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# AI with a Human Face: Reimagining Education for Gen Z and Gen ALPHA. *Living Dialogue between Disciplines, Voices, and Visions*

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## ABSTRACT

This interdisciplinary review explores how artificial intelligence (AI) can transform education for Generations Z and Alpha without eroding its human core. Drawing on historical, philosophical, and policy perspectives, the article frames AI as both *mirror* and *lamp*: it mirrors existing pedagogical shortcomings while illuminating new possibilities for dialogic, relational learning.

Part I examines teacher-learner interaction through the lens of humanistic and bilingual pedagogy (CLIL+IA, *Intelligenza Artificiale* in Italian). It argues that meaningful education depends on presence, empathy, and shared agency. Revisiting Enlightenment and modern pedagogical traditions, from Locke and Wollstonecraft to Dewey, it highlights the enduring importance of conversation and reciprocity in the learning process.

Part II extends this analysis to the systemic, policy, and technological dimensions of human-centred AI in education. Through a critical synthesis of global frameworks from UNESCO, OECD, and the World Economic Forum, as well as a case study of Italy's Multiversity S.p.A., it explores tensions between corporate automation and the ethical goals of humanistic learning. The findings suggest that AI's educational value lies not in efficiency or replication, but in its capacity to revive democratic dialogue, intercultural understanding, and creative thinking.

The article concludes that human-centred AI must rest on ethical governance, equitable access, and pedagogical courage. These principles can help teachers and learners rediscover what it means to learn and teach humanly in an algorithmic age.

**Keywords:** AI in Education; Dialogic Pedagogy; Digital Humanism; Educational Policy; Gen Alpha; Gen Z; Human-Centred Learning; Postcolonial Critique of AI; Systemic Innovation.

## 1. INTRODUCTION

*"The highest education is that which does not merely give us information but makes our life in harmony with all existence."*

**- Rabindranath Tagore**

*"We need to learn to dialogue again - not to debate, not to convince, but to listen."*

**- Ilenia Valleriani**

The dawn of the AI era has redefined not only how we access information but also how we understand

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learning itself. Across educational systems, generative technologies (tools capable of producing text, images, sound, and simulation) are provoking profound questions about the essence of teaching, the nature of cognition, and the boundaries between human and machine. Yet, beyond the fascination with technological novelty lies an older philosophical concern: how do we remain human while learning alongside machines?

At the core of this question is a paradox that has persisted throughout educational history. The more we automate processes of knowledge delivery, the more we rediscover the irreplaceable value of human presence and dialogue. Education has always been a negotiation between transmission and transformation, between information and imagination. As *Tagore's* vision suggests, genuine education extends beyond information transfer: through education, we nurture harmony, awaken resonance, and inspire moral growth, deepening our understanding and connection with reality. The rise of artificial intelligence does not negate this vision; it challenges us to revisit and reanimate it under radically new conditions.

This article, *AI with a Human Face: Reimagining Education for Gen Z and Gen Alpha*, is conceived as a dialogue between two complementary perspectives. Part I, *Teacher-Learner Interactions in the Age of GenAI*, adopts a **humanistic and pedagogical lens**, exploring the dialogic, bilingual, and intercultural dimensions of teaching in the age of generative intelligence. It traces continuities between Enlightenment pedagogies and contemporary CLIL+IA classrooms, arguing that authentic learning still depends on presence, reciprocity, and co-creation of meaning.

Part II, *Systemic, Policy, and Technological Dimensions of Human-Centred AI in Education*, extends the inquiry to the **structural and systemic level**. It situates the humanistic insights of Part I within the frameworks of international educational policy, technology ethics, and institutional design. By engaging recent developments in UNESCO's *Recommendation on the Ethics of Artificial Intelligence* (2021), OECD's *Education 2030* initiative, and the World Economic Forum's analyses of digital transformation, this section examines how human-centred AI can be institutionalised rather than idealised.

Together, these two parts articulate a single proposition: that AI, when guided by ethical imagination, can serve as both *mirror* and *lamp*: a mirror reflecting the limits of mechanistic instruction, and a lamp illuminating the possibilities of renewed dialogue, creativity, and collective intelligence.

This study therefore moves deliberately between **micro and macro levels** of analysis. It begins with the classroom encounter (the teacher, the learner, and the invisible, algorithmic 'interlocutor') and expands outward to include educational systems, governance frameworks, and the political economy of digital knowledge. This movement between voices and scales embodies what this article calls a *living dialogue between disciplines, voices, and visions*.

The argument proceeds from the conviction that technological advancement, by itself, does not guarantee progress in education. What determines the quality of learning in the age of AI is not the sophistication of machines, but the ethical and dialogic orientation of those who design, teach, and learn with them. As such, the integration of AI into education represents not merely a technical transition but a civilisational one, an opportunity to reaffirm the human face of learning.

## 2. HISTORICAL AND PEDAGOGICAL FOUNDATIONS OF HUMAN-CENTRED EDUCATION IN THE AGE OF AI

The impulse to teach dialogically, to educate through conversation rather than through command, has marked the evolution of pedagogy for over three centuries. From Enlightenment thinkers to 20$^{th}$-century reformers, the aspiration to place the learner at the centre of the educational process has consistently resurfaced whenever societies confronted technological or ideological transformations. Artificial intelligence, far from breaking with this history, now extends and tests its boundaries.

The Enlightenment's call for rational inquiry and self-formation was rooted in a humanistic belief that education should cultivate judgment rather than obedience. *John Locke's Some Thoughts Concerning Education* (1693) envisioned learning as the shaping of reason through dialogue and reflection. *Mary Wollstonecraft* and *Maria Edgeworth* challenged patriarchal models of instruction by foregrounding empathy, experience, and the social context of learning. In Italy, *Giacomo Leopardi's* pedagogical writings already perceived a crisis of meaning in rote instruction, urging teachers to awaken imagination rather than transmit doctrine.

