

Artificial Intelligence At School: Challenges And Opportunities For Innovative Teaching

Amelia Lecce¹, Lucia Campitiello² and Stefano Di Tore²

1 University of Sannio; alecce@unisannio.it

2 University of Salerno; lcampitiello@unisa.it; sditore@unisa.it

* Correspondence: alecce@unisannio.it

Abstract: Growing technological development has a significant impact on society, influencing different aspects of daily life, the economy, politics, culture and, last but not least, the educational and training processes linked to the school sphere. Compared to the past and other technologies, Artificial Intelligence allows for much more advanced human-machine interaction, sometimes arousing doubts and uncertainties on the part of users, mainly due to the management of the enormous quantity of open data. Open data, in fact, is easily accessible but also easily modifiable and shareable for any purpose. For this reason, it is considered important to reflect on the ways in which Artificial Intelligence tools are used in teaching. Therefore, the purpose of this contribution is to participate in the reflection on the responsible and ethical use of Artificial Intelligence, presenting an exploratory investigation aimed at investigating students' opinions regarding this technology.

Keywords: AI; STEAM Education; Didactic

1. Introduction

In an increasingly digitalized era, Artificial Intelligence (AI) is revolutionizing many sectors of society, including education (Floridi, 2022; Di Tore, 2023). Implementing educational interaction (Sibilio, 2017; Sibilio, 2020) with the use of Artificial Intelligence could offer multiple benefits, including personalized learning or the creation of innovative and engaging educational experiences (Chen, 2020; Ahmad, 2021; Lin, 2022). “Skills-based teaching” emphasizes that school learning must be designed to allow the acquisition of knowledge, skills and abilities useful for dealing with a complex and constantly changing society (Kennedy & Odell, 2014). In this regard, transversal skills and soft skills have become increasingly crucial in the contemporary educational context as they could prove fundamental for the personal and professional lives of students. In this regard, the Organization for Economic Co-operation and Development (OECD, 2021) and the World Economic Forum (WEF, 2020) have identified several key skills that students should strengthen during their educational journey. These skills go beyond academic knowledge and include transversal skills such as the ability to effectively use digital technologies, to make informed decisions, to critically evaluate information coming from the media,



Copyright: © 2024 by the authors.
Submitted for possible open access
publication under the terms and
conditions of the Creative Commons
Attribution (CC BY) license
(<https://creativecommons.org/licenses/by/4.0/>).

¹ Amelia Lecce is the autor of the contribute; Lucia Campitiello is the autor of the abstract; Stefano Di Tore is the scientific director of the research.

to generate innovative ideas, to communicate effectively and to collaborate as a team. These skills are essential to prepare students to face the challenges of an ever-evolving world and to adapt to new situations and working contexts. Promoting these skills within the school environment not only promotes the individual success of students, but also contributes to creating a more equitable, inclusive and sustainable society, in which each individual is able to actively contribute to their own well-being and that of the community.

Digital skills are increasingly important for students, not only for their educational path, but also for facing the challenges of life and the world of work, through an ethical, responsible and creative use of technology, in order to promote teaching innovative and a digitally competent society (Guzmán-Simón, García-Jiménez, López-Cobo, 2017; Martzoukou, Kostagiolas, Lavra-nos, Lauterbach, Fulton, 2021). In this sense, AI can represent a valuable tool for creating more dynamic and personalized learning environments, allowing students to acquire key skills for the future (Luckin, Cuku-rova, Kent, du Boulay, 2022).

However, to fully exploit the benefits of AI in education, it is essential to understand students' opinions and expectations.

Therefore, this research aims to explore students' point of view on the use of Artificial Intelligence. Through an exploratory investigation, we intend to analyze students' opinions on the use of Artificial Intelligence and on possible teaching activities to be carried out using Artificial Intelligence.

2. Materials and Methods

2.1. Objective

This research aims to explore students' point of view on the use of AI in the educational experience. Through an exploratory investigation, we intend to analyze students' opinions on AI and possible teaching activities that could be carried out using this technology, in order to inform future pedagogical practices and improve the effectiveness of the teaching process -learning.

