

ANTONIO VÍCTOR MARTÍN GARCÍA (Coord.)

# LA PEDAGOGÍA SOCIAL EN UNA SOCIEDAD DIGITAL E HIPERCONECTADA: DESAFÍOS Y PROPUESTAS



AQUILAFUENTE  
A

  
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## AQUILAFUENTE, 369

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Ediciones Universidad de Salamanca  
y los autores

1ª edición: noviembre, 2024

ISBN: 978-84-1091-008-9 (POD)

ISBN: 978-84-1091-009-6 (PDF)

DOI: <https://doi.org/10.14201/0AQ0369>

Ediciones Universidad de Salamanca  
Plaza San Benito s/n  
E-37002 Salamanca (España)  
<http://www.eusal.es>  
[eusal@usal.es](mailto:eusal@usal.es)

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Maquetación y realización:

Cícero, S.L.U.

Tel.: +34 923 12 32 26

37007 Salamanca (España)

Impresión y encuadernación:


Nueva Graficesa S.L.


Teléfono: 923 26 01 11


Salamanca (España)



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# (RE)THINKING THE ROLE OF ARTIFICIAL INTELLIGENCE IN EDUCATION

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## 1. «DEEP THOUGHTS» AND ANCIENT DEBATES

«There is an answer?» said Fook with breathless excitement.»

«A simple answer?» added Lunkwill.

«Yes,» said Deep Thought. «Life, the Universe, and Everything. There is an answer. But,» he added, «I'll have to think about it.» (Adams, 1979, p. 143).

**T**HESE FAMOUS LINES from *The Hitchhiker's Guide to the Galaxy*, born from the mind of Douglas Adams, describe the moment when the programmers of the supercomputer «Deep Thought» (the second most powerful one in the Universe) ask him without too much thinking the answer to THE question, to Life, the Universe and Everything. This pivotal episode in the narration triggers the beginning of a series of amusing and paradoxical events that are still today an inexhaustible source of reflection. It is not by chance that the author decides to interrupt the solemnity of that moment by having two philosophers burst into the room, who demand the immediate deactivation of the machine.

Faced with the consternation of the two programmers, one of the two philosophers explains the nature of the problem:

«Demarcation, that's the problem! You just let the machines get on with the adding [...] and we'll take care of the eternal verities! [...] Under law the Quest for Ultimate Truth is quite clearly the inalienable prerogative of your working thinkers. Any bloody machine goes and actually finds it and we're straight out of a job aren't we? [...] we demand rigidly defined areas of doubt and uncertainty! (ibidem, p. 144).

It is emblematic that Adams, so many years in advance, has staged a scenario like the one just mentioned: on the one hand, technical operators clouded by enthusiasm who do not question themselves too much either on the possible implications of their invention or on the effectiveness and correctness of their way of interacting with it, and on the other hand, 'operators of thought' who claim to have a say for the sake of having it, and who feel threatened by the mere presence of a computer so intelligent that they want to disable it.

The representation proposed by Adams is highly representative of what is happening in the debate around Artificial Intelligence (AI), which in the eyes of the public is probably one of the most nebulous technologies on the contemporary scene. One only must think of the various letters of moratorium and protest, the calls for the suspension of AI technologies, and the numerous – and discordant – statements in the press and on platforms following the very rapid dissemination of OpenAI's ChatGPT 4 to understand how this technology has also become part of the now consolidated dialectic between apocalyptic ones and integrated ones (Eco, 1964). Yet, as always, fossilising the discussion on AI into antithetical positions precludes a meaningful understanding of the phenomenon under discussion. Firstly, of the semantic and referential complexity of the technology: with AI, we refer to a wide variety of machines, automations, simulations, and speculations. Personal assistants such as Alexa, Google Assistant and Siri, Machine Learning (ML) and Deep Learning (DL)

architectures, semantic network models, neural networks and natural language processing (NLP), artefacts such as cyborgs, robots, expert systems, automata, self-driving cars (Panciroli & Rivoltella, 2023). Secondly, of the historical reconstruction of the interdisciplinary nature from which the phases and projects of AI and also of AIED – Artificial Intelligence in Education – originate (Ye et al., 2021). Suffice to think in this direction of the fact that the dawn of the theoretical origin of AI is the work of a mathematician, Alan Turing, who published his *Computing Machinery and Intelligence* in 1950 in *Mind*, a journal of psychology and philosophy, or of the transversal training, straddling philosophy, mathematics, engineering, psychology and economics of the researchers present at the *Dartmouth Summer Research Project on Artificial Intelligence* in 1956. Thirdly, the analysis of the symbolic and literary representations underlying the oxymoronic binomial ‘artificial intelligence’. In many ways, in fact, there is nothing new about AI. Humans have always imagined enchanted objects and mechanical devices that could approach some form of consciousness. Cave, Dihal e Dillon (2020) trace the history of mankind by bringing together fictional and non-fictional accounts within the so-called ‘AI narratives’. Several chapters of their volume collect pre-capitalist accounts of AI, drawn from Greek philosophy and also from the Middle Ages. Although not AI as we understand it, these conceptions of intelligent, reasoning or conscious ‘entities’ are already embedded in distant historical epochs, evoking a dimension of the human imagination (Floridi & Cabitza, 2021) that now, perhaps more than ever before, seems to us (mistakenly?) about to be realised.

