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Digital Pedagogy. Definition and Conceptual Area

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Abstract: Is there a digital pedagogy, as a distinct domain, different from general pedagogy and from any other pedagogy? If so, what are the aims, object of study, specific methods and principles of digital pedagogy? **What is digital pedagogy** and how does it articulate with education sciences? These are the questions of the beginning stage of an emerging area within the education sciences, where practice challenges us to expand the existing body of knowledge corpus and pedagogical methods.

The article contributes to the contextualization of the set of information, experiences and scientific knowledge, conditions, relationships, meanings orbiting the phrase „digital pedagogy”. The term itself has been used for over 10 years – the first dedicated articles being from 2011, with elements of digital proto-pedagogy in 2004: Latham, apud Fyfe – but absorbing a series of much older concepts and practices, sometimes in a new way.

Keywords: pedagogical innovation, digital pedagogy, digital technologies, education innovation, education sciences, innovative pedagogies, open pedagogy, theory of education

When we refer to digital pedagogy, we have in mind a wide range of concepts, educational situations, techniques, teaching methods and strategies, resources and contexts, tools and educational applications within the sphere of an area named in various interchangeable ways and subdivisions, such as training computer-assisted, computer-mediated education, technology-mediated pedagogy, virtual learning/ training environments, digital curriculum, distance education, e-learning, online learning/ online pedagogy, web-based learning, cyberpedagogy, multimedia pedagogy, OER-enabled pedagogy, electronically-enabled pedagogy, hybrid pedagogy.

The common point is one of the following conditions:

- the direct use of digital technologies for educational purposes – for example, for teaching, learning, assessment or for educational management;

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- ensuring the premises to use digital technologies in education – for example, through programs for the purchase of equipment or through adaptation of the curriculum or through training programs for the development of digital skills; or
- considering their potential in an educational context – for example, in the development of an educational policy or in instructional design, in estimating the opportunity to use (or not use) a tool or a digital resource.

Digital pedagogy overlaps to a certain extent with the fields of study of other focused pedagogies: open pedagogy, critical pedagogy, interactive pedagogy.

A definition for digital pedagogy

A definition and circumscription of the digital pedagogy domain starts from a good knowledge of pedagogy. This is because digital pedagogy is and will remain a projection of pedagogy in the digital space. Also, the definition of digital pedagogy requires a good knowledge of the technological possibilities translated into concrete educational situations – the experience of the last years shows that only certain aspects of the use of digital technologies in education have authentic value and can add new pedagogical meanings.

A working definition for digital pedagogy is given by JISC: “We define digital pedagogy as the study of how digital technologies can be used to best effect in teaching and learning” (JISC, 2020/ 2021), a completion of an older short definition: “In simple terms, a digital pedagogy is the study of how to teach using digital technologies” (Howell, 2013). Various definitions in the specialized literature are centred (exclusively) on the practical aspect of teaching and/or learning, sometimes in relation to certain pedagogical currents or in contrast to certain aspects of “traditional” education. In analysing the praxeological and epistemological area covered by the term digital pedagogy, we notice that it is rather a pedagogy of digitalization of education or a pedagogy for the digital age than a *digital pedagogy*.

In our opinion, the exploration of digital pedagogy can only be done in the extension of pedagogy, as the science and art of education – practice has shown that the effectiveness of educational situations with a digital component is rather contextual, it comes in the conditions where it benefits from a good pedagogical design, is integrated in a mixed/hybrid pathway, uses digital and non-digital resources and tools.

Definition:

Digital pedagogy is the part of pedagogy that studies the design, implementation and evaluation of educational situations comprising a significant component of digital technologies, as well as the necessary conditions for their implementation – synchronous and asynchronous interactions in virtual and mixed learning environments, learning management platforms and tools, digital educational resources, educational usage of various digital applications and tools, virtual assistants for learning and teaching, digital competences of teachers, educational policies and specific programs.

In essence, digital pedagogy deals with education – principles and legalities, characteristics, limits – and the specificity of the field is given by the distinctive note that the digital component adds to learning, teaching methods, assessment of learning, learning content, learning conditions, as well as the extent to which it contributes to their efficiency. In situations where a teaching, learning and/or assessment experience supported by digital technologies cannot be transposed into the “analogue environment” without altering its essence (the learning objectives and/or the didactic strategy), then we can speak of innovation exclusive to the field of study of digital pedagogy.

However, digital pedagogy is not a science of education, but a part of pedagogy, a component of the system of education sciences.

Is there a digital pedagogy without computers? asked Paul Fyfe, from Florida State University, in 2011, in an attempt to circumscribe a digital pedagogy for the humanities. Today, we could imagine various other digital tools and applications, more or less miniaturized, as well as more variants of digital interfaces, which do not necessarily require physical contact. In any case, we cannot limit the understanding of digital pedagogy to the tools we use (Fyfe, 2011) or, we would add, to the way we use digital tools today.

Conceptualizing educational applications of new media is a prolific exercise for the broad field of educational sciences.

The certainties and hypotheses, the subtleties, and nuances of the area of intersection between digital technologies and education can only be revealed in the field of pedagogy, by referring to the rigors of traditional pedagogy, in direct relation with open pedagogy and in the perspective of the proposals of innovative pedagogies.

Digital pedagogy – an open pedagogy

In general, digital pedagogy has been defined and operationalized in convergence with the open pedagogy or open education. Open education “successfully fits into the new paradigm defined by fluidity of roles, learner-centeredness, distributed resources, virtual facilities, and asynchronous lessons” (Istrate, 2000). A multitude of overlaps of the two conceptual areas show us the interdependence between the constructs; to a small extent we can talk about digital pedagogy without considering the *open* attribute; symmetrically, the proposals of an open pedagogy today have no substance without the new technologies, because life, in the social, cultural, personal, professional dimensions, is today largely mediated or supplemented by the tools of the new technologies. In fact, the development of open and collaborative web technologies has been a major contributor to the emergence of the open pedagogy ‘movement’ – that emerged nearly half a century earlier with the Leicester Model – offering new educational resources, techniques and specific teaching methods (Pasekivicius & Irvine, 2019) and, we would add, open pedagogy, in turn, provided the right ideological framework, justifying to a good extent digital education and favouring it in practice.

Among the first theorists of a digital open pedagogy, along with Gráinne Conole and her approaches that foreshadow new educational approaches in an “open world”, Bronwyn Hegarty (2015) proposes a model with eight interrelated features for open pedagogy: (1) participatory technology , (2) innovation and creativity, (3) sharing ideas and resources, (4) reflective practice, (5) people, openness and trust, (6) connected community, (7) learner generated, (8) peer review.

