# Chapter 01 / Capítulo 01

*New literacies in the age of AI: Ethics, teaching, and writing (English Version)*
**ISBN:** 978-9915-9854-5-9
**DOI:** 10.62486/978-9915-9854-5-9.ch01
**Pages:** 1-18

# The New Literacy in the Age of AI: Educational Foundations, Pedagogical Practices, and Ethical Challenges

## La nueva alfabetización en tiempos de inteligencia artificial: fundamentos, prácticas y desafíos

Gaoussou Goro[1]

[1]Centre Hospitalier Mémorial France Etats-Unis de Saint-Lô. Saint-Lô, Caen, France.

**ABSTRACT**

This chapiter examines the transformation of literacy and writing in the era of artificial intelligence (AI), addressing cultural, pedagogical, ethical, and cognitive implications. It develops four sections: theoretical foundations of new literacy, innovative teaching practices across educational levels, tools and ethical/evaluative challenges, and future perspectives on teacher education.
Significant changes in writing are highlighted, where AI functions as a co-author, redefining authorship and educational practices. In primary, secondary, and higher education, classroom projects, guided writing, critical essays, and AI-assisted academic production are discussed, along with teacher communities fostering collaborative innovation. The tools and ethics section explores prompt design, responsible use, authorship, and institutional guidelines.
Findings indicate that literacy in the AI era does not replace human thinking but expands, enhances, and diversifies it, fostering critical, ethical, and creative competencies. AI should be integrated as a co-author and mediator in education, promoting reflection, creativity, and analytical thinking while maintaining intellectual autonomy.

**Keywords:** Artificial Intelligence; Literacy; Education; Ethics; Generative Writing; Teacher Training; Prompt Design.

**RESUMEN**

El presente capítulo analiza la transformación de la alfabetización y la escritura en la era de la inteligencia artificial (IA), considerando implicaciones culturales, pedagógicas, éticas y cognitivas. Se desarrollan cuatro secciones: fundamentos teóricos de la nueva alfabetización, prácticas docentes innovadoras, herramientas y desafíos éticos y de evaluación, y perspectivas futuras sobre la formación docente.
Se evidencian cambios significativos en la conceptualización de la escritura, donde la IA actúa como coautora de textos, transformando la autoría y las prácticas educativas. En educación básica, media y superior, se presentan experiencias con proyectos del aula, escritura guiada, ensayos críticos y producción académica asistida por IA, así como comunidades docentes para innovación colaborativa. La sección de herramientas y ética aborda el diseño de *prompts*, límites de uso, autoría responsable y lineamientos institucionales.
Los hallazgos sugieren que alfabetizar en tiempos de IA no reemplaza el pensamiento humano, sino que lo amplía, potencia y diversifica, promoviendo competencias críticas, éticas y creativas. Se plantea la necesidad de integrar la IA en la educación como coautora y mediadora del aprendizaje, fomentando la reflexión crítica y la creatividad, sin perder la autonomía intelectual.

**Palabras clave:** Inteligencia Artificial; Alfabetización; Educación; Ética; Escritura Generativa; Formación Docente; Diseño De *Prompts*.

## INTRODUCTION

We are living in a time of profound cultural transformation in which artificial intelligence has burst onto the scene as an unprecedented tool for symbolic production. Writing, historically understood as an exclusively human practice, is now shared with systems capable of generating coherent, creative, and argumentative text. This reality is reshaping not only the act of writing, but also teaching, reading, and academic assessment.

Literacy has evolved significantly with the emergence of artificial intelligence (AI) and generative tools, transforming the act of writing and learning (Bazerman, 2013; Gee, 2015; Floridi, 2023). This transformation involves cultural and pedagogical changes that require a critical and ethical approach (Floridi, 2019; Selwyn, 2023). Education faces the challenge of integrating these technologies into the classroom to foster creativity, critical thinking, and skill development (Luckin et al., 2016; Holmes et al., 2021).

In the educational context, AI presents challenges and opportunities. While some sectors warn of the risk of technological dependence or loss of authenticity, others recognize its potential to expand creativity, personalize learning, and democratize access to knowledge (Selwyn, 2019; Luckin et al., 2016). In this scenario, the notion of *new literacy* emerges, understood as the ability to read, write, analyze, and produce critically with digital and intelligent tools.

The purpose of this chapter is to explore the theoretical foundations, emerging teaching practices, and ethical challenges associated with AI writing. Throughout the sections, we analyze the cultural and pedagogical implications of AI as a co-author, experiences of generative literacy at different educational levels, and the policies necessary for ethical and inclusive use of the technology.

## DEVELOPMENT

### SECTION 1. THE NEW LITERACY: FOUNDATIONS AND CHALLENGES

#### 1.1. Writing in the age of artificial intelligence

Writing has always been a cultural act deeply linked to thought, memory, and identity. Throughout history, technological changes—from the invention of the alphabet to the printing press and the computer—have redefined the ways we write, read, and transmit knowledge. However, the emergence of artificial intelligence represents a different qualitative leap: for the first time, technology not only facilitates writing, but *writes with us*.

Writing in the age of AI redefines the act of writing, with AI acting as a co-author and collaborator in the creation of texts (Bender et al., 2021; Boden, 2016). Literacy in the age of AI involves developing critical thinking, digital skills, and ethical awareness (Floridi, 2023; Ng, 2021). Teaching practices are transformed through the incorporation of generative tools and the modification of teaching skills and strategies (Mishra & Koehler, 2006; Luckin et al., 2022).