Across these traditions runs a common insight: learning is a moral and relational act. This conviction would later re-emerge in *John Dewey's* progressive pedagogy, which defined education as "a process of living and not a preparation for future living." Dewey's insistence that knowledge arises from participation and experience resonates powerfully in today's discussions of *AI-supported learning environments*.

### 2.1 From Transmissive to Dialogic Models

Modern schooling, especially throughout the industrial 19th and early 20th centuries, institutionalised

transmissive learning. The teacher became the central authority, while learners were passive recipients of fixed curricula. Yet even amid industrial modernity, reformers like Dewey, *Lev Vygotsky*, and *Paulo Freire* sought to re-establish the primacy of dialogue. Freire's concept of "problem-posing education" anticipated the very challenges of algorithmic learning: systems that risk reducing learners to data points rather than participants in meaning-making.

The 20th century thus witnessed an ongoing oscillation between *progressive ideals* and *traditional persistence*. Progressive education aspired to active, student-centred engagement, while many institutions retained exam-oriented, lecture-driven practices. In the 21st century, this paradox persists. Digital technologies promised autonomy and participation, yet in many contexts they have reproduced transmissive logic through screens rather than chalkboards.

As shown in **Figure 1**, the historical pendulum between transmissive and dialogic paradigms has swung repeatedly from the Enlightenment to the age of AI.

The timeline illustrates how technological innovation has historically coincided with pedagogical reaction: industrial modernity favoured transmissive order; the digital revolution revived collaborative ideals. In the AI era, this cyclical tension intensifies, revealing that progress in learning depends less on tools than on the moral imagination guiding their use.

## 2.2 Language, Dialogue, and the CLIL+IA Paradigm

In contemporary classrooms, the interplay between *language, cognition, and culture* continues to define how learning occurs. The *Content and Language Integrated Learning plus Artificial Intelligence* (CLIL+IA) model exemplifies this shift. It combines bilingual instruction with AI-enabled tools for interaction, assessment, and creative expression. In such environments, teachers act not just as content deliverers but also as educational designers who orchestrate multimodal, cross-linguistic dialogue.

CLIL+IA reinforces the dialogic dimension of education by recognising language as both *medium and message*: a living interface where human and machine intelligences meet. Rather than automating correction or translation, AI tools can serve as scaffolds for reflection, encouraging students to become co-authors of meaning. The pedagogy thus returns, paradoxically, to Socratic inquiry: learning through questions, uncertainty, and shared exploration. Table 1 below synthesises the multimodal, multilingual, and meaningful dimensions that define the CLIL+IA model at the heart of human-centred, AI-mediated pedagogy.

This framework highlights how CLIL+IA redefines the relationship between language, cognition, and technology. By linking multimodality to creativity, multilingualism to inclusion, and meaningfulness to ethics, the model situates AI within a dialogic ecology rather than a mechanistic process. It demonstrates that artificial intelligence, when used reflectively, can become a tool for *human amplification* - enriching the learner's capacity to perceive, articulate, and empathise across linguistic and cultural boundaries.

## 2.3 Ethics of Presence and Attention

The digital saturation of modern life has transformed attention into a scarce resource. OECD reports (2023) note declining literacy and concentration among young learners, especially in screen-dominant environments. For Generations Z and Alpha, raised amidst algorithmic feeds and rapid cognitive switching, education must reclaim

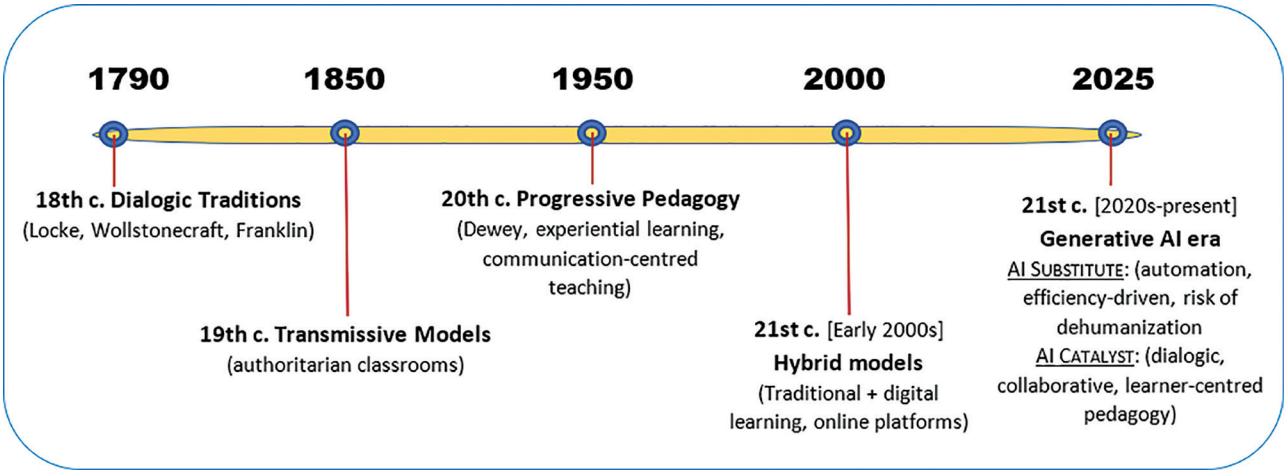


**Figure 1:** Timeline of Educational Paradigms (18th - 21st Centuries)

***Source**: Authors, 2025*

**Note.** *The figure traces the shift from 18th-century dialogic traditions (Locke, Wollstonecraft, Franklin) through 19th-century transmissive models and 20th-century progressive pedagogy to the current AI-mediated tension between automation and dialogue.*