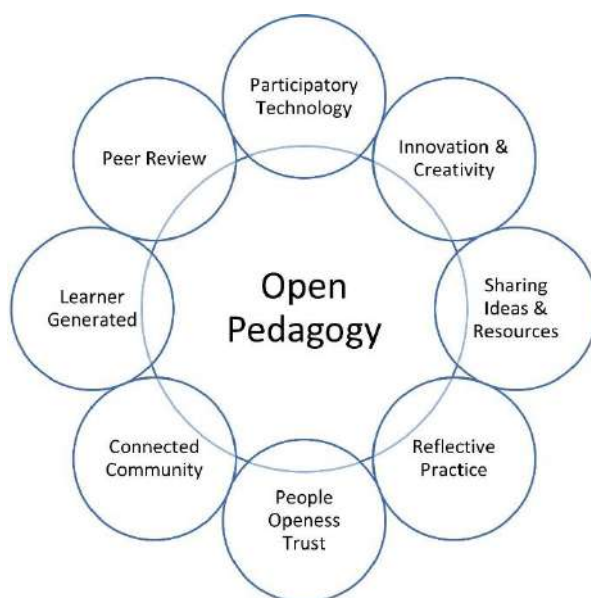


Fig. 1. Attributes of Open Pedagogy – Hegarty, 2015, based on Conole (2013)

Thus, digital pedagogy becomes “a method of empowerment” (Waddell & Clariza, 2018), by which learners are stimulated to take on the exploration of the world and of themselves. Anyway, when learning has conditions to overcome the classroom space and time, we are already talking about (premises for) a decentralization of educational authority (Boczar & Jordan, 2022). In the same rationale, the openness offered by digital education makes a major contribution to participation and civic engagement (through “critical digital literacy” – Polizzi, 2021), in a world where the social is increasingly intertwined with the digital, influencing the imaginaries of civic life, in a utopianism-dystopianism dialectic (ibid.) that can be shaped by education.

According to some authors, influenced by studies on MOOC-type initiatives in the area of adult education, open pedagogy can be considered a melange between design, algorithms and personalized adaptive technologies, on the one hand, and connections between learners, on the other hand, to make the learning process effective and participatory (Benneaser et al., 2016). In this perspective, most of the benchmarks of open pedagogy are anchored in

digital pedagogy: “Although technology [...] is not unique to open pedagogy, sharing and open licensing of student artefacts generally involves use of digital technologies.” (Clinton-Lisell, 2021).

In the new reality, the ecology of learning provides a mixed learning space, where multiple actors use a variety of tools, relationships and didactic approaches (Wals, 2020, apud Aroles and Küpers, 2022). According to the same author, in accordance with the new reality, the new pedagogy is:

- relational – showing deference to people, places and other species;
- critical – allowing (and encouraging) criticism and questioning;
- actional – pursuing change/ improvement;
- ethical – opening the way for ethical considerations and moral dilemmas;
- political – confrontational, challenging routines, systems and structures when it seems justified (p. 75).

So here is a significant revolution in the formulation of expectations from education, to which digital pedagogy has a major contribution, both in terms of defining implementation possibilities and in the pace of dissemination and integration in practice.

Digital pedagogy – an innovative pedagogy

Perhaps the most important contribution of thinking about digital pedagogy is actually bringing back pedagogy to a current trajectory, in a dynamic and effervescence to ensure its relevance, utility, value in the present times. The theoretical and practical progress of the field of educational science comes from the incorporation of surrounding influences and opportunities, closer (imperative) or more distant (wish-list), to which it gives a particular meaning and legitimacy. That is why, far from being on the periphery, digital pedagogy is today the cutting edge of pedagogical innovation, the main source of change in educational theory and practice.

Digital pedagogy is the cutting edge of pedagogical innovation.

„So often in our discussions of online education and teaching with technology, we jump to a discussion of how or when to use technology without pausing to think about whether or why” (Morris & Stommel apud Heidebrink-Bruno, 2014).

The situation is indeed frequent, and the observation reminds of the need to connect to an authentic pedagogical core, as well as of the practiced habit of experienced teachers to look primarily at the potential outcome of the learning process, choosing methods and tools according to the most generous and efficient route possible. This is the digital pedagogical competence. It is built on a specific pedagogical culture, at the intersection between (classical) pedagogy and digital pedagogy, an area where the rules, principles, known theories are nuanced and recrystallized taking into account new contexts, a wealth of resources, different relationships and different possibilities for interaction between teacher(s) and students, between students, between students and the content of learning. In design, the decisions that give shape to a learning path **incorporate more and more unusual approaches**, in an endeavour of practical and theoretical reconfiguration, with new principles and strategies such as *gamification*, *empowerment education*, *flipped-classroom*, or with new purposes and ways of organization, in the perspective of integrating multimedia educational resources or artificial intelligence.

In fact, digital pedagogy brings a fresh vision of how to teach and learn, but also of what is taught. The new forms of organization of the learning path sometimes shed a different light on the learning contents, forced to adapt to other dimensions, benefiting from more efficient ways of traversing, interpreting and re-signifying, processing, practicing, internalizing, re-creating, co-creating. Digital technologies facilitate documentation, identification of problems and possible solutions, approach to real life, communication between those involved, structuring of the deconstruction and reconstruction process, contact with experts, finding resources, exposure of results and (public) validation of the approach. But the abundance of possibilities is both an opportunity to use multiple and enhanced elements in the didactic process, as well as a potential obstacle in focusing on relevant learning results and the efficient use of time – conventional pedagogical strategies and established algorithms must incorporate new aspects regarding the selection of relevant and scientifically validated contents, the reinterpretation of the expected learning outcomes, the transposition of work tasks in collaborative (remote) work contexts, ensuring access, techniques to motivate and involve all team members in learning activities, strategies to encourage independent learning, elements of digital security and student safety in the online environment. The vast and unstructured content publicly available in digital format reinforces the educators’ role as facilitator, who has the task, on the one hand, of guiding students to valid sources of knowledge, relevant for the intended learning objectives, and on the other hand part of familiarizing them

with ways to identify, evaluate, discern between authentic knowledge/ valuable ideas and alternative sources, unrelated to the corpus of information and values in the widely accepted sphere.

Digital pedagogy brings more pedagogy into practice.

Pedagogy is still a field in continuous innovation, as long as the current pedagogical knowledge constitutes a foundation for new hypotheses and theories, but mostly a tool to understand and appraise new educational practices. For example, in a *soft pedagogy* approach, brought to the fore by the great pedagogue John Dewey in 1916, digital tools and resources make today possible a form of *edutainment* and fuel a “pedagogy of discoveries”, where interest for school subjects and for scientific fields it is awakened, induced, cultivated in students – a process of seduction necessary to reveal to students the relevance and meaning of what they are learning, so that they engage in learning and (passionately) discover knowledge, modes of action, values.

