Chapter 6 / Capítulo 6

Superintelligence Series
ISSN 3046-4463
Volume 2 – Thinking in Machine Code: Dialogues between technology, knowledge, and culture
ISBN of the complete work: 978-9915-9851-0-7
ISBN of this volume: 978-9915-9851-2-1
DOI of the chapter: https://doi.org/10.62486/978-9915-9851-0-7_202520

©2025 The authors. This is an open access article distributed under the terms of the Creative Commons Attribution (CC BY) 4.0 License.

REVIEW

Teaching and learning with machines: augmented intelligence pedagogy

Enseñar y aprender con máquinas: pedagogía de la inteligencia aumentada

Norjhira Romero Pérez[1]

[1]Universidad Nacional Experimental Simón Rodríguez (UNESR). Caracas, Venezuela.

ABSTRACT

The growing integration of Artificial Intelligence (AI) into education demands a redefinition of what it means to teach and learn in the twenty-first century. This work develops a critical pedagogy of augmented intelligence (AI+), understood not merely as the use of technological tools, but as a transformation of the relationship between knowledge, technology, and humanity. Drawing on Latin American philosophical and pedagogical traditions—particularly those of Simón Rodríguez and Paulo Freire—the text reimagines education as a collaborative and ethical process in which humans and machines co-create meaning rather than reproduce automation. Through a qualitative and hermeneutic approach, it analyzes the pedagogical, ethical, and decolonial implications of AI in educational contexts, identifying both emancipatory potential and systemic risks such as surveillance, algorithmic bias, and loss of agency. The discussion proposes six foundational principles for a pedagogy of augmented intelligence: ethical human-machine collaboration, the redefinition of the teacher's role as designer of learning ecologies, the student as creative co-constructor of knowledge, territorialized education, affectivity as the center of learning, and critical technological literacy. Ultimately, the text argues that augmented intelligence can become a vehicle for freedom and collective creation—provided it is guided by ethical reflection, contextual sensitivity, and a humanistic vision rooted in Latin American thought.

Keywords: Augmented Intelligence; Critical Pedagogy; Decolonial Education; Artificial Intelligence; Latin America; Human-Machine Collaboration.

RESUMEN

La creciente integración de la inteligencia artificial (IA) en la educación exige una redefinición de lo que significa enseñar y aprender en el siglo XXI. Este trabajo desarrolla una pedagogía crítica de la inteligencia aumentada (IA+), entendida no solo como el uso de herramientas tecnológicas, sino como una transformación de la relación entre el conocimiento, la tecnología y la humanidad. Basándose en las tradiciones filosóficas y pedagógicas latinoamericanas, en particular las de Simón Rodríguez y Paulo Freire, el texto reimagina la educación como un proceso colaborativo y ético en el que los seres humanos y las máquinas co-crean significado en lugar de reproducir la automatización. A través de un enfoque cualitativo y hermenéutico, analiza las implicaciones pedagógicas, éticas y descoloniales de la IA en contextos educativos, identificando tanto el potencial emancipador como los riesgos sistémicos, tales como la vigilancia, el sesgo algorítmico y la pérdida de agencia. El debate propone seis principios fundamentales para una pedagogía de la inteligencia aumentada: la colaboración ética entre humanos y máquinas, la redefinición del papel del profesor como diseñador de ecologías de aprendizaje, el estudiante

como co-constructor creativo de conocimiento, la educación territorializada, la afectividad como centro del aprendizaje y la alfabetización tecnológica crítica. En última instancia, el texto sostiene que la inteligencia aumentada puede convertirse en un vehículo para la libertad y la creación colectiva, siempre que se guíe por la reflexión ética, la sensibilidad contextual y una visión humanista arraigada en el pensamiento latinoamericano.

Palabras clave: Inteligencia Aumentada; Pedagogía Crítica; Educación Descolonial; Inteligencia Artificial; América Latina; Colaboración Entre Humanos Y Máquinas.

INTRODUCTION

This chapter proposes a critical pedagogy of augmented intelligence in the Latin American context, understood not as a simple incorporation of technologies into the classroom or learning environments, but as a profound transformation of the link between knowledge, technology, and humanity. Faced with a global scenario dominated by the logic of automation, control, and commodification of learning, an alternative is proposed: teaching with machines, but without subordinating ourselves to them. Learning with intelligent systems, but without losing what makes us human: the ability to imagine, to doubt, to create, and to transform.

This approach is part of a line of thinking already begun in previous works[1], which analyze how the emergence of generative artificial intelligence requires an urgent rethinking of teacher training from an andragogical ethics and critical pedagogy perspective.

From a qualitative, hermeneutic, and situated approach, the intersections between critical education, technological ethics, and epistemological justice are explored. The text begins with a review of interdisciplinary literature (critical pedagogy, decolonial studies, AI ethics, popular education, philosophy of technology) to outline the principles of an augmented pedagogy that does not repeat the banking logic with devices, but rather opens up possibilities for collective invention, critical subjectivity, and cognitive sovereignty.

Here, artificial intelligence is not conceived as a simple tool, but as a form of knowledge organization: it selects, hierarchizes, interprets, and thereby configures what can be thought, said, or learned. For this reason, it cannot be separated from the systems of power that produce it, nor from the territories where it is imposed. In response to this, the text calls for a situated intelligence that articulates local knowledge, languages, memories, and struggles, rather than uncritically replicating the techno-pedagogical models of the global North.

Although some countries in the region are beginning to test educational proposals that engage critically with AI, asymmetries persist. Unequal access, technological dependence, limited data sovereignty, and precarious teaching conditions limit the real possibilities of building an educational project of their own. In the case of Venezuela, there is a lack of publicly systematized experiences that articulate augmented intelligence with critical, ethical, or decolonial pedagogical models. This lack of visibility is not due to a lack of thought, but rather to a web of structural conditions, geopolitical coercion, and epistemic silencing. Where critical pedagogy with technology is not visible, there is often educational creativity in resistance, outside the radar of official discourse.

In this context, this chapter also proposes opening the debate on the need for a Venezuelan technological pedagogy, anchored in the territory, in the concrete conditions of struggle, and in the legacy of Simón Rodríguez, who already warned: *"America should not imitate slavishly, but be original."* Today, that warning takes on renewed urgency: it is not enough to adopt platforms, we must create thought; it is not enough to integrate AI into the classroom, we must ask ourselves from where, for what purpose, and with whom we do so.

With these conceptual and political frameworks, the chapter is organized around the

following axes:

1. A critical journey from traditional teaching to the notion of augmented intelligence as a pedagogical possibility.
2. The construction of a new learning ecosystem where humans and machines collaborate from a critical, situated, and non-automated perspective.
3. The re-signification of the role of the teacher and the learner in environments mediated by intelligent systems.
4. The identification of the ethical, epistemic, and social risks that emerge with the advance of educational AI.
5. The development of principles for an augmented pedagogy from and for Latin America that does not repeat the colonial logics of the past under new digital formats.

The chapter concludes that augmented intelligence can open up emancipatory horizons for education, provided that it is accompanied by a critical pedagogy that is ethically situated and committed to human dignity. At a time when thinking with technology is inevitable, but doing so critically is urgent, this text offers keys to imagining and building an educational future in which machines do not replace thinking, but expand it, and in which pedagogy once again becomes an act of invention, dignity, and freedom.

DEVELOPMENT

NEW GRAMMARS FOR LEARNING AND TEACHING

"Teaching is not educating. Giving children useful knowledge is one thing; making them useful is quite another."
— *Simón Rodríguez*

We are immersed in an unprecedented transformation. The emergence of artificial intelligence (AI) in all areas of human life has begun to alter not only how we work, communicate, and consume, but also how we learn and teach. As UNESCO[2] warns, "AI is profoundly reshaping education, from system planning to the classroom, raising questions about equity, privacy, and the role of teachers." In this profound transition, education is no longer presented as a neutral or merely adaptive space, but as a field of dispute: between automation and emancipation, between control and creativity, between repetition and reinvention.