**Table 1:** *CLIL+IA Framework: Integrating Multimodal, Multilingual, and Meaningful Dimensions of Learning*

| Dimension | Description | Example of AI Mediation | Dialogic Outcome |
|---|---|---|---|
| **Multimodal** | Integrates text, image, and sound to construct meaning across sensory channels. | AI tools generate adaptive visuals, voice synthesis, and audio feedback to enhance comprehension. | Heightened sensory engagement and creative expression. |
| **Multilingual** | Encourages learners to navigate between languages, cultures, and registers. | AI-assisted translation, speech recognition, and semantic mapping tools foster cross-linguistic experimentation. | Greater intercultural awareness and linguistic confidence. |
| **Meaningful** | Grounds learning in authentic social, ethical, or ecological contexts. | Generative storytelling, simulation, and collaborative projects link knowledge to lived experience. | Co-authored meaning and ethical reflection. |

*Source: Authors (2025).*

**Note.** *The table conceptualises the integration of AI into CLIL+IA pedagogy through three interdependent dimensions (multimodal, multilingual, and meaningful learning) each fostering dialogic engagement rather than automation.*

*presence* as an ethical act. Presence here does not oppose technology but redefines its use: technology becomes a medium for fostering *slow attention* and sustained dialogue.

In this sense, human-centred AI must preserve the emotional and cognitive ecology of learning. The teacher's empathy and the learner's curiosity remain the true engines of intelligence. Machines may process data, but only humans can generate meaning.

### 2.4 From Humanism to Digital Humanism

The concept of *digital humanism* offers a bridge between historical pedagogy and contemporary innovation. It insists that digital transformation should advance human values rather than replace them. The *Vienna Manifesto on Digital Humanism* (2021) called for technologies that strengthen democratic participation, cultural diversity, and intellectual autonomy. Applied to education, this ethos demands that AI systems respect pedagogical freedom and pluralism of knowledge.

Human-centred education, therefore, is not nostalgic; it is anticipatory. It prepares learners to engage critically with the world they inhabit, one increasingly mediated by algorithms and data economies. In this light, the history of education reads not as a succession of obsolete paradigms but as an unfinished conversation between generations of teachers, learners, and now, machines.

## 3. METHODOLOGY

This study adopts a **qualitative and interpretive approach**, combining *comparative historical analysis* with *contemporary case observation* to trace the evolution of human-centred learning in the age of AI. The methodology reflects the dialogic structure of the paper itself: two voices, two perspectives, united by a shared inquiry into how technology reshapes human interaction in education.

### 3.1 Research Orientation

The research follows an **interdisciplinary humanistic inquiry** grounded in both philosophy and education studies. It draws from pedagogical theory (Dewey, Freire, Vygotsky), digital ethics (UNESCO, 2021; Crawford, 2024), and policy discourse (OECD, 2023; WEF, 2025) to situate current developments within a historical continuum. Rather than testing hypotheses, this study seeks to understand how the concept of *dialogue* (as both a cognitive and moral principle) survives and transforms in the context of machine-assisted learning.

### 3.2 Data and Source Selection

Primary materials include philosophical and pedagogical texts, recent policy frameworks, and selected institutional case studies such as Italy's **Multiversity S.p.A.**, which integrates AI into flexible online learning systems. Secondary sources consist of peer-reviewed articles, conference proceedings, and reports from UNESCO, OECD, and WEF, focusing on the ethics and governance of AI in education.

These materials were selected using three criteria:

1. **Relevance to human-centred learning** (focus on ethics, dialogue, or pedagogy).
2. **Recency and policy significance** (sources from 2020-2025 emphasised).
3. **Cultural representativeness**, reflecting both Global North and Global South perspectives.

### 3.3 Analytical Framework

The analysis proceeds in three interpretive layers:

1. **Historical-pedagogical layer**, reconstructing the philosophical genealogy of dialogic education.
2. **Systemic-policy layer**, identifying international frameworks that shape AI's educational governance.
3. **Technological-ethical layer**, examining how generative AI affects cognitive, affective, and linguistic dimensions of learning.

This triadic lens reflects the *mirror-lamp duality* underpinning the paper: the reflective dimension (critique of automation) and the illuminative dimension (creative, ethical reimagining). Each part contributes to a composite understanding of *human-centred AI in education*.

### 3.4 Reflexive and Dialogic Method

Given the co-authored structure, the research also embodies a **method of living dialogue**, not only analysing interaction but enacting it. The integration of voices from different cultural and disciplinary contexts (humanities and policy) mirrors the very diversity the article advocates. Reflexivity was maintained throughout by continuously revisiting how AI tools were used in writing, analysis, and editing, ensuring awareness of the authors' own technological mediation.

In essence, this methodological stance positions AI not merely as an object of study but as a *participant*: a co-agent whose presence in research and writing compels renewed ethical and epistemological reflection.

## 4. TEACHER-LEARNER INTERACTION AND THE DIALOGIC CLASSROOM IN THE AGE OF AI

Teacher-learner interaction remains the crucible where technology either deepens or diminishes humanity in education. The question is not whether AI can assist teaching, but whether it can preserve the reciprocity that makes teaching human.

Dialogic pedagogy assumes that knowledge is co-constructed through communication. In AI-mediated classrooms, this principle becomes newly urgent: teachers must balance algorithmic guidance with interpretive flexibility, ensuring that feedback systems and predictive analytics do not silence curiosity or difference.

### 4.1 The Teacher as Mediator

In a world where information is abundant and instantly retrievable, the teacher's role shifts from being a gatekeeper of knowledge to a *curator of meaning*. Rather than competing with machine intelligence, teachers humanise it, embedding ethical reflection, empathy, and narrative understanding into the learning process.