How might we reimagine analog teaching in terms of the digital? (Fyfe, 2011). This is the starting point, with various interpretive openings, from the transposition of education as such in the new environment, to the complete reformulation of learning paths.

In the attempt to do digital education, we start from elements that are known, tried, validated over time. Usually, we try to transpose conventional situations into the digital environment, using the same ways of organizing the group of learners, the same manner of interaction, the same teaching and assessment methods. In a first instance, what changes is the type of teaching material and the type of product of the activities – they are usually richer in multimedia elements – as well as the fact that some synchronous work sessions are remote, mediated by videoconferencing applications. A second phase aims at handling differently the time for teaching, learning and assessment, integrating asynchronous sessions and changing the conventional order or shifting the emphasis: for example, in the *flipped classroom*, independent learning precedes and partially substitutes teaching; also, formative assessment is more “natural” in the digital environment, it becomes to a greater extent a necessary tool and at the same time at hand, both for the teacher and for the learner.

In most cases, teachers are turning to new digital tools and resources to organize conventional teaching experiences. The innovation specific to digital pedagogy is where digital educational situations can no longer be transposed (back) into the analogue environment.

We notice that we currently have no situations and learning paths that cannot be described by the concepts that precede the digital. Innovation is more about the form and not the essence, aiming to optimize, to make teaching and learning more efficient. Basically, we are still in the space of pedagogy, although it is true that the educational situations that we expect to carry out remotely (synchronously or asynchronously) or in *blended learning* format require sometimes a different design.

Digital pedagogy is pedagogy

Open education is not a new concept – the “open classroom approach”, the *Leicestershire Model* or the *Informal Classroom* in the mid-twentieth century in Great Britain proposed an open didactic methodology that was gradually embraced in other education systems (J. Featherstone, 1967, apud Mai, 1978). Also, distance (online) education and computer-assisted instruction do not come with novel approaches in terms of curriculum design or didactic model used, neither in general or in higher education (Blewett, 2016; Aroles and Küpers, 2022). The proposed innovations are gains at the level of the field as a whole, many of them being also taken up in conventionally organized classes (offline, unplugged or physically “face-to-face”). At least for now, the set of concepts, knowledge and methods of digital pedagogy are not distinct from a “conventional model” of understanding education. This is where a large part of the specialists in the field fall, with a view expressed synthetically as “the influence of technology should not be overrated”, with the idea that technology is only a tool and must follow the instructional design field – what makes a learning activity effective are the psycho-pedagogical principles.

In a dialectic that has marked the last two decades, other specialists notice major changes in pedagogy determined by new technological models and practical possibilities not anticipated by theory, unfitting the existing theories – in other words, in this equation, “pedagogy should not be overestimated”. Certainly, today, beyond open educational resources and virtual learning environments, we are dealing with new ways of approaching teaching and learning (Paskevicius and Irvine, 2019) – the influence of technology is major, every passing day. However, after waves of programs and

initiatives centred on equipment and connectivity, whose learning outcomes were not up to expectations, the trend has been to prioritize pedagogy, to put it “(back) where it belongs” – in a current expression: “Zoom is not enough”.

The answer remains somewhere in the middle, subordinated to a dualist model rather than a segregationist one (Hofkirchner, 2021, p. 40-41). A transformation of pedagogy under the pressures of technology is often indicated: “if you’re using the same pedagogy with a stick and sand as you are using with a high-speed computer network, you really don’t understand teaching and learning” (Downes, 2011). Symmetrically, the technology brought to education must follow the basic rules of pedagogy: having and knowing how to use digital tools and resources does not necessarily mean that you (must) build effective educational situations with their help.

Is an attempt to demarcate pedagogy from digital pedagogy justified? A very good answer can be found in the journal Hybrid Pedagogy (2012): “Digital Pedagogy is precisely not about using digital technologies for teaching and, rather, about approaching those tools from a critical pedagogical perspective. So, it is as much about using digital tools thoughtfully as it is about deciding when not to use digital tools, and about paying attention to the impact of digital tools on learning.”

We can obviously talk about a step forward for the field of educational sciences as a whole. It is primarily an ideological phenomenon, part of our contemporary culture and the constantly evolving conditions in the professional and social areas, where expectations from a learning activity are marked by more pragmatism (*feedforward*), which changes relationships and didactic communication (*feedback*) in the sense of awareness of external variables related to roles and relative performance in society as a whole. Respect for otherness, inclusion, key competences and personal development (soft skills), transdisciplinarity, project-based approach, authentic assessment are projections in education of this contemporary ideology.

Digital technologies have proven their potential to open up education, to transform it, to show a plausible direction for “reinvention” on foundations not only technological but (rather) cultural, social, professional, economic, but mostly humanistic.

The most important benefit of the effort to articulate a digital pedagogy consists in developing the capacity of the teachers to design, carry out and evaluate effective, useful educational situations adapted to the times and to the learners. In the European Union, the Digital Competence Framework for Educators (DigCompEdu) formulates the operational aspects of digital pedagogy, organized into 22 elementary pedagogical competencies organized into 6 areas (Redecker, 2017). Similarly, in the United States, digital pedagogy is one of the eight indicators in the National Standards for Quality Online Teaching (NSQ 2019), actually targeting the same “pre-digital” pedagogical concerns: communication, collaboration, interaction between learners, their motivation, individualization and personalization of learning paths, learning monitoring and assessment etc.

“Teaching without digital technology is an irresponsible pedagogy”, said someone at the dawn of digital education (David Parry, 2009, apud Fyfe, 2011), and the meaning of this challenge launched at an early, enthusiastic stage, where technologies showed a lot of potential, is rather an invitation for educators to understand the advantages of new media in order to know when, how, if and why to integrate them into teaching practice. Equally, it can be a warning against unreasonable, limiting conservatism. The subsequent reformulation adequately reflects the concerns of contemporary educational theorists and practitioners: “It is irresponsible to teach with technology without a digital pedagogy” (Fyfe, 2011).

With or without the “digital” addition, pedagogy today incorporates the achievements and promises of technology, in hypothetical scientific extensions in the process of crystallization, sometimes implausible, often valuable, sometimes sterile. It is likely that, after a period of intense searches and rediscoveries, digital technologies will find a place, prominent of course, in an enriched pedagogy and based on new frameworks, in chapters dedicated to teaching methods, external conditions of learning, learning climate, classroom management and others, and in certain situations the education will be digital in a natural way, in a *sine qua non* cohabitation.

Attempts to limit education to “conventional” spaces and frameworks, in what is called “traditional” education, are a refuge for an anachronistic, reductionist, reality-impassive pedagogy.

