism of the content presented also emerges as a further advantage of Artificial Intelligence: "*When teachers use the various applications during lessons, you don't get bored, on the contrary you pay more attention because you feel more involved*".

6. Critical issues in the use of Artificial Intelligence

The macro-category "Critical issues in the use of Artificial Intelligence" allows us to identify the set of risks, perceived by the interviewees, regarding the use of Artificial Intelligence. The most perceived fear is certainly the loss of critical skills: "*I believe that using artificial intelligence too much both in life and at school does not allow you to think for yourself at some point*"; "*I fear that for the resolution of all problems we always rely only on Artificial Intelligence and do not use our ability to solve problems on our own*". A further critical issue would be the development of an excessive dependence on AI which "*would make us passive and not be able to critically evaluate information*" so "*we make our choices depend on the advice of a virtual assistant because we feel unable to deal with situations without the support of AI*". Most participants fear that the use of Artificial Intelligence could lead to loneliness and the interruption of authentic bonds with their peers in real life": "*Our generation lives in an era made up of communications, especially digital communications, which create the illusion of a closeness that, often, does not translate into deep and truly intimate bonds*"; "*Sometimes it happens that you feel a feeling of relational emptiness that technology tries to compensate for with AI-based chatbots but then you realize that you continue to be alone and not understood*". All participants said they had experienced or witnessed acts of cyberbullying: "*In class almost all of us have experienced bullying on social networks where we have had to defend ourselves from false and offensive information about ourselves in turn*". Cyberbullying is also configured in terms of impersonation for which "*a Facebook profile was created with my sister's data from which sexual messages were sent to other classmates*" or in terms of outing: "*I had told friends that I had a flirtation with a classmate and the following day I found comments on Instagram saying that I was gay*".

Only some of the participants underline a series of critical issues related to ethical and privacy risk: "*When you use AI, you are not aware of the problems related to data protection*" or "*the transparency of AI in automated decisions*". Some of the participants tell how "*Behind AI there may be the violation of individual rights and the loss of control over personal data, but this is not talked about much at school*". According to the point of view of some of the participants, the risks associated with the use of technologies would be related to the lack of knowledge and skills in terms of technical skills and critical and ethical awareness: "*We should learn to assess whether the output of AI is valid or not*"; "*We adolescents must know how to use AI correctly, both for ourselves and for other users and not accept AI passively*".

Conclusions

The analysis of the textual corpus allows us to reflect on the representations and perceptions of the participants regarding Artificial Intelligence, understood in terms of a tool that arouses ambivalent experiences, harbingers of challenges and characterized by risks and opportunities. The students interviewed consider AI as a useful and fundamental tool in the management of learning and daily life, as a study support and support in the face of personal problems using chatbots as well as a tool capable of innovating teaching, making it more interactive, dynamic and inclusive, respecting the times and learning styles of each and every one. The interviews also show how Artificial Intelligence has become a tool for promoting psychological well-being through therapeutic chatbots, psychological screening platforms and mood tracking tools. However, most students fear that the use of artificial intelligence could "anesthetize" relationships with the peer group and with the adults of reference. AI would be experienced and perceived with fear for the consequences it portends in terms of loss of critical skills and autonomy of judgment, isolation from the peer group and lack of meaningful human relationships together with ethical and privacy-related risks. Some of the interviewees narrated the need to possess skills that allow them to correctly manage the use of AI to limit risks, to acquire greater awareness and adopt ethically correct behavior on the net. It is no coincidence that digital skills are focused on in their transversal theoretical-applicative dimension, i.e. no longer as a subject, a "hard" skill, but as digital soft skills (Iavarone & Aruta, 2022), i.e. cognitive-operational skills that imply the use of technologies with flexibility and creativity, which are essential for living, functionally and responsibly. the digital environment. In this sense, the acquisition of these skills correlates with the ability to foster processes of ethical and moral self-orientation in the new generations that lead

them to recognize any dysfunctional contexts and disvalue-based content on the network (Iavarone, Scuotto, Aruta, 2023). In the light of these considerations, the school should be a 'social beacon', capable of transmitting rules and values where they are lacking, relying on adequately trained professional figures, teacher-educators able to guide young people, teaching them to govern the use of technologies with awareness, a sense of community and civil spirit. (Iavarone, Scuotto, Aruta, 2023). The focus from an educational point of view should be the promotion and support of the development of moral thought, also through a more responsible use of technologies, through educational interventions that aim at a use that enhances their transformative value (Riva and Gaggioli, 2019) All the students interviewed have experienced or witnessed acts of cyberbullying, a phenomenon that does not always present the typical characteristics of traditional bullying such as intentionality, persistence over time and asymmetry of power (Olweus, 1993). In fact, in virtual contexts, the distance between the victim and the cyberbully makes it problematic to consider the intentionality of the latter, while the repetitiveness of bullying acts on the network towards the victim, given the possibility of sharing content online, can also be due to other users (Menesini et al., 2019), further undermining the mental health of the victims.

The complexity and ambivalences that characterize the theme of Artificial Intelligence prompt an introductory reflection on digital moral literacy as an operational trajectory of a Digital-Civil aimed at preventing network risks, such as, for example, fake news and cyberbullying. This goal becomes achievable through the experimentation of digital moral literacy paths that consider the fact that life, today, unfolds along an online/offline 'continuum' (Iavarone, Scuotto, Aruta, 2023).

Operating by virtue of this means promoting ethical sensitivity, ethical reasoning skills and moral imagination skills (Tuana, 2006), without neglecting the awareness that this fluidity between real and virtual connotes the contexts, events, reflections and choices of individuals. It is precisely this awareness that opens the structuring of experimental educational interventions which, constructed, in short, as 'virtual reality tasks', help subjects to immerse themselves in simulated situations and to observe themselves in the way of interpreting them and acting in resolution of them.

These tasks can therefore promote the indirect and experiential learning of moral values, pushing subjects to activate a cognitive, visual and kinesthetic modality, in the pedagogical logic of technologically enhanced learning by doing (Zagami, 2018), in the same perspective as Civil Pedagogy (Iavarone, 2022). In support of the usefulness and effectiveness of an educational approach on moral digital literacy,

the analysis of the scientific literature highlights that the effectiveness of educational digital interventions can be correlated in particular to immersive and interactive simulations, as they allow participants not only to learn moral rules and principles, but also to actively exercise their morality to make decisions (Scuotto, Triberti, Iavarone, Limone, 2024).

In a nutshell, it could be said that the present and future use of AI seems to be welcomed with a positive attitude, if the identity of man and machine are kept clearly distinct. In a time when everything changes quickly, the real risk for the protagonists of education, students and teachers, is to be "overwhelmed" by changes in contexts and scenarios, places and actions of intervention. It therefore becomes urgent to have useful tools to design a "navigation map" to inhabit changes by going through them with critical capacity, civic sense and hermeneutics of experience (Iavarone, 2022)

Author contributions

This paper is the result of the shared work of the authors; however, for the purposes of the attributions of its individual parts , the introduction and paragraphs 1,2,3,4,5 and 6 are attributed to Valentina Paola Cesarano while the conclusions are attributed to Maria Luisa Iavarone.

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