AI tools, when employed thoughtfully, can extend this mediation. Conversational agents or generative tutors can simulate inquiry-based dialogue, but they cannot *embody presence*. The human teacher remains essential for transforming information into wisdom, a distinction critical to both Dewey's experiential education and today's debates on *machine pedagogy*.

### 4.2 The Learner as Co-Author

For Gen Z and Gen Alpha learners, education is increasingly multimodal and participatory. They engage with content through text, image, and simulation, often collaborating with generative systems. This co-authorship marks a shift from passive reception to *co-creation*, demanding new literacies: critical AI literacy, ethical reasoning, and metacognitive awareness.

As shown in **Figure 2**, the learner's position oscillates between *AI as substitute* (automation of routine learning) and *AI as catalyst* (enhancement of creativity and dialogue).

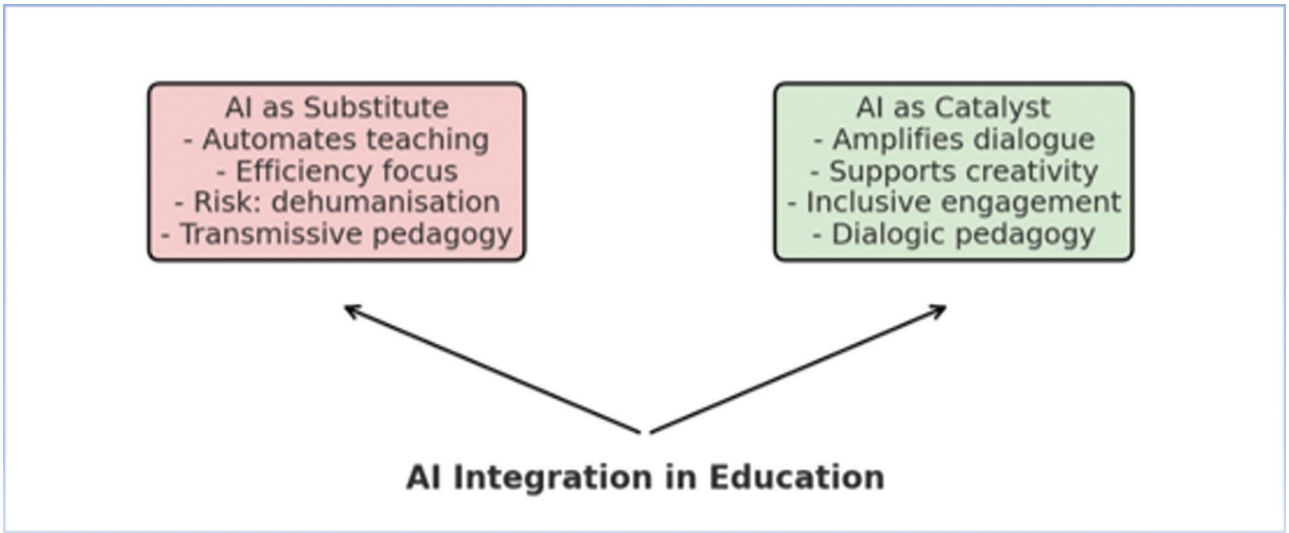


**Figure 2** – AI as Substitute vs. AI as Catalyst for Dialogic Pedagogy (a conceptual contrast model).

***Source**: Authors, 2025*

**Note.** The diagram contrasts two pedagogical paradigms: AI as a *substitute* automating transmissive instruction, and AI as a *catalyst* amplifying collaboration, creativity, and dialogic learning. *Source: Authors (2025).*

Figure 2 visualises the critical tension in educational AI adoption: efficiency versus empathy. The sustainability of human-centred education depends on positioning AI as a pedagogical tool (almost partner in thought) rather than a replacement for human relation.

### 4.3 Cognitive Ecology and Emotional Presence

AI-mediated learning environments alter not just how knowledge is processed but how emotion and cognition interrelate. Neuroscientific studies suggest that emotional engagement remains decisive for memory and comprehension, areas where machines cannot replicate human affect. The educator's task is therefore to cultivate emotional intelligence alongside digital fluency.

Attention, empathy, and curiosity become the new "core literacies" of the AI era. As *OECD (2023)* notes, these capacities are vital for democratic citizenship and cannot be outsourced to algorithms. The dialogic classroom is thus both a technological and moral space: a laboratory of empathy, imagination, and responsibility.

## 5. SYSTEMIC, POLICY, AND TECHNOLOGICAL DIMENSIONS OF HUMAN-CENTRED AI IN EDUCATION

The philosophical reflection developed in Part I finds its systemic counterpart in the structures, policies, and technologies that now govern education. Whereas the first part explored *how* learning happens within dialogic, bilingual, and ethical classrooms, the present section considers *where and under what conditions* such learning may occur.

Education in the AI era cannot be viewed in isolation from global governance frameworks, economic incentives, and institutional transformations. These macro-dimensions determine whether AI will reproduce hierarchies of access or advance the democratisation of knowledge.

### 5.1 International Policy and Ethical Frameworks

Global organisations have become increasingly vocal about the promises and risks of AI in education. The **UNESCO Recommendation on the Ethics of Artificial Intelligence** (2021) established a landmark framework urging member states to prioritise transparency, inclusivity, and human-centred values in AI adoption. More recently, at the **2025 UNESCO Conference on the Ethics of AI in Education** (Bangkok), policymakers highlighted the urgent need to design *public or cooperative AI systems* to counterbalance the monopolistic tendencies of private corporations. These calls resonate with **Pasquinelli's (2023)** reminder that AI is not a neutral innovation but a socio-technical artefact rooted in labour, power, and extractive histories.

