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Artificial Intelligence in the Classroom: Navigating Fascination, Paradoxes, and the Imperatives of Pedagogical Accountability

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ABSTRACT

The introduction of Artificial Intelligence into the educational sphere is profoundly transforming our teaching and learning practices, reshaping the relationships between teachers, learners, and knowledge itself. While institutional discourses often portray AI as a means to enhance personalization, inclusion, and efficiency, its integration brings to light significant paradoxes: the standardization of learning pathways under the guise of differentiation, the increasing delegation of pedagogical decisions to algorithms, and an overemphasis on performance that can overshadow reflective, relational, and creative dimensions of learning. In this article, we examine these tensions through a comparative analysis of human-produced texts and AI-generated outputs. Our findings reveal that, although algorithmic texts are typically well-structured, coherent, and efficient, they frequently lack subjectivity, relational sensitivity, and imaginative insight, whereas human productions foreground experience, interpretation, and affective guidance. These observations lead us to advocate for an augmented pedagogy in which AI functions as a complementary tool, supporting but never substituting the nuanced and context-sensitive work of educators. We contend that fostering algorithmic literacy, critical reflection, and ethical awareness is essential for enabling a thoughtful coexistence between human and Artificial Intelligence in our classrooms, ultimately ensuring that technological advancement serves the richness and humanity of educational practice rather than diminishes it.

Keywords: Artificial Intelligence, Education, Augmented pedagogy, Algorithmic literacy, Human mediation

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INTRODUCTION

The advent of Artificial Intelligence (AI) within the educational sphere may be regarded as one of the most consequential technological and epistemological turning points of recent decades. More broadly, it forms part of a global trajectory toward the digitisation of pedagogical practices and the automation of knowledge transmission—a trajectory that is profoundly reshaping modes of learning, the nature of assessment, and the very foundations of the educational relationship. In this context, AI cannot be confined to the status of a mere assemblage of technical tools; rather, it engenders a substantive reconfiguration of the relations between knowledge and power within both school and university settings. It redistributes roles among teachers, learners, and machines, while simultaneously redefining the conditions governing the access to, production of, and validation of knowledge (Holmes, Bialik & Fadel, 2023).

From this vantage point, education emerges as a privileged domain for the experimentation and deployment of AI, characterised by a persistent oscillation between promise and apprehension. On the one hand, international organisations such as UNESCO (2023) frame AI as a historic opportunity for the personalisation of learning and the advancement of inclusion, insofar as it enables the adaptation of educational pathways to learners' specific needs and holds the potential to mitigate inequalities in access to knowledge. On the other hand, a growing body of scholarship underscores the risks inherent in such technological integration, including the standardisation of pedagogical practices, the attenuation of human mediation, and an increasing reliance on systems whose operational logics remain largely opaque and governed by algorithmic processes (Popenici & Kerr, 2023).

This phenomenon is thus marked by a profound ambivalence, manifesting in a dual discourse: one characterised by a certain fascination with an innovation perceived as both transformative and inevitable, and the other by a critical vigilance regarding the normative implications of algorithmic rationality. In this respect, it is essential to move beyond the conception of AI integration as a mere technological transition and instead apprehend it as a cultural and cognitive transformation. Such a transformation reactivates, in renewed configurations, longstanding tensions between educational humanism and technoscientific rationality.

It is precisely from within this tension that the present study is situated, structured around the following research question: to what extent can Artificial Intelligence contribute to the enrichment of educational practices without undermining the human, cultural, and ethical dimensions that underpin the processes of teaching and learning?

In addressing this question, three working hypotheses are advanced. First, it is posited that AI remains intrinsically limited in its capacity to apprehend the complexity of the cultural and relational contexts that are constitutive of educational processes, and which, by their very

nature, resist strictly computational modelling. Second, it is argued that institutional and media discourses tend, at times, to overstate the benefits of AI while underestimating its ideological implications and its potential to engender forms of cognitive standardisation. Third, it is contended that the viability of AI-assisted education depends upon a principle of complementarity between technological innovation and human mediation, the latter constituting a necessary condition for the critical and ethical appropriation of digital tools.