In this new scenario, AI becomes an *algorithmic co-author* (Boden, 2016), capable of generating texts with semantic coherence, logical argumentation, and a style adaptable to the context. Tools such as ChatGPT, Claude, Copilot, and Gemini do not merely process information: they interpret complex linguistic instructions, learn discursive patterns, and respond with outputs that mimic the human voice. This phenomenon marks a paradigm shift in the conception

of writing as an exclusively human process.

From a cultural perspective, this change leads to a *decentralization of authorship*. The text no longer belongs solely to the person who signs it, but emerges from the interaction between the human mind and artificial intelligence. This raises questions about authenticity, creativity, and originality. Can the user who guides textual production through *prompts* be considered a "writer"? Where does human creativity begin, and where does algorithmic intelligence end?

Boden (2016) suggests that creativity does not disappear in this process, but instead transforms. The human writer ceases to be the sole producer of ideas and becomes a *cognitive curator*, an architect of meanings who designs, selects, and evaluates the responses generated by AI. In this sense, AI acts as an extension of the human mind, an *epistemic instrument* that amplifies expressive capacity, but also demands new skills in control, analysis, and ethics.

Floridi (2019) argues that we live in an "information society" where data and algorithms mediate reality. Writing, therefore, involves constantly negotiating with intelligent systems that filter, recombine, and propose meaning. In this context, traditional literacy—focused on decoding letters and constructing sentences—is insufficient. Writing in the age of AI demands *algorithmic literacy*, understood as the ability to understand, monitor, and question the invisible structures that generate text.

An illustrative example can be found in academia: a university student uses ChatGPT to write an essay on environmental ethics. The AI produces a formally correct text, but with generic arguments and no cultural nuances. The student's task is no longer to check spelling, but to identify conceptual gaps, add references, and give the text a *human voice*. In this way, AI-assisted writing becomes a dialogical exercise: the human reinterprets, corrects, and enriches what the machine proposes.

The transformation of the act of writing also raises pedagogical tensions. On the one hand, the use of AI can encourage superficiality—copying and pasting generated texts—but, on the other hand, it can encourage metacognitive reflection by comparing different versions of a text or analyzing how the response changes depending on the *prompt* used. Thus, AI-assisted writing should not be seen as a threat, but as an opportunity to strengthen understanding of the writing process, highlighting the importance of intention, structure, and communicative purpose.

**1.2. What does literacy mean in the age of artificial intelligence?**

In the digital age, literacy is no longer limited to teaching reading and writing, but rather to educating critical citizens capable of interacting with complex information in algorithm-mediated environments. According to Ng (2021), *new literacy* combines technical skills (knowing how to use digital tools), cognitive skills (thinking critically about information), and ethical skills (deciding responsibly how and when to use technology).

In the age of AI, literacy means teaching people to understand how automatic text generation works, how to identify biases in results, and how to distinguish between validated knowledge and plausible but false content. This type of literacy also requires developing *algorithmic awareness*: understanding that every AI response reflects the system's limitations, values, and training data.

From a pedagogical perspective, this literacy requires an interdisciplinary approach. Teachers no longer teach only grammatical rules or argumentative structures, but become mediators

between language, technology, and ethics. Education must foster experiences in which students engage in dialogue with AI, question its results, and build knowledge through the contrast between what is generated and what is researched.

For example, a classroom exercise could consist of asking AI for a text on "the social impact of climate change" and asking students to identify which parts of the text lack evidence or reproduce stereotypes. This process stimulates critical thinking and promotes *augmented reading*: active reading that does not accept information as truth, but subjects it to verification and analysis.

Furthermore, literacy in the age of AI involves incorporating digital ethics as a cross-cutting theme in the curriculum. Students must reflect on authorship, data privacy, consent, and intellectual property. These discussions are not merely technical, but deeply moral: Is it ethical to use AI to produce academic work without declaring it? How can intellectual integrity be protected when machines can generate texts?

Selwyn (2019) emphasizes that educating in AI does not mean teaching how to use software, but how to *think with software*. Contemporary literacy, then, is oriented toward developing citizens capable of understanding the political and cultural role of technology, not just its operational functionalities.

**1.3. Writing, teaching, and learning with generative tools**

The educational process is undergoing an unprecedented metamorphosis. AI is transforming not only individual writing, but also the dynamics of teaching and learning. In classrooms, generative tools enable the exploration of new forms of *creative learning*, where students become content designers, and teachers become facilitators of cognitive experiences.

Luckin et al.(2016) propose the concept of *augmented educational AI*, which does not replace teaching but rather enhances it. Algorithms can analyze student progress, suggest personalized activities, and offer immediate feedback. However, the human dimension remains irreplaceable: only teachers can interpret the emotions, motivations, and contexts that AI cannot understand.

In this sense, writing with AI becomes a practice of *pedagogical co-authorship*. Students learn to negotiate with the tool, adjusting parameters, reformulating *prompts*, and evaluating results. Each interaction is an act of metacognitive thinking: by observing how AI responds, learners discover their own cognitive and discursive patterns.

For example, a university workshop can incorporate a teaching sequence in which students write an introduction with the help of AI, review it as a group, and finally produce an individual final version. This process highlights the importance of critical reflection and human collaboration in the use of generative tools.