These dimensions allow discussions in the field of AI to be declined on several fronts, without falling into the temptation of the sterile diatribe between enthusiasts and critics. In our opinion, within this framework, it is necessary to integrate and emphasise a further level, sometimes underestimated, that allows us to understand the phenomenology and the paths that have led to recent developments: we are talking about the relationship between AI and capitalism, the subject of the next section. The

operation, in our opinion, is important because the economic element not only represents an essential key to understanding the role that technologies play in our society but also represents one of the main mediators of experiences with them: Toffler's prosumer user (Toffler, 1990) is, first and foremost, a consumer user who, as a user of a service, interfaces with market mechanisms in a more or less conscious and more or less manifest manner.

As Preston states (2022), AI can only be understood as a late capitalist device: a technology that is an effect of the productive fabric driven by that calculating and instrumental reason incapable of thinking beyond established patterns. Elliott (2019) highlights the link between AI, globalisation and geopolitics, pointing out the various limits and relevant issues connected with its development, such as the growth of inequalities: the latter aspect that in the educational sphere may represent a further exacerbation of forms of *digital divide* (Soriani & Bonafede, 2023)<sup>1</sup>.

## 2. THE ECONOMIC MODELS UNDERPINNING AI-BASED SYSTEMS: BETWEEN DATA COLONIALISM AND DIGITAL CAPITALISM

With the advent of the age of post-mediality (Eugeni, 2015), discerning the profile of these mechanisms has become increasingly complex: whereas previously technologies and media were recognisable in their materiality (the printed page, the television screen), in their languages (journalistic language, television, radio) and in their economic/distributive

<sup>1</sup> For example, Benjamin (2019) \n \n As more organizations and industries adopt digital tools to identify risk and allocate resources, the automation of racial discrimination is a growing concern. Social scientists have been at the forefront of studying the historical, political, economic, and ethical dimensions of such tools (\n 1 \n -\n 3 \n \n shows how AI exacerbates existing racial prejudices in society in the criminal justice system, healthcare and education.

models (often linked to the purchase of the device to enjoy them), with the digital revolution the media scenario has changed profoundly. Not only has there been a process of convergence and collision of media products (Jenkins, 2007), but also their dematerialisation: Eugeni speaks of the «vaporisation» of the media, meaning the fact that a clear distinction between the different media devices inherited from the past has disappeared (Eugeni, 2015), which has led not only to the blurring (the author speaks of «disappearance») of the boundaries between one media device and another, but also between what is a media device and what is not. This immateriality, which has the character of omnipresence, has been accompanied by an inexorable transformation of distribution models that has affected the technology industry in its entirety: from the world of information to that of business, from the world of communication to that of entertainment.

There has been a clear paradigm shift that has seen the development, especially in recent years, of the commercialisation of services and user platforms in favour not only of physical media, but also of traditional software and apps (Colombo, 2020): DVD and BlueRay, of course, still exist, but the home-video entertainment game is now played on streaming platforms such as Netflix, Apple Tv+ or Amazon Prime Video; books are and will still be on the market, but we are already beginning to see platforms such as Audible or Kindle Unlimited that allow, subject to subscription, the use of a multitude of texts available in the catalogue.

Similar platforms and services are designed with the intention of building user loyalty and ensuring that users remain in the ranks of their subscribers for as long as possible. This trend can be observed not only in the examples just mentioned, but also in work platforms such as Microsoft Office 360 or Google Workspace – platforms that will soon be massively updated by functionalities enriched by AI systems (Chat GPT for Office and Bard for Google) – which have slowly become more and more an integral part of the daily practices of millions of professionals from the



corporate world, but also from the world of education, such as teachers and, consequently, students (Soriani & Bonafede, 2023).