Methodologically, this study adopts a qualitative, critical, and resolutely interdisciplinary approach. It is grounded, on the one hand, in an analysis of discursive corpora drawn from institutional sources (including reports from UNESCO, the OECD, and the European Union), as well as academic and media materials; and, on the other hand, in a comparative exploratory study that juxtaposes human discursive productions (teachers and students) with machine-generated outputs (texts produced by models such as *GPT-4* and *Gemini*), on the basis of identical pedagogical stimuli. This triangulated approach enables the articulation of an analysis of discursive representations with a theoretically informed perspective drawing on cognitive linguistics, the sociology of education, and digital studies (Baker & Smith, 2022; Järvelä, Nguyen & Hadwin, 2023).

The purpose of this study is not to posit a reductive opposition between human and machine intelligence, but rather to interrogate the conditions under which a reflective coexistence between these two forms of intelligence may be envisaged. In this light, it appears less pertinent to ask whether AI is capable of teaching than to examine how it reconfigures the paradigms of teaching and the very representations of knowledge. Through this line of inquiry, the study seeks to contribute to a broader reflection on pedagogical responsibility in the age of automation, and to advance the imperative of articulating a form of digital humanism grounded in the plurality of knowledge and in the preservation of the dialogical essence of education.

I. Educational AI: Between Innovation and Technological Mythology

Artificial Intelligence as applied to the field of education is presently generating a level of enthusiasm of notable magnitude, attributable both to the sustained acceleration of technological innovation and to a form of institutional rhetoric firmly oriented towards the modernisation of educational systems. Within this framework, the phenomenon appears to be structured by an inherent tension: on the one hand, AI is conceived as a lever for enhancing efficiency and promoting equity; on the other, it tends to crystallise into a veritable technological myth, thereby shaping collective representations of educational success.

1. Defining Educational Artificial Intelligence

By the term *Educational Artificial Intelligence* (EAI), we refer to the ensemble of technologies capable of simulating certain human cognitive processes within learning

contexts. In this regard, Luckin et al. (2016) characterise such systems as those able "to interpret data generated by learners in order to personalise pedagogical activities and support the development of complex competences."

From this definition, we retain the conception of learning processes mediated by algorithmic systems that analyse, calibrate, and orient educational trajectories in accordance with user profiles. However, it is essential to emphasise that this apparent scientific neutrality conceals a more profound ideological orientation: that of a pedagogy increasingly rationalised through data, wherein knowledge itself becomes progressively quantifiable and amenable to computational modelling.

Accordingly, AI does not merely support learning processes; it contributes, more fundamentally, to a redefinition of the very ways in which learning is conceived and understood.

2. Institutional Discourses: The Promise of Personalisation

It is evident that international institutions have played a decisive role in disseminating the educational promise associated with Artificial Intelligence. UNESCO (2023), for instance, underscores the capacity of such technologies to "foster inclusive and equitable education," notably through their ability to adapt to the specific needs of learners while providing teachers with real-time analytical support. In a similar vein, the OECD (2022) highlights the potential of intelligent systems to anticipate learning difficulties and to deliver targeted remedial interventions.

While these positions reflect a legitimate aspiration to enhance both the quality and accessibility of education, they also appear to convey a form of technicist optimism. This optimism rests upon the often implicit assumption that the increasing sophistication of technological tools might, in itself, suffice to resolve deep-seated structural challenges, including overcrowded classrooms, deficiencies in teacher training, and persistent territorial inequalities.

Such a perspective is underpinned by a particularly compelling metaphor—that of the *intelligent tutor*, envisaged as capable of providing individualised support to each learner. It aligns with what Selwyn (2021) describes as the "narrative of digital progress," namely a pervasive belief in the capacity of digital technologies to embody the future of educational institutions. Yet, this narrative arguably rests, at least in part, upon an illusion of transparency, insofar as it tends to naturalise political and economic choices under the guise of pedagogical innovation.

