DIGITAL INFLUENCE IN EDUCATION CONTEXT: ALGORITHMIC INFRASTRUCTURES AND INFORMED INFERENCES IN THE AGE OF HYPERMEDIALITY

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ABSTRACT

The intensification of digital influence processes in contemporary educational environments has required a new theoretical vision capable of generating comprehensive explanations of how current algorithmic infrastructures and socio-technological environments contribute to the formation, stabilization, and transformation of individual beliefs. The ever-increasing integration of hypermedia personalization systems, datafication mechanisms, and automation devices creates a cognitive ecosystem in which individuals' inferential processes are profoundly modulated by algorithmic agents (Kitchin, 2021). In light of predictive processing models (Clark, 2025), human cognition has been interpreted in terms of a hierarchical system of generations of possible predictions and error minimizations. In personalized digital environments, algorithmic stimulus selection can reduce information variability by strengthening existing priors, influencing bilief updating processes, and amplifying cognitive biases such as confirmation bias, availability heuristics, and motivated reasoning (Kahneman, 2011). Adaptive personalization functions as a cognitive accommodation apparatus that stabilizes preexisting generative models, reducing exposure to epistemic dissonance. The distributed cognition perspective (Hollan, Hutchins, & Kirsh, 2000) highlights how human cognition is distributed across socio-technological networks consisting of human agents, digital artifacts, and algorithmic infrastructures. Digital platforms act as systems for modulating cognitive salience, orienting attention, filtering available evidence, and generating inferential paths that impact the reality we understand. This results in conscious learning systems characterized by epistemic asymmetries, reduced cognitive complexity, and a polarized metacognitive thinking. This paper seeks to analyze how skills related to critical algorithmic literacy lead to a rethinking of knowledge construction systems, potentially transforming them into autonomous areas of inferential nature. Mitigating the distorting effects of digital influence leads to the creation of actions aimed at a concrete awareness of algorithmic mediation processes, thanks to the strengthening of skills and processes of metacognitive and reflective knowledge processing and the design of educational environments resilient to the dynamics of emotional amplification (Floridi, 2026).

KEYWORDS

Digital Influence; algorithmic Inferences; personalization of knowledge; adaptive technologies; data driven.

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1. Introduction

The functional transformation we are immersed in calls to mind processes of idealization and structural compensation that pervade and encompass us unconsciously and inducedly. This process of naturalizing the unnatural, artificially created and enhanced, invites us to reflect on the real affinities between neurodivergent processes and the automation of technological inferences. The elements that constitute and sustain the world, nourished by hyper-complex devices rich in repetitively conveyed information, form the basis of numerous generative studies that encompass activities of re-finalizing knowledge and generating co-evolved and shared artifacts.

Although our society today is based on multidimensional articulations and representations, a preeminent characteristic of the technology-enabled world, what matters is the contextual essence of an interdependent process between cognitive extrapolation and its heuristic approximation. Hypermedia inferential forms, thus configured, trigger functional and convergent burdens dictated by what digital infers and what reverberates as a selected influence. What is chosen as essential, what is identified as a probable version of reality, as a panacea for the countless problems to which we need answers, embodies a multifaceted ideology of identity that is now being studied, shared, and analyzed.

In this scenario, digital influence emerges as a key concept for understanding how algorithmic infrastructures, cognitive architectures, and dataset training systems can shape cognitive and inferential constructs and the active participation of learners. The structured process that impacts and influences knowledge does not merely guide and manage access to content, but also influences the configuration of cognitive priorities, information selection, belief formation, and the construction of epistemic frameworks that generate new perceptual systems and new learning modalities.

Digital influence acts as a technosocial tool that reshapes the parameters of attention, amplifies cognitive biases, modulates the salience of knowledge, and conditions learners' abilities. The educational implications of this intense, transversal revolutionary process are manifold, from the transformation of teaching practices to the restructuring of teacher-student relationships, from motivational and autonomous processes to the recognition of new epistemic vulnerabilities. Being understandably motivated by questioning the effectiveness of digital technologies also questions how they influence and shape human cognition, participation, and the construction of knowledge within contemporary educational environments.

2. Technological proximity and symbolic knowledge. Hyper-multidimensionality as a distributed and inferential environment.