In this new scenario, teaching and learning can no longer be thought of as separate or hierarchical acts. Just as the experience of learning with machines is being transformed, teaching is also being profoundly redefined: not as transmission, but as the creation of conditions for thinking, dialoguing, and creating in an augmented key. This new grammar does not replace teaching; it renews, questions, and reinvents it.

Talking about teaching and learning with machines is no longer a futuristic projection. It is an established reality that requires pedagogical thinking, critical action, and, above all, political imagination. However, the frameworks from which this transformation is analyzed are often anchored in business, technocratic, or exclusively technical logic. There is much talk of efficiency, personalization, and scalability, but little—or nothing—about justice, subjectivity, community, or freedom.

As Neil Selwyn[3] warns, much of the discourse surrounding educational technology "is driven by commercial interests and neoliberal visions, more interested in efficiency than equity or pedagogy." Similarly, other authors argue that "the history of educational technology is also the history of broken promises, of solutions designed for markets, not for communities." This criticism has also been taken up by UNESCO[2], which warns that many of today's technological proposals are "market-driven rather than driven by the needs of public education systems."

The emergence of augmented intelligence as an educational paradigm, as opposed to

autonomous artificial intelligence, opens up a fertile possibility for a pedagogy that is not limited to incorporating machines into teaching, but rather thinks and designs new ways of learning, being, and creating with them. It is not a question of replacing teachers or adapting students to automatic systems, but of reconfiguring the relationship between knowledge, technology, and humanity from a critical and humanly intelligent perspective.

In this context, it is not enough to think about *educational technologies*: it is necessary to conceive of a technological education designed from Latin America, built from its territories, inequalities, knowledge, languages, memories, and futures. We cannot allow the algorithmic systems that mediate learning today to replicate, under the guise of innovation, the same colonial logics of knowledge production and circulation. As Simón Rodríguez warned in the 19th century: "America must not imitate slavishly, but be original!" Today, that warning resonates with urgency in the face of a global model of educational artificial intelligence that is imported and applied without critical mediation. Are we educating from who we are, or imitating a system that neither knows nor recognizes us?

To understand how this transformation impacts specific educational environments, it is useful to first explore what we mean by a learning ecosystem in the age of artificial intelligence.

What do we mean by augmented intelligence?

In the contemporary context of technological acceleration, the notion of *augmented intelligence* (AI+) emerges as a conceptual and ethical alternative to the dominant model of *autonomous artificial intelligence*. While the latter has been promoted as a technology capable of simulating and eventually replacing human processes, augmented intelligence proposes a complementary vision: it is not about replacing humans with artificial intelligence, but rather enhancing their cognitive, affective, and ethical capacities in collaboration with intelligent systems.

The term began to gain traction in the field of technological and business innovation with voices such as Ginni Rometty (former CEO of IBM), who argued that "artificial intelligence will not replace humans; humans with augmented intelligence will replace those who do not use it." In this approach, the key is not automation, but rather the symbiosis between humans and machines, where each contributes what the other lacks: judgment, creativity, and empathy on the one hand; processing power, speed, and memory on the other.

From a more critical and humanistic perspective, authors such as Floridi[4] and Ito[5] have called for "human-centered AI," that is, AI designed from ethical values, with a rights-based approach, and oriented toward the common good. In this sense, augmented intelligence is not just a technology, but a political and educational horizon: it involves consciously deciding how, why, and for what purposes we use intelligent systems in our societies.

In the field of education, this distinction becomes particularly relevant. While many AI developments in education seek to automate teaching, evaluate on a large scale, or personalize trajectories according to predictive algorithms, augmented intelligence opens up another path: using technology as a tool to enrich the pedagogical experience, expand creative processes, strengthen ethical decision-making, and promote critical citizenship in the digital environment.

From this perspective, the teacher is not a technical operator or an intermediary between the machine and the student, but a designer of learning experiences who can integrate AI as an ally in the construction of knowledge. The student, in turn, is not a passive user of intelligent systems, but an active subject who interacts, modifies, questions, and creates with technology, and not under its closed rules.

International organizations such as UNESCO[2] have begun to incorporate this perspective, noting that AI developments in education must be guided by principles of inclusion, equity, cultural diversity, and respect for human rights. In this sense, augmented intelligence is not an inevitable technical advance, but rather a social, pedagogical, and political construct that must

be thought of from the perspective of territories, communities, and struggles for emancipatory education.

Thus, thinking in terms of augmented intelligence invites us to rethink not only technology, but also the educational project we want to build with it. Do we want machines that automate obedience or technologies that enhance the freedom to imagine, create, and learn collectively?

To answer that question, we need to look beyond devices and focus on the entire ecosystem where humans and machines coexist, learn, and transform each other.

A new learning ecosystem: critical collaboration between humans and machines

The advent of technologies such as intelligent tutoring systems, learning analytics, conversational chatbots, and adaptive learning platforms has changed the spaces, times, and formats of teaching. But it is not enough to say that AI transforms education: we must ask how, for whom, and for what purposes it does so.

In this context, the concept of augmented intelligence (or AI+) takes on special relevance. Unlike autonomous AI, which seeks to simulate and eventually replace human capabilities, augmented intelligence proposes cooperation between human thought and computational power, where what is enhanced is not only efficiency, but also creativity, interpretation, judgment, empathy, and invention. Instead of training passive users of automated systems, the aim is to train critical thinkers who think with machines, but not like machines.

What is teaching with augmented intelligence?

Teaching with augmented intelligence does not simply mean "using" technology in the classroom. It involves redesigning pedagogy: revising the traditional roles of teacher and student, rethinking the organization of school time, diversifying modes of assessment, and opening spaces for co-creation and exploration of knowledge.

In this new scenario, the teacher is no longer the sole transmitter of content but becomes a curator, mediator, and designer of cognitive and affective experiences, while the student is no longer a receiver but an active co-constructor of personalized, but also collective, learning trajectories.

But this pedagogy cannot be naive. Faced with the opacity of algorithms, biases in data, and the concentration of technological power, a critical, ethical, and situated perspective is urgently needed. Teaching with machines, yes—but not to adapt to them without resistance, but to shape them through humanistic, social, and emancipatory projects.

Purpose of the chapter

This chapter seeks to outline the coordinates of a pedagogy of augmented intelligence that is critical, creative, and committed to social justice. Through a theoretical and practical journey, five main objectives are proposed:

1. To analyze the transformations of the teaching role and pedagogical practices in the context of educational AI.
2. To outline the principles of an augmented pedagogy that enhances human-machine collaboration from an ethical and situated perspective.
3. To highlight the risks and tensions that emerge in these new environments (surveillance, technological dependence, algorithmic biases, etc.).
4. Recover Latin American experiences that dialogue with this approach, far from the model of technological imitation.
5. Propose a new educational subject capable of thinking, imagining, and creating in a collective, critical, and digital way.

At a time when enthusiastic but poorly thought-out discourses on the digitization of teaching

and learning are proliferating, this chapter proposes an alternative approach: a pedagogy that does not fear technology, but neither bows down to it. A pedagogy where machines do not replace the teacher or the student, but serve as tools for freedom and collective creation.

Methodological approach

Methodologically, the chapter is based on a critical and interpretive review of interdisciplinary literature in education, critical pedagogy, artificial intelligence, decolonial studies, and situated education. In addition, a selective analysis is made of Latin American experiences that integrate technology and augmented intelligence in educational contexts.

The choice of case studies is based on three criteria:

1. They are designed or adapted from educational realities in the global south.
2. They integrate artificial intelligence in a pedagogical rather than merely instrumental way.
3. They represent ethical, situated, and culturally contextualized approaches.

This approach seeks to articulate theory, practice, and territory (context) to outline guiding principles for a pedagogy of augmented intelligence, from and for Latin America.

Thesis

Augmented intelligence offers a unique opportunity to transform education, but only if it is accompanied by a **critical pedagogy** that is ethically situated and culturally contextualized, which trains individuals capable of thinking with machines without losing their humanity or their ability to imagine other possible worlds.