3. The Technological Mythology of Innovation

Beyond the enthusiasm it engenders, Artificial Intelligence contributes to the construction of a broader mythology of educational progress. As Livingstone (2022) observes, technological innovations in education are frequently perceived not merely as tools, but as inherently imbued with modernity and efficiency, and thus presumed capable of remedying the perceived shortcomings of an educational system deemed outdated.

A discernible tendency thus emerges to conflate innovation with improvement, whereby technical novelty is at times elevated to an end in itself. In our view, this mythology rests upon three principal implicit assumptions:

1. the presumed intrinsic neutrality of technology;
2. the belief in the superiority of automation over human mediation;
3. the conviction that digital solutions are universally transferable across contexts.

Such assumptions, however, risk obscuring the inherent complexity of the educational field, which cannot be conceived as a homogeneous domain. Pedagogical practices are invariably situated within specific sociocultural contexts that must be taken into careful consideration. From this standpoint, we contend that the promise of a universal Artificial Intelligence participates in a broader dynamic of homogenisation in relations to knowledge, ultimately to the detriment of their diversity.

4. An Ambivalent Innovation: Between Potentiality and Constraint

It would, however, be unduly reductive to apprehend Artificial Intelligence exclusively through the prism of risk. It must equally be acknowledged that it opens up fertile and intellectually stimulating avenues for the reconfiguration of didactic approaches and the enrichment of learning environments. Recent research suggests, for example, that conversational agents, when judiciously and reflexively integrated, can enhance learner motivation and foster the development of metacognitive processes (Zawacki-Richter et al., 2023). Similarly, automated analytical tools enable the identification of distinct learning profiles and facilitate the provision of targeted support for students experiencing difficulties.

Nevertheless, it is essential to stress that such contributions acquire their full pedagogical significance only within a framework of co-constructed learning. In the absence of human mediation, the machine remains fundamentally insensitive to the affective, cultural, and symbolic dimensions that are constitutive of the learning experience. As Morin (2021) aptly observes, “intelligence cannot be reduced to rationality; it presupposes a relationship to the world and an engagement of the subject in the process of knowing.”

From this perspective, the challenge confronting both researchers and practitioners lies neither in rejecting Artificial Intelligence nor in embracing it uncritically, but rather in understanding how educational practices might enter into a sustained and meaningful dialogue with it. Such a posture necessitates both ongoing critical vigilance and a steadfast ethical commitment.

II. Paradoxes and Deviations of Algorithmic Rationality in Education

The integration of Artificial Intelligence into educational environments brings to light a series of paradoxes that cannot readily be overlooked. While these technologies purport to personalise learning, they simultaneously tend to standardise it; while they promise to emancipate teachers, they risk confining them to supervisory roles; and while they present themselves as neutral, they frequently reproduce—and at times amplify—the biases embedded within the contexts from which they emerge. These tensions call for a critical interrogation of the complex relationship between the ideology of an ostensibly objective algorithmic rationality and the inherently human, situated, and unpredictable nature of educational processes.

1. The Myth of Technological Neutrality

Contemporary discourses surrounding Artificial Intelligence continue, to a considerable extent, to rest upon a persistent belief in the neutrality of technology. Yet, upon closer scrutiny, this purported neutrality reveals itself to be largely ideological. Algorithms, far from being impartial instruments, embody from their very design specific choices, value systems, and normative priorities (Baker & Smith, 2022).

When educational AI systems are mobilised—whether in the form of learning analytics platforms or generative models—they rely upon extensive datasets that are themselves produced within particular sociocultural contexts, frequently Western, Anglophone, and economically privileged.

In such conditions, their deployment across diverse educational settings is far from inconsequential. These systems tend to propagate implicit biases, manifest in lexical choices, cultural representations, and pedagogical norms. As Holmes et al. (2023) underscore, algorithmic bias does not constitute a marginal anomaly, but rather a structural consequence of non-representative data corpora. Consequently, learners are confronted with a form of artificial universality, within which linguistic and cultural diversity is subsumed under statistical regularities.