The objective of the following survey is to explore, through some closed-ended questions and one open-ended question, the use of artificial intelligence in the school environment. Through an analysis of the questions, it aims to provide a reflection (albeit partial) on the current state of the art and on the future prospects of the use of AI in schools.

2.2. Participants

The number of people who participated in the exploratory survey was 271, of which 161 were male, 104 were female and 4 were non-binary (mean 0.376; standard deviation 0.548). It should be noted that the reference sample is part of a group of students attending secondary schools in the provinces of Benevento and Avellino in the Campania region and who participate in the PNRR orientation courses organized by the University of Sannio. In particular, the students attended a 3-hour course, entitled "School orientation and the value of inclusion: between knowledge

society and Artificial Intelligence" which is part of the "Biotechnologies for medicine" path.²

2.3. Research questions

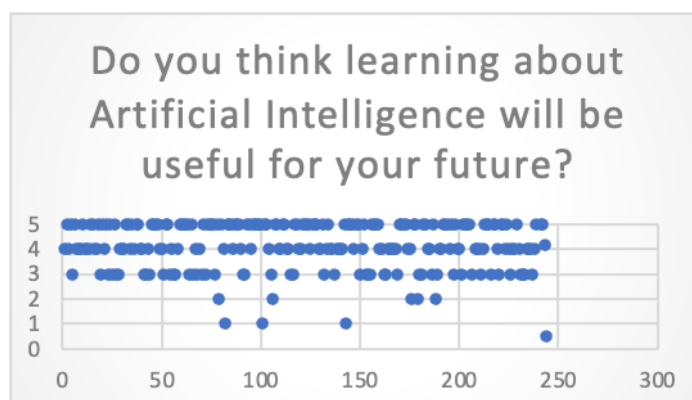
The following research questions were used to conduct action research aimed at investigating students' opinions, experiences and perceptions on the topic of Artificial Intelligence and its possible use in teaching. Therefore, questions addressed to students

- Do you think learning about Artificial Intelligence will be useful for your future?
- Do you use Artificial Intelligence?
- If you answered yes to the previous question, which program do you use most?
- Do you use Artificial Intelligence for educational purposes?
- Would you like to use Artificial Intelligence more at school?
- Summarize an activity that you would like to carry out at school using Artificial Intelligence.

3. Results

Assigning a scale of values from 1 to 5, to the question "Do you think knowing Artificial Intelligence will be useful for your future?" students seem to have a positive vision of the usefulness of Artificial Intelligence for the future, suggesting that it is considered quite important to know how it works and optimize its potential (mean 4.16; SD 0.483).

Figure 1. Do you think learning about Artificial Intelligence will be useful for your future?

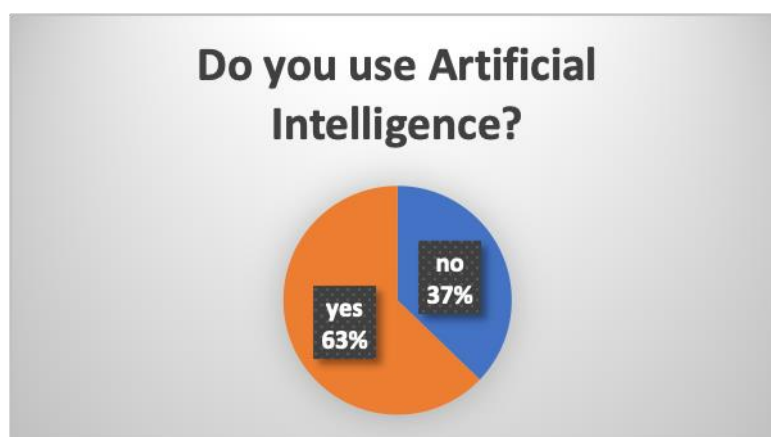


To the question "Do you use Artificial Intelligence?" 152 students (63%) responded affirmatively and 90 students (37%) declared they did not use it (see Figure 2). Of the 63% of students who say they use Artificial Intelligence, more than 90%

² At the following link you will find information regarding the PNRR courses organized by the University of Sannio <https://www.unisannio.it/it/articoli/corsi-orientamento-2023-2024>

say they use ChatGPT and only a few students say they use programs such as Bing, Midjourney, Alexa; Eclipse AI, HeyGen, Smodin, Gamma AI.