And a warning, in the style of Simón Rodríguez:

"School is not a factory for obedient people, but a workshop for inventors. Today, more than ever, we must train rebels with ideas, not subjects with tablets."

FROM TRADITIONAL TEACHING TO AUGMENTED EDUCATION

"Instructing is not educating. Teaching is not talking and saying things: it is giving people the opportunity to think in an orderly manner."
— Simón Rodríguez

For centuries, modern schools have functioned as a social technology designed to reproduce the established order. Their hierarchical structure, standardized schedules, closed curricula, and rigid division of roles responded to the industrial logic of the 19th century: to train obedient citizens, functional workers, and subjects adapted to the system. In this model, the teacher is the legitimate bearer of knowledge, and the student is a passive recipient whose main task is to memorize, repeat, and obey.

This conception was based on three fundamental principles:

1. Knowledge is found in books or in the mind of the teacher.
2. Learning is linear, cumulative, and universal.
3. The student must imitate and memorize before thinking.

This form of teaching—still dominant in many classrooms—has been widely questioned by emancipatory pedagogies. Among them is Simón Rodríguez, who broke with the colonial-repetitive model in the 19th century. In his experimental schools, dogmas were not taught nor maxims recited: learning took place through creating, discussing, experimenting, and imagining. Rodríguez understood teaching as an act of invention, not domestication. His goal was to train

individuals capable of transforming reality, not simply adapting to it.

In the current context—marked by the rapid expansion of artificial intelligence (AI)—his ideas are once again relevant. Traditional schools have not only fallen behind in terms of new ways of accessing knowledge, but also run the risk of becoming irrelevant if they do not reinvent themselves pedagogically.

However, the presence of technology in schools does not always imply transformation. Often, the discourse of innovation masks traditional forms of teaching that persist under a digital guise.

The illusion of technological innovation

Over the last few decades, the incorporation of technology into education has been driven by a discourse of innovation that often hides structural continuities. Devices, platforms, interactive content, and algorithms are introduced, but pedagogical logic remains unchanged: the teacher continues to talk, the student continues to listen, and assessment continues to reward repetition.

This phenomenon has been widely discussed. As Neil Selwyn[3] warns, the dominant techno-pedagogical discourse "is driven by commercial interests and neoliberal visions, more interested in efficiency than equity or pedagogy." Often, technology reinforces standardized models, only now mediated by screens and algorithms.

In line with this, Audrey Watters states that "the history of educational technology is also the history of broken promises, of solutions designed for markets, not for communities." And UNESCO[2] has warned that many technological proposals are "market-driven rather than driven by the needs of public education systems."

Instead of liberating learning, some technological applications constrain it even further, transforming education into a sequence of inputs and outputs, monitored by platforms that measure everything but understand little.

This contradiction is exacerbated by the arrival of more complex technologies such as artificial intelligence, which not only mediate but directly shape the learning process.

What changes with artificial intelligence?

Unlike previous technologies, artificial intelligence does not merely mediate content, but directly intervenes in the cognitive, evaluative, and organizational processes of education. Some examples:

- Adaptive systems that adjust difficulty levels according to student performance.
- Intelligent tutors that simulate conversation and offer automated feedback.
- Learning analytics that constantly monitor behavior, timing, and errors.
- Generative models that write texts, solve exercises, or synthesize content.

These tools allow for more personalized experiences, but they also generate new ethical and pedagogical tensions. Feedback is automated, pedagogical judgment is delegated to the machine, and learning is reduced to statistical patterns.

In addition, there are multiple risks:

- Reduction of learning to observable behaviors.
- Displacement of the teacher as a pedagogical guide.
- Reproduction of social and cultural biases.
- Loss of emotional and human connection.

As UNESCO[2] points out, "educational artificial intelligence must be aligned with the values of inclusion, equity, and respect for human rights."

From device to pedagogy: towards augmented education

Faced with these challenges, it is not enough to simply incorporate technologies. It is

necessary to review the pedagogical foundations that guide their use. Instead of algorithmic and automated education, an alternative is beginning to emerge: augmented intelligence (AI+).

This approach does not seek to replace human intelligence, but rather to enhance it through collaboration with machines. Unlike autonomous AI, AI+ is based on the principle of co-creation, not substitution.

In the context of augmented education:

- Teachers become designers of experiences, not repeaters of content.
- Students are active participants, capable of exploring, deciding, and creating.
- Technology is a pedagogical tool, not an end in itself.
- The human connection is irreplaceable and must be protected.

Ultimately, it is about designing with machines, not for them; thinking from a critical, situated, and liberating pedagogy that recovers the value of questioning, creativity, ethical judgment, and collective invention.

But for this pedagogy to make sense, it must arise from specific contexts. In Latin America, this implies an approach that not only criticizes global AI, but also builds alternatives from within.

A pedagogy suited to complex times

Not all AI is the same. Nor are educational contexts. While many AI tools have been developed in contexts in the global north, with logic specific to platform capitalism, Latin American education faces radically different conditions: structural inequality, linguistic and cultural diversity, and unresolved historical tensions.

Therefore, a pedagogy of augmented intelligence cannot be limited to importing models, but must produce situated educational knowledge, in dialogue with local communities, memories, and struggles.

As Simón Rodríguez warned, "America must not imitate slavishly, but be original." Today, that means asking ourselves:

- What knowledge is left out of AI systems?
- What languages and cultures are invisible in their databases?
- What kind of future are we building if we educate with machines that do not know or recognize us?

In the face of these questions, a territorialized, decolonial, and technologically conscious pedagogy is needed, one that transforms algorithms into tools of freedom, not obedience.

Towards an augmented ecology of learning

Truly augmented education requires a new ecology of learning, where the following coexist:

- Teachers as pedagogical architects, capable of combining human and technological knowledge.
- Students as creators, not passive consumers.
- Machines as critical assistants, not impersonal evaluators.
- Communities as co-educators, active in the design and control of the educational process.

This model cannot be bought, it must be built. It cannot be imposed; it must be invented. It requires discarding the logic of imitation and cultivating an educational mindset capable of inhabiting the present with creativity, but also with memory and courage.

As the teacher Simón Rodríguez would say:
"Do not teach what is done elsewhere, but what we need here".

And what we need today is a critical, situated, and technologically free pedagogy capable of training individuals who do not adapt to the world as it is, but rather imagine and transform it.

This shift is no small matter: it involves abandoning the disciplinary educational model, centered on obedience, to make way for new forms of teaching and learning that prioritize invention, autonomy, and collaboration.

FROM THE FACTORY OF OBEDIENCE TO THE LABORATORY OF INTELLIGENCE

"The teacher should not command, but teach how to command; they should not teach obedience, but how to be free."
— Simón Rodríguez

Since its consolidation as a modern institution, the school has functioned as a great social technology of reproduction. Its structure—closed spaces, rigid schedules, homogeneous curricula, vertical hierarchies—responds to the logic of the industrial age. The classroom was designed to *produce* obedient citizens, efficient workers, and functional consumers. In this model, the teacher embodies the figure of knowledge, and the student is the passive vessel that must be filled. Paulo Freire called this structure "*banking education,*" and Simón Rodríguez denounced it in the 19th century when he criticized mechanical, context-free teaching that repeated without thinking.

The question is: what happens when this logic clashes with technologies designed to adapt, learn, and respond in real time?

Today, artificial intelligence is disrupting that order. Machines are no longer simple tools that execute human commands: they process language, recommend content, evaluate, provide feedback, and even design personalized learning paths. Faced with this radical change, traditional schools are proving obsolete: incapable of providing educational answers to a world in rapid transformation.

But beware: just because it is in crisis does not mean that its replacement is guaranteed. The promise of "automated education" does not always imply an emancipatory, h y transformation. In fact, many of the current applications of AI in education reinforce the banking model, only now the "bank" is algorithmic: students repeat, respond, and advance according to rules they neither understand nor control.