2. The Paradoxical Standardisation of Personalisation

A second paradox warrants particular consideration, namely that which pertains to the very logic underpinning algorithmic personalisation. It is widely acknowledged that one of the principal arguments advanced in favour of AI in education lies in its capacity to tailor content to the specific needs of learners. However, such personalisation is predicated upon prior segmentation: each learner is construed as a data entity, analysed and anticipated on the basis of past performance.

This process effectively transforms cognitive diversity into a set of measurable variables, thereby generating—paradoxically—a form of invisible standardisation. Selwyn (2021) aptly notes that "algorithmic personalisation leads to a homogenisation of educational behaviour, insofar as it reduces human variability to patterns of performance." In other words, the promise of individualisation tends to conceal a deeper rationalisation of learner behaviour.

This tendency is particularly problematic insofar as it affects the very meaning of learning itself. Learning, in its most profoundly human dimension, involves uncertainty, error, and experimentation—constitutive experiences that algorithmic systems frequently seek to minimise, correct, or even eliminate. Yet, it is precisely these zones of indeterminacy that lie at the core of meaningful educational development.

3. Cognitive Delegation and the Reconfiguration of the Teacher's Role

Among the most consequential transformations associated with the introduction of Artificial Intelligence into educational contexts is the redefinition of the teacher's role. As these technologies acquire increasing autonomy, teachers are progressively assigned new functions: supervision, verification, and the interpretation of outputs generated by automated systems. This shift entails a displacement in the locus of the educational act, which gradually moves from human mediation towards technological mediation.

Popenici and Kerr (2023) characterise this phenomenon as a form of "cognitive delegation," understood as the progressive transfer of intellectual and decision-making authority from the teacher to algorithmic systems. This does not imply a straightforward replacement, but rather a reconfiguration of professional roles, whereby the teacher becomes the guarantor of a system whose internal logics are not always fully transparent. A notable paradox thus emerges: in order to preserve critical autonomy, the teacher must learn to collaborate with tools whose underlying mechanisms remain partially opaque.

This development also invites a reconsideration of the very notion of pedagogical responsibility. Should an algorithm generate an inappropriate recommendation, produce an erroneous assessment, or suggest an inadequate remedial pathway, where does accountability reside? With the institution, the system designers, or the teacher who relies upon such outputs?

It is therefore imperative to initiate a collective ethical reflection aimed at redefining the contours of responsibility within an increasingly hybrid human–machine educational ecology.

4. The Illusion of Performance and the Erosion of Meaning

Within an educational landscape increasingly structured by performance indicators and a results-driven ethos, Artificial Intelligence contributes to the reinforcement of a logic of quantification. Digital dashboards and real-time monitoring systems encourage the emergence of a metric-oriented pedagogy centred on measurable indicators such as progression rates, success rates, and completion percentages.

While such metrics may serve valuable functions in institutional governance, they also entail the risk of reducing learning to a process of optimisation, in which the value of knowledge becomes conflated with its measurable efficiency. Bennett (2022) observes in this regard that "algorithmic logic tends to substitute the pursuit of meaning with an economy of signals." The learner is thus progressively reduced to a producer of data traces, rather than recognised as an epistemic subject in their own right.

Yet, although AI systems are capable of measuring certain competencies, they remain fundamentally unable to apprehend deep understanding or the transformative dimension that accompanies any meaningful learning experience. For this reason, education cannot be conceived exclusively through the lens of performance: it entails an ethical, symbolic, and relational engagement with others—dimensions that, in their current state, remain beyond the scope of algorithmic modelling.

Synthetic Overview: The Paradoxes of Educational Artificial Intelligence

Foundational Promise	Observed Paradoxical Effect	Pedagogical Implication
Personalisation of learning	Standardisation of learner profiles	Attenuation of cognitive diversity
Objectivity of the machine	Reproduction of cultural biases	Obscuring of cultural plurality
Reduction of teacher workload	Intensification of cognitive delegation	Erosion of pedagogical agency
Optimisation of learning	Overemphasis on performance metrics	Dilution of formative meaning

III. Exploratory Study: Human and Machine-Generated Discourses in the Construction of Pedagogical Meaning

In order to substantiate our theoretical reflections through empirical inquiry, we undertook an exploratory study aimed at comparing discursive representations of the learning process as articulated, on the one hand, by human actors—teachers and students—and, on the other, by generative Artificial Intelligence systems. The purpose of this investigation was not to evaluate the linguistic performance of such systems per se, but rather to elucidate how

conceptions of learning and the values underpinning educational practice are structured across these two distinct discursive regimes.