The voluntary growth of hypermedia environments as an essential condition of contemporaneity represents one of the most significant epistemic transformations of recent decades. Far from a simple expansion of communicative spheres, hypermediality represents a new regime for the legitimation of knowledge, in which knowledge is not organized according to linear forms of meaningful, hierarchical, or sequential appropriation, but takes shape through a networked, multimodal, and inferentially active ecosystem.

To better understand the revolutionary pace at which technological structures have influenced the social context, the idea that has emerged over time is that hypermedia is configured as an extension of human cognition, precisely as highlighted by Hutchins (2020) to explain the complexity of knowledge construction processes by emphasizing the "distributed" nature of cognitive phenomena across time and space. This extends the concept of cognition, which must be decoded beyond the idea of singularity, tracing the activity of thinking as accommodations with the resources and materials present in the environment.

The concept of extended cognition (Clark & Chalmers, 2023) has given humanity a different vision of the mind under construction, according to which human cognition should be limited within the confines of the brain and body. The idea of active externalism has strengthened the theoretical construct's belief that, under certain contextual conditions, external objects and tools can be a necessary part of the origination of cognitive processes themselves, becoming an extension of the world itself.

From these perspectives, the human mind cannot be conceived as an isolated entity, as a structure that extends through all the articulations, tools, and technological infrastructures. The hypermedia framework, with its networked and coevolved nature, amplifies this extension, transforming every cognitive act into a process that simultaneously involves multiple characteristics. Engagement encompasses and recognizes prominent attributes that interdependently convey symbolic, iconic, dynamic, and algorithmic representations.

Focusing on the technological factor that influences the formation of knowledge, the dynamic flow that innovates knowledge that is no longer stereotyped, is continually structured through interactions, connections, and inferences that shape and influence the extrapolation of significant assumptions. Thinking about it heuristically leads us to interpret and consider it useful to refer to informational distribution as a path that inferentially unites what the mind reports as true and the cognitive frameworks that cooperate to produce meaning.

These meaningful frameworks take on rhizomatic cognitive forms, precisely because it is impossible to eliminate the roots that allow us to operate according to meaningful and environmental decodings that remove a concept or structural connection that could act as a barrier. Each element, in fact, is potentially

interconnected with a multitude of other elements capable of influencing thought and directing it towards broad and effective perspectives.
The educational environments thus described construct their modular plans through profound implications that substantially impact the management of the teaching curriculum. Added to this is the interoperability of learning fragmentation, which helps delineate specific and autonomous areas of belonging. The core of these areas is structured around a hierarchical vision of the sources used to give specific weight to learning, where the distinction between author and reader is blurred and dissipated.
The digital world thus gives rise to a new form of nonconscious cognition (Hayles, 2021) that grows latently beneath the human attention span, capable of optimally managing not only the content to be delivered and assimilated, but all the possible connections and mechanisms that interact with the inferential process that underpins learning. This entails the ability to interact not primarily with the content delivered, but with complex, integrated, and autonomous cognitive environments. The self-regulating process of hypermedia systems integrates and nourishes one of the preponderant aspects of the multidimensional inferential nature: the capacity, inherent in the devices themselves, to guide and activate inferential frameworks. Every suggestion, hyperlink, hint, or recommendation gives rise to the so-called inferential "invitation," a plausible but necessary, pronounced cognitive directionality that guides the individual toward specific interpretations or insights. The role of the hypermedia context thus becomes no longer neutral and passive with respect to the generative mechanisms of knowledge, but a structuring of possible cognitive alienations.
Along with technological innovation, studies on predictive processing (Holwy, 2020) have shown how the human mind is structured through a continuous generative process and through updates of possible referenced hypotheses. Hypermedia amplifies this predictive processing by stimulating learning environments in which:

- ✓ Ideas and hypotheses are continuously stimulated and prompted by relational-inference-stimulus actions;
- ✓ Predictive activity for the generation of hypotheses is necessarily strengthened or weakened by the specific weight of the inferred outputs;
- ✓ Cognitive confirmation actions are easily found in self-management systems;
- ✓ Meaningful dissonances are reduced through personalized and autonomous learning paths.

The envisioned scenario highlights how hypermedia environments are predictive ecosystems, in which digital biosystems and cognitive articulations collaborate to produce meaning. Building from and for the creation of meaning within a network that aims to manage complementary and necessary adjacencies demonstrates how the management of learning environments changes as phenomena correct

according to meaningful training modalities. The importance of a bottom-up construction that unifies and engages the system of meaningful appropriation and digital infrastructures leads to a repositioning on a path of balance between what will potentially be achieved through the alignment of virtual representations with real ones.