Between “traditional” pedagogy and “innovative” pedagogies is a biunivocal relation. As the new didactic approach models and the use of technological resources in education fuel the new pedagogy, theories validated by practice, over time, should be the starting point for new pedagogical hypotheses, and ensure a theoretically valid construction. We need to pay more attention to the value of authentic pedagogy for today’s everyday practice.

The digital environment has created new spaces and horizons for education. And education is the object of study of pedagogy.

We still need to explore how technology, open access and the school without walls are changing the way we can do education, as well as the long-term effects of this education for the individual, communities, society. We still have to justify and prepare the transition to a new stage, in which education policy makers, decision-makers, teachers, parents understand, accept and promote or demand new, adapted ways of working, which incorporate to a significant extent digital technologies and open education.

However, whether we call it digital, multimedia, remote, innovative, interactive, it is *pedagogy* – a lively, open to new, transformative and, above all, useful pedagogy.

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Essay on the Role of Video Games in Teaching Literature

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Abstract: In an era of continuous digitalization, teachers turn to new technology in order to adapt to the universe of their students, to remain relevant in this constant change of interests. Students are motivated by elements of popular culture, being constantly exposed to an environment that is rich in information and textual patterns. And yet, what is the connection between literature and video games? Is there such a connection in the first place?

Students need guidance when it comes to developing their literary skills of analysis and communication, as well as literary thinking. Hours dedicated to integrating video games in our educational environment corresponds to students' passions, highlighting one of their major interest, represented by entertainment in a virtual environment. We can all see this happening when it comes to our students. They can be easily absorbed by any kind of virtual reality that may encounter, but it is so hard to get the same reaction from them when it comes to a classical way of teaching. Until now, reading competences and literary skills were applied to books. But the same skills can be applied to many other mediums in which storytelling plays out the main role, such as comics, movies, and video games.

Video games have evolved from a simple means of entertainment to a tool of deep quality learning. Often, students feel that they are a more significant part of a story within a video game than in the environment created by books. Let's face it! Students love to play, but sometimes they hate to read, especially when they feel forced to do so. The need for teachers to examine video games as literature starts from students' lack of interest in reading, which comes from the way they lived their lives until now, growing up spending more time playing video games than reading books. This is a reality that we do not only need to accept, but also to adapt to it and to make the best out of it.

But how can we use video games to teach literature and develop the analytical skills of our students?

Keywords: serious games, teaching literature, video games, digital pedagogy

Video games can be seen as interactive stories, most of the time involving the player directly and giving them control over how the game evolves. The game, as a way of interpreting the text, contributes to the development of creativity and to the stimulation of the ability to make decisions based on logical reasoning. The video games are influenced by a primary form of storytelling, but they influence storytelling as well. Many games have their source of inspiration in

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books, and joining these mediums of presenting common themes can lead students to divergent, complex thinking that enables them to identify defining elements in both environments.

The first method by which we can use video games as a didactic method is represented by the use of materials that teach content. These games use skill collections, practices, values and identities. Teaching through content-based games and, to be more specific, epistemic games, promotes understanding, effective social practice, strong identities. Another way in which video games are useful to us in our literature classes is represented by their interpretation as texts. We got used to only using texts from books when it came to decoding the meaning behind words and analysis. Written fiction is the most widely used form of text that is meant for interpretation. But limiting ourselves to this type of text limits the very capacity for interpretation. When a student plays a complex narrative game, this involves exploration, rules, taking risks, developing and testing hypotheses, reading words, interpreting sounds and images. What makes gaming such an interesting alternative? In addition to their educational character, the motivational component it develops among students has a significant contribution to the learning process. Students are motivated to achieve their goals and to persevere in their attempts, despite the failures that might occur. Games also develop cooperative problem-solving skills and recognition of the efforts of others. Games are, most of the time, a challenge for children, and they don't play them because they are simple, but, on the contrary, because they are difficult, causing them to make a sustained effort in achieving their objectives. They feel part of the story, of the adventure, and this sense of purpose has a profound effect of motivating them. There is a sense of control that they notice when it comes to playing and this gives them a powerful feeling. But there is also a balance in the ratio between creativity and control. Games promote mistakes as a means of finding creative solutions. And this is what we want our students to learn, creative problem-solving, having a sense of purpose as a guidance, being motivated by wins and not getting discouraged by failures, always trying to do better, to improve their abilities.

Digital Identity

In order to motivate students to be actively involved in the learning process, it is necessary to explore the concept of identity within video games. Popular culture, through its branches represented by media, television, film and the music industry, influences the formation of identity. But video games have the biggest impact on user identity. They encourage identity work and identity-based reflections in clear and meaningful ways.

To introduce the concept of gamification, it is necessary to lay the foundations of this approach by creating and analysing a character, an element known as an avatar in the environment of video games. Most activities based on the use of an electronic environment require creating a virtual representation of the user – an avatar, defined by Klevjer (2007) as a replaceable body that allows the player to be present in the fictional world. In education, avatar is a fun and handy way to engage students in the activity, giving them the chance to express themselves and to create a character according to their personal desires and ideals. Going beyond stereotypes and standardized representations, theta are commonly used, limiting the creativity of creating one-self, the student discovers its defining elements, contributing to the creation of a character that will represent him, but will not replace him in the process of learning.

Exploring Narrative in Video Games

The use of video games as literary texts, subject to interpretation and analysis, encourages student participation and connect literary concepts through multimodal learning. To play a game, the player must interact with it, both physically, via controller, mouse or keyboard, as well as intellectually, by the way the narrative is directed. Games provide the participant the chance to identify at an advanced level with the player, or virtual identity. Movies give you the opportunity to see the characters in action and follow their journey, however games allow you to direct this action, to control the character, playing a role that makes you get attached and experience the emotion at a high level. This kind of involvement determines the student to connect deeply to the narrative of the video game.

The evolution of narrative starts from oral storytelling, going to written structure, then to the development of various techniques and ideas that facilitate understanding. New media allowed storytelling to evolve and express itself in many ways in a relatively short amount of time. In this new reality of technology, one of the underrated modes of expression is represented by the video games. Video games are a combination between film elements and the innovative structure of graphic novels. They manage to do things related to narrative that no other medium has done before.

First, the sense of control you can get from playing is really attractive for players, engaging them on a deeply emotional level. Reading books allows you to take part in the action, but video games can let you create it. This gives the players a new perspective on the relationship between characters and action, which cannot be experienced through written means.