1. Methodological Framework and Corpus Construction

To examine the interplay between human discourse and AI-generated discourse within educational contexts, we constructed a contrastive corpus organised into three distinct sets of textual productions.

The first set (Set A) comprises contributions from ten instructors of English as a Foreign Language (EFL), with universities across Laghouat, Setif, and Batna. These participants were invited to respond to three pedagogical prompts designed to elicit their conceptions of teaching, their relational stance towards learners, and the educational values informing their practice.

The second set (Set B) consists of fifteen postgraduate students enrolled in a Master's programme in language didactics. Confronted with the same prompts, these participants enabled a comparative analysis between the representations of novice educators and those of more experienced practitioners, thereby opening a particularly illuminating analytical perspective.

The third set (Set C) brings together responses generated by two Artificial Intelligence models, namely *ChatGPT-4* and *Gemini* (2024 version). These systems were prompted using equivalent instructions, carefully reformulated in neutral terms so as to minimise any potential bias influencing the generated outputs.

The three prompts were designed to probe distinct dimensions of the teaching–learning process. The first invited participants to reflect upon the meaning of "learning to write in a foreign language," thereby granting access to the cognitive and intercultural dimensions of learning. The second required participants to formulate a brief feedback response addressed to a learner exhibiting recurrent errors, enabling an analysis of corrective strategies, relational positioning, and underlying pedagogical values. The third prompt asked participants to design an activity fostering linguistic creativity within the language classroom, thus providing insight into imaginative engagement, didactic innovation, and cultural mediation.

The analysis of these productions was conducted within a linguistico-discursive framework structured around four complementary dimensions. The cognitive dimension focused on the construction of meaning and knowledge; the relational dimension examined the nature of the relationship to the learner and the quality of pedagogical support; the axiological dimension sought to identify the values—implicit or explicit—conveyed through discourse; and the stylistic dimension addressed tone, enunciative positioning, and lexical selection.

A qualitative approach was adopted, privileging the identification of discursive regularities, as well as points of convergence and divergence. This methodological orientation enabled a more nuanced understanding of the underlying logics governing both human and machine-generated discourse, moving beyond a merely descriptive account.

In this way, the adopted framework allowed for a systematic documentation of the discrepancies between human conceptions of teaching and the outputs produced by Artificial Intelligence systems, while also providing a robust basis for interrogating the pedagogical and ethical implications of their integration into educational practices.

2. Comparative Analysis of Discourses: Convergences and Divergences

a. Conceptions of Learning

An examination of teachers' discourse reveals a conception of learning intimately bound to lived experience and reflexive engagement. One participant, for instance, observes: "*Learning to write means learning to situate oneself, to enter a culture, and to find one's voice in a language that is not one's own*."

Such a formulation may be interpreted as a marker of subjectivation, insofar as it situates learning within a dynamic that is at once identity-forming and intercultural.

Among students, discourse—while more explicitly oriented towards metacognitive awareness—remains centred on processes of discovery and meaning-making: "*Learning to write in a foreign language is learning to think differently, to translate one's emotions into another symbolic system*."

By contrast, the outputs generated by Artificial Intelligence systems tend to adopt a more procedural and operational definition of learning: "*Learning to write in a foreign language involves acquiring grammatical, lexical, and syntactic skills necessary to produce coherent texts."*

A particularly salient contrast thus emerges: whereas human discourse operates within a hermeneutic register—foregrounding meaning, subjectivity, and cultural embeddedness—machine-generated discourse adopts a more taxonomic orientation, privileging normativity, structural organisation, and performance.

b. Feedback: Between Pedagogical Accompaniment and Normative Prescription

The analysis of feedback further reveals a marked divergence in the treatment of error and the relational positioning of the speaker.