These algorithmic ecologies underlying digital inferential processes represent the set of infrastructures, predictive models, platforms, and social practices that implement and substantiate the foundations of a coevolutionary learning process. The algorithmic inferential process operates as an invisible editor (Butcher, 2018), capable of supporting and managing what becomes visible to the eye and mind, and therefore real, relevant, and credible. The influential role of digital platforms is exercised through the classification and selection of useful and necessary content, implicitly defining what can truly be considered knowledge (Gillespie, 2020).

This thesis demonstrates how the ability to go beyond the human gaze allows us to focus our attention on the computational observational dynamics through which reality is interpreted, renegotiated, and transformed into cognitive data, or "data gaze" (Beer, 2019). Operating on structurally configured foundations, according to canonical shared automation mechanisms, data gaze produces forms of selective amplification, asymmetric visibility, and algorithmic normalization that profoundly influence cognitive and sociocultural dynamics.

Through perceptual personalization, technological platforms influence the processes of analyzing and decoding knowledge, focusing on epistemic regulations that serve as formative and directional axes. The effects of these regulatory ecosystems involve cognitive biases, such as confirmation bias, reinforced by the algorithmic selection of content aligned with individuals' expectations; availability heuristics, characterized by overexposure to emotionally salient content; and the control of motivated reasoning, fueled by the algorithmic polarization of knowledge.

Some scholars (Pennycook, Rand, 2021) suggest that the spread of false and contradictory information is driven by attentional and receptive dynamics rather than by deliberately deceptive intentions. This phase of inferential perception highlights cognitive vulnerabilities, conditioned by a difficult distinction between reliable information and manipulative content.

This unexpected difficulty in educational contexts has led to a structural reconfiguration of educational processes and the necessary reconversion of the dynamics usable for predictive activities and actions.

The interoperable perspective of multiple souls moving in unison converges in the recognition and concerted effort that the process of datafication is gradually revolutionizing education. What sustains this field, in an environment governed by market logic in which hypermedia actors and environments exert increasing power over educational dynamics (Williamson, Eynon, 2020), are the actors involved, from

the automatic to the natural. A shared path that must be directed toward the formation of symbolic beliefs capable of best representing what society pours upon us and with which it pervades us.

This modus operandi defines a demarcation line within which multiple areas of reference for the human sciences operate, such as philosophy subjected to technology, media sociology, cognitive sciences, and pedagogy, specifically in the experimental field. Although we organize ourselves, naturally and in many cases unnaturally, like machines, the question that arises is whether influence, whether constructed on biological or technological bases, can guide humans toward the correct identification of received signals.

The educational field, therefore, has yet to find its stable position, achieved through an integration of these factors of autonomous negotiation of internal systems of perception of environmental feedback and epistemic channels of evolutionary representation. The essential concept we are discussing, namely digital influence in the educational field, introduces new socio-cognitive vulnerabilities, where the overabundance of content delivered digitally, extreme personalization, the logic of engagement, and the disproportionately increased temporality of devices thwarts the normal process of raising awareness of systems that can be defined as relational.

How are algorithmic structures organized in the management of sociocultural inferences compared to the normal human aptitude for the individualized management of acquired knowledge? The structures of meaning formation through algorithmic coding do not simply organize content according to categorical frameworks, but propose a revision of inferential processes that anticipate subjective preferences, suggesting cognitive pathways that address the formation of beliefs about the world by modulating attention. The actions performed are manifested according to mechanisms of ranking, recommendation, fiftering, and profiling, operating under the radar and repeatedly. The process of algorithmic analysis is not limited to a series of computational procedures, and therefore associated with hypermedia devices, but to a constant factorial regulation that affects the probabilities of action and thought itself.