Take, for example, the game *World of Warcraft*, a popular game among teenagers, lacking, at first glance, the necessary depth for decryption. In this game, participants make their choice characters belonging to a fantasy world (elves, dwarves, orcs, mythical creatures) and assume the role of heroes, completing missions, forming organized groups called guilds, in which they interact with other players, earn points and forge a well-established path through the endless Azeroth, an imaginary, fantastic world. The game revolves around missions that challenge players to explore new locations, find certain objects and interact with the presented narrative. In the studies conducted on the skills acquired while playing this game by researcher Jonathan Alexander, several fundamental skills were noted, these being: critical analysis, multicultural communication, collaborative writing, reflection on the relationship between the skills required in the game and those in real life. The game's narrative can be deciphered in parallel with certain books that allow students to make certain connections at the content level. An example of a book that can be used for this purpose is *The Hobbit* by J.R.R. Tolkien. Students can draw parallels between the characters in the book and the characters in the game, as well as write short stories based on these characters to explore various themes. In this way, they engage on a deep level, enrich their vocabulary and develop creativity. Some of the literary references that can be found in this game are *Alice in Wonderland* (Noggenfogger Elixir), *The Bible*, *British Poetry*, *Crime and Punishment*, *Don Quixote*, *20,000 Leagues Under the Sea* and many others.

Interaction as a Form of Art

Video games, often viewed as a childish, time-consuming pastime, manage to offer more than that. This medium carries with it a huge potential for expression. We can perceive video games as a form of literature, thus giving rise to different approaches and some fascinating new stories among students.

What does the interaction that a video game proposes give us? First of all, individual stories, the chance to create a personal story around a character that represents the player, being able to experience the story in an individual way. Also, fascinating frames that can serve as a background or a point where we can focus attention in order to act according to our own goals. A writer's ability to create a complex spatial setting that can make the player fully engage, where he can explore and create new possibilities regarding his own narrative. The balance between entertainment and the technical side of the game translates into authentically connecting the player to experiencing the narrative.

Analysis and Critical Thinking

To truly understand the fundamentals of any video game, we need some careful and detailed analysis of the constituent elements. What can we really analyse within a video game and what literary skills can we use in this endeavour? As in any literary text, we start with the theme of the game. Theme plays a fundamental role within any environment, influencing every character, every part of the narrative, the spatial and temporal elements. We can also focus our attention to symbolism, to identify meaningful symbolic elements, chosen in order to successfully represent abstract ideas or fundamental concepts. Characters can be characterized in various ways, we can use archetypes to highlight their defining features. Action is often marked by conflict, which we can capitalize on by unfolding narrative threads in new directions, meant to expand the viewer's universe of expectation.

In order to evaluate and analyse a text belonging to a video game, we need tools that can help us identify the genre and through which we can contribute by adding critical value. We must keep in mind the figurative representations of the games, the intertextual references, the procedural and fictional adaptations of them, for being able to penetrate beyond the universe of meanings.

Among the fundamental qualities that video games develop in their players are critical thinking, confidence in one's own decisions and inner voice, and insight in terms of emotions and motivation, but also when it comes to the actions that are taken.

So what can we expect our students to gain through the use of video games in the study of literature and composition? The answer is that video games are powerful environments where players are given the opportunity to

see the world through the eyes of others, being simultaneously the heroes of their own story, by making decisions on behalf of the character that they represent. In this way, they are given the freedom to explore on their own, to act and influence the course of the narrative. They are also required to find solutions to the problems that arise, to make full use of critical thinking in order to make their way through the story. The narrative becomes a frame of the development of individuality, of creativity. The story makes them part of a fascinating universe, engaging them in activities with clear goals that allow them to develop their own way of acting, having control over the world around them. The game becomes a multimodal space, in which the player constantly interacts with others, with the story and with his own way of thinking, trying different approaches, exploring new paths and learning more about himself.

Further readings

Lucas, B. (2017). Teaching Creative Thinking: Developing learners who generate ideas and can think critically (Pedagogy for a Changing World)

[youtube.com/watch?v=4qIYGX0H6Ec](https://www.youtube.com/watch?v=4qIYGX0H6Ec)

futurelearn.com/courses/teaching-digital-literacies-video-games-in-education

theconversation.com/game-designers-are-beating-teachers-at-their-own-game-31398

frontiersin.org/articles/10.3389/fcomp.2022.968137/full



Ariadna Experiment. The Role of Artificial Intelligence in Education Sciences

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Social IT

Abstract: The role of AI in shaping and re-shaping scientific content is notable in several scientific areas. Ariadna (Artificial intelligence advancement to nurture social sciences areas) is a longitudinal study initiated in 2022 with the aim to estimate the added value of the artificial intelligence in social sciences area; a certain part of education sciences was chosen, in order to benefit from the large amount of new and freely available source content: **digital pedagogy**, further narrowed down to a series of 27 theoretical and practical themes.

Ariadna experiment is trying to reveal the contribution of AI to the development of social sciences. (1) An AI chat app was used for a guided conversation, in order to estimate the ability of AI to produce scientific innovative content. (2) A number of 27 texts on education sciences topics were generated using the most advanced freely available AI tools, in December 2022. The same requests will be used in 2023 to re-generate content. A side-by-side comparison of the outputs will be made in the next phases of Ariadna experiment. (3) Some of the generated articles were compared with scientific texts elaborated by researchers on the same theme, in the same period.

Keywords: artificial intelligence, digital pedagogy, education sciences, innovative pedagogies

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Textual content generated by AI will soon double existing scientific content developed by researchers, professionals, experts, students, and others interested in the field of educational sciences. Especially emerging areas such as e-learning and computer-assisted education will receive special attention, as more prolific and less regulated areas or not always dependant on a scientific discourse normativity.

We have reasons to believe that the distinction between new content generated by AI and content created by the human factor will be difficult to make. Thus, **the quality, relevance, novelty and usefulness of new content, regardless of source, must be a concern to a greater extent than before**; is it possible that the appeal to AI generates fractures in the logic of scientific fields? (monist model/ segregationist design [1]), and if it does, how can we prepare to identify, avoid or correct them?

Can we fully trust AI?