Teachers' responses are characterised by a supportive and encouraging tone, combining corrective guidance with recognition: "*You are making good progress. Do check the*

consistency of your verb tenses, but your argumentation is strong."

Students, for their part, frequently adopt an empathetic stance, marked by experiential proximity and shared difficulty: "*I understand your difficulties—I encountered the same issues. Try reading your text aloud; it can be very helpful*."

In contrast, AI-generated responses tend to adopt a prescriptive and decontextualised register: "*Correct your grammatical errors and ensure appropriate use of tenses. Review your work carefully before submission*."

Such formulations reveal a notable absence of affective and relational dimensions: feedback appears primarily normative rather than dialogical. It may therefore be inferred that Artificial Intelligence tends to reproduce a pedagogy of regulation and control, rather than one of guidance and accompaniment.

c. Linguistic Creativity: Human Imagination versus Algorithmic Reproduction

When invited to propose activities aimed at fostering linguistic creativity, teachers referred to pedagogical designs involving collective engagement or stylistic transformation: "*Ask students to rewrite a well-known text in the style of another author; this develops their sense of voice and stylistic awareness."*

Students, in turn, proposed activities with a more playful and exploratory orientation: "*Create a story using three words provided by your classmates."*

By contrast, Artificial Intelligence systems predominantly generated mechanically structured exercises: "*Complete the following text with the missing words." "Rephrase these sentences to improve grammatical correctness*."

These responses suggest that AI tends to construe creativity as a form of formal variation within predefined constraints. It reproduces existing patterns without genuinely engaging in processes of semiotic invention. This observation underscores the limitations of systems grounded in probabilistic modelling and pattern recurrence, rather than in intentionality, aesthetic sensibility, or expressive agency.

3. Discussion: Meaning and Subjectivity in Human and Machine Discourse

Our comparative analysis reveals that human discourse consistently exhibits three core dimensions. First, it carries a marked subjective quality, evident through the use of the first-person pronoun, expressions of empathy, and the mobilization of lived experience. Second, it places a high value on culture and relationality, situating learning within a profoundly social and interactive dynamic that is co-constructed and collectively shared. Third, knowledge is conceived as a dialogical process, emerging gradually through exchange, the confrontation of

perspectives, and shared interpretation.

By contrast, discourse generated by Artificial Intelligence demonstrates lexical neutrality and often impeccable syntactic correctness but displays relative semantic impoverishment. AI output reveals no affective engagement or genuine relation to otherness. While formally accurate, these texts lack the human dimension central to pedagogy: they reproduce linguistic structures without conveying the sensitivity, subjectivity, or relational depth intrinsic to meaningful teaching.

This observation resonates with Floridi (2023), who characterizes AI as an "informational simulation of intelligence": it does not think, but calculates and produces plausible forms of human discourse. Our findings thus underscore a fundamental distinction between human linguistic production—rich in meaning, values, and educational intent—and machine-generated discourse, which remains confined to normative and procedural functions.

4. Comparative Summary

Dimension	Human Discourse (Teachers / Students)	Machine Discourse (Generative AI)
Relationship to knowledge	Meaning-making, reflexivity	Acquisition of standardized skills
Relationship to error	Encouragement, guidance	Prescription, formal correction
Discursive tone	Empathic, dialogical	Neutral, depersonalized
Relationship to creativity	Imagination, symbolic play	Reproduction, reformulation
Educational values	Humanism, otherness, experience	Efficiency, conformity, rationalization

5. Implications for Educational Practice

Although limited by corpus size, our study provides meaningful insight into the qualitative differences between human and machine language in educational contexts. Human knowledge is co-constructed through relational interaction and meaning-making, whereas machine-generated output remains largely functional, structured, and codified.

These findings advocate for what we term *augmented pedagogy* rather than *substitutive pedagogy*. In this framework, AI can serve as a supportive tool—for linguistic revision, information retrieval, or simulation of learning scenarios—while preserving the educator's central role in mediating, interpreting, and constructing meaning.