A real battle, fought under the aegis of a prevailing digital capitalism (Panciroli & Rivoltella, 2023): attracting users with platforms offered for free, collecting data for years, retaining these users thanks to new functionalities, new products and new solutions to their needs (or perhaps, in certain cases, it would be better to speak of induced desires?) and finding forms of monetisation when the user is already completely inside the system (annual or monthly subscriptions for more space in the cloud or to unlock advanced functionalities). The winner is 'whoever shows marked monopolistic and anti-competitive tendencies' (Crouch, 2020) and where the amount of data collected by users, in a race for data 'colonialism' (Couldry & Mejias, 2022), becomes the figure of an unstoppable datafication that, by now, affects every aspect of people's lives.

In this chessboard, AI-based systems play a major role: they base their functioning, accuracy and reliability on the huge amount of data they have at their disposal. And, recursively, the more they are recognised as functional, accurate and reliable, the more users they will have and, consequently, the more data they will have at their disposal. Until a few months ago, no one could have imagined the extent of the impact that AI-based systems could have on society, and perhaps no one is really yet able to anticipate the effects in the immediate future, but a scenario of great changes is looming.

Changes that are likely to be governed by large service providers and big tech companies rather than government agencies. In this sense, the recent AI Act, approved on 14 June 2023 by the parliament of the European Union (European Commission, 2021), is a declaration of intent of great relevance and a concrete act that certainly gives the idea of a stance in the face of a change of such epochal proportions. Let it be clear, the quality of the services offered and used, as well as their usefulness and convenience, are factors that cannot be eliminated from the equation:

today, thanks to technology, the Internet, IoT (Internet of Things) and AI technologies, scenarios of extraordinary possibilities have opened up, also and above all, as we will see later, for the world of education.

It is, however, necessary, and this is a matter of particular interest to the world of schools, to develop a critical awareness of everything that concerns the use of technologies and AI technologies: it is important to educate to a data awareness, i.e. an awareness, a critical consciousness, of how data flows are created, are managed by companies and influence the user experience even in a simple online search (Panciroli & Rivoltella, 2023); just as it is important to educate to a consumer awareness, i.e. an awareness of the economic and business models that are linked to the hardware and software devices used (CoE, 2019).

### 3. PERSPECTIVES FOR AN «AI ENRICHED» SCHOOL

Although there is as yet little direct evidence in the field (UNESCO, 2022), there are many reflections that see AI as a useful element in solving various problems in the world of education, including: the lack of qualified teachers, low scholastic performance, and the widening of the performance gap between students from different socio-economic backgrounds (Davies et al., 2021).

Without going into too much detail on the experiences and research carried out on the subject, and in this sense we would refer you to synthesis works (Zhai et al., 2021), it is appropriate to ask ourselves a series of questions in order to better understand the directions of meaning in the use of AI in education: what are the pedagogical objectives linked to its use? On what occasions and in what contexts are AI systems used in education? By whom are they employed? How? What degree of reflection and awareness accompanies these uses?

According to the Council of Europe's Working Group on AI and Education, which refers to the work of Holmes et al. (Holmes et al., 2019),

the connections between AI and education can be operationalised in four areas:

- Learning with AI involves the use of AI-based tools in teaching and learning processes. This approach includes: a) the use of AI to directly support students, through tools such as intelligent dialogue-based tutoring systems, exploratory learning environments, automatic text evaluation systems, chatbots and AI systems to support students with disabilities; b) the use of AI to support administrative systems, such as staff selection, timetabling and learning management systems; the use of AI to directly support teachers in their professional development, production of teaching materials and classroom management.
- The use of AI to understand learning processes (using AI to learn about learning) concerns the use of learning analytics and educational data mining systems that can provide a detailed and accurate view of student progression and teaching processes, the most effective teaching strategies and the most suitable instructional designs;
- Learning about AI (learning about AI) involves increasing the technological knowledge and skills in AI by students (from primary to tertiary) and teachers;
- Preparing for AI, on the other hand, is about ensuring that all citizens are prepared for the possible impacts of AI on their lives. It is about educating on issues such as AI ethics, data bias, surveillance and the potential impact on the future world of work. This area is designed to be transversal to all the previous ones, precisely to emphasise the importance of the human dimension in the horizon of meaning of the uses of AI systems in everyday contexts.

The work is intended as a guideline and does not go into detail: the main focus is to show priorities and directions regarding the integration of AI in educational systems in order to implement a sensible and

well-considered updating of school curricula that is able to embrace the complexity and the didactic and educational challenges of the phenomenon.

Rivoltella and Panciroli (Panciroli & Rivoltella, 2023), address the issue by offering a point of view in agreement with this categorisation, which is however articulated according to three different approaches: educating to AI, educating with AI and educating AI.