From a teaching perspective, teaching with AI involves reconfiguring assessment strategies. The traditional approach—focused on the final product—must give way to a *process-based assessment* that evaluates decision-making, justification of AI use, and the ability to reinterpret results. This change requires specific teacher training in digital ethics, educational *prompt* design, and discourse analysis.

Finally, learning with AI also means learning to set limits. Not everything should be automated: writing remains a space for subjective expression, imagination, and experience. AI can be a guide,

a mirror, or an assistant, but never a substitute for the human voice. Comprehensive literacy must ensure that students do not lose their ability to think, feel, and create autonomously.

**Summary of Section 1**

Writing in the age of artificial intelligence does not represent the end of traditional literacy, but rather its expansion into new cognitive and ethical dimensions. Literacy today means educating individuals who can understand the language of machines without losing the essence of human thought.

The educational challenge lies in balancing technological efficiency with critical depth, promoting a collaborative relationship between human and artificial intelligence. Only through comprehensive literacy—combining technique, ethics, and creativity—will it be possible to inhabit the new digital ecosystem of knowledge responsibly.

## SECTION 2. TEACHING PRACTICES AND REAL-LIFE EXPERIENCES

### 2.1. Generative literacy in basic education

Literacy in basic education is the foundation upon which the communicative, cognitive, and social skills of future citizens are built. At this level, the challenge is to integrate artificial intelligence (AI) as a learning tool without replacing the development of symbolic thinking, imagination, and personal expression.

In basic education, generative literacy enables AI-supported classroom projects and guided writing, promoting creativity (Fullan, 2021; Lévy, 2019). In secondary education, AI is used to write essays and develop argumentation and critical review skills (Sahlberg, 2023; Selwyn, 2019). Academic and professional writing benefits from AI in papers, reports, and teacher reflections (OECD, 2023). H y communities of practice strengthen collaboration and pedagogical innovation (Wenger, 1998; Williamson & Piattoeva, 2022).

*Generative literacy* is defined as the ability to create, understand, and modify content produced jointly with AI systems (Ng, 2021). In basic education, this involves introducing children to the responsible, guided use of tools that generate text, images, or stories from verbal or written instructions. It is not about teaching programming or encouraging technological dependence, but instead accompanying students in exploring new forms of representation and communication.

An example of a classroom project focused on this literacy can be developed around guided collaborative story writing. The teacher proposes an initial situation—for example, "a girl travels into space to save a planet in danger"—and the students, with the help of generative AI, create descriptions, dialogues, or endings. The emphasis is not on the final textual product, but on the process: reflecting on which AI suggestions are helpful, which should be rejected, and why.

This type of experience promotes critical and metacognitive thinking from an early age. Children learn that AI is not an infallible source, but rather a tool that requires human guidance and judgment. As Gee (2015) points out, modern literacy must be *situated*; that is, it must contextualize learning within meaningful social practices. By writing with AI, students not only learn to use technology but also participate in a contemporary discursive community where creativity is collaboratively built.

From the teacher's perspective, implementing these practices requires a curriculum redesign that incorporates digital skills, critical thinking, and ethics. AI can support pedagogical differentiation by offering suggestions tailored to each student's reading and writing levels,

enabling more inclusive teaching. However, it also poses risks: overexposure to generated texts can limit original expression or reinforce cultural biases present in language models (Bender et al., 2021).

Therefore, generative literacy in basic education must be based on three essential pedagogical principles:

1. Constant human mediation: AI does not replace the teacher, but acts as a cognitive assistant under their supervision.
2. Ethical and cultural reflection: Students should discuss the implications of creating with machines, recognizing the value of authorship and authenticity.
3. Experiential learning: AI should be integrated into meaningful, grounded projects aligned with students' interests.

These principles ensure that AI becomes a means of expanding the imagination rather than reducing intellectual autonomy.

**2.2. AI in secondary education: writing to think**

In secondary education, students face more complex writing tasks: argumentative essays, scientific reports, and critical analyses. In this context, AI becomes a powerful tool for thinking through writing. Writing to think, as Bazerman (2013) states, involves using the act of writing not only to communicate ideas but to construct, refine, and understand them in depth.

Generative AI tools, such as ChatGPT or Gemini, can facilitate this process by generating drafts, outlines, or counterarguments. However, the educational value lies in their thoughtful use. For example, a teacher may ask students to use AI to produce an introduction to an essay on social inequality. Students must then critically analyze the generated text: What assumptions does it contain? What does it omit? What kind of language does it use? Is it neutral, or does it reproduce biases?

This type of activity encourages *critical thinking* and *discursive awareness*. Students learn to identify the ideology underlying algorithmic language, understanding that all textual generation reflects particular values, data, and perspectives (Floridi, 2019). In addition, this practice helps improve argumentative competence, as students must justify their acceptance or rejection of an AI response.

AI can also act as *cognitive scaffolding* (Vygotsky, 1978), providing examples or writing models that students adapt to their own style. However, teachers must establish clear criteria for authorship and originality. Secondary education should teach not only how to use AI, but also how to engage in dialogue with it, while maintaining the centrality of human judgment.

A particularly valuable practice involves critically reviewing AI-generated text. This dynamic encourages students to compare an automatic version with one they have written themselves. The subsequent discussion, guided by the teacher, allows them to identify the strengths and weaknesses of both pieces of work. This promotes *formative assessment*, focusing on the process of improvement rather than the final grade.