Therefore, before talking about augmented pedagogy, we must ask ourselves: what does "teaching" mean in this new era? And what is lost when we do not ask ourselves that question?

To answer that question, we need to briefly review how teaching has been conceived historically in the modern tradition, and what ruptures have attempted to challenge it.

What is teaching? The modern legacy

In the Western pedagogical tradition, teaching was synonymous with transmitting knowledge for centuries. This conception responded to three basic principles:

1. Knowledge is found in books or in the mind of the teacher.
2. Learning is linear and cumulative.
3. Students must imitate and memorize before thinking.

Simón Rodríguez, teacher of the Liberator Bolívar, broke with this paradigm in his experimental schools. There, sentences were not memorized nor dogmas recited: learning took place through doing, discussing, creating, and imagining. His pedagogy was a laboratory of invention: he did not want to train subjects useful to the colonial system, but rather free men and women

capable of changing it.

And today, in the midst of the digital revolution, his ideas make sense again.

Throughout the 20th and 21st centuries, modern educational thinking has given rise to multiple approaches that recognize the diversity of subjects, contexts, and purposes of education.

Traditional pedagogy conceived of the student as a recipient of content transmitted by a teacher, following a banking model that is now insufficient.

In response to this, other trends emerged:

- Andragogy, developed by Malcolm Knowles, emphasizes the autonomy of adults as active learners, capable of making educational decisions based on their life experience. Knowles argues that adult learning is based on self-management, intrinsic motivation, and the immediate applicability of knowledge in everyday life.

  Complementarily, Venezuelan Félix Adam, considered one of the leading theorists of andragogy in Latin America, defended adult education as a human right and as a path to comprehensive development, especially in contexts of social exclusion and structural inequality. For Adam, andragogy is not just a teaching technique, but an educational philosophy focused on the dignity, participation, and freedom of the adult learner. In his works, he proposed a separate institutional framework for adult education, distinct from traditional school education, and advocated a participatory, dialogical, and culturally situated approach, thus anticipating many of the current demands of technology-based education.

- Heutagogy, proposed by Hase and Kenyon, extends this vision towards self-determined learning, which is key in digital and hyperconnected environments, where individuals design and manage their own learning paths.

- And critical pedagogy, since Freire, problematizes the social and political conditions of learning, calling for the formation of conscious individuals, capable of reading the world and transforming it.

Far from being mutually exclusive, these trends can be articulated in a pedagogy of augmented intelligence that recognizes the multiple ways of learning in the digital age: autonomous, collective, situated, and transformative. However, despite the richness of these pedagogical trends, the incorporation of technologies in education has not necessarily followed these critical and transformative approaches. In many cases, the digitization of classrooms has been guided more by commercial imperatives and promises of efficiency than by deep pedagogical reflection. Technological innovation, understood as an automatic improvement simply by integrating devices, platforms, or algorithms, has often reinforced the very traditional models that it was intended to overcome.

New technologies and the illusion of innovation

From the first computers in classrooms to today's learning management systems, education has been permeated by a constant technological promise: to improve learning through the incorporation of devices, platforms, interactive content, or intelligent algorithms.

But decades of evidence show that simply introducing technology does not guarantee pedagogical innovation or better results. On the contrary, it often reproduces old practices in new formats: the teacher who projects in PowerPoint what they used to write on the blackboard, the platform that automatically grades without paying attention to the process, the student who clicks but does not understand.

Authors such as Neil Selwyn[3] call this *educational technosolutionism*: the belief that the structural problems of the school system can be solved with software. But teaching is not just about delivering content. It is about guiding, questioning, provoking, supporting, and shaping subjectivities. A machine cannot do that on its own.

At this point, it is worth delving deeper into how AI changes the logic of the classroom beyond the superficial, and what implications this has for the role of teachers.

What changes with artificial intelligence?

Artificial intelligence should not be understood simply as another technology, but as a way of organizing knowledge. In this sense, it is pertinent to remember that "technology is not a simple means, it is a way of revealing the world," as Martin Heidegger stated in *The Question Concerning Technology,*[6] included in his book *Philosophy, Science, and Technology.*

This observation forces us to look beyond the practical use of AI and question its ability to shape what is visible, sayable, and thinkable within educational and social systems. It is not just a tool that automates tasks, but a technology that, by operating on knowledge, also transforms the conditions of its access, interpretation, and meaning.

AI, then, not only performs functions, but also defines epistemic frameworks: it selects, hierarchizes, and arranges information, directly influencing how knowledge is produced, distributed, and legitimized in our time.

In a recent work,[7] I analyzed how generative artificial intelligence transforms notions of authorship, intellectual property rights, and academic production, opening up new ethical tensions in the everyday use of automated systems as co-agents of knowledge, and I have argued that this reorganization of knowledge also implies a dispute over academic authorship and intellectual property rights, especially in scenarios where generative AI systems begin to act as co-agents in content production.

Unlike previous technological tools, artificial intelligence is not limited to executing predefined instructions: it learns, recognizes patterns, customizes processes, and makes autonomous decisions within certain frameworks. It no longer just *serves*, but *interacts*; it not only facilitates access to information, but also actively intervenes in its filtering, interpretation, and circulation. This shift turns AI into a cognitive agent that models environments of meaning and guides the production of knowledge. By automating forms of inference, synthesis, and prediction, artificial intelligence redefines what it means *to know* and *learn,* conditioning academic practices as well as pedagogical, scientific, and communicational processes. Thus, its impact is not merely instrumental, but structural: it transforms the very conditions under which the human experience of knowledge is organized.

This transforms the educational relationship. Some examples:

- Adaptive systems: platforms that adjust the level of difficulty according to the student's responses.
- Intelligent tutors: conversational agents that explain topics, correct exercises, and suggest resources.
- Learning analytics: constant monitoring of habits, times, errors, and progress.

These developments allow for more dynamic experiences, but they also present serious risks:

- Reduction of learning to statistical patterns.
- Loss of the affective, ethical, and subjective components.
- Displacement of the teacher's role as a critical guide.

The question, then, is not whether to use Artificial Intelligence or not—because it is already among us—but how to use it, for what purposes, and from what perspective of the subject, knowledge, and society.

From artificial intelligence to augmented intelligence

Here we come to the central concept of this chapter: augmented intelligence.

Unlike systems that seek to automate and replace human intelligence, AI+ proposes

collaboration between humans and machines. It is a model of cognitive symbiosis, where technology expands our capabilities—but does not define or replace them.

Teachers do not become irrelevant, but even more necessary: not as transmitters, but as curators of meaning, interpreters of knowledge, and trainers of judgment.

This vision is articulated with Latin American critical pedagogy, which was never technophobic, but demanding: it is not enough to know how to use technology, one must know why, for whom, and from where it is used.

In this approach, learning is not about adapting to a platform, but about appropriating it, intervening in it, re-signifying it, and—if possible—hacking it in the name of another possible world.

This critical attitude toward technology only makes sense if it is anchored in the territories. This is where decolonial thinking comes into play as a necessary horizon for AI pedagogy in Latin America.

A decolonial and pedagogical shift

In the face of global technological enthusiasm, a shift is needed to recover situated, territorial, and decolonial thinking. Most educational AI systems have been designed in contexts in the global North, with data that does not represent our languages, cultures, ways of learning, or experiences.

Adopting them uncritically may imply new forms of algorithmic colonialism.

Simón Rodríguez spoke of *American originality*: not as a negation of Europe, but as an invention from within. Today, that call must be translated into questions such as:

- What kind of learning do we want to promote with AI in our communities?
- How can we prevent technologies from reinforcing existing inequalities?
- Is it possible to design augmented intelligences *from* Latin America?

The answer is not technical, but deeply pedagogical and political.

Towards an augmented learning ecology

To move forward, it is not enough to change devices. We must build a new ecology of learning, where:

- Teachers are designers of experiences, not reproducers of content.
- Students are creators of knowledge, not mere users of platforms.
- Machines are tools for expansion, not replacements for humans.
- The community is part of the process, not a spectator of change.