Their proposal seems to deviate slightly from the one just illustrated and is more oriented towards the need to form in students a critical awareness of this technology (educating to AI) without neglecting a participatory posture that raises, in continuity with the values and objectives of a Media Literacy, citizenship and ethical design objectives of AI-based systems (educating AI). There is also a focus on the use of generative AI tools to enhance and optimise creative processes (both student- and teacher-side), on the possibilities that AI can represent in an assistive technology perspective, and on evaluative processes and formative feedback supported by AI systems (educating with AI).

The possibilities for innovating didactics, as well as the spaces for reflection, are many and intertwine numerous spheres, among which one can identify education in digital skills, both from a purely technical-informatics point of view and from a knowledge-building point of view; understanding the AI-based systems in use in educational contexts and how to make the most of them; training teachers in the use of AI-based tools for design, construction of teaching materials, formative feedback, and evaluation; and the need to educate students in a critical awareness towards such tools.

These areas represent the terrain on which concrete paths and operational proposals for the inclusion of AI in educational processes can be set in motion and proceed: it is the precise duty of educational systems to explore them thoroughly, to conduct meaningful experiences and to

promote research initiatives in order to nurture an improvement process that does not renounce the reflexive component.

As Yu states (Yu & Lu, 2021), with the development of AI, education will enter an era in which traditional teachers and artificial intelligence will work collaboratively in the classroom. This collaboration, in his view, will lead to a golden age in which personalised, inclusive, equitable and lifelong education can be developed. The risk, however, as mentioned earlier, is that much of these hopes (if not utopian dreams) will dissipate due to certain socio-economic premises that have a decisive effect on educational practices. Both manual and intellectual work is increasingly segmented into parts and sections that can increasingly be performed by machines (Preston, 2022). Systematisation and fragmentation have pervaded almost all sectors, with standardised procedures even in the selection processes of so-called human resources (which produce prescriptive job descriptions detailing measurable units of work and seek replaceable workers) contributing to this trajectory (Holmes & Porayska-Pomsta, 2023). Our educational systems seem to unwittingly participate in a similar strategy, and AI could lead to a reinforcement of these logics.

In this direction, the centrality of the school – not as a homologising space but as a social space, of the meeting of differences and plurality, in a democratically open perspective (Laval & Vergne, 2023) – is the criterion for avoiding the temptation of personalisation as a solipsistic ideology (Holmes & Porayska-Pomsta, 2023). Our formal educational systems, into which AI will be inserted, will continue to ‘socialise’, i.e. still make concrete the uncomfortable human variability of our students, saving them from the risk of conformation and standardisation. Machines, bound by the rules of codes, will thus be able to be part of an itinerary in which our students can be so much more. As Treviranus writes, human diversity is our greatest resource, and so educating for diversity is first and foremost an effort to bring out divergent processes. Therein lies the main

challenge for the school to come: a challenge posed not so much, or not only, by AI (*ibidem*).

On the other hand, this critical memento is also accompanied by several positive notes, which in our opinion already offer significant implications of the effects that AI can have on certain distortions that have long been present in school systems. Firstly, AI-integrated education makes it possible to completely leave behind the season of teaching by knowledge and content. The school will necessarily have to reshape itself as a space in which teaching dominated by the static nature of knowledge, by the inertia of knowledge that is verbally declaimed but little used, transferred, adapted, and reconstructed (Calvani et al., 2010), is replaced by teaching by competence, in which content is screened and selected on the basis of interest, relevance, reliability, and inserted within a continuous operativity, made up of authentic and situated tasks, and, as we will see shortly, which ‘trains’ a craft posture.

Compared to the content-based didactics model, AI represents a real checkmate, not least by virtue of the tools it offers for overriding classical demands: it will therefore be necessary to take even more seriously the challenge of an education based on the maturation of competences rather than on the achievement of certain content-based results. In this case, the objective can no longer be achievement, hence the outcome, but becomes the learning process, i.e. the space and time needed to construct a situated, reflective and operational knowledge, in a continuous flow of exchange between teachers, students and artificial machines. In this direction, precisely in order to enhance the learning and training process, it will be necessary to focus on error, understood as a category of authenticity of learning and a space of exploration, of possible creation of divergent paths, which cannot be pigeonholed into the input-output schemes of algorithmic logics.

#### 4. CONCLUSION: A RENEWED EDUCATION: THE ARTISAN'S POSTURE

Even if it seems superfluous, it is good to remember that thinking of implementing an innovation in teaching through the simple grafting of AI technologies into the school is not only not sufficient, but actually a sterile and counterproductive operation if not accompanied by a reflection adequate pedagogy.