Highlighting how hypermedia environments structured according to autonomous and automated functions bring about a profound transformation in many representation processes, leads us to reconsider the tools used to deliver knowledge. The sequentiality of written text, which for centuries has constituted the basis of formal education, is subverted by a path of interoperable links where information proceeds following nodes, connections, and flows of knowledge. According to Manovich (2023), digital culture is characterized by a profound "computationalization" of content, which is broken down into modular, manipulable, and recombinable units. This also impacts cognitive function,

connecting areas such as attention, memory, inferences, and comprehension, generating new forms of digital literacy.
Precisely because of this non-explicit nature, algorithms operate according to feedback background analyses, integrated into digital infrastructures, revealing themselves clearly only through the effects they produce. Hence the idea of a form of epistemic colonization that becomes a mutable factor, a technical process that redefines experiential expectations and the connection between significant assumptions.
The transformation of accommodation environments is significant, where both universities and the school context take on adapted and calibrated forms for a structure that channels factors related to expertise, the relationship between the human and the non-human, and the specific algorithmic fragmentations that devices generate.
Getting to the heart of the matter, the central focus of this discussion is not on analyzing whether and how algorithms and their decoded forms influence the ways in which knowledge is acquired, but on considering the possible causes, effects, and consequences of this influence. From these arise new forms of social representation through the ability to amplify informational complexity, enabling the development of critical algorithmic literacy, capable of managing and providing all the information necessary for a proper understanding of the underlying logic and analysis of social inferences as a conscious control of all technology-based educational practices.

3. The algorithm as an epistemic environment for educational awarenes

Understanding the critical role of algorithmic infrastructures as epistemic environments, capable of acting and reacting to the multiple facets of environmental-inferential interactions, requires analyzing not only their technical functions but also the quality with which they reorganize the physiosocial conditions of knowledge. The underlying potential of these devices, thanks to experiential journeys, follows preferential paths structured by a unique information ecosystem, shaped by a combination of personal data, past behaviors, implicit preferences, and predictive analytics.
While we largely agree with interpreting technological dynamics as the updating and emulation of human ones, when we consider the issue of the personalization of knowledge, we must necessarily consider the implications that balance beneficial actions in terms of procedural effectiveness and efficiency. What needs to be reconsidered is the transformation of the concept of shared experience and how it has been revisited precisely in light of the implications arising from hypermedia and digital influence.

The algorithmic phenomenon through which digital influence operates on fragmented knowledge, amplifying the distance between individuals, further complicating the process of constructing collective knowledge. The strengths with which humans shape their world are weakened, stemming from the functional dispersion that underpins even the most authentic relationships between individuals and machines.

The second implication concerns the transformation of inferential processes. Systemic algorithms do not simply present content; they suggest connections, anticipate interpretations, and guide processes and actions. Predictive logic navigates and stays afloat thanks to models that attempt to reduce uncertainty by anticipating human behavior. The ability to anticipate, however, acts as a borrowed gauge, centrally located, neutral, and incorporating values and priorities that reflect the logic of contemporary society.

Continuous exposure to these processes not only reflects individuals' preferences, but consolidates them through a process of continuous and manipulative adaptation. Indeed, when algorithmic structures operate by presenting standardized content, which confirms users' expectations and reinforces the subjects' pre-existing mental models, they produce an attentional threshold limited to contextualized needs.

Another implication bases its content on observing the temporality of information. In the technological world, the concept of time, in relation to the quantity of data processed for necessary actions, is essential if not vital. Engulfed content is often consumed rapidly without the possibility of more careful reflection. This rapid use of sources, with brief, emotionally immediate, and totally engaging content, has the small flaw of causing human processing to weaken within a whirlwind of concepts originating from different directions. Understanding how our mind is structured according to the mechanisms of epistemic self-determination of content should make us reflect on the irregular and spaced manifestations of our attention, no longer structured on interpretative models but exclusively on those intentionally observable.

In this regard, we must not overlook the analysis of multimodal vehicles, particularly hypermedia. Indeed, the simultaneous use of multiple information transmission channels enriches learning, creating multiple access points to knowledge and generating information about concepts and relationships between them that would otherwise undermine the object of study. In managing knowledge, the likelihood of experiencing cognitive overload, attentional dispersion, and a mode of comprehension consistent with environmental factors could lead to a misinterpretation that would, in fact, complicate feedback and feedback mechanisms.

If we are not aware of, and often unable to manage, the amount of data produced by intelligent systems, we can easily fall into uncomfortable situations. If we fail to

question why, as Kitchin (2021) reveals, that "black box" influences the very generative practices of human cognition, we will, in some respects, be unable to attempt to cross and overcome the limitations caused by the incorrect use of digital devices.

The algorithmic structure of intelligent technological systems is designed to give specific weight to engagement, often favoring content with a high emotional impact, such as sensations like surprise, indignation, fear, or enthusiasm for an event or a highly comfortable situation.