Parallel to UNESCO's efforts, the **OECD** has focused on systemic challenges such as declining literacy levels, digital divides, and widening inequities among learners.

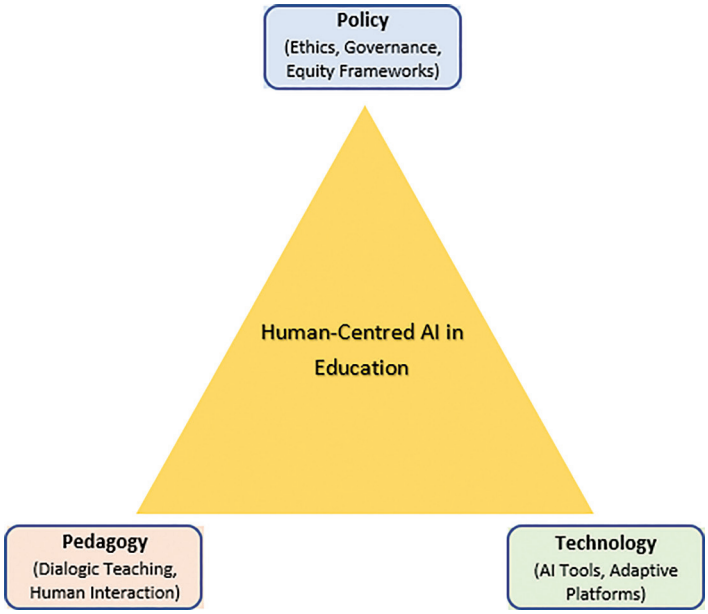


**Figure 3** – Policy-Technology-Pedagogy Triangle

***Source**: Authors, 2025*

*The Policy-Technology-Pedagogy triangle: A framework for balancing systemic governance, technological innovation, and human-centred pedagogy in AI" enabled education.*

**Note.** *The triangle illustrates how ethical AI in education emerges at the intersection of policy governance, technological design, and pedagogical practice.*

The *OECD Education 2030 Framework* stresses that AI must be harnessed not only to improve efficiency but also to nurture critical thinking, creativity, and socio-emotional skills, competencies essential for Gen Z and Gen Alpha learners. This aligns with Part I's analysis, which identified literacy decline and the erosion of attention spans as barriers to meaningful learning in the digital age.

The **World Economic Forum (WEF)** further contributes by positioning AI within the broader shift toward the *Fourth Industrial Revolution*. Its reports (2022-2025) underscore AI's potential to expand access, automate routine tasks, and address teacher shortages, while also warning of risks related to workforce displacement, algorithmic bias, and over-reliance on automated systems. Collectively, these global institutions converge on the recognition that AI in education must balance innovation with safeguards that preserve equity and human dignity.

As shown in **Figure 3**, these intersecting frameworks form a triangulated structure of *policy*, *technology*, and *pedagogy* whose equilibrium determines the direction of AI's educational impact.

This model situates educational innovation within a balanced ecosystem: policies establish the ethical ground, technologies provide adaptive tools, and pedagogies ensure human connection. Any imbalance risks either technocratic automation or rhetorical idealism detached from practical governance.

### 5.2 Systemic Restructuring of Higher Education

Alongside these policy frameworks, systemic transformations in higher education are reshaping how AI is integrated into learning environments. Traditional "brick universities" increasingly compete with digital-first institutions such as **Italy's Multiversity S.p.A.**, which combines accredited online universities with coding academies and IT certification providers. These organisations present a flexible, on-demand model of education that leverages AI to automate administrative processes, deliver personalised pathways, and expand international reach.

While such models demonstrate the scalability and inclusivity potential of AI-driven systems, they also raise pressing questions: Will efficiency-driven "multiversities" marginalise dialogic forms of pedagogy? Can human interaction be preserved in an educational marketplace increasingly governed by corporate logics? These systemic tensions illustrate the dual potential of AI: to democratise education or to accelerate its commodification.

The implications are especially significant for regions seeking to widen access to tertiary education without eroding its civic mission. The challenge is not only technological but institutional: ensuring that AI supports academic integrity, intellectual autonomy, and ethical citizenship.

### 5.3 Technological Advances and Scholarly Debate

At the technological level, the integration of generative AI tools (ranging from adaptive platforms and virtual tutors to conversational agents) has begun to transform educational practice. Scholars such as **Gunkel (2012)** and **Crawford (2024)** caution that AI adoption is inseparable from ethical dilemmas, including surveillance, bias, and the colonialist extraction of data from the Global South. Conversely, education specialists highlight the transformative possibilities of AI when thoughtfully deployed: personalisation of learning (**Arora, 2021**), dialogic engagement through conversational AI, and multimodal bilingual learning in CLIL+IA contexts (**Cattoni, 2021**).

Recent contributions (**Benanti & Maffettone, 2024; Treré & Bonini, 2024**) stress that the educational future will depend on whether policymakers and institutions adopt AI as a *substitute for* or a *complement to* human interaction. The former risks entrenching transmissive models of education, while the latter opens the possibility of reanimating dialogic traditions.

### 5.4 Synthesis: Towards Human-Centred Systems

Taken together, these frameworks suggest that the future of AI in education hinges as much on **systemic and policy choices** as on technological innovation. UNESCO, OECD, and WEF converge on the principle of *human-centred learning*, yet the pathways to achieve it remain contested. Higher-education institutions are experimenting with radically different models (from corporate-led multiversities to grassroots cooperative platforms) each testing the balance between innovation and integrity.

The synthesis points to a crucial insight: technology is never neutral. It embodies power relations, cultural assumptions, and ethical orientations. The task ahead is not to resist AI but to humanise it, embedding its use within pedagogies that prioritise dialogue, empathy, and critical reflection. Only through such integrative thinking can education fulfil its dual mission: fostering individual flourishing and sustaining democratic societies.