In short, AI in secondary education can become a laboratory of thought where the most necessary skills for the 21st century are trained: discernment, argumentation, ethics, and creativity. Far from weakening learning, its well-planned incorporation can strengthen it by offering new avenues for intellectual exploration.

**2.3. Academic and professional writing with AI**

In higher and professional education, writing serves specific cognitive, communicative, and social functions: building knowledge, disseminating research results, and participating in academic communities. At this level, AI represents both an opportunity for efficiency and an ethical and epistemological challenge.

The use of AI for writing *papers*, reports, or teaching reflections has spread rapidly. Tools such as Scite, Elicit, and ChatGPT allow users to synthesize bibliographies, suggest argumentative structures, and generate summaries. However, as Nature (2023) warns, irresponsible use can lead to the "automation of scientific appearance," that is, to texts that are formally correct but lack rigor.

Therefore, AI should be conceived as a *cognitive assistant* rather than an author. Its ideal role is to enhance intellectual productivity, helping researchers formulate questions, organize ideas, and review writing, without replacing critical judgment or theoretical analysis.

A concrete example can be seen in the process of writing an academic article:

1. The author uses AI to generate a list of possible titles and section outlines.
2. They review the suggestions, adapt them to their approach, and complete the argument.
3. Finally, they use AI to check for textual consistency and grammatical correctness.

This workflow reflects responsible collaboration, where AI optimizes efficiency without compromising scientific integrity.

In addition, AI can play a key role in university teacher training. Teachers can use it to design rubrics, personalized feedback, or examples of academic writing. This promotes teaching based on modeling and reflection.

However, it is also necessary to recognize the risks. Generative systems can reproduce biases or plagiarize unidentifiable fragments. In this sense, the *critical literacy in AI* proposed by Selwyn (2019) and Williamson & Piattoeva (2022) becomes essential: professionals must be aware of the tool's limitations, the conditions of its training, and the implications of its use in assessment or publication contexts.

AI-assisted professional writing, therefore, redefines the role of the author: from producer to editor, from executor to strategist. The quality of writing will not depend on typing skills, but on the *cognitive competence to guide and validate automatic generation*. In this new paradigm, knowing how to write becomes *knowing how to direct artificial intelligence to write meaningfully*.

**2.4. Teacher training and communities of practice around AI**

The effective incorporation of AI into education requires prepared, critical, and creative teachers. *Teacher training in generative literacy* cannot be limited to technical courses on software use, but must focus on developing an epistemological and ethical understanding of the technology.

According to Mishra and Koehler (2006), teacher competence in technology is based on the integration of technological, pedagogical, and disciplinary knowledge (TPACK model). In the

context of AI, this integration involves knowing when, how, and why to use generative tools to promote meaningful learning.

Communities of practice (Wenger, 1998) are ideal spaces for this training. In them, teachers share experiences, reflect on the results obtained, and build collective pedagogical knowledge. For example, a network of language teachers can exchange strategies for using AI to teach argumentation without encouraging plagiarism.

These communities not only promote pedagogical innovation but also act as ethical support networks. In the face of technological enthusiasm, it is necessary to maintain a critical dialogue about limits and responsibilities. Decisions about the use of AI must be discussed collectively, recognizing the diversity of contexts, resources, and educational values.

A relevant example is the collaborative work between Latin American universities that implement digital literacy and AI laboratories. In these spaces, teachers experiment with generative tools, design interdisciplinary projects, and reflect on the social and cultural impacts of algorithmic approaches to teaching. These experiences show that the most valuable pedagogical innovation arises from peer exchange rather than from adopting external technologies.

Finally, teacher training in AI must promote a new type of *educational leadership*: one that combines emotional intelligence, critical thinking, and digital competence. Teaching with AI means teaching with intelligence, not fear. It means recognizing the transformative potential of technology without renouncing the humanistic principles that underpin education.

As Fullan (2021) concludes, sustainable educational change occurs when teachers feel they are protagonists in the process and not simply users of tools. Therefore, AI literacy should be conceived as a collective, continuous, and reflective process that strengthens professional autonomy and ethical innovation in the classroom.

**Summary of Section 2**

Teaching practices and real-world experiences show that artificial intelligence can become a powerful ally for contemporary literacy when integrated from a critical, ethical, and pedagogically grounded perspective.

In basic education, AI fosters guided creativity; in secondary education, it enhances argumentation and critical thinking; in higher education, it increases productivity and academic rigor; and in teacher training, it promotes communities of learning and ethical innovation.

The central challenge is to balance automation and humanization, efficiency and reflection. The education of the future will not be based on teaching people to compete with AI, but on teaching them to collaborate with it consciously, maintaining the centrality of human judgment, emotion, and ethics in all teaching and learning processes.

## SECTION 3. TOOLS, ETHICS, AND ASSESSMENT

### 3.1. Designing educational *prompts*: the new digital competency

The design of *prompts*—linguistic instructions that guide generative AI models—has become a core competency of contemporary literacy. In the educational context, this skill transcends the technical and transforms into a new pedagogical language: educational prompting. Knowing how to communicate with artificial intelligence involves understanding the structure of language,

the logic of algorithms, and the pedagogical intentions behind each question or request (Ng, 2021).