IV. Toward an Ethics of Human–Machine Coexistence in Education

Our results raise critical questions regarding the conditions for balanced coexistence between human and Artificial Intelligence in education. This coexistence is not merely a matter of technological efficiency; it encompasses significant ethical, political, and cultural

considerations. We contend that the future of digital education depends less on AI's technical performance than on our collective ability to establish a reflective, critical, and responsible framework for its use.

1. Redefining Pedagogical Responsibility in the Algorithmic Era

The proliferation of intelligent systems—virtual tutors, automated graders, conversational agents—reshapes the distribution of responsibility within the educational community. Whenever AI guides learning, evaluates student work, or offers remediation, a critical question arises: who bears responsibility for these outcomes?

Responsibility is increasingly diffused across algorithm designers, institutional authorities, and teachers integrating AI into practice. Such diffusion risks undermining the ethical foundation of educational relationships, historically grounded in trust, transparency, and reciprocity.

To address this, we advocate a clear, explicit, and democratic governance framework. UNESCO's (2023) principles—transparency, fairness, safety, accountability, and human autonomy—offer essential guidance for AI integration policies in education.

Accordingly, it is necessary to rethink the pedagogical contract in the algorithmic era. Education is no longer solely the transmission of knowledge but also the cultivation of an ethics of technological use. Teachers are thereby entrusted with a renewed role: that of ethical mediators, safeguarding the meaning, purpose, and quality of learning.

2. Algorithmic Literacy: An Imperative for Educators and Learners

The increasing presence of AI in educational practice necessitates the development of *algorithmic literacy*: the ability to understand AI systems, critically interpret their outputs, and anticipate social, cognitive, and ethical implications (Long & Magerko, 2022).

This literacy should not be confined to computer science specialists but must form part of the general knowledge of both educators and learners. Critical engagement with AI entails learning to "think with and against the machine": exploiting its capabilities without becoming subordinate, understanding its logic while preserving intellectual autonomy.

Pedagogical experiments confirm the value of such an approach. For instance, in a didactics course, students compared AI-generated text with peer-produced text to examine differences in tone, argumentative coherence, and cultural sensitivity. This exercise fostered critical awareness: students recognized AI's structural utility but also its semantic limitations.

Algorithmic literacy, therefore, transcends technical mastery. It cultivates a reflective stance and critical consciousness regarding knowledge mediated by technology, progressively

becoming a cornerstone of educational citizenship in the digital era.

3. Toward Augmented and Reflective Pedagogy

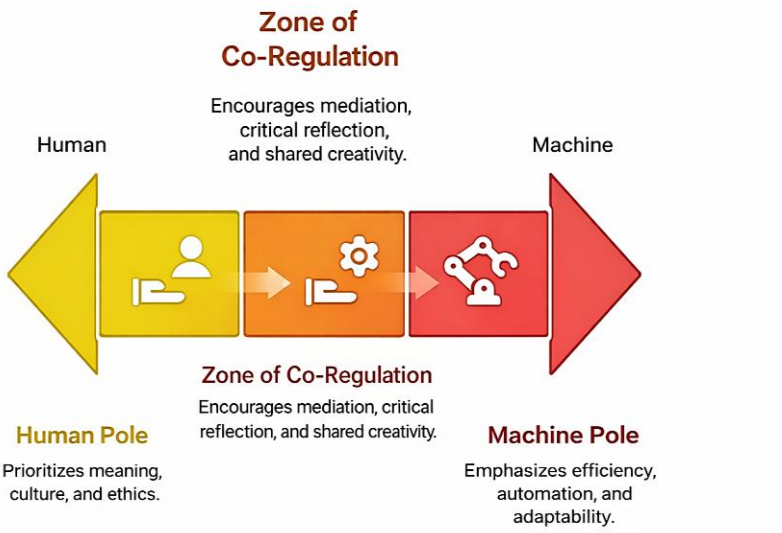
Rather than framing humans and machines as oppositional, we advocate a model of dynamic complementarity. Contemporary pedagogy should be *augmented*: enriched by technological tools used critically, consciously, and creatively. AI can enhance learning—through grading assistance, scenario simulation, or individualized support—but realizing this potential requires careful reflection on purpose and responsible use.