## 6. FINDINGS AND DISCUSSION

The analysis of policy frameworks, institutional restructuring, and emerging technologies reveals that the adoption of artificial intelligence in education is not a purely technical transition but a cultural, ethical, and systemic transformation. Across the evidence reviewed, three interdependent domains (**systemic**, **policy**, and **technological**) shape how AI can either erode or enrich

human-centred learning. The findings demonstrate a complex interplay between global governance and local pedagogy, between algorithmic automation and dialogic imagination.

### 6.1 Systemic Findings: Institutional Evolution and Educational Ecology

At the systemic level, AI integration is transforming the architecture of higher education. The case of **Italy's Multiversity S.p.A.**, discussed earlier, provides a striking illustration of this new institutional ecology. By merging accredited online universities with coding academies and IT certification providers, Multiversity demonstrates how AI can streamline administration, personalise learning, and expand transnational access. Yet this efficiency carries a paradox: as digital-first universities gain market dominance, the risk of commodifying education increases.

The challenge lies in **sustaining dialogue and ethics in an automated environment**. While digital systems can reduce bureaucratic inefficiency, they may also dilute the intangible dimensions of learning: mentorship, intellectual risk-taking, and emotional resonance.

The findings suggest that sustainable institutional models must preserve the *human interface* even as they leverage algorithmic assistance. In this sense, the real question is not whether AI will replace the university, but whether universities can reimagine themselves as *dialogic ecosystems* that cultivate both technological literacy and ethical imagination.

This transformation echoes what **OECD (2023)** calls a shift toward *learning ecosystems*, where collaboration among educators, learners, and digital systems replaces rigid hierarchies. Human-centred AI thus becomes a form of *systemic ethics*: a mode of governance that aligns technological innovation with democratic participation and civic accountability.

### 6.2 Policy Findings: Ethical Governance and Global Convergence

At the policy level, a clear convergence emerges across international frameworks: **UNESCO's Recommendation on the Ethics of Artificial Intelligence (2021)**, **OECD's Education 2030**, and **WEF's Education 4.0** (2023) initiatives. All three stress the need to balance innovation with equity, and automation with autonomy.

**UNESCO's** ethical guidelines emphasise *human oversight, inclusivity, transparency, and accountability* as conditions for responsible AI governance. They further encourage states to promote *public-interest AI* as a counterweight to private monopolies. Similarly, the **OECD** framework foregrounds *well-being, creativity, and emotional intelligence* as the "new core competencies" essential for thriving in the digital century.

The **World Economic Forum (2025)** adds a complementary economic perspective, envisioning AI as a catalyst for upskilling and social mobility. However, it also warns that technological adoption without cultural adaptation risks amplifying inequalities. Together, these frameworks establish a **shared normative horizon**: the belief that technology should serve the development of the whole person, not merely the optimisation of performance.

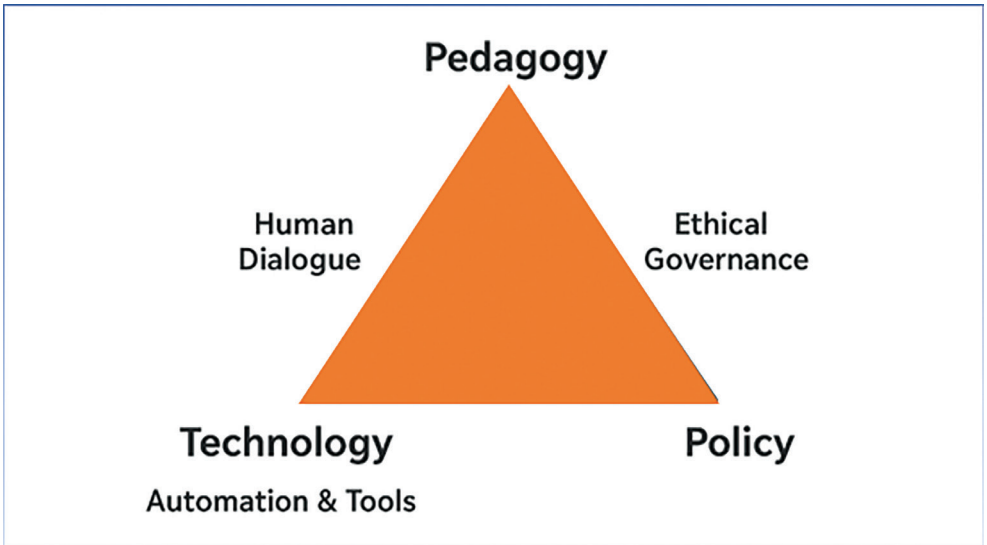


**Figure 4** – Strategic Pathways for Human-Centred AI Integration in Education

***Source**: Authors, 2025*

**Note.** *The triangular model represents the interdependence of Pedagogy, Technology, and Policy in the sustainable integration of artificial intelligence within education systems. Each vertex symbolises a key domain — Pedagogy (human dialogue), Technology (automation and tools), and Policy (ethical governance) — which must remain in equilibrium to achieve truly human-centred AI implementation.*

From the perspective of this study, such convergence provides an unprecedented opportunity for cross-national collaboration in educational ethics. Yet it also reveals a persistent gap between policy discourse and institutional reality. Policies often proclaim *human-centred values*, but their implementation is constrained by market logic, underfunding, and digital asymmetries between the Global North and South.

To address this gap, the study identifies three actionable priorities:

**Embedding ethical design in AI tools**, ensuring transparency in data use and algorithmic decision-making.

**Promoting open-access AI models** that reduce dependency on corporate software and allow localised pedagogical adaptation.

**Investing in teacher training and digital ethics education**, recognising educators as key interpreters of AI rather than passive adopters.