The design of educational prompts becomes a key competency, facilitating pedagogical interaction with AI (Holmes et al., 2021; Ng, 2021). Detecting and delimiting the use of AI requires establishing ethical boundaries and ensuring responsible authorship (UNESCO, 2021; UNESCO, 2023). Institutional policies promote critical literacy and regulate the incorporation of AI in education (Luckin et al., 2016; Selwyn, 2023).

The *prompt* is not a simple command, but rather a cognitive mediation. It allows human intention to be translated into an instruction that is understandable to the machine. In this sense, teachers who master the design of *prompts* become architects of algorithmic thinking: they guide AI toward an educational purpose, preventing responses from being superficial or disconnected from educational objectives.

From an educational perspective, educational *prompting* serves three main functions:

1. Exploratory function: it allows students to investigate ideas, generate hypotheses, or discover new perspectives. For example, a *prompt* such as "compare the social causes of poverty in Latin America and sub-Saharan Africa" invites AI to structure information for students to analyze critically.
2. Reflective function encourages metacognition, as the learner observes how their formulation of the question affects the quality of their response.
3. Creative function: it drives the production of original texts, scripts, stories, or projects based on established parameters.

However, mastering this skill does not mean relying on AI to generate knowledge; instead, it means learning to engage in critical dialogue with it. As Selwyn (2019) warns, education must prioritize critical thinking over uncritical automation. Teaching *prompting* involves teaching how to ask good questions, contextualize, and evaluate responses based on ethical and epistemological criteria.

From a teaching perspective, *prompting* can be conceived as a new pedagogical metalanguage. Designing effective instruction requires conceptual clarity, communicative intent, and disciplinary knowledge. A poorly formulated *prompt* can lead to erroneous or biased responses, while a well-structured one encourages in-depth exploration of the content. For this reason, some authors (Holmes et al., 2021) propose including *prompt design* in the digital teaching skills curriculum.

In practice, teachers can use different educational *prompting* strategies:

- Prompt by cognitive levels: linked to Bloom's taxonomy. Example: "Explain," "Compare," "Analyze," "Evaluate."
- Role-based prompt: assigning roles to AI ("act as a historian," "as an academic writer," etc.) to obtain contextualized perspectives.
- Metacognitive prompt: inviting the AI to reflect on its own response ("What are the limitations of your argument?").
- Ethical prompt: introducing moral dilemmas ("What consequences would this decision have for different social groups?").

These approaches promote a reflective, formative use of AI rather than mere instrumental dependence.

Therefore, *educational prompting* is configured as a new discursive literacy. It is not enough to "use AI": it is necessary to teach how to think with it, understand its biases, validate its contributions, and question its limits. In Floridi's (2019) words, human intelligence must remain the "moral and epistemological filter" of all digital interaction.

**3.2. Detecting, analyzing, and delimiting the use of AI: ethical limits, evaluation, and responsible authorship**

As generative AI tools are integrated into the educational environment, a central concern arises: how to ensure ethical and responsible use. This question encompasses three key dimensions: detecting misuse, evaluating AI-mediated productions, and defining authorship in academic contexts.

The first dimension, detection, has become more relevant as automated systems have developed to identify AI-generated text. However, recent research (Mitchell et al., 2023) shows that these detectors have significant error margins, leading to false positives and harming innocent students. Therefore, experts agree that the solution is not technical but pedagogical: instead of "hunting" for AI use, it should be integrated into assessment practices, promoting transparency and ethical reflection.

One possible strategy is to incorporate an AI collaboration statement into assignments. Students explicitly state which tools they used, at what stage of the process, and for what purpose. This approach, already adopted by universities such as Harvard and the UOC, encourages academic honesty and transparency and allows evaluation not only of the final product but also of the decision-making process.

The second dimension, assessment, requires a thorough review of traditional criteria. If AI is involved in generating ideas or drafts, what is being assessed: technical skill, critical thinking, or supervisory ability? The answer lies in refocusing assessment on thinking skills rather than just the text produced.

Teachers can design activities that value the ability to analyze AI responses, identify errors, or improve consistency. In this way, students demonstrate understanding and judgment, rather than simple reproduction. According to Luckin et al. (2016), this form of assessment promotes *augmented intelligence*, understood as the synergy between human creativity and technological support.

The third dimension, responsible authorship, is one of the most complex debates of the 21st century. UNESCO (2023) has noted that AI-generated texts lack copyright protection, as algorithmic creativity lacks intention or consciousness. However, when a human author guides, edits, and validates the result, a hybrid form of co-authorship is produced.

In academia, this raises ethical dilemmas: Is it legitimate to include AI-generated fragments in a research paper without citing the source? International publication guidelines (such as those from Elsevier and Springer) state that AI can be used for technical support but should never be listed as an author. In addition, any algorithmic intervention must be explicitly declared.

In the educational context, it is recommended that students be taught to apply three basic principles of ethical authorship:

1. Transparency: always indicate whether AI has been used and for what purpose.
2. Responsibility: take responsibility for reviewing and validating all generated

content.

3. Criticism: Do not passively accept results, but analyze them from a reflective standpoint.

These principles ensure that learning remains human, even when mediated by technology. The goal is not to ban AI, but to educate citizens who can coexist ethically with it.

In short, the ethics of AI use are not based on prohibition, but on the user's critical awareness. Detecting and delimiting its use requires institutional policies, teacher support, and a culture of transparency that reinforces trust and intellectual responsibility.