Thus, forms of affective governance emerge (Couldry & Mejias, 2022), as a guiding effect on emotional reactions and the relationships resulting from their inferential processes. These aspects, anchored in educational contexts, strengthen motivation, attentional states, and the ability to develop complex relational forms. Precisely the relationships that are established by accommodating sensations, actions, goals, and modes of conformity require establishing an egalitarian relationship between different characters, balancing misaligned experiential spheres. The cognitive variation generated by algorithms manifests itself through a series of mechanisms that operate perpetually and often imperceptibly. This has led to the term "precision weighting," a concept inherent in the Predictive Processing paradigm, according to which the brain assigns a specific weight to inferential signals based on their reliability and what is perceived of them. Perceived reliability is fueled by the construction of feedback relating to patterns consistent with people's expectations. Thus structured, technological platforms, using criteria that are consistent and satisfactory in relation to human preferences, strengthen the perception of the reliability of signals, guiding inferences toward actions consistent with those expectations.

This continuous and never-static transmission of knowledge, according to methods of rethinking and rebuilding, imposes positions and actions that are totally discordant with the recent past. Today, as Rosa (2021) states, society is structured on an increasing compression of time that makes it difficult to construct narratives consistent with the context of belonging and to understand phenomena from a historical and shared perspective.

The history effect, often criticized as a potential distortion of knowledge, becomes difficult to imagine when considering the time and evolutionary path through which technologies often pervade modern society. Every human action is guided by predictive systems, which support, by reducing uncertainty, the anticipatory process of possible convergence toward a truth about the world.

Exposed to a predominantly continuous flow structure, individuals, immersed in this sea of knowledge present in socio-technological relationships, must quickly identify themselves by making an initial assessment of the outputs received. These actions contribute to the creation and intuition of small cognitive shortcuts, such as the availability heuristic or, as in many cases, confirmation bias. These shortcuts

consist of a series of recognition patterns that, through alphanumeric codes, position themselves at the center of the conflict in the identification of meanings, making them necessary for an interoperable process between dissociated and often incongruent characters.

The ability to select data according to algorithmic suggestions, relying on them, moves the human mind toward the consolidation of pre-existing knowledge, or know-how, integrating it with predictive hypotheses of possible beliefs about the world. Anticipatory analysis delegates to future productions that possible imaginary of a world constructed according to experiential spheres. These spheres present us with a worldview that analyzes the effects of consequences as delegated inferences, in which individuals attempt to rely on algorithmic suggestions to direct future choices. The growing integration between human agents and algorithmic agents gives rise to a hybrid structure attributable to the identification of hybrid intelligence (Jarvela, Zhao, Nguyen & Chen, 2025), an emerging approach that positively combines human intelligence with the unique problem-solving capabilities of AI systems.

The confrontation with this reality, more relevant than ever in its physical manifestation, has raised questions that touch on both social and epistemic values, highlighting the distinction between mechanically directed and fully conscious inferences. Indeed, conscious inferences require the inherent human ability to recognize inferential states as potential maneuvers for the creation of beliefs that serve as supporting structures for cognition.

The hybrid nature of relational systems, contextualized in an era where time is a precious resource and information is calibrated according to the trends of the place where it occurs, leads to the identification of that natural idea that leads to an attempt to understand who is inferring, how, and with what expectations. The possible answer is not fixed in a perspective converging toward a common point. Perceptual misalignment requires, according to unwritten rules, monitoring levels of social interaction from different perspectives, reorganizing them into fields of symbolic and meaningful representation.

The quality of automated transparency emerges as a central element where algorithms operate structurally on complex models, often based on machine learning and deep learning formulas, which often lead to opacity and hallucinations that compromise the true understanding of real events. From an educational perspective, seeking models that integrate the inferential, emotional, epistemic, sociocultural, and pedagogical dimensions offers food for thought for analyzing, decoding, and understanding the hybrid nature of cognitive processes in the technological age. The challenge will be to best accommodate these opposing forces as they attempt to live their daily lives while finding space within the relevant social structure.

The training environment itself, where each individual tries to carve out a small space for action, must nurture, support, and carefully evaluate what can be useful not only for individual needs but also for the integrated world we live in. It's not easy to be prepared and aware if what's being proposed speaks a different language than our own, but what can lead to radical change must stem from the conscious understanding that changing simply to keep pace with innovation often won't achieve the desired goals.