Figure 2. Do you use Artificial Intelligence?

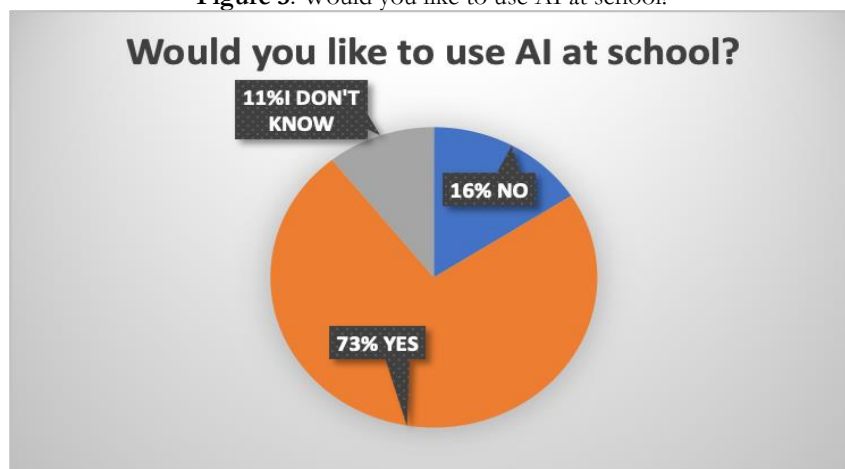


Focusing more on the educational aspect, they answered the question "Do you use Artificial Intelligence for educational purposes?" only students who had previously stated that they used Artificial Intelligence, therefore, out of 152 students, 143 (i.e. 94.08%) students declared that they used Artificial Intelligence (probably ChatGPT) for teaching purposes.

Instead, to the question "Would you like to use AI more at school?" 73% of students responded affirmatively, indicating that they would like to use artificial intelligence more at school; 16% responded negatively and 11% expressed uncertainty on the issue.

These results suggest that the majority of people are in favor of the use of AI in schools, however there is still a percentage of uncertainty probably due to the lack of information and awareness on new forms of Artificial Intelligence.

Figure 3. Would you like to use AI at school?



In the last question, students are asked to summarize an activity they would like to carry out at school with Artificial Intelligence. From the analysis of the answers provided, various themes and approaches emerge regarding the use of Artificial Intelligence. 260 responses were analyzed and subsequently collected into three different codes:

1. Research and in-depth study of school contents (106 responses);
2. Activities to understand the functioning of Artificial Intelligence (80 answers);
3. In-depth activities on Virtual Reality and Robotics (75).

Overall, the responses reflect a widespread interest in Artificial Intelligence; in fact, it is noted that the majority of students say they want to use it to delve deeper into the topics covered at school in a more interactive and engaging way, enriching the learning experience. Many students believe that AI can represent an opportunity to simplify traditional lessons and make learning more accessible and understandable. However, the number of students who would like to understand the functioning of AI to program interactive Chatbots on different topics is also relevant. Below are some answers given by the students:

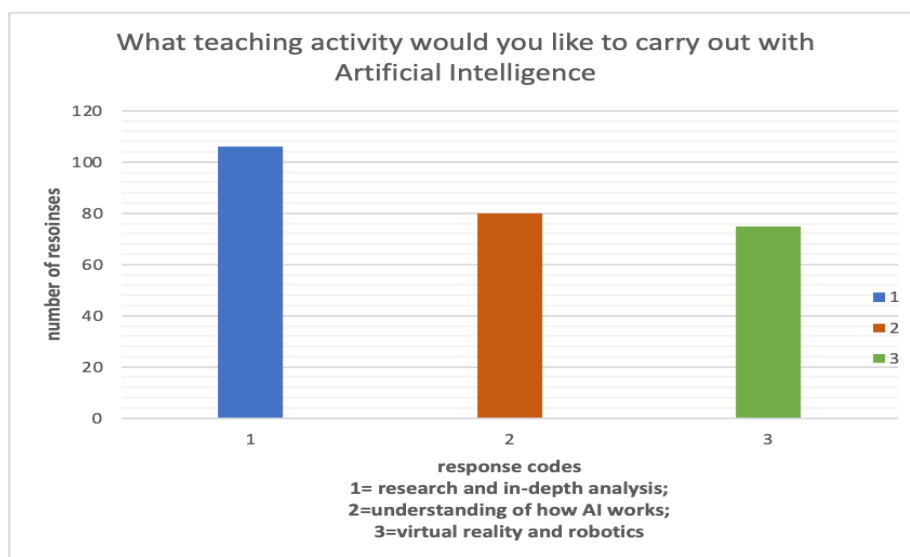
"I would like to use Artificial Intelligence to deepen lessons in class, carrying out different, more interesting and engaging activities".