This model is not imposed from above or bought in a store. It is co-constructed in dialogue with the territories, with their memories, languages, and possible futures.

End of section

Augmented education is not just a technical improvement: it is a paradigm shift. Teaching can no longer mean repeating, grading, or "preparing for the market." Teaching, in this new era, must be a radical act of invention, cooperation, and freedom.

And for that, we need a pedagogy that is not subordinate to machines, but that does not ignore them either. A pedagogy that embraces augmented intelligence as a territory of dispute, collective creation, and social transformation.

As the master Rodríguez would say:

"Either we invent or we err! But we invent with an open mind and an open heart, not by following other people's models, but by forging our own."

PRINCIPLES OF AUGMENTED PEDAGOGY

Here we propose six fundamental principles for a pedagogy of augmented intelligence, designed from and for Latin America:

Principle No. 1. Conscious and ethical human-machine collaboration

Instead of rejecting technology or surrendering to it uncritically, we propose conscious collaboration: an alliance between human thought and algorithmic capabilities, where AI functions as cognitive support, not as a substitute for subjectivity.

- Teachers can use AI to generate multiple learning paths without compromising the ethical orientation of the process.
- Students can develop an active relationship with AI, not only as users, but as critical readers of its processes.

"How far does the machine go, and where does what I want to do with it begin?"

This question must be present in every educational interaction.

Principle No. 2. Redefining the role of the teacher as a designer of learning ecologies

In augmented pedagogy, the teacher ceases to be a transmitter of content and becomes:

- A curator of knowledge: they select, adapt, and connect resources from different systems (human and technological).
- Designer of personalized trajectories: proposes dynamic and context-sensitive learning itineraries.
- Facilitator of questions rather than answers.

Here, AI can assist in monitoring processes, offering alternatives, and suggesting content, but the pedagogical decision rests with the teacher. And their role is no longer to control, but to create conditions for thinking.

As Simón Rodríguez said:

"It is not about teaching what others have said, but about provoking the desire to think for oneself."

Principle No. 3. The student as a creative subject and co-constructor of knowledge

Unlike models where students are users of platforms, this teaching method proposes that students become authors and architects of their own learning experience.

- Machines can offer paths, but students must be able *to modify them*, *deviate* from them, and *create new routes*.
- Divergent thinking, creative problem solving, and experimentation are encouraged, not just the correct answer.

Example: instead of using AI to answer questions, it can be used to create questions, debate assumptions, and generate imaginative scenarios.

Principle No. 4. Situated and territorialized education

There is no augmented intelligence without **context**. The systems used in the classroom must be analyzed according to their origin, their design logic, and their relationship to the local culture.

Key questions:

- What language does AI use?
- What knowledge does it render invisible?
- What learning logics does it privilege?

Augmented pedagogy does not import technologies, but rather reinterprets them from the perspective of the territory, its memories, and its struggles. Instead of applying the Silicon Valley model, it is designed from the rural classroom, the neighborhood, the intercultural school, and the migrant experience.

"There is no teaching without place. All learning is territorial."
–Silvia Rivera Cusicanqui

Principle No. 5. Affectivity, subjectivity, and connection

One of the risks of AI in education is the dehumanization of connection. When feedback is automatic, support disappears. But learning is not just cognition: it is desire, emotion, body, history.

Augmented pedagogy must restore the educational bond:

- The teacher who listens, the community that accompanies, error as a transformative experience.
- Machines can evaluate, but only humans can understand what failure or an unanswered question means.

Principle No. 6. Training for technological criticism and humanistic computational thinking

Finally, augmented pedagogy must train individuals to read, interpret, and transform the technological systems that surround them. This includes:

- Literacy in computational thinking (logic, data structures, algorithms).
- Critical analysis of digital platforms, biases, and power structures.
- Design, experimentation, and creation skills with technology.

It is not just about using AI, but about **training those who can build another kind of intelligence: one that is more human, more just, and more supportive.**

What can a teacher do with AI in the classroom or learning environment?

Let's consider some practical scenarios to illustrate this pedagogy:

- A history teacher uses an AI model to simulate a conversation between Simón Bolívar and Toussaint Louverture. Students do not memorize dates, but interact, debate, and write new versions of history from different points of view.
- An indigenous school engaged in intercultural bilingual education uses AI to preserve and teach its ancestral language. Here, augmented intelligence serves to re te invisible knowledge, not to impose external knowledge.
- A writing workshop where students co-write stories with creative AI and then reflect on the algorithm's decisions. The class is not about literature, but about ethics, style, and subjectivity.

End of section

The pedagogy of augmented intelligence does not propose replacing teachers or a techno-digital utopia. It proposes a reconfiguration of the link between technology, knowledge, and culture, based on a situated ethic, a critical perspective, and a deep desire for freedom.

It is necessary to return to Simón Rodríguez. He not only defended education as an act

of invention, but also thought with his feet on the ground and his eyes on the future. He did not reject technology, but subordinated it to the common good. Above all, he believed that education was not for obeying, but for imagining and building another world.

"Instruction is not a commodity. It is a right. It is fire. It is seed."

Today, augmented intelligence can be all of that. But only if pedagogy takes it in that direction.

RISKS AND TENSIONS: SURVEILLANCE, DEHUMANIZATION, AND DEPENDENCE

"Machines can evaluate, but they cannot understand the pain of error or the joy of discovery."

"There is no education without freedom, nor freedom without thought"
— Simón Rodríguez

In any transformative educational project, enthusiasm for the new must coexist with epistemological and ethical vigilance. The field of artificial intelligence in education is no exception. While promises about "smart" platforms that personalize learning, optimize processes, and predict outcomes are growing, serious risks are also emerging that threaten integrity, autonomy, and justice within the education system.

We cannot talk about augmented intelligence without first talking about the dangers of automated and unconscious intelligence.

The silent expansion of educational surveillance

In the name of personalizing learning, many educational platforms collect, process, and store an immense amount of student data: how long it takes them to respond, what mistakes they make, what content paths they choose, what words they use, what emotions their faces register if there is a camera.

This phenomenon, known as the "datafication of education," is turning schools into spaces of permanent algorithmic surveillance.

- Learning Analytics systems: they cross-reference data on academic performance, behavior on platforms, browsing habits, and even mental health.
- Proctoring or exam supervision software: monitors students via webcam, detects "suspicious behavior," penalizes eye movements or external noises.
- Automated AI assessments: assign scores without human interaction, even on essays or creative work.

What is the problem? These technologies don't just observe: they produce forms of control and discipline that are often invisible to those who use them. And this changes the way we learn, making it more anxious, more performative, less free.

Automation without humanity

The use of AI for automatic assessment and feedback has obvious benefits: speed, efficiency, scalability. However, it can also break the educational bond.

- When students only receive machine-generated responses, the affective, dialogical, and ethical dimensions of learning are lost.
- An instrumental relationship with knowledge is created: responding in order to advance, not to understand.
- Mistakes are no longer an opportunity for reflection, but rather a failure that the

machine penalizes without context.

This reinforces the logic of performance over meaning. As Freire would say, it is a pedagogy that "does things with students, but not things for and with them."

Cognitive dependence and loss of agency

One of the most subtle effects of AI in the classroom is the risk that students will stop thinking for themselves. If a platform recommends what to read, how to solve a problem, what topics to study, and how to evaluate oneself, then:

- Where does intellectual autonomy fit in?
- What space is there for trial and error, doubt, exploration without immediate purpose?

Augmented intelligence should expand our capabilities, not atrophy them. But if it is not designed carefully, it can produce individuals who are dependent on systems they neither understand nor control.

And this is serious. Because the purpose of education is not efficiency, but freedom.

> *"Teaching is not preparing to follow orders, but to invent answers where no one has yet given them."*
>
> — Simón Rodríguez (adapted to the 21st century)

Reproduction of inequalities and algorithmic biases

AI systems learn from historical data. But that data is not neutral: it reproduces the prejudices, exclusions, and inequalities of the real world.