4. Multidimensional process and educational implications of the algorithmic framework

If the idea put forward so far was to reflect on the transformations dictated by the processes of positive influence coming from technology and in particular from the world of artificial intelligence, what we are now interested in analyzing is the implications for the educational field deriving from this new relational and cognitive-behavioral ecosystem.

The work carried out by educational institutions cannot be limited to latently observing ongoing transformations; it must actively engage in building critical skills and developing autonomous individuals capable of navigating a complex and algorithmically mediated information environment. The set of computational structures that underpin the algorithmic framework, along with inferential models and classification systems, mediate knowledge and direct the circulation of knowledge within automated ecosystems.

The algorithmic framework takes on a multidimensional nature, structured around four interdependent axes:

- ✓ Computational engineering, thanks to machine learning models, neural networks, and systemic recommendation systems;
- ✓ Epistemic-inferential engineering, thanks to pattern extraction, prediction, and classification processes;
- ✓ Sociocultural engineering, precisely because of the logic of engagement and complex dataification;
- ✓ Ethical-political engineering, structured according to algorithmic biases, data governance, transparency, and accountability.

First, algorithms are structured through statistical inferences that position data in predictions and suggestions that at least partially fill the gaps resulting from information verification that is not fully identifiable and processed. Creating a multi-level work environment requires, on the part of those directly involved, an in-depth analysis of the conscious systems of algorithmic mediation. Without full mastery of one's own awareness, any attempt to develop inferential, critical, or metacognitive skills risks being ineffective, precisely because navigating an invisible ecosystem would imply a lack of awareness (Freire, 1971) of one's internal ecosystems.

Awareness in algorithmic mediation cannot be seen as a simple prerequisite that anchors the machine within a unidirectional system. Naturally, it must be considered an essential and fundamental epistemic condition for building informed digital citizenship.

The data-driven agents of a change that has reversed the nature of social inferences must be interpreted as the custodians of explicit knowledge, highlighting what we need. Becoming aware of the logic behind algorithms doesn't mean becoming programmers, and we certainly don't want to stray into irrelevant fields, but rather create spaces that provide the tools for a meaningful understanding.

Today, a multidimensional process characterizes the evolution of an algorithmic framework, as the integration of data analysis systems, predictive models, and artificial intelligence does not produce a linear impact on knowledge, but evolves in a simultaneous dimension that involves the cognitive, pedagogical, organizational, and ethical-social frameworks of educational contexts. Far from being a simple technological extension, the process manifests itself in a true ecological reconfiguration (Williamson & Kizilcec, 2023) of the ways in which knowledge is produced, analyzed, and delivered.

The multi-layered nature of a potential algorithmic framework arises, as identified in the literature, from the intertwining of four dimensions, which shape and influence actions aimed at social and technological development. Actions aimed at better managing social phenomena in the contemporary era are leading to a reflection that is affecting several areas of great impact on digital society.

Looking at a new way of managing the role of teachers is one of the implications dictated by the influence of digital and all technologies, where the very value of professionalism is changing and morphing. It's not just about mediating what is delivered in society, but becoming a critical interpreter of algorithmic data, a facilitator of inferential processes, and a guarantor of the epistemic quality of information. To achieve this, the model of critical AI literacy (Ranieri, 2024) creates a simultaneous integration of cognitive, critical, operational, and ethical-social skills necessary to govern interactional flows with intelligent systems.

It follows that if we consciously create a path that personalizes the decoding of algorithmic data, establishing adaptive and targeted pathways, on the other hand, we will reduce the complex processing that underlies learning, risking excessively flattening thought and its cognitive articulations. This highlights the clear separation between strong personalization (driven by predictive models) and weak personalization (oriented towards educational flexibility), promoting a balanced management of automation and human agency.

Objectively reconfiguring procedures for meaningfully accommodating decoded information, through data-driven approaches, leads to the introduction of new, repetitive, granular, and predictive metrics. This can improve the accuracy of subcognitive monitoring, but raises questions about the reduction in knowledge

acquisition capacity and the potential erosion of formative assessment. Scholars Williamson & Kizilcec (2023) emphasize the importance of rethinking a new "human-in-the-loop" model that keeps professional judgment at the center of knowledge creation.