**3.3. Policies and recommendations for critical literacy in AI**

The sustainable and ethical integration of AI into education cannot depend solely on individual teacher efforts. It requires a solid institutional framework to guide practices, ensure equity, and promote critical literacy at the systemic level (UNESCO, 2023).

Education policies on AI must address three fundamental areas:

1. Ethical regulation,
2. Teacher training, and
3. Technological equity.

*1. Ethical regulation:*

Institutions must establish clear guidelines on the acceptable use of AI in educational contexts. This includes defining what types of assistance are valid in assessments, how to cite algorithmic intervention, and what practices constitute digital plagiarism. In addition, policies should promote respect for student privacy and data protection, ensuring that interaction with AI systems does not compromise sensitive information (Bender et al., 2021).

Ethical frameworks, such as those proposed by UNESCO (2021) or the European Commission (2022), recommend adopting principles of transparency, accountability, and algorithmic fairness. In the Latin American context, this also means ensuring that the tools used respond to local cultural and linguistic realities and avoid reliance on systems designed with Anglo-centric biases.

*2. Teacher training:*

Education policies must invest in ongoing training programs that strengthen teachers' digital and pedagogical skills. As Mishra and Koehler (2006) argue, technological, pedagogical, and disciplinary knowledge (TPACK) is key to integrating AI meaningfully.

These training courses should not be limited to technical workshops, but should also include modules on digital ethics, *prompt* design, AI evaluation, and bias analysis. Teachers need spaces for collective reflection—communities of practice, forums, educational laboratories—where they can share experiences and build situated knowledge (Wenger, 1998).

*3. Technological equity:*

One of the most significant risks of AI-based education is widening the digital divide. Policies must ensure equitable access to technological resources, infrastructure, and connectivity, preventing algorithmic literacy from becoming a privilege reserved for specific sectors. Educational AI must be designed and implemented with a social justice perspective that promotes the inclusion and participation of all students, especially those in vulnerable contexts (Selwyn, 2019).

Likewise, institutions must encourage research on AI and education to generate locally and contextually relevant knowledge. Universities, for example, can establish observatories of ethics and educational innovation to analyze the impact of AI on teaching and to produce guidelines adapted to their sociocultural realities.

**Summary of Section 3**

Artificial intelligence is redefining not only the act of writing, but also the ways of teaching, assessing, and legislating in contemporary education. *Prompting* is emerging as a new linguistic-pedagogical skill that combines critical thinking and communicative design; ethics and assessment demand transparency, accountability, and reflection; and institutional policies must guarantee an equitable, inclusive, and humanistic framework.

Critical literacy in AI is not about mastering tools, but about educating individuals who are aware of the power and limitations of algorithms. Education must teach 21st-century citizens to ask better questions, think independently, and coexist ethically with the intelligence they themselves have created. Only then will it be possible to build a genuinely democratic digital culture, where technology amplifies human intelligence without replacing it.

## SECTION 4. LOOKING TO THE FUTURE

### 4.1. The new teaching literacy: teaching with intelligence, not fear

The emergence of artificial intelligence (AI) in education has generated equal amounts of enthusiasm and fear. Some see it as a threat that jeopardizes authorship, assessment, and the authenticity of learning; others celebrate it as an opportunity to personalize teaching and democratize knowledge. Between these two positions, an urgent challenge emerges: building a new teaching literacy that allows teachers to teach with intelligence—based on understanding, ethics, and creativity—rather than fear.

The new teacher literacy involves teaching with intelligence rather than fear, taking advantage of opportunities offered by AI to enhance teaching and learning, and promoting critical and ethical skills (Floridi, 2023; Nussbaum, 2021).

This literacy is not limited to acquiring technical skills, but involves a cultural and epistemological transformation of the teaching role. The 21st-century teacher is not a transmitter of information, but a designer of cognitive experiences, a mediator between humans and algorithms, and an ethical reference point in the face of digital complexity (Fullan, 2021; Luckin et al., 2022).

In this new educational ecosystem, teachers must master three key competencies:

1. Cognitive-digital competency: understanding how AI models work, their potential and limitations, and how to integrate them pedagogically.
2. Ethical and emotional competency: maintaining a critical relationship with technology, avoiding both uncritical dependence and conservative rejection.
3. Creative and innovative competence: using AI to enhance imagination, problem-solving, and collective knowledge building.

### 4.2. Teaching with AI: from control to support

The education of the future will be characterized by a paradigm shift: from controlling knowledge to supporting learning. Instead of "monitoring" students' use of AI, teachers will need to teach them to use these tools judiciously, ethically, and purposefully.

AI-mediated autonomous learning redefines the time and space of education. Adaptive platforms, virtual tutors, and cognitive assistants will enable students to learn in flexible and personalized contexts. However, the role of the teacher will remain irreplaceable: only human interaction can offer empathy, moral guidance, and a sense of community.

Holmes et al. (2021) warn that the future of education will depend on teachers' ability to co-evolve with technology. This means not only adapting to new digital environments but also actively influencing their design, demanding inclusive, transparent, and culturally diverse systems.

In this context, teaching with AI requires a balance between reason and emotion. As Floridi (2023) suggests, ethical intelligence—the ability to discern good in technologically mediated contexts—will be the basis of future education. Teachers must guide students toward responsible use of AI, understanding that every interaction with a machine involves a moral decision.