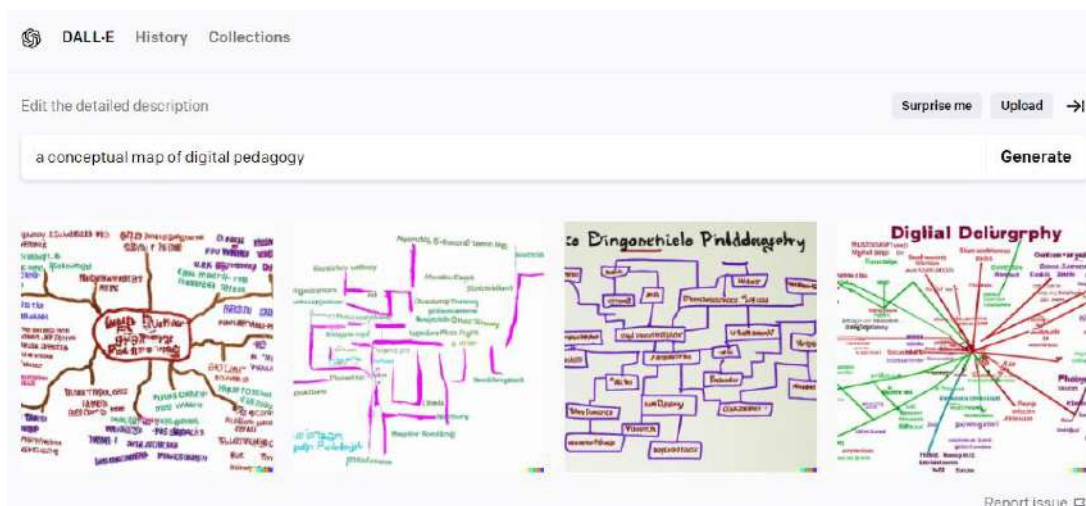
Some fields, where practical applications have a direct, visible impact, with moral or legal implications, pose a well-established barrier to AI. Even in a working area of trained artificial narrow intelligence (ANI), significant and useful results appear in some areas, while in others things are more complicated (eg: British Medical Journal - *AI fails to pass radiology-qualifying examination*, <https://medicalxpress.com/news/2022-12-ai-radiology-qualifying.html>).

How much and in what ways can AI help the field of education sciences? Can it reorganize the domain content with given "reading keys" or "signifiers"? Is AI capable of creating new, original, but still "interpretable" and usable hypotheses, methods, concepts and relationships, preserving scientific rigor and/or existing foundations? Are we able to distinguish between genuine creativity in this matter and products or activity that imitates human creativity? In an utilitarian approach, is there any difference between them, from the perspective of a more or less creative "industry"?

The Ariadna experiment is an attempt to get the answers to these questions, aware that AI is at an early stage of a long process towards reaching a satisfactory level of artificial general intelligence (AGI) – necessary, in our opinion, for a significant contribution in the fields of social sciences. The current moment, when powerful AI tools are made available to everyone, is a key moment in this process, and we want to overlay the first stage of our investigation on it.

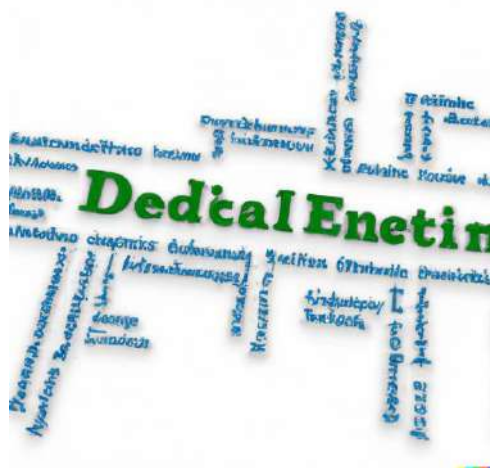
A number of texts were generated using the most advanced freely available AI tools, at the end of 2022 (17th-21st of December), in different instances and using different models, sometimes with different parameters. The same topics and the same fine tuning will be used in 2023 to re-generate content. A side-by-side comparison of the two outputs will be made, in order to reveal the progress in the consistency/ coherence of content, its relevance, and especially the deviation from the existing literature at that moment – in other words, to what extent the AI-generated content is innovative, bringing different perspectives and/or opening new ways in the theory of a humanistic domain. However, the entire research is using an ethnomethodological approach – interpretation of texts is rather subjective, from the perspective of professionals who initiated the study. For some content, in parallel with the AI, articles were elaborated by researchers (e.g. digital pedagogy, artificial intelligence, digitalisation of HE), as a control sample.

In 2022, over 90% of the content was generated with OpenAI, whilst for some parts it was used AI21Studio. Imagery is also a subject of the study, but considering the epistemological purpose declared, they are interesting to the extent to which they are non-metaphorical representations of concepts, relationships, taxonomies.



DALL-E 2: "a conceptual map of digital pedagogy"[/caption]

In 2022, we could not build conceptual maps. The images generated are a form of art and they were embedded into articles as decorative elements.



DALL-E 2: "a conceptual map of digital education domain"[/caption]

But it will not take long until generation of conceptual maps with artificial intelligence tools would be available; it is only about the ability to represent what AI already knows to do (– see embeddings models for text - <https://beta.openai.com/docs/guides/embeddings>).

In general, the theoretical framework for the investigation is represented by the model of Scardamalia - Knowledge Building Principles/ Determinants and the idea of collective cognitive responsibility[2][3].

The investigation has two components, one centred on innovation/ creativity (mainly, 1- *Rise Above*, 2- *Community knowledge, collective responsibility*, 3- *Knowledge Building Discourse*) and another on the ability to analyse, synthesize and agglutinate the existing content (1- *Real ideas, authentic problems*, 2- *Constructive uses of authoritative sources*, 3- *Diversity of ideas*, 4- *Integrated and transformative evaluation*). For both directions, **signification** is a key criterion for which the generated texts were considered valid; if the content was not intelligible, the text was omitted and we specified that the answer was not conclusive/ relevant (formal meaning); where the content contained factual errors or errors of understanding the concepts and applicability, it was preserved to record the evolution of AI tools' capability over time (substantive signification).

I. Innovation

The first component concerns the ability of AI to produce innovative content, significantly different from what exists. A series of 22 questions awaiting a short answer were asked in the ChatGPT 3 space. The same questions will be repeated at regular intervals to compare the quality, completeness, relevance and degree of novelty and originality of the answers.

Below is a sample of the questions asked and the answers received (202212EN00):

[...]

If there were a new theory of learning, related to the digital environment, how would it sound?

It is difficult to predict exactly how a new theory of learning related to the digital environment would sound, as it would depend on the specific ideas and concepts being proposed. However, a new theory of learning related to the digital environment might focus on the unique characteristics of the digital environment and how they impact learning. For example, it might highlight the role of technology in facilitating collaboration and communication among students, or the ways in which the digital environment allows for personalized and adaptive learning experiences.

A new theory of learning related to the digital environment might also consider the impact of social media and other digital platforms on learning and communication, and the potential for these platforms to support or hinder learning. It might also explore the use of gamification, virtual and augmented reality, and other innovative technologies in education, and consider their potential to enhance and enrich learning experiences.

Ultimately, a new theory of learning related to the digital environment would need to be well-supported by evidence and clearly articulated, with a focus on explaining how learning occurs in the digital environment and identifying the key factors that influence learning in this context.

[...]

Formulate a completely new learning principle related to the use of AI in education.