Such initiatives would translate ethical principles into operational practice, anchoring the moral vision of Part I within the institutional realities of Part II.

The interdependence between these priorities is conceptualised in Figure 4, which situates pedagogy, technology, and policy as mutually reinforcing forces in the pursuit of human-centred AI.

As shown in Figure 4, effective AI integration in education depends on balancing the pedagogical, technological, and policy dimensions. If any one of these dominates — technological innovation without ethics, policy without pedagogy, or pedagogy without digital literacy — the system risks imbalance. The model underscores that *dialogue*, *governance*, and *digital design* must evolve together, ensuring that human agency remains at the heart of educational transformation.

### 6.3 Technological Findings: Generative AI and Cognitive Transformation

Technological innovation in generative AI has revolutionised not only the methods of teaching but also the ontology of learning itself. The findings show that **AI is transforming cognition from linear acquisition to networked co-creation**. Adaptive platforms, natural language interfaces, and multimodal tools allow learners to interact with knowledge as living dialogue rather than static content.

This transformation holds promise for **CLIL+IA** pedagogy, where AI facilitates multilingual comprehension and fosters intercultural empathy. Through intelligent feedback and contextual adaptation, students learn not

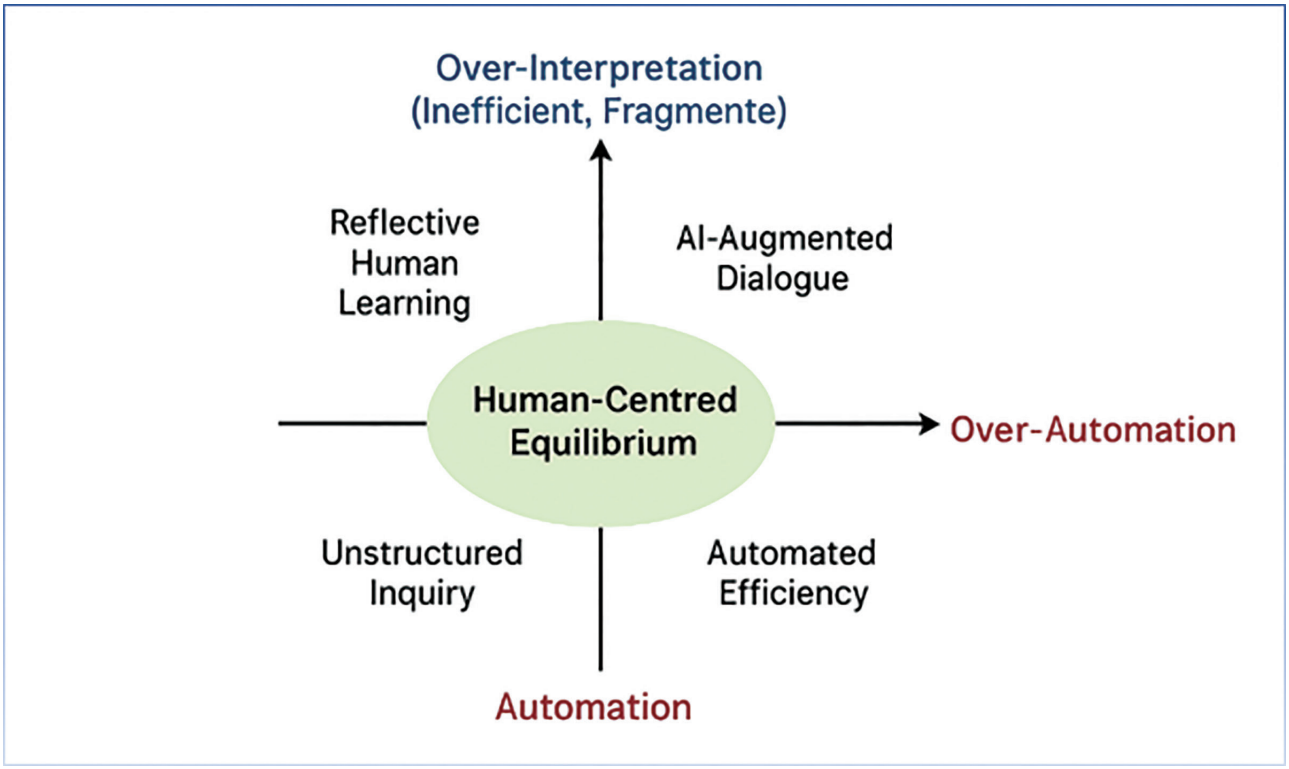


**Figure 5:** *Equilibrium Model of Automation and Interpretation in AI-Mediated Learning.*

***Source**: Authors (2025).*

**Note.** *This model visualises the dynamic balance between automation (data-driven efficiency, content generation) and interpretation (dialogic reflection, meaning-making). The central zone — Human-Centred Equilibrium — represents the optimal space where AI complements rather than replaces human cognition.*

only *through* language but *about* language, understanding how meaning evolves across cultures and media. The affordances of AI can thus extend Dewey's and Freire's dialogic principles into multimodal, cross-linguistic environments.

Yet this technological shift is not without risk. Scholars such as **Crawford (2024)** and **Gunkel (2012)** warn that algorithmic systems, if left unregulated, can replicate societal biases and reinforce epistemic inequality. In data-driven education, students' identities risk being reduced to quantifiable patterns, and their creativity channelled into predictive models.

The research findings suggest that meaningful innovation requires a **hybrid pedagogy**, one that blends algorithmic precision with human improvisation. When used dialogically, AI can function as a *cognitive tool-partner*, enabling learners to visualise complexity, simulate outcomes, and cultivate metacognition. However, this partnership demands critical literacy: learners must understand *how* AI operates to resist passive dependence on its outputs.