For example, when faced with a student who uses ChatGPT to write an essay, the teacher of the future will not automatically punish them, but will instead accompany them in reflecting on how and why they used the tool, what they learned from the process, and how they can improve their critical thinking based on that human-algorithmic dialogue.

**4.3 Emerging scenarios for AI literacy**

The future of literacy with AI is shaping up in three major complementary scenarios: pedagogical, technological, and sociocultural.

*1. Pedagogical scenario: the classroom as a co-creation laboratory*

The classroom of the future will be a hybrid space where writing, reading, and thinking are developed in collaboration with intelligent systems. Students will become augmented authors, capable of creating, analyzing, and rewriting texts with the assistance of AI.

Literacy will cease to be an individual skill and become a collaborative social practice (Gee, 2015). Educational projects will integrate audiovisual production, digital narratives, and multimodal communication, combining human creativity with algorithmic efficiency.

In this scenario, teachers will act as curators of knowledge. Their task will be to select tools, contextualize information, and guide dialogue between multiple intelligences. This pedagogical co-authorship redefines the notion of academic authority, which is no longer based on mastery of knowledge, but on the ability to construct meaning together with students.

*2. Technological scenario: the teacher as a designer of cognitive experiences*

The literacy of the future will require teachers with skills in instructional design and computational thinking. Knowing how to create *prompts*, adapt materials to adaptive platforms, and evaluate interactions with AI will be everyday tasks.

However, educational technology must evolve toward more explainable, ethical, and transparent systems. According to Luckin et al. (2022), next-generation educational AI must allow users to understand why it makes certain decisions or generates specific responses. Only then can blind dependence be avoided and cognitive autonomy promoted.

In this sense, teacher training should include notions of critical algorithmic literacy, combining knowledge of language, epistemology, and digital ethics (Ng, 2021). Teachers will

not be programmers, but mediators capable of translating the languages of algorithms into pedagogical language.

*3. Sociocultural scenario: learning as a humanistic practice*

New literacy with AI cannot be reduced to a technical adaptation; it must be articulated with a humanistic and socially committed vision. Education has a responsibility to train ethical, empathetic individuals who are aware of the social impact of their technological actions.

According to Nussbaum (2021), the future of education requires strengthening moral imagination and empathy as pillars of critical thinking. AI can be a means to this end, provided it is used to promote intercultural dialogue, global cooperation, and cognitive justice.

In contexts of inequality, AI literacy must also aim to close gaps and democratize access to knowledge. Public policies must guarantee infrastructure, training, and regulatory frameworks that promote the equitable and safe use of innovative technologies.

**4.4. Educational leadership and ethics of the future**

Teaching leadership in the 21st century must be based on three principles: technological wisdom, emotional intelligence, and ethical responsibility. According to Fullan (2021) and Sahlberg (2023), these principles form the basis of transformational leadership in the age of AI.

1. Technological wisdom involves understanding the potential and limitations of AI tools, not out of fascination, but out of discernment. The educational leader of the future does not adopt technologies because they are fashionable, but because of their pedagogical relevance.
2. Emotional intelligence means accompanying students and colleagues in the digital transition, recognizing the fears, resistance, and challenges that change entails.
3. Ethical responsibility means ensuring that AI use respects human dignity, privacy, and cognitive justice.

Ethical leadership will ultimately be the axis that determines the course of future education. Teachers must become guardians of meaning in an era where data and algorithms threaten to replace reflection.

To this end, continuing education will be essential. Universities, ministries, and international organizations must promote professional development programs for teachers that focus on ethical thinking, advanced digital literacy, and educational leadership with AI (OECD, 2023).

In addition, it will be crucial to foster international collaboration networks among educators, researchers, and technologists. These global communities of practice will enable the sharing of experiences, the development of joint policies, and the construction of a planetary digital ethic grounded in cooperation and sustainability.

**4.5. Towards a pedagogy of shared intelligence**

The most promising horizon for the education of the future is the development of a pedagogy of shared intelligence: a model in which AI does not replace humans, but instead collaborates with them in the construction of knowledge.

Pierre Lévy (2019) already anticipated this vision when he spoke of *collective intelligence*, a network of distributed knowledge that mutually reinforces itself. In the age of AI, this idea takes on a new dimension: collective intelligence expands into the interaction between humans

and machines, forming a hybrid cognitive ecology.

In this context, teachers take on a central role: they must orchestrate the symphony between human, artificial, and social intelligence. Their mission will be to cultivate critical thinking, empathy, and creativity in an environment of algorithmic collaboration.

The *pedagogy of shared intelligence* is based on three postulates:

- Knowledge is built through interaction. AI can offer information, but the human community generates meaning.
- Technology is a means, not an end. Educational value lies in the reflective process, not in automation.
- Ethics is the foundation of learning. The literacy of the future will be ethical, or it will not be.

In short, teaching with intelligence—not fear—means recognizing AI as an ally of human thought, but also as a reminder of our moral responsibility. Education should not fear technology, but rather train individuals to use it with judgment, compassion, and purpose.

### 4.6. Summary of the fear of pedagogical intelligence

The future of literacy with AI will depend on the education system's ability to reconcile humanity and technology. The key is not to resist innovation, but to guide it ethically. Tomorrow's teachers will need to be critical thinkers, cultural mediators, and moral guides, prepared to teach how to think in a world where algorithms also write.