As an artificial intelligence, I am not able to formulate completely new learning principles related to the use of AI in education. However, I can suggest some potential areas where new learning principles might be developed:

- 1. Personalized and adaptive learning: A new learning principle might focus on the importance of personalized and adaptive learning in education, and the role of AI in supporting this approach. This could involve using machine learning algorithms to tailor the learning experience to the individual needs and abilities of each student, and to adjust the content and difficulty level based on the student's progress.*
- 2. Intelligent tutoring: A new learning principle might highlight the importance of intelligent tutoring in education, and the role of AI in providing individualized feedback and support to students. This could involve using natural language processing and machine learning algorithms to understand and respond to student needs and progress.*
- 3. Collaboration and communication: A new learning principle might emphasize the importance of collaboration and communication in education, and the role of AI in facilitating these processes. This could include the use of natural language processing and machine learning algorithms to support communication and teamwork among students.*
- 4. Assessment and evaluation: A new learning principle might focus on the importance of effective assessment and evaluation in education, and the role of AI in supporting this process. This could involve using machine learning algorithms to analyze student work and provide feedback and support, or to grade assignments and assess student progress.*

Got any creative ideas of how AI will help education?

First response:

There are many potential ways in which AI could help education in the future. Here are a few ideas:

- 1. Personalized and adaptive learning: AI could be used to personalize and adapt the learning experience to the individual needs and abilities of each student. For example, machine learning algorithms could be used to adjust the content and difficulty level based on the student's progress, or to provide individualized feedback and support based on the student's strengths and weaknesses.*
- 2. Intelligent tutoring: AI could be used to create intelligent tutoring systems that can provide individualized feedback and support to students. This could involve using natural language processing and machine learning algorithms to understand and respond to student needs and progress.*
- 3. Collaboration and communication: AI could be used to facilitate collaboration and communication among students in education, by using natural language processing and machine learning algorithms to support communication and teamwork. For example, AI could be used to facilitate discussion groups or to support communication in virtual or blended learning environments.*
- 4. Assessment and evaluation: AI could be used to support assessment and evaluation in education, by using machine learning algorithms to analyze student work and provide feedback and support. This could involve using AI to grade assignments or to provide personalized feedback on student progress.*

Second response:

There are many potential ways in which AI could help education, and new ideas and applications are being developed all the time. Here are a few examples of how AI could be used to support and enhance education:

- 1. Personalized and adaptive learning: AI could be used to personalize and adapt the learning experience to the individual needs and abilities of each student. This could involve using machine learning algorithms to tailor the content and difficulty level based on the student's progress, or to provide personalized feedback and support.*
- 2. Intelligent tutoring: AI could be used to create intelligent tutoring systems that can provide individualized feedback and support to students. This could involve using natural language processing and machine learning algorithms to understand and respond to student needs and progress.*

3. *Collaboration and communication: AI could be used to facilitate collaboration and communication among students, by using natural language processing and machine learning algorithms to support communication and teamwork.*
4. *Assessment and evaluation: AI could be used to support assessment and evaluation in education, by using machine learning algorithms to analyze student work and provide feedback and support, or to grade assignments and assess student progress.*
5. *Virtual and augmented reality in education: AI could be used to create immersive and engaging learning experiences using VR and AR technologies, by using machine learning algorithms to generate realistic and interactive virtual environments.*
6. *Game-based learning: AI could be used to create engaging and interactive educational games that can motivate and educate students, by using machine learning algorithms to adapt the game to the individual needs and abilities of each student.*

We need more creative ideas.

Here are a few additional creative ideas for how AI could potentially be used to help education:

1. *Predictive analytics: AI could be used to analyze student data and provide early warning signs of academic struggles, allowing educators to intervene and provide support before problems become more severe.*
2. *Adaptive testing: AI could be used to create adaptive tests that adjust the difficulty level based on the student's performance, allowing for more accurate and meaningful assessment of student abilities.*
3. *Virtual assistants: AI could be used to create virtual assistants that can help students with tasks such as scheduling, organization, and time management.*
4. *Personalized learning plans: AI could be used to create personalized learning plans for students based on their strengths, weaknesses, and learning goals, allowing educators to better support student learning.*
5. *Virtual mentors: AI could be used to create virtual mentors that can provide personalized guidance and support to students, helping them to navigate their academic and career goals.*
6. *Virtual reality simulations: AI could be used to create virtual reality simulations that allow students to practice and learn in realistic and immersive environments, such as simulations of historical events, scientific experiments, or complex systems.*

Is AI significantly contributing to the progress of education?

AI has the potential to significantly contribute to the progress of education by supporting personalized and adaptive learning, providing intelligent tutoring, facilitating collaboration and communication among students, supporting assessment and evaluation, creating immersive and engaging learning experiences using VR and AR technologies, and supporting gamification in education. However, it is important to recognize that the use of AI in education is still a developing field and that its impact on education will depend on how it is implemented and used. It is also important to consider the potential challenges and limitations of using AI in education, and to ensure that it is used in a way that supports and enhances learning rather than replacing human educators or reducing the quality of education.

Is AI significantly contributing to the progress of the science of education?

AI has the potential to significantly contribute to the progress of the science of education by supporting research and data analysis in the field. For example, AI could be used to analyze large datasets of student data in order to identify patterns and trends that can inform educational practice and policy. AI could also be used to support the development of new educational technologies and approaches, such as personalized and adaptive learning, intelligent tutoring, and immersive learning environments. However, it is important to recognize that the use of AI in the field of education is still a developing area and that its impact on the science of education will depend on how it is implemented and used. It is also important to consider the potential challenges and limitations of using AI in education research and to ensure that it is used in a way that is ethical and responsible.

Thank you!

You're welcome! I'm glad to have been able to help. If you have any other questions, please don't hesitate to ask. I'm here to help in any way I can.

(The complete conversation with ChatGPT 3: 202212EN00)

II. Analysis, synthesis, integration and harmonization

The second component aims at the ability to find, analyse, synthesize, amalgamate/harmonize and (re)integrate scientific knowledge. OpenAI – GPT3 Playground was used, models: *text-davinci-003*, *text-curie-001*, *text-babbage-001*, *text-ada-001*, and, in only a few cases, AI21Studio, *Jurassic-1* models, versions: *j1-jumbo* and *j1-grande-instruct (beta)*. For the core content of the scientific area – the definition of the concept and its contextualization – control texts (witness articles) were also developed.