This balance between algorithmic precision and human interpretation is represented schematically in Figure 5.

As depicted in Figure 5, the transformative potential of AI in education depends on maintaining an equilibrium between automation and interpretation. Over-automation leads to mechanistic learning, while over-interpretation without digital augmentation risks fragmentation and inefficiency. The human-centred equilibrium, therefore, symbolises a pedagogical partnership between machine precision and human creativity, fostering reflective and adaptive learning environments.

### 6.4 Integrative Discussion: AI as Mirror, Lamp, and Bridge

The triadic findings underscore the paradox articulated throughout this study: **AI mirrors existing educational shortcomings (Albarras, 2024) and illuminates new creative possibilities. It also bridges the human-machine divide** through dialogue and ethical imagination.

At the systemic level, the *mirror* reflects institutional inertia and the commodification of learning. At the policy level, the *lamp* illuminates shared aspirations for fairness and transparency. At the technological level, the *bridge* connects cognition and creativity through hybrid interaction.

Taken together, these dimensions affirm the central thesis of this article: that the value of AI in education will ultimately be measured not by its computational sophistication, but by its contribution to the moral and relational renewal of learning.

The challenge before educators and policymakers is to sustain the *dialogic condition* (the human capacity to listen, question, and co-create meaning), in a world increasingly mediated by 'intelligent' machines. As AI becomes more capable of mimicking knowledge, education must become more capable of cultivating wisdom.

## 7. CONCLUSIONS AND FUTURE DIRECTIONS

The reflections presented in this article affirm that the question of *artificial intelligence in education* cannot be separated from the question of *what it means to be human in an age of intelligent machines*. Across both parts of the study (the philosophical-pedagogical and the systemic-policy dimensions) the findings converge on a central proposition: **AI does not replace the human condition of learning; it redefines its parameters.**

The evidence drawn from historical, ethical, and institutional analyses underscores that every technological leap in education revives the same moral challenge first articulated by Enlightenment humanism: how to harmonise the advancement of knowledge with the cultivation of wisdom. In this sense, AI becomes not a rupture but a mirror: it reflects our enduring struggle to reconcile efficiency with empathy, information with imagination, and automation with interpretation.

Human-centred education, as revisited in this work, reaffirms that learning is a relational, ethical, and dialogic act. Machines can imitate understanding, but they cannot *care*, *listen*, or *wonder*. The irreplaceable human capacities for empathy, creativity, and moral judgment are what transform knowledge into wisdom. When AI is designed and implemented within pedagogies that foster these capacities, it serves not as a substitute but as a *catalyst* for deeper human development.

Concrete implementation of principles requires educators and policymakers to move from abstract ethics to concrete action. Two immediate priorities stand out: first, mandating professional development programs that train educators both in AI literacy and in digital ethics; second, establishing cross-sector "AI-in-Education Interdisciplinary Councils" at national and local levels that explicitly align technological innovation with pedagogical and social goals. These steps can ensure that human-centred values are not peripheral aspirations but structural imperatives guiding every phase of AI integration.

At the **systemic level**, this study demonstrates that the sustainability of AI in education depends on whether institutions and governments can embed *ethical governance* within their technological architectures. As UNESCO (2021), OECD (2023), and WEF (2025) consistently emphasise, policy must guide innovation rather than follow it. The creation of transparent,

inclusive, and equitable digital ecosystems is essential to ensure that access to AI-enhanced learning becomes a public good rather than a private commodity.

At the **pedagogical level**, the CLIL+IA framework developed in Part I offers a model for integrating language, culture, and cognition through AI mediation. It demonstrates that multimodal and multilingual learning environments can use technology to *expand* rather than *dilute* human dialogue. The convergence of bilingual pedagogy and digital interactivity creates conditions for intercultural empathy, which may become one of the most crucial literacies for Gen Z and Gen Alpha.

At the **technological level**, the equilibrium model proposed in Figure 5 encapsulates the future challenge: maintaining balance between automation and interpretation. Over-automation risks mechanising education and eroding critical agency; over-interpretation without technological support risks inefficiency and elitism. The middle ground — *human-centred equilibrium* — is the space of innovation, creativity, and ethics.

In envisioning the **future of human-centred AI**, several directions emerge. First, the development of *AI literacy curricula* should become a cornerstone of educational reform, enabling students to understand not only how to use AI but also how AI shapes cognition, communication, and society. Second, *teacher education* must evolve to include digital ethics, emotional intelligence, and algorithmic awareness, preparing educators as interpreters and curators of technological mediation. Third, *interdisciplinary research* should bridge computer science, cognitive psychology, and the humanities to ensure that AI systems are evaluated not solely on performance metrics but on their contribution to human flourishing.

The future of education will depend not on whether we adopt AI but on how we inhabit it: whether we use it as an extension of our ethical imagination or as a tool of intellectual outsourcing. The *mirror and lamp* metaphor that threads through this article captures this choice vividly: AI mirrors our educational systems, revealing both their brilliance and their blind spots, but it can also act as a lamp, illuminating paths toward renewed dialogue, inclusion, and moral creativity.

Ultimately, the enduring lesson is that **education endures as the most human of all technologies**. Its success in the AI age will be measured not by how efficiently knowledge is transmitted, but by how deeply understanding is shared. If guided by courage, empathy, and critical reflection, the partnership between human and artificial intelligence can rekindle the very essence of learning: the art of becoming more fully human.

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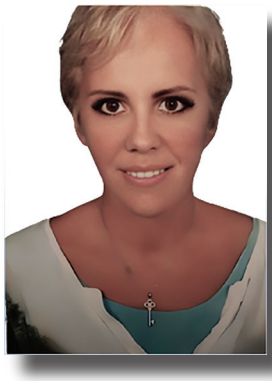

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