- If a system is trained with data in English, it will tend to penalize Spanish or its variants.
- If models are based on students from urban and connected contexts, they will fail with rural, indigenous, Afro-descendant, or disabled students.
- If AI predicts "success" based on previous patterns, it tends to exclude those who were already excluded from the system.

Without critical correction, AI can become a mechanism for automated exclusion. And the most dangerous thing is that it is presented as "objective."

Ruha Benjamin[8] calls this *"discrimination by design"* and reminds us that algorithms also have ideology.

Displacement of the teaching role and job insecurity

In some countries, platforms are being implemented that allow for a reduction in the number of teachers, the delegation of feedback to automatic systems, and the standardization of content through software. This raises the following issues:

- A loss of the value of teaching as a relational, ethical, and political act.
- The transformation of the teacher into a technical operator of platforms, rather than a pedagogical creator.
- The temptation to govern the education system through automated indicators, obscuring the social, cultural, and emotional dimensions of learning.

At stake here is not only education, but also the dignity and professional autonomy of educators.

So what do we do about all this?

It is not a question of rejecting AI outright. It is a question of looking at it with open eyes, as educators rather than technology consumers. In light of these risks, we propose three educational defense strategies:

Pedagogy of critical digital awareness

Teaching how to use AI is not enough. We must teach how to think about AI.

- Who designed it?
- What data does it use?
- Who does it benefit?
- What silences does it produce?

This should be part of the school curriculum, from elementary school to university. Because 21st-century digital literacy is not just technical: it is ethical, political, and cultural.

Designing AI from the margins

Latin America should not limit itself to consuming technologies made in other realities. We need:

- AI models trained with our languages, voices, and experiences.
- Platforms that respect students' rights.
- Collective design processes, where teachers, communities, and students participate.

This implies a vision of technology that is situated and democratic.

Reclaiming the human connection as the core of learning

No platform, no matter how sophisticated, can replace the real presence of the teacher, human contact, gestures, patience, complicity, and hugs.

Critical pedagogy teaches us that learning is not just about knowing more, but about feeling accompanied while searching for meaning in the world.

Therefore, all technology must be subordinate to the educational bond, not the other way around.

End of section

Artificial intelligence is not neutral. Nor is it inevitable. It can be a tool for freedom or a mechanism for control. It can expand our capabilities or lock us into systems of intelligent obedience.

That is why a pedagogy of augmented intelligence is not simply teaching with machines, but teaching how to think with them, against them when necessary, and beyond them when we fall short of humanity.

"The worst teacher is the one who does not question the method. The best is the one who invents another when it no longer works."
— Simón Rodríguez

SITUATED INTELLIGENCE AS A RESPONSE TO GLOBALIZED ALGORITHMIC EDUCATION

In a global scenario marked by the rapid expansion of intelligent systems, education has been reconfigured by algorithmic logics that promise efficiency, personalization, and scalability. However, these promises do not come in the abstract: they are inscribed in technical infrastructures, epistemologies, and worldviews that rarely recognize the plurality of cultural, social, and linguistic contexts in which they are inserted. Artificial intelligence applied to

education is not neutral: it incorporates and reproduces assumptions about what it means to learn, teach, evaluate, and produce knowledge.

From Latin America, this situation raises serious questions. It is not just a matter of a technological gap or a question of access, but a much deeper dispute: one that pits universal models of innovation against the historical, linguistic, and epistemic realities of our peoples. Given this reality, it is urgent to think of alternatives from the margins, from the peripheries, from our own realities. What is needed is not only new technology, but a new, re rience: a situated intelligence that starts from the territory, from concrete needs, and from the knowledge that has historically been subordinated.

"We are not educating ourselves to live well, but to obey well."
— Catherine Walsh

The global does not always serve the local

Most artificial intelligence systems applied to education have been designed in contexts in the global North: Silicon Valley, European academic centers, large educational technology (EdTech) companies. Their platforms, algorithms, and ways of conceiving learning do not necessarily respond to the material, cultural, and linguistic conditions of Latin America.

As Dussel[9] points out, "the discourse of innovation tends to ignore the structural inequalities of the Latin American education system, and therefore its proposals end up reinforcing them, even though they are presented as inclusive or democratic". Faced with this situation, there is an urgent need to think of educational technologies not as imported packages, but as situated processes, built from and for our territories.

This mismatch between the global promises of artificial intelligence and local realities is not only a problem of implementation, but also of political and pedagogical imagination. It is not enough to adapt external technologies: we need to reinvent the frameworks from which we think about learning, knowledge, and living together. Latin America cannot limit itself to consuming models manufactured in other geographies; it must generate its own questions, methodologies, and answers.

And to do so, we need to recover a pedagogy that is not afraid to stray from the beaten path, that does not repeat what is already being done, but dares—as Simón Rodríguez would say—to *"imagine what has not yet been."* That pedagogy is not a given: it must be created collectively, in dialogue with the realities that inhabit us.

Pedagogies to come: imagining what has not yet been

Although there are scattered initiatives in the region that attempt to integrate digital technology for critical pedagogical purposes, there is still a lack of rigorous systematization and coherent public policy that promotes augmented intelligence with a Latin American focus. Rather than presenting specific experiences, this section proposes a hypothesis: it is possible to construct a pedagogy of augmented intelligence that is situated, critical, and creative in Latin America, if we start from the concrete realities, local knowledge, and historical struggles of our peoples.

This pedagogy would not imitate external models or repeat schemes designed from other cultural logics. On the contrary, it would seek to redefine AI from the margins, put it at the service of educational justice, and turn it into a tool for epistemic, linguistic, and territorial autonomy. To this end, it is essential to promote:

- Critical digital literacy processes at all educational levels.
- Community participation in the design of technological tools.
- The production of open, protected, and sovereign educational data.
- The promotion of interdisciplinary research with an ethical, social, and territorial focus.

Augmented intelligence from the South

A Latin American pedagogy of augmented intelligence cannot come out of a laboratory in California or a multinational edtech company. It must be born in rural classrooms, in working-class neighborhoods, in indigenous schools, in cultural centers, in public universities. Wherever people struggle to learn, not to obey, but to liberate themselves.

As Simón Rodríguez wrote:

> *"One should not teach what is, but what can be. One should not teach what is done elsewhere, but what we need here."*

Thinking about augmented intelligence from the South is not only a technical challenge, it is an ethical, political, and pedagogical task. It means rejecting the uncritical universalization of technologies that do not represent us and, instead, building other ways of learning, teaching, and living in the digital age. This task is still ongoing, and its realization will depend on the collective ability to imagine what has not yet been, as the teacher Rodríguez taught us.

ABSENCE OF SYSTEMATIZED EXPERIENCES IN VENEZUELA: A NECESSARY REFLECTION

Unlike other countries in the region, Venezuela has not yet seen any publicly visible or systematized experiences that explicitly articulate artificial intelligence or augmented intelligence with critical, ethical, or decolonial pedagogical models. This absence should not be interpreted as a lack of creativity or educational thinking, but rather as a reflection of a series of structural conditions, unilateral coercive measures, and epistemological factors that have limited the consolidation of such initiatives.

First, Venezuelan educational technology policy, particularly since the Canaima Educational Plan (2009-present), has focused on providing digital equipment and resources as a strategy for inclusion, but without the sustained support of an educational project that rethinks the meaning of teaching and learning in technological and liberating terms. In this context, technology has been understood primarily as an instrument of access, not as a critical mediation of knowledge or an opportunity for collective invention. This model of "technology distributed without transformative pedagogy" has led to advances in infrastructure, but not necessarily in genuine educational innovation.

Secondly, this challenge has been exacerbated by a number of factors, such as declining public funds, inflation, competition, and unilateral coercive measures imposed by the United States, Canada, the European Union, among others (questioned by multilateral organizations for their effects on economic and social rights), which have hampered research and publication of local experiences in digital education or artificial intelligence. Numerous teaching or community initiatives—in Bolivarian schools, rural high schools, or public universities—remain invisible, outside formal academic circuits or digital repositories. Pedagogical knowledge exists in action, but it is not systematized, shared, or critically evaluated.

