

## Editorial

### The year of AI in education

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The year that just ended will probably be remembered as the year in which artificial intelligence finally entered the mainstream of educational research.

With the release of ChatGPT and the sudden succession of applications and announcements from major players in the digital market, the human experience of technology has been transformed for the umpteenth time in recent decades. The most significant advances in AI in 2023 include machine learning, autonomous decision making, and the augmentation and potential replacement of human tasks and activities (Mutyalala et al., 2022).

Rivoltella and Panciroli (2023) highlight the need to distinguish three specific foci that characterise the relationship between AI and education: educating with artificial intelligence, educating about artificial intelligence, and educating the artificial intelligence.

The first of these three, educating with AI, is probably the topic in which the most investment is being made to significantly improve the educational technologies currently on the market or to develop new killer applications. Although there is not yet a general condition of human replacement in the operational phases, some applications present decidedly original and innovative features and aspects.

What we do not always focus on and understand about AI is the strong link between human operating habits and the possibility of generating new solutions. The other key point concerns the influence it can have on the results when the machine mainly takes into account the data of a single subject, a specific group of people or the general average of the population using the application. To clarify this difference, we refer to a study by Ng et al (2022): they highlight a key aspect of the proliferation of AI-based applications that has occurred over the past year due to the availability of user-friendly educational tools such as Tensorflow Playground, Teachable Machine, and AI for Ocean in Code.org. Many of these platforms allow students with no technical expertise to generate machine learning models without any computer science prerequisites (Wangenheim et al., 2021). This means that teaching AI is no longer as difficult as it used to be, and in recent years there has been renewed interest in introducing AI to high school students (Long & Magerko, 2020) and non-computer science university students (Kong et al., 2021). Based on the same principle, it is not difficult to imagine a future scenario in which most aspects of teaching will include the possibility of training the machine to recognise situations that lead to a particular sequence of operations.

Thus, it seems that one of the possible future scenarios is to allow training experts (but not necessarily computer experts) to modify a setting by selecting clusters of users with certain characteristics, so that the machine learns from their behaviour how to set up the teaching or make it more adapted to personal needs.

However, we will not be able to ensure complete neutrality with respect to the underlying learning models of the application. For example, applications such as Decktopus AI or SlidesAI refer to a design by content, whereas ChatGPT (actually...) tends to propose a design more oriented towards the development of competences through active teaching. All of these solutions currently offer little in the way of "off-the-shelf" solutions, or rather, technically finished products, which nevertheless require analysis and verification in order to avoid trivial and important errors in the delivery of courses to students.

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However, we will not be able to guarantee complete neutrality with regard to the teaching models underlying the application. For example, applications such as Decktopus AI or SlidesAI refer to a design by content, whereas ChatGPT tends to propose a design more oriented towards the development of competences through active teaching. All of these solutions currently offer little in the way of "off-the-shelf" solutions, or rather technically finished products, which still need to be analysed and verified in order to avoid both trivial and major errors in the delivery of courses to students.

The new era of personalised learning will therefore be characterised by the search for the smallest distance between personalised educational needs and the actual personalisation of the course generated by adaptive environments. Teachers and trainers will need to become increasingly adept at understanding how to teach the machine, or rather how to provide the best combination of prompts and data to be processed in order to achieve the desired solution.

However, one of the key issues we will have to address is the need to rely on one of the multinational companies capable of providing such a complex and articulated service. It is not so much the availability of code or know-how, in this case it is the impossibility of operating without having made major investments in computing power and advanced data mining capabilities based on huge amounts of data. It is clear that companies like Microsoft have an impressive advantage over others, just think of the huge amount of data and experience that has been gathered in recent years from the use of Teams by major international organisations and bodies. This is a theme that Negroponte had already anticipated in *Being Digital* (1995), when he stressed that 'decentralisation' would be virtually impossible with the advent of AI, and that it would be important to have a centralised system capable of linking all the choices and suggestions that AI applications could offer to the same user.

Faced with rapidly evolving scenarios, it is all the more urgent to look for authentic solutions and, above all, to ensure that as many didactic approaches as possible can be adopted, otherwise the enormous opportunity presented for the first time to 'non-programmers' may not be fully exploited.

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