"I would like to create a "psychologist" chatbot that supports me in difficult choices."

"I would like to take a course on artificial intelligence to learn how to make good use of it"

"I would like to find out first of all what artificial intelligence is and then delve deeper into it. Then I would like to identify which jobs will be replaced by artificial intelligence and how these jobs will be carried out by machines"

Figure 4. What teaching activity would you like to carry out with Artificial Intelligence?



5. Conclusions

The conclusions of the research reflect the growing awareness of the importance of Artificial Intelligence in education and the need to promote digital skills among students. In fact, given the need to reflect on students' understanding, awareness and trust regarding Artificial Intelligence, the European Commission (2020) invites Member States to identify a series of innovative teaching tools and methods to increase digital skills, at all levels of education. In the "White Paper on Artificial Intelligence", it is specified that to help educate aware and self-determined citizens of tomorrow, a collective effort is necessary, involving the whole of society as a whole. The document, in fact, represents a guide to allow students to acquire fundamental digital skills, promote understanding of the impacts of AI on society, the economy and work dynamics. The objective of policy makers, in fact, is to promote a critical approach among students aimed at understanding changes and participating in the creation of a digitally competent society.

Innovative teaching, understood as a set of tools, methods and models that use new technologies (Calvani, 2011; Calvani and Vivanet, 2014; Di To-re, 2022), can play a fundamental role in promoting active and participatory learning, allowing students to directly experience the practical applications of AI and develop the skills necessary to use it ethically and responsibly.

The adoption of innovative educational policies and tools for AI in educational systems reflects the desire to prepare future generations to face the challenges and seize the opportunities of an increasingly digitalized world, while promoting values of awareness, responsibility and active participation in the digital society. In this way, we aim to create a generation of citizens capable of driving technological progress in a sustainable and inclusive way, rather than passively suffering it.

Therefore, innovative teaching can bring students closer to understanding the functioning of AI tools with curiosity and a critical spirit, through a co-construction of meanings that takes place in collaboration with others (Aiello et al., 2012).

One of the challenges that teaching faces is using Artificial Intelligence effectively to support student learning and participation. Therefore, this research aims to investigate the potential for use in schools to allow safe and reliable development of AI.

In the exploratory investigation presented, the students' responses show a strong interest and a positive vision on the usefulness of Artificial Intelligence. The majority of students say they already use AI, mainly through ChatGPT, and the majority of those who use it also do so for educational purposes (Thorp, 2023; Lo, 2023). The answers to the open question "Synthesize an activity you would like to carry out at school using Artificial Intelligence" show a strong interest among students in integrating AI into the school environment to improve learning and develop advanced skills. However, they also highlight the need for critical re-reflection on the ethical implications and responsible use of this technology. Furthermore, there is a clear desire from students to use AI more in school, with the majority speaking positively about this. The activities proposed by the students reflect a broad spectrum of interests and approaches to the use of Artificial Intelligence at school. Many students want to use AI to learn more about academic topics in a more engaging and interactive way, while others are interested in better understanding how AI works and developing practical skills such as chatbot programming. There are also more specific proposals, such as creating a "psychologist" chatbot or requiring courses on AI to learn how to use it effectively. Overall, these results indicate strong student interest in integrating AI into the classroom environment and suggest that there is significant potential to leverage this technology to improve learning and experience. -students' educational achievement.