The *Human-AI Shared Regulation of Learning* (HASRL) model (Järvelä, Nguyen, & Hadwin, 2023) is particularly instructive. It envisions co-regulation of learning involving teacher, learner, and AI system. This framework positions AI not as a substitute but as a cognitive partner within an interactive and mediated relationship.

To implement this approach, teacher training should include collaborative workshops that allow participants to experiment with AI tools, analyze biases, and co-develop context-sensitive pedagogical applications. Such practices transform fears of technological substitution into reflective competence founded on critical understanding.

Ultimately, pedagogical innovation resides not in increasingly sophisticated tools but in how educators and researchers engage them with the complexity of real-world learning. AI should be regarded not as a model to replicate but as a reflective mirror, prompting us to interrogate our own intelligence, renew our creativity, and assume full responsibility in the act of teaching.

4. Proposed Conceptual Framework: Reflective Human–Machine Coexistence



Through this framework, we highlight a central idea underlying our reflection: in the era of Artificial Intelligence, the quality of education does not primarily depend on the tools themselves, but rather on the nature of the relationship we establish with them. In other words, the true educational potential of these technologies lies in the way we conceptualize, regulate, and meaningfully integrate them into pedagogical practice.

5. Toward an Educational Digital Humanism

Ultimately, we advocate a conception of Artificial Intelligence that goes beyond the mere logic of technical optimization. In our view, it can become a genuine lever for humanization, provided that it is embedded within a conscious, reflective, and collectively shared educational project. Rather than marginalizing the teacher, technology has the potential to reaffirm the teacher's role by repositioning them at the heart of pedagogical mediation.

The educational digital humanism we envisage is structured, in our perspective, around three fundamental principles. The first is responsibility, which entails fully assuming the necessity of human mediation in any technological use. The second is reflexivity, which requires us to critically examine the effects of technology on knowledge, practices, and educational relationships. The third is plurality, which calls for preserving the diversity of cultures, forms of knowledge, and voices within digital environments.

Within this perspective, the coexistence between humans and machines should not be conceived as a threat. On the contrary, it represents an opportunity to fundamentally rethink the purpose of education. The objective is no longer merely to learn how to learn, but to learn how to think together—humans and Artificial Intelligences—while respecting the complexity and plurality of the world.

Conclusion

At the conclusion of this reflection, we argue that Artificial Intelligence cannot be reduced to a simple instrument of technological innovation. Rather, it appears as a revealing lens through which the tensions and transformations currently shaping the educational field become visible. By entering the classroom, AI reconfigures the relationships between knowledge, teacher, and learner, while simultaneously prompting us to reconsider the very purpose of the act of teaching.

Our analysis has shown that discourses surrounding Artificial Intelligence tend to oscillate between two poles: on the one hand, a fascination with its capacity for personalization, and on the other, concern regarding the risks of standardization. The analysis of our corpus demonstrates that, although generative models efficiently reproduce the structures of language, they nevertheless remain external to its deeply human dimension: Artificial Intelligence formulates without truly understanding and generates responses without

being embedded in an authentic dynamic of dialogue.

This observation leads us to advocate an approach grounded in reflective coexistence between humans and machines. The challenge, in our view, is not to reject artificial intelligence, but to conceive of it as a critical partner serving a pedagogy that is both augmented and responsible. Such an orientation presupposes the development of a shared algorithmic literacy, enabling teachers and learners alike to understand, question, and frame the technological logics that increasingly structure their practices.

Ultimately, we believe that the future of education depends on our ability to preserve the centrality of meaning and human relationships within increasingly automated environments. Artificial Intelligence will not replace the teacher; rather, it will contribute to redefining the teacher's mission: no longer solely to transmit knowledge, but to guide learners in developing judgment, critical thinking, and creativity within a world profoundly shaped by algorithms.

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