Artificial Intelligence in Basic Education

Guidance on Curriculum Pathways and Ethical Practices for the Use of AI in Brazilian Schools

MINISTÉRIO DA EDUCAÇÃO

2026
Ministry of Education

Minister of Education
Camilo Sobreira de Santana

Secretariat of Basic Education (SEB)
Kátia Helena Serafina Cruz Schweickardt

Directorate for the Support of Educational Management (DAGE)
Anita Gea Martinez Stefani

General Coordinator of Digital Education, Innovation and Connectivity
Ana Úngari Dal Fabbro

Authors
Paula Menezes and Flora Ariza

Design and Layout
Patrícia Jatobá

Scientific and editorial collaboration
Thaís Sanches Cardoso
Marina Kóvacs
Larissa Santa Rosa
Christian Brackmann
Rosa Vicari

This publication is made possible through the cooperation of UNESCO within the framework of project 914BRZ1157 – Futures of Education in Brazil: Towards an inclusive, equitable and quality education that promotes citizenship and sustainability. The recommendation of individuals and presentation of this publication do not imply the expression of any opinion on the part of UNESCO concerning the legal status of any country, territory, city or region or of its authorities, or concerning the delimitation of its frontiers or boundaries. The ideas and opinions expressed in this publication are those of the authors and do not necessarily reflect those of UNESCO nor commit the organisation.

Cooperation:

MINISTÉRIO DA EDUCAÇÃO

unesco

Introduction

This guiding document for Brazilian education systems and schools aims to provide education managers, particularly the state and municipal departments of education with the Ministry of Education's (MEC) current position on the **knowledge, learning processes, and meaningful uses of artificial intelligence in Basic Education, as well as uses that do not contribute to the teaching and learning process.**

With this document, the Secretariat of Basic Education wishes to complement the new **Framework for the Responsible Development and Use of Artificial Intelligence in Education,** developed by the Secretariat for Information Management, Innovation and Evaluation of Educational Policies of the MEC in collaboration with other secretariats of the Ministry, with specific guidelines for Basic Education. This document opens a new chapter in Brazilian education, at all levels, as well as in research and innovation practices, detailing pathways for the ethical integration of AI in educational environments. Thus, in addition to this Framework, we intend to provide **specific guidance for Basic Education**, aligned with the general guidelines on AI that will impact teaching and research in Brazil.

Based on the definitions in the **Framework for Responsible Development and Use of Artificial Intelligence in Education**, this guiding document is grounded in the principle that teaching **about** AI and teaching **with** AI are two dimensions to be articulated in Brazilian basic education, **strengthening critical digital and media literacy for digital citizenship.** Teaching and learning **about** AI refers to *artificial intelligence as an object of knowledge, implying the development of curricula for its understanding and its relationship with the world.* Teaching and learning **with** AI, in turn, refers to using *artificial intelligence as an educational resource, implying decisions about whether, when, and how to use these resources in teaching about AI or for school support.* These two definitions provide the basis for the entire body of guidelines contained in this document.

The document is organised into 5 chapters: theoretical, regulatory, and curricular guidelines (chapters 1 and 2); guidelines on the use of AI (chapter 3); teacher training (chapter 4); and, finally, the conclusion (chapter 5).

The first chapter provides theoretical and regulatory references on Artificial Intelligence in education, helping education managers and school leaders understand the main national and international definitions on the subject. It also includes references to documents and research on how Artificial Intelligence has been used by students and teachers, including in Brazil.

The second chapter, which reflects on the curricular adaptations education systems should make to encompass the teaching and learning of AI, establishes 7 (seven) guidelines and 12 (twelve) learning objectives that support pedagogical intentionality in AI education. The general guideline is that existing curricular frameworks (BNCC and Digital and Media Education) should form the basis for AI education. This chapter also presents the connections between these curricular frameworks and new knowledge and competencies regarding AI, as well as guidelines for each stage of education.