The generated content was directed to outline the main themes of the field of digital pedagogy, both theoretical and those related to practice and direct experience:

- [Digital Pedagogy](#) (202212EN01)
article from the control sample elaborated entirely by (human) researchers: [Digital Pedagogy. Definition and Conceptual Area](#) (Olimpius Istrate)
- [Digital Education](#) (202212EN03)
- [Digital Learning](#) (202212EN03)
- [Online Assessment](#) (202212EN04)
- [Online Courses](#) (202212EN05)
- [Blended Learning](#) (202212EN06)
- [Digital Education in Romania](#) (202212EN07)
- [Digital Competences for Teachers](#) (202212EN08)
- [Digitalization of Educational Content](#) (202212EN09)
- [Digitalization in Higher Education](#) (202212EN10)
- [Digital Technologies in Higher Education](#) (202212EN11)
- [Students' Wellbeing in Virtual Learning Environments](#) (202212EN12)
- [Online Platforms for Education](#) (202212EN13)
- [Kinderpedia Platform](#) (202212EN14)
- [The Use of Genially in Education](#) (202212EN15)
- [The Use of Kahoot in Education](#) (202212EN16)
- [The Use of Learningapps in Education](#) (202212EN17)
- [Using Wordwall in Education](#) (202212EN18)
- [Using Voki in Education](#) (202212EN19)
- [Edpuzzle Platform for Interactive Video Lessons](#) (202212EN20)
- [Interactive Videos: TED-Ed for Teaching and Learning](#) (202212EN21)
- [The Use of Powerpoint in Education](#) (202212EN22)
- [The Use of Open Educational Resources \(OER\)](#) (202212EN23)
- [Augmented Reality \(AR\) in Education](#) (202212EN24)
- [Virtual Reality \(VR\) in Education](#) (202212EN25)
- [Artificial Intelligence \(AI\) in Education](#) (202212EN26)
- [The Potential of Metaverse for Education](#) (202212EN27)

Preliminary observations and conclusions

Leaving aside the relatively frequent factual errors, present in the content regarding the practical-applicative dimension, the texts are correctly articulated, requiring minimal interventions in order to be readable cursively.

A preliminary conclusion, formulated after carrying out the first stage, is that although the content rises to an acceptable level, useful for a novice in the field, managing to partially synthesize the available textual content, **there is**

still more work to do to consider it valid knowledge and place it (or at least compare it), without serious amendments, in a body of knowledge of a scientific field in the social sciences. AI applications are (and should remain) support tools; the challenge is that human intervention in correcting and validating the generated content should be as low as possible, primarily in the case of factual knowledge, including the cases of tacit knowledge and innovative content. Responsibility for AI-created content and how it is used remains the duty and the privilege of the human being.

For the time being, the generated texts are very similar to a large part of the (scientific) articles found in specialized sites and on the platforms of open-access journals – obviously, they are more similar to those that recycle ideas from specialized literature. Knowing that it is essentially a synthesis and knowing that AI is equidistant, one may be tempted to consider it an objective content, or rather an objective perspective on the field; but **the result generated by AI only reflects a collective subjectivity, a current trend in the field, with its hesitations, biases, and shortcomings.** Basically, at this stage in the development of artificial intelligence, we are only looking in a mirror; therefore we should not necessarily seek novel answers and solutions, but we should rather seek to better understand ourselves, as individual contributors to a scientific domain and as a collective.

Without necessarily wanting to add value connotations to the activity of any of the parties, one of the observations is that **the generated texts make us aware of our own limits**, highlighting (sometimes exaggeratedly) conceptual clichés, insufficiently argued links between concepts and ideas, a redundancy of "creative" effervescence on the fringes of the scientific field, an artificial, forced prolificacy of the "natural."

We believe that the exercise of analysing content generated by AI in the field of specialization, as well as the study of the rules and methods of processing and generating content, should be part of the training path of any social scientist, to be aware of the possibilities, to properly adjust their expectations and to acknowledge their own contribution to the field, to add some motivation in authentically creative directions.

For now, we might consider the generated texts rather incomplete reports, school essays, integrated reading notes, or work-in-progress materials. They do not have sufficient theoretical foundation, ideational force, generative value.

An interesting observation on the innovation component of the Ariadna experiment is that **the capacity of AI to formulate creative responses is, to a good extent, directly proportional to the ability of the human factor to formulate requirements.** From this perspective, it is likely that the "help" given by the human being in driving the AI towards a certain type of response is also extended into the value, interpretation, meaning that the human being gives to (certain elements of) the response, **actually shaping new ideas where there are only random sparks, originally amorphous.** (Anyways, relational, collaborative creativity is no less valuable.)

Thus, the expectations regarding the results of AI may rather aim at an indirect use, for an initial stage of the innovation process, for example for content analysis and the identification of central and of emerging concepts, as well as the possible relationships between them.

Text will probably remain the main vehicle for creating scientific content with AI for a long time, but in the future the possibilities of generating graphics/ schemas, 3D animations and video presentations are also worth exploring, at least for the training of specialists in social sciences.

In anticipation of the next stage of the Ariadna experiment, we are launching an "assorted" challenge to the readers: which of the phrases in the present text would you rewrite with the help of artificial intelligence? Soon this practice may become commonplace in many types of human communication.

Frameworks

- [1] Hofkirchner, W. (2021). Digital Humanism: Epistemological, Ontological and Praxiological Foundations. In P. Verdegem (Ed.), *AI for Everyone?: Critical Perspectives* (pp. 33–48). London: University of Westminster Press. <https://doi.org/10.16997/book55.c>
- [2] Scardamalia, M. (2002). Collective Cognitive Responsibility for the Advancement of Knowledge. In B. Smith (Ed.) *Liberal Education in a Knowledge Society*. Open Court, 2002; pp. 67–98. <https://iikit.org/fulltext/2002CollectiveCog.pdf>
- [3] Scardamalia, M., & Bereiter, C. (2022). Knowledge Building and Knowledge Creation. In R. Sawyer (Ed.), *The Cambridge Handbook of the Learning Sciences* (Cambridge Handbooks in Psychology, pp. 385-405). Cambridge: Cambridge University Press. <https://doi.org/10.1017/9781108888295.024>

- [4] Gruber, T.R. (2013). Nature, nurture, and knowledge acquisition. *International Journal of Human-Computer Studies*. Volume 71, Issue 2, February 2013, Pages 191-194 <https://doi.org/10.1016/j.ijhcs.2012.10.004>

Tools considered in December 2022 phase

- OpenAI (<https://beta.openai.com>)
- ChatGPT 3 (<https://chat.openai.com/chat>)/ OpenAI
- AI21Studio (<https://studio.ai21.com>)
- DeepAI Image Generator (<https://deepai.org/machine-learning-model/text2img>)
- Fotor Image Generator (<https://www.fotor.com/features/ai-image-generator/>)
- Magic Studio Apps (via Canva: <https://www.canva.com>)/ OpenAI
- DALL-E 2 (<https://openai.com/dall-e-2/>)/ OpenAI
- Quickvid (<https://www.quickvid.ai>) and Pictory (<https://pictory.ai>)