Added to this is an epistemological and technological dependence on the global North: the tools and platforms that currently mediate digital learning in Venezuela are usually imported, designed according to corporate logic, with little participation by local educators in their design or adaptation. This phenomenon reproduces, in digital form, the old colonial structure of knowledge that Simón Rodríguez denounced in the 19th century: "servile imitation" versus original creation.

Faced with this scenario, an urgent task is required: to research, document, and build a Venezuelan technological pedagogy that articulates three fundamental dimensions:

1. The emancipatory Latin American pedagogical tradition, from Rodríguez and Freire to contemporary trends in popular education and digital criticism.
2. Local scientific and technological development, taking advantage of the capabilities

of universities, research centers, and emerging technological communities.

3. The participation of teachers and communities as co-creators of educational technology, not as mere users.

Promoting an augmented Venezuelan intelligence—rooted in the territory, language, and cultural diversity—implies overcoming the model of technological importation and moving toward a policy of digital educational sovereignty. This requires institutional will and commitment, academic collaboration networks, investment in educational research, and above all, confidence in the inventive capacity of the nation's teachers, as well as the cessation of the more than 1,041 unilateral measures imposed by foreign countries, which have been questioned by multilateral organizations for their negative effects on economic and social rights, including the right to education, science, and technology.

As Simón Rodríguez would say, "it is not a question of repeating what others do, but of thinking about what we need here." And what we need today is precisely that: a Venezuelan technological pedagogy that is critical, inclusive, and creative, capable of transforming crisis into opportunity and turning machines into allies of popular invention, Latin American emancipation, and the common good.

TOWARDS A NEW EDUCATIONAL SUBJECT: FROM FUNCTIONAL USERS TO CRITICAL CREATORS

Faced with the rapid expansion of smart technologies in the field of education, it is no longer enough to ask *how* artificial intelligence is implemented in the classroom or learning environment. It is necessary to go beyond the instrumental to ask fundamental questions: for what purposes, based on what knowledge, and to form what kind of human being? These questions are not new, but they take on an unprecedented urgency in light of the shaping power of algorithms on learning, perception, and decision-making processes. It is here that pedagogical reflection must recover its ethical, political, and cultural dimension. It is not just a matter of incorporating new tools, but of rethinking what kind of subjectivity we want to cultivate in this new technocognitive horizon.

This shift requires a change of perspective: from user to creator, from algorithm to judgment, from machine to world. It is not simply a matter of learning to use tools, but of forming criteria, imagining alternatives, and constructing collective meanings in a world increasingly mediated by automatic decision-making systems. Augmented intelligence thus raises a radical question that cuts across all transformative pedagogy:

What kind of subject does augmented intelligence form?

"Education is not for learning to repeat what is already known, but for learning to imagine what has not yet been."
— Simón Rodríguez

One of the most pressing questions in contemporary education is not technical, but anthropological and political: what kind of human beings do we want to shape in the era of " r intelligent machines"? The answer cannot be delegated to engineers or tech entrepreneurs. It belongs, profoundly, to educators, to communities, to those who think of learning as an ethical and collective act.

When artificial intelligence is incorporated into the classroom without critical reflection, we run the risk of training functional users of opaque systems who reproduce patterns without understanding them and adapt to a digital world without questioning its structure. On the contrary, a pedagogy of augmented intelligence must aim to train individuals capable of thinking, creating, and deciding in contexts mediated by technology, without losing their humanity or their capacity for social transformation.

As I have argued in a previous reflection[1], the emergence of generative artificial intelligence directly challenges the work of teachers and demands a new principle of pedagogical responsibility, which is not limited to incorporating tools, but rather reconfigures the profound meaning of educational accompaniment and mediation.

The technical subject: the risk of adaptive training

Technocratic discourses on education and artificial intelligence often refer to the need to train "human capital for the 21st century." This approach, focused on job skills, prepares students to adapt to a changing and automated market, but does not train them to be ethical, critical, or creative citizens.

As Paulo Freire[13] warns, "education as a practice of freedom implies a break with passive adaptation, to make way for the active transformation of the world." The technical subject, prepared to operate systems without questioning them, is functional to an unjust order. Instead, education must promote the emergence of a political subject, aware of their power, their limits, and their collective responsibility.

In the context of AI, this means teaching not only how to use a platform, but also how it is designed, what biases it may contain, what interests it serves, and what alternatives can be built.

The ethical subject: educating for responsibility in the age of algorithms

The use of intelligent systems in education inevitably requires an ethic of care, both in design and application. It is not just a matter of protecting personal data, but of educating students to be aware of the ethical implications of living in a society mediated by algorithms.

According to Vallor[14], a philosopher specializing in technological ethics, "ethical literacy must accompany digital literacy. We cannot allow technical skills to develop in the absence of moral judgment."

This means integrating questions such as the following into the curriculum:

- What decisions is an AI system making for me?
- Who do these decisions favor or harm?
- What impact does automation have on employment, culture, and human connections?

The ethical subject is not one who simply follows the rules of the system, but one who asks what to do when those rules do not guarantee justice.

The creative subject: from content consumption to world invention

One of the most profound effects of pedagogy based on automated platforms is the impoverishment of the imagination. If learning is reduced to answering multiple-choice questions, completing predefined exercises, or consuming information generated by algorithms, students cease to be creators and become consumers.

In response to this, augmented pedagogy must propose spaces for invention, expression, and technological and symbolic creation. As Seymour Papert[15], a pioneer of computational thinking, put it, "children learn best when they build things that matter to them." Meaningful learning occurs when students have agency over their process, when they create rather than repeat, when they make mistakes and try again from an original perspective.

This requires active methodologies such as:

- Creative programming (e.g., with Scratch, Python, or generative AI).
- Writing interactive narratives with AI.
- Designing solutions to community problems with the support of technology.
- Digital arts, educational robotics, and ethical prototyping.

AI should not replace human imagination, but rather be provoked and expanded by it.

The collective subject: learning with others in hybrid environments

AI can personalize learning trajectories, but it should not isolate the subject. Meaningful learning remains, above all, a social experience. As Vygotsky[16] demonstrated, cognitive development occurs through interaction with others. And as Walsh[17] reminds us, emancipatory education is built in community, based on collective and relational knowledge.

Therefore, a pedagogy of augmented intelligence cannot be solitary or competitive.[18,19] It must encourage:

- AI-mediated collaborative projects, where students work in teams to solve problems.
- Extended classrooms, where knowledge circulates between the school, the community, and digital networks.
- Spaces for dialogue between cultures, generations, and languages, with AI as a tool for mediation, not separation.

This requires designing systems that encourage cooperation, not just personalization. Augmented intelligence must open the classroom to the world, not close it off in individualized learning paths without context.

Teacher training as the core of the new pedagogical subject

To train ethical, creative, and collective subjects, teachers must be up to the task. Not as technological operators, but as critical intellectuals and pedagogical designers. This implies:

- Initial and ongoing training in the ethics of technology, computational thinking, digital justice, and educational sovereignty.
- Spaces for co-creating open educational resources with AI tools.
- Participation in the design and evaluation of platforms based on pedagogical criteria, not just technical ones.

As Neil Selwyn[3] warns, "critical digital education is not one that teaches how to use platforms, but one that trains teachers to question them, transform them, and, when necessary, reject them."

Teachers cannot be replaced by machines. But they must reinvent their role in relation to them. As Simón Rodríguez wrote: *"The teacher who repeats what already exists is a civil servant. The one who invents with what is available is an educator."*

Conclusion: The subject that does not yet exist

A pedagogy of augmented intelligence does not seek to restore the past or uncritically celebrate the future. Like all transformative education, it seeks to form subjects that do not yet exist but are possible.

Subjects who create and do not repeat.

Subjects who collaborate and do not compete.

Subjects who understand the limits of machines and empower them through their humanity.