UNESCO (Sabzalieva & Valentini, 2023) identifies some of the most relevant critical issues that these tools, in particular Chat GPT, represent for professionals in the world of education. In addition to the problems of accessibility, poor regulation, privacy, cognitive biases that may arise, it is worth focusing attention on academic integrity: i.e. the risk of plagiarism, the risk of having students using technology-based AI systems Natural Language Processing (NLP) to copy, to generate texts, essays and tasks without efforts.

Tools such as Chat GPT represent, especially for a school of knowledge not prepared for a real and significant innovation, a cognitive shortcut that risks causing quite a few problems.

Taleb writes:

«Anything you do to optimize your work, cut some corners, or squeeze more «efficiency» out of it (and out of your life) will eventually make you dislike it. Artisans have their soul in the game. [...] they would not sell something defective or even of compromised quality because it hurts their pride [...]. In other words, cutting corners is dishonest.» (Taleb, 2018, p. 51)

That of the artisan, for Taleb, is a necessary posture, indispensable if you want to obtain quality results, built with perseverance, passion, without giving up a component of effort. And if «academics can be artisans» (ibidem, p. 53) the same applies to students.

The very etymology of the word technology offers us grounds for reflecting on its more complex meaning:

«The term should rather open up to a very particular use of these devices or in any case to a particular *formae mentis* in approaching them: the «logos» component witnesses the need for an operation of reflection, discernment and conscious choice which, as thinking subjects destined to act in a world now dominated by technology, we have the possibility and the responsibility to carry out.» (Soriani, 2019).

This *formae mentis*, in the relationship with AI technologies, appears even more important and necessary. Understanding and activating awareness about how, why, meaning, effects, benefits, what is «lost» and what is «gained», must become practice in schools: it is a question of building, training, and exercising daily, in use of AI tools, an «artisan posture» that does not give up these questions.

In conclusion, it is also a question of the challenge posed by AI, both to the world of education and, more extensively, to the social fabric of the near future, of keeping a careful eye on the meanings and trajectories with which to proceed in the synergy *anthropos – techne*. In other words, this concerns a critical posture with which to analyze AI under the lens of *lógos*, that is to say of language, reasoning and thought, which must be the essence of the technique. The word in fact, in the first instance is a tool for conveying a meaning – therefore a signifier. Discussing the educational potential of AI means questioning the senses, representations and design intentions that will come together in school systems and informal education in the coming decades.

Probably claiming the need to preserve «areas of doubt and uncertainty», perhaps not rigidly defined as requested by the philosophers of The Hitchhiker's Guide to the Galaxy, but which open up to the possible and the utopian (understood as Bertin's categories), remains an fundamental option – which human speech and thought must take charge of, in order not to mechanize the human. Compared to the principle of scientific



and calculating rationality, something remains as a waste that does not belong to this way of thinking: subjectivity. Education in the age of AI cannot forget that the human being – changeable, unstable, essentially a becoming – cannot be reduced to a mechanism, circuit or number. Existence inextricably links it to the concept of openness, wonder, discovery, change, and the search for a meaning which, through recourse to the logos, education and training, makes it unique, irreplaceable, guides choices and intentions. If this sense of the subject is lost, one acts excessively, blindly, mechanising humanity rather than humanizing the machines, thus ending up justifying the fears of the philosophers of Adams' story.

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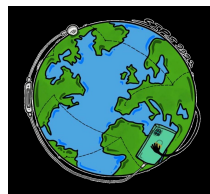
En un mundo donde la tecnología digital transforma nuestra manera de vivir, educar y relacionarnos, mediatiza las relaciones personales, las formas de crianza, la atención y el cuidado de los grupos sociales más vulnerables, en el que fenómenos asociados a la hiperconexión y digitalización introducen nuevas formas de control y vigilancia (en el hogar, en el trabajo, en la calle...), invadiendo nuestro espacio personal, la intimidad y la cotidianidad y en el que se acentúan situaciones de exclusión y marginación social derivados de la falta de acceso al mundo digital, planteamos en este texto algunos interrogantes sobre el papel que puede jugar la Pedagogía y la Educación Social para contribuir a mejorar una sociedad conectada, haciéndola más sostenible e inclusiva. Con ello se trata no solo de reflexionar y advertir de algunos de estos riesgos y desafíos que presenta la digitalización e hiperconectividad, sino igualmente queremos aportar soluciones, asumiendo en este libro que las tecnologías pueden ser vistas también como instrumentos para la solución de los problemas sociales.



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ISBN: 978-84-1091-009-6



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