The educational context thus plays a fundamental role in preparing students to understand, interpret, and negotiate the logic of algorithmic systems. In concert, the importance of recognizing contextual biases, interpreting predictive models, and critically evaluating digital sources will create an algorithmic framework that can serve as a pedagogical object.

Modern literature converges toward a rethinking of a pedagogical model that integrates algorithmic awareness because it increases the sensory modality and internal control over received information. This must be complemented by an analysis of epistemic vigilance, i.e., the ability to critically and conscientiously evaluate inferences and the data derived from them (Watson & Morgan, 2025). The issue focuses on defining guidelines for data literacy that leads to a constant reevaluation of data through the ability to read, understand, analyze, and communicate effectively with data and make informed decisions (Morrow, 2021).

The ability to correctly interpret data, understand its representations, how it is collected and transformed, and know how to use it to answer relevant questions or make decisions based on objective evidence transforms identity-based forms of knowledge into virtual representations. This process does not require advanced programming or machine learning, but it significantly influences critical thinking, inferential statistical analysis, and data visualization to correctly decode it. From this perspective, it is helpful to consider the key skills that can be developed through action stemming from data literacy, which include:

- ✓ Understanding data and its relevant environment—knowing where it comes from, how it is structured, and the meaningful representation of data categories;
- ✓ Constructing a critical analysis that identifies possible anomalies, errors, or significant patterns in the data;
- ✓ The process of visualizing and communicating data, knowing how to represent it clearly and independently;
- ✓ Implementing decision-making autonomy through data to make informed decisions without the guidance of IT specialists.

The prospective, but likely current, task leads to the convergence of an AI Literacy, which does not inhibit the process of assimilating the phenomena underlying artificial intelligence, so as to self-regulate the methodologies for understanding digital influences and implications.

The path that is leading society toward safe harbors, where knowledge becomes the formative anchor that strengthens us and gives us security, must serve as a beacon that directs our abilities and envelops them in a shared flow of knowledge.

This requires the ability to design educational environments capable of mitigating all informational asymmetries and potential biases arising from a high-impact and rapid inferential relationship.
The image of the world that we are preparing to draw today is characterized by regular and irregular planes of cognitive representations combined with those blurred perimeters that regulate and make human beings autonomous and aware within a complex and prolific system of knowledge.

Conclusion

Digital Influence opens up new scenarios that primarily impact forms of real representation, configuring cognitive processes in educational environments as the core of a process that meets the expectations of individuals and the society in which they live. A broad understanding of the algorithms that fuel mechanical processing mechanisms, and the autonomy to manage potential distractors of knowledge, creates a process of techno-social negotiation that is aware of one's own action and position within digital ecosystems.
Being an integral, and often even declarative, part of inferences linked to internal constructions that stylize knowledge and make it their own must lead humanity and the technological context to share the same perspective, laying the foundation for achieving individual and collective growth goals. Taking on responsibilities that allow us to better interact with the world around us and with those who experience it. The influence generated by constant contact with the hypermedia world currently represents an epistemic and social challenge that requires profound reflection on the management and organization of educational environments. A key issue, this same challenge leads to the formulation of new educational paradigms that analyze the essential prerequisites and the specific weight to be given to intervening in what is occurring. The natural propensity of the foundations for the creation of new educational horizons will gradually lead us toward that comfort zone that will significantly influence our way of learning and sharing knowledge.

References

Alashwal, M. (2024). *Empowering education through AI: potential benefits and future implications for instructional pedagogy.* PUPIL: International Journal of Teaching, Education and Learning 8, 201–212. http://doi.org/10.20319/ictel.2024.201212

Beer, D. (2019). *The data Gaze: Capitalism, Power and Perception*, SAGE Research Methods Community Publications

Bouakaz, L., Khalid, S. (2025). *AI in Education: a sociological exploration of technology in learning environments*, Frontiers Media SA, Frontiers in Education, Digital Education. http://doi.org/10.3389/feduc.2025.1700876

Butcher, T. (2018). *If…Then: Algorithmic Power and Politics*, Oxford University Press. https://doi.org/10.1093/oso/9780190493028.001.0001

Freire, P. (1971). *La Pedagogia degli oppressi,* Mondadori, Milano

Clark, A. (2025). *Growing your influence: Social Media Strategies for a new Generation*, Independently Published