Ultimately, the integration of AI into education represents a challenge and an opportunity to prepare future generations for an increasingly digitalized world, promoting values of awareness, responsibility and active participation in the digital society.

References

- Ahmad, S., Rahmat, M., Mubarik, M., Alam, M., & Hyder, S. (2021). Artificial Intelligence and Its Role in Education. Sustainability. <https://doi.org/10.3390/su132212902>.
- Aiello, P., D'Elia, F., Di Tore, S., & Sibilio, M. (2012). A constructivist approach to virtual reality for experiential learning. *E-learning and Digital Media*, 9(3), 317-324.
- Calvani, A. (2011). Principi dell'istruzione e strategie per insegnare. Criteri per una didattica efficace. Roma: Carocci.
- Calvani, A., & Vivanet, G. (2014). Evidence Based Education e modelli di valutazione formativa per le scuole. *Journal of Educational, Cultural and Psychological Studies (ECPS Journal)*, 1(9), 127–146.
- Chen, L., Chen, P., & Lin, Z. (2020). Artificial Intelligence in Education: A Review. *IEEE Access*, 8, 75264 75278. <https://doi.org/10.1109/ACCESS.2020.2988510>.
- Commissione Europea, 2020, Libro bianco sull'intelligenza artificiale Un approccio europeo all'eccellenza e alla fiducia. Consultato il 20 gennaio 2024. Disponibile da https://commission.europa.eu/document/download/d2ec4039-c5be-423a-81ef-b9e44e79825b_it?filename=commission-white-paper-artificial-intelligence-feb2020_it.pdf
- Di Tore, S. (2022). Dal metaverso alla stampa 3D: Prospettive semplesse della didattica innovativa, Studium.

- Floridi, L. (2022). *Etica dell'intelligenza artificiale: Sviluppi, opportunità, sfide*. Raffaello Cortina Editore.
- Guzmán-Simón, F., García-Jiménez, E., & López-Cobo, I. (2017). Undergraduate students' perspectives on digital competence and academic literacy in a Spanish University. *Comput. Hum. Behav.*, 74, 196-204. <https://doi.org/10.1016/J.CHB.2017.04.040>.
- Kennedy, T. J., & Odell, M. R. L. (2014). Engaging students in STEM education. *Science Education International*, 25(3), 246-258.
- Lin, H. (2022). Influences of Artificial Intelligence in Education on Teaching Effectiveness: The Mediating Effect of Teachers' Perceptions of Educational Technology. *Int. J. Emerg. Technol. Learn.*, 17, 144-156. <https://doi.org/10.3991/ijet.v17i24.36037>.
- Lo, C. (2023). What Is the Impact of ChatGPT on Education? A Rapid Review of the Literature. *Education Sciences*. <https://doi.org/10.3390/educsci13040410>.
- Luckin, R., Cukurova, M., Kent, C., & du Boulay, B. (2022). Empowering educators to be AI-ready. *Computers and Education: Artificial Intelligence*, 3, 100076.
- Martzoukou, K., Kostagiolas, P., Lavranos, C., Lauterbach, T., & Fulton, C. (2021). A study of university law students' self-perceived digital competences. *Journal of Librarianship and Information Science*, 54, 751 - 769. <https://doi.org/10.1177/09610006211048004>.
- OECD (2021), *Beyond Academic Learning: First Results from the Survey of Social and Emotional Skills*, OECD Publishing, Paris, <https://doi.org/10.1787/92a11084-en>.
- Sibilio, M. (2017). *Vicarianza e didattica. Corpo, cognizione, insegnamento*. Brescia: La Scuola.
- Sibilio, M. (2020). *L'interazione didattica* (pp. 1-191). Morcelliana.
- Thorp, H. (2023). ChatGPT is fun, but not an author. *Science*, 379, 313 - 313. <https://doi.org/10.1126/science.adg7879>.
- World Economic Forum [WEF]. (2020). *Schools of the future: Defining new models of education for the fourth industrial revolution*. Consultato il 30 gennaio 2024. Disponibile da <https://www.weforum.org/reports/schools-of-the-future-defining-new-models-of-education-for-the-fourth-industrial-revolution>