Subjects who do not fear artificial intelligence, because they have cultivated a collective, sensitive, critical, and free intelligence.

This individual is not formed solely by devices. They are formed by questions. By connections. By memory. By imagination.

And with teachers who, like Simón Rodríguez, do not teach what the world already is, but what the world can still be.

This analysis identified that augmented intelligence, approached from a critical, situated,

and Latin American pedagogy, can be a way to resist the logic of automation imposed by the technology market. The experiences analyzed demonstrate that it is possible to design artificial intelligence from the margins and for the margins, promoting human connections, social justice, and collective creation.

Future research could delve deeper into the systematization of pedagogical practices with AI in rural, popular, and indigenous territories, as well as into regulatory frameworks that guarantee educational rights in digital environments.

However, this transformation does not depend solely on the will of teachers or technological enthusiasm. It requires political decisions, ethical frameworks, and institutional will to build another educational horizon with machines, but also beyond them.

Because if we—teachers, communities, peoples—do not design this pedagogy, others will do it for us, not to emancipate, but to automate.

And then, as Simón Rodríguez warned us, it will not be because we did not know how, but because we did not dare to invent.

EPILOGUE

Rethinking humanity in the age of artificial intelligence: a pedagogy for not giving up

"To instruct is to teach how to think. To educate is to teach how not to give up."
— Simón Rodríguez

Artificial intelligence is reconfiguring what we understand by work, language, communication, art, knowledge. In other words, it is reconfiguring what it means to be human. Faced with this, we cannot reduce the role of education to preparing "human talent" for unstable markets, much less teaching us to passively coexist with machines that decide for us.

AI is here to stay. What is at stake is how we want to live with it and, above all, who we want to be in doing so. Education—and pedagogy in particular—has an indispensable role to play here: not to adapt us to automation, but to reclaim the world through questioning, criticism, imagination, and care.

A pedagogy of augmented intelligence does not celebrate machines for their own sake. It celebrates what we can be with them, if we design them from an ethical commitment, if we use them to expand the possibilities of thought, if we inscribe them in collective processes of social transformation.

As Ruha Benjamin[8] warned, "technology is not inevitable: it is malleable, and therefore political." And as Paulo Freire[13] wrote, "education is an act of love, and therefore an act of courage."

It is not enough to teach digital literacy.[20] We must politicize technology. We must teach people to intervene in systems, to imagine other possible uses, to design futures that do not repeat the mistakes of the past.

We need a pedagogy that prepares us to:

- Critically understanding intelligent systems.
- Producing knowledge and technologies from and for the territories.
- Preserving the irreplaceable human bond in the act of learning.

This pedagogy cannot be built in isolation: it requires active educational communities, schools that are ethical and social laboratories, spaces where dialogue with technology does not silence memory and diversity, but rather enhances them.

Simón Rodríguez said that we should not copy what belongs to others, but rather invent what is necessary. Today, more than ever, his legacy is both a guide and a warning: "Either we invent or we err," he wrote.

Today, in the age of AI, that phrase takes on new meaning:

Either we reinvent pedagogy in human terms, or we accept being educated by systems that do not understand our history or our dreams.

The task remains open.

Will we be able to imagine an education with machines, without losing what makes us human?

BIBLIOGRAPHIC REFERENCES

1. Romero Pérez NS. Generación de contenidos asistido por inteligencia artificial y derechos de autor en la gestión de la creación intelectual. En: Romero Pérez N, Azuaje Rondón V, Agudelo Esteves O, Ramírez Y, Meza Chávez M, Riera Escalona R, Olivar Aldana J, comp. Investigar para la paz y la vida: horizontes transdisciplinarios desde Nuestramérica. Compendio de extensos de las V Jornadas Nacionales de Investigación. Caracas: Ediciones DP UNESR; 2025. p. 730–83.

2. UNESCO. Inteligencia artificial y educación: orientaciones para los responsables de políticas. París: Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura; 2023. Disponible en: https://unesdoc.unesco.org/ark:/48223/pf0000384757

3. Selwyn N. ¿Deberían los robots reemplazar a los docentes? La IA y el futuro de la educación [Should robots replace teachers? AI and the future of education]. Cambridge (UK): Polity Press; 2021.

4. Floridi L. Soft ethics and the governance of the digital. Philos Technol. 2018;31(1):1–8. https://doi.org/10.1007/s13347-018-0303-9

5. Ito J. Resisting reduction: a manifesto. J Des Sci. 2019. https://doi.org/10.21428/6a79e83c

6. Heidegger M. La pregunta por la técnica. En: Filosofía, ciencia y técnica. 3ª ed. Santiago de Chile: Editorial Universitaria; 1997. p. 113–48.

7. Romero Pérez NS. Formación docente e inteligencia artificial generativa: retos y oportunidades. En: Carvajal S, Agudelo Esteves O, eds. La formación docente: cuatro décadas de reformas educativas en Nuestra América. Entre neoliberalismos, progresismos y neoconservadurismo. Caracas: Ediciones DP UNESR; 2023. p. 113.

8. Benjamin R. La raza después de la tecnología: herramientas abolicionistas para el nuevo código de Jim [Race after technology: abolitionist tools for the new Jim code]. Cambridge (UK): Polity Press; 2019.

9. Dussel L. La innovación educativa en América Latina: entre la urgencia y el deseo. Montevideo: Fundación Ceibal – IIPE UNESCO; 2020. Disponible en: https://www.ceibal.edu.uy/storage/app/media/documentos/Publicaciones/La-innovacion-educativa-en-America-Latina-LDussel.pdf

10. Rodríguez S. Sociedades americanas en 1828. Caracas: Biblioteca Ayacucho; 1992. Obra original publicada en 1828.

11. Rodríguez S. Luces y virtudes sociales. Caracas: Ediciones del Ministerio de Educación; 1975. Obra original publicada en 1840.

12. Rodríguez S. Obras completas. 2ª ed. Calzadilla JA, ed. Caracas: Biblioteca Ayacucho; 2001. 3 vols.

13. Freire P. Pedagogía del oprimido. 30ª ed. Buenos Aires: Siglo XXI Editores; 1997.

14. Vallor S. Tecnología y virtudes: una guía filosófica para un futuro que valga la pena [Technology and the virtues: a philosophical guide to a future worth wanting]. Oxford: Oxford University Press; 2016.

15. Papert S. Tormentas mentales: niños, computadoras e ideas poderosas [Mindstorms: children, computers, and powerful ideas]. Nueva York: Basic Books; 1980.

16. Vygotsky LS. El desarrollo de los procesos psicológicos superiores [Mind in society]. Cambridge (MA): Harvard University Press; 1978.

17. Walsh C. Interculturalidad crítica y pedagogía decolonial: perspectivas latinoamericanas. Quito: Instituto de Estudios Ecuatorianos; 2009.

18. Rometty G. Why AI will not replace humans. IBM Newsroom; 2017. Disponible en: https://newsroom.ibm.com

19. Hase S, Kenyon C. From andragogy to heutagogy. UltiBASE Articles. 2000. Disponible en: https://www.ultibase.rmit.edu.au/Articles/dec00/hase2.htm

20. Adam F. Andragogía: la educación de adultos. Caracas: Ediciones del Ministerio de Educación; 1971.

FUNDING

None.

CONFLICT OF INTEREST

None.

AUTHOR CONTRIBUTION

Conceptualization: Norjhira Romero Pérez.
Data curation: Norjhira Romero Pérez.
Formal analysis: Norjhira Romero Pérez.
Investigation: Norjhira Romero Pérez.
Methodology: Norjhira Romero Pérez.
Project management: Norjhira Romero Pérez.
Resources: Norjhira Romero Pérez.
Software: Norjhira Romero Pérez.
Supervision: Norjhira Romero Pérez.
Validation: Norjhira Romero Pérez.
Visualization: Norjhira Romero Pérez.
Writing - original draft: Norjhira Romero Pérez.
Writing - proofreading and editing: Norjhira Romero Pérez.