Clark, A., Chalmers, D. (1998). *The extended Mind*, Analysis, 58(1), 7-19

Couldry, N., Mejias, U. (2022). *Il prezzo della connessione. Come i dati colonizzano la nostra vita e se ne approfittano per far soldi*, Il Mulino, Milano

Floridi, L. (2026). *Il nodo etico. Informazioni e valori nella società digitale*, Raffaello Cortina Editore, Milano

Floridi, L. (2025). *La differenza fondamentale. Artificial Agency: una nuova filosofia dell'Intelligenza Artificiale*, Mondadori, Milano

Gillespie, T. (2018). *Custodians of the Internet. Plattforms, content moderation and the Hidden Decision that shape Social Media*, Yale University Press

Hayles, K. (2021). *L'impensato. Teoria della cognizione naturale,* Effequ, Firenze

Hollan, J., Hutchins, E., Kirsh, D. (2000). *Distributed Cognition: Toward a New Foundation for Human-Computer Interaction Research*, Acm Transactions on Computer-Human Interaction, 7(2), pp. 174-196, University of San Diego, California

Holwy, J. (2020). *New Direction in Prediction Processing.* Mind & Language, 35, (2): 209-223

Manovich, L. (2023). *Cultural Analytics. L'analisi computazionale della cultura*, Raffaello Cortina Editore, Milano

Morrow, J. (2021). *Be Data Literate: The Data Literacy Skill EveryoneNedds to Succeed*, Kogan Page, London

Jarvela, S., Zhao, G., Nguyen, A., Chen, H. (2025). *Hybrid Intelligence: Human – AI coevolution and learning*, Bera, British Journal of Educational Technology, https://doi.org/10.1111%2Fbjet.13560

Kahneman, D. (2011). *Thinking fast and slow*, Penguin Edition

Kitchin R. (2021). *Data Lives: How data aremade and shape our World*, Bristol University Press, Bristol

Pennicook, G., Rand, D., G. (2021). *The Psicology of fake news*, Trends in Cognitive Sciences, 25(5). http://doi.org/ 10.1016/j.tics.2021.02.007

Perkins, M. (2023). *Academic integrity considerations of AI Large Language Models in the post-pandemic era: ChatGPT and beyond*. Journal of University Teaching & Learning Practice, 20(2). http://doi.org/10.53761/1.20.02.07

Ranieri, M. (2024). *L'Intelligenza Artificiale a scuola. Una lettura Pedagogico-didattica delle sfide e delle opportunità*, Rivista di Scienze dell'Educazione, (62)1, 123-135

Rosa, H. (2021). *Accelerazione e alienazione: Per una teoria critica del tempo nella tarda modernità*, Einaudi Editore, Milano

Selwyn, N. (2020). *Education and Technology: Key Issues and Debates, 3rd Edn*. London: Bloomsbury Academic

Trong, T. B., Truong, S. N. (2023). *The Survey of Digital Transformation in Education: A systematic Review.* International Journal of TESOL Et Education

Vasile, C., (2023). *Artificial intelligence in education: transformative potentials and ethical considerations*. J. Educ. Sci. Psychol.15, 45–56. http://doi.org/10.51865/JESP.2023.2.01

Wang, S., Wang, F., Zhu, Z., Wang, J., Tran, T., Du, Z. (2024*). Artificial intelligence in education: a systematic literature review*. Expert Syst*. Appl.*252:124167. http://doi.org/10.1016/j.eswa.2024.124167

Watson, R., Morgan, T. J. H. (2025). *An Experimental test of epistemic vigilance: Competitive incentives increase dishonestly and reduce social influence*, ScienceDirect, volume 257, DOI 10.1016/j.cognition.2025.106066

Williamson, B., Kizilcec, R. (2023). *Algoritmics Governance in Education.* Oxford University Press

Yingyang, L., Zirui, Z. (2024). *The role of education in the era of AI: challenges along with opportunities*. Journal of Humanities, Arts and Social Science*,* Volume 8, 45–52. http://doi.org/10.26855/jhass.2024.04.039

Zhang, Y., Ye, X. (2023). *Commercial AI in education.* J. Educ. Policy 38, 567–585

Zou Y., Kuek F., Freng W., Cheng, X. (2025), *Digital Learning in the 21st century: trends, challenges, and innovation in technology integration,* Frontiers in Education

Zuboff, S. (2019). *The Age of Surveillance Capitalism*. New York, NY: PublicAffairs