The new teaching literacy is not about teaching how to use tools, but about teaching how to think and create with them consciously. Educating with AI is a balancing act: harnessing its power without losing the human voice, exploring its potential without abdicating critical judgment.

As Selwyn (2023) states, the most significant risk of AI is not that it will replace teachers, but that teachers will give up thinking. Teaching intelligently means reclaiming pedagogy as a space for reflection, care, and humanity.

## CONCLUSIONS

The analysis of the four sections allows us to draw comprehensive conclusions about literacy in the age of artificial intelligence. First, writing and interacting with AI transform cultural and educational processes, consolidating AI as a co-author and tool for critical and creative learning. Second, teaching practices must be adapted to different educational levels, promoting generative literacy, ethical evaluation, and collaborative training. Third, the design of *prompts*, the detection of AI use, and the implementation of institutional policies reflect the need for an ethical, responsible, and thoughtful approach to technological integration. Finally, the future of education requires teachers who can lead with intelligence, ethics, and creativity, teaching students to think and learn with AI in a critical and humanistic way. Taken together, the sections show that 21st-century literacy is not just about technical skills, but about comprehensive competencies that combine critical thinking, ethics, creativity, and pedagogical mediation, consolidating an education where technology enhances, but does not replace, human intelligence.

This chapter shows that integrating AI into education redefines literacy, teaching practices, and the skills required. It highlights the need for critical thinking, digital ethics, and assisted creativity. Teacher training and institutional policies are essential for the responsible use of AI.

It is recommended to foster communities of practice, develop generative skills, and establish clear ethical guidelines to consolidate critical and sustainable literacy.

## REFERENCES

Bazerman, C. (2013). *A theory of literate action: Literate action volume 2*. WAC Clearinghouse.

Bender, E. M., Gebru, T., McMillan-Major, A., & Shmitchell, S. (2021). On the dangers of stochastic parrots: Can language models be too big? *Proceedings of the 2021 ACM Conference on Fairness, Accountability, and Transparency*, 610–623. https://doi.org/10.1145/3442188.3445922

Boden, M. A. (2016). *AI: Its nature and future*. Oxford University Press.

Floridi, L. (2019). *The logic of information: A theory of philosophy as conceptual design*. Oxford University Press.

Floridi, L. (2023). *The ethics of artificial intelligence*. Cambridge University Press.

Fullan, M. (2021). *The right drivers for whole system success*. Centre for Strategic Education.

Gee, J. P. (2015). *Literacy and education*. Routledge.

Holmes, W., Bialik, M., & Fadel, C. (2021). *Artificial intelligence in education: Promises and implications for teaching and learning*. Center for Curriculum Redesign.

Lévy, P. (2019). Collective intelligence for education in the digital age. *Educational Philosophy and Theory, 51*(6), 580–589. https://bit.ly/3O9yzqN

Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). *Intelligence unleashed: An argument for AI in education*. Pearson.

Luckin, R., Holmes, W., & Griffiths, M. (2022). AI and education: Towards a human-centred approach. *Frontiers in Artificial Intelligence and Applications, 341*(1), 10–23. https://doi.org/10.3233/FAIA220341

Mishra, P., & Koehler, M. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record, 108*(6), 1017–1054. https://bit.ly/3R2Xb8F

Ng, W. (2021). *New digital literacies for learning in the 21st century*. Springer.

Nussbaum, M. (2021). *Creating capabilities: The human development approach*. Harvard University Press.

OECD. (2023). *Artificial intelligence and the futures of teaching and learning*. OECD Education Working Papers. https://bit.ly/3QpK1AF

Sahlberg, P. (2023). Education and artificial intelligence: Preparing for the uncertain future. *European Journal of Education, 58*(3), 423–438. https://bit.ly/3YvR4qA

Selwyn, N. (2019). *Should robots replace teachers? AI and the future of education*. Polity Press.

Selwyn, N. (2023). Critical AI literacy: Developing an education agenda for the age of artificial intelligence. *Learning, Media and Technology, 48*(2), 129–144. https://bit.ly/3PojgqX

UNESCO. (2021). *Recommendation on the ethics of artificial intelligence*. UNESCO.

UNESCO. (2023). *Guidelines for the use of generative AI in education and research*. UNESCO.

Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity*. Cambridge University Press.

Williamson, B., & Piattoeva, N. (2022). Education governance and datafication in the age of AI. *Learning, Media and Technology, 47*(4), 365–379. https://bit.ly/3R4r6Jz

**ACKNOWLEDGMENTS**

I would like to express my gratitude to my family for their support and motivation throughout my professional medical and research career.

I am grateful to the institutions and colleagues who facilitated access to the information and resources necessary to carry out this work.

**CONFLICT OF INTEREST**

We declare that there are no conflicts of interest, financial or otherwise, with commercial associations or institutions.

**FUNDING**

No specific financial support has been received from public institutions, commercial companies, or non-profit foundations for the completion of this study.

**USE OF ARTIFICIAL INTELLIGENCE**

This chapter included the use of artificial intelligence tools exclusively to improve the clarity and style of the text, while maintaining full authorship and responsibility for the content.

**AUTHORSHIP CONTRIBUTION**

*Conceptualization:* Gaoussou Goro.
*Writing – original draft:* Gaoussou Goro.
*Writing – proofreading and editing:* Gaoussou Goro.