In the third chapter, we aim to introduce new concepts related to data responsibilities and platform uses in institutional spaces, particularly in schools, as well as to raise awareness among education managers and school leaders regarding two central documents: the ECA Digital (**Digital Statute for Children and Adolescents**) and the LGPD (Brazilian General Data Protection Law). The document outlines the opportunities and risks of using AI in basic education, criteria for evaluating potential solutions, fundamental principles for their adoption, and suggestions for good implementation practices. All sections of Part 3 incorporate the provisions of the General Data Protection Law (Law 13.709/2018) and the ECA Digital (Law 15.211/2025) as transversal and mandatory principles for the use of AI systems in schools, prioritizing aspects such as privacy, security, and the well-being of students in the digital environment.

The fourth chapter focuses on guidelines for teacher training in the AI era. The two main reference documents are UNESCO's AI Competency Framework for teachers (2024) and the Brazilian Ministry of Education's Framework for Digital Skills for Teachers (2024), which provide the basis for identifying the areas in which teachers need training. The framework identifies four training domains: Critical Understanding of AI; Intentional Pedagogical Use of AI; Protection of Rights and Well-being; and Professional Development and Teacher Well-being. The education manager will also find guidance on creating a decision-making process for the use and teaching of AI that incorporates teachers' contributions.

The fifth chapter provides final support by summarizing the decisions and actions discussed throughout the document. This support aims to help education managers visualize the various decisions behind teaching about and with AI, articulating the various elements discussed in the previous chapters.

This document is intended for state and municipal education departments and schools to support reflection and the development of curricula and policies for the use and learning of AI, guided by the fundamental values of Brazilian democracy. With this, we intend to consolidate teaching about and with AI within the Digital and Media Education agenda, strengthening the critical, creative, and ethical capacities of Brazilian children and young people to navigate the digital environment safely and in a healthy way.

Content

Chapter 1

Foundational guidance on AI in education 7

1.1 What is AI and how is it used in education? 8

1.2 AI in the brazilian educational context 13

1.3 National and international policy and regulatory frameworks 16

Chapter 2

How can curricula for learning about artificial intelligence be developed? 18

2.1 What vision should guide AI in basic education curricula? 19

2.2 Fundamental learning objectives in the age of AI 21

2.3 How does learning about AI relate to digital and media education and the BNCC? 26

2.4 How should learning about AI be organised across stages of education? 30

Chapter 3

How should the use of AI in education be guided? 36

3.1 What are the opportunities and risks of using AI in teaching and learning? 37

3.2 How to evaluate AI-based systems in education: balancing risks and opportunities during implementation 41

3.3 Fundamental principles for the adoption and use of AI platform 48

3.4 Building good practices for implementing AI in education systems and schools 52

Chapter 4

How should teacher education and professional development be organised? 59

4.1 Teacher education and professional recognition 60

4.2 Teachers at the centre of pedagogical decisions about and with AI 68

Chapter 5

Where to begin? Integrating teaching about AI and teaching with AI 71

References 77

Appendix 1 81

Appendix 2 85

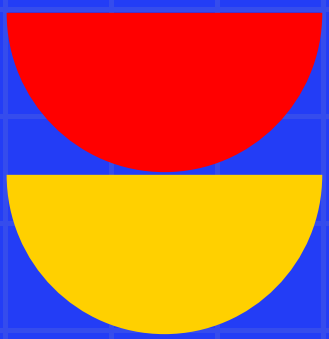
CHAPTER 1

Foundational guidance on AI in education

1.1 What is AI and how is it used in education?

1.2 AI in the brazilian educational context

1.3 National and international policy and regulatory frameworks



1.1 What is AI and how is it used in education?

Artificial intelligence (AI) can be defined as a set of computational systems and models aimed at simulating certain human cognitive operations. Its development has drawn on contributions from areas such as mathematics, cybernetics, physics, information and communication theories, logic, computer science, cognitive science, linguistics, and neuroscience, among others. Although it has gained significant public visibility recently, AI results from a longer historical process, with conceptual foundations dating back to the 19th century and formalisation occurring throughout the 20th century.

How is artificial intelligence defined in international documents?

In line with the definitions adopted by the OECD, UNICEF, and UNESCO, AI refers to machine-based systems that, based on objectives defined by humans or inferred by the AI itself from the data it receives, are capable of making predictions, recommendations, or decisions that influence real or virtual environments, interacting directly or indirectly with people or other physical or virtual systems. These systems can operate with varying degrees of autonomy and adapt their behaviour through learning processes, which reinforces the need, highlighted by these international organisations, for approaches guided by ethical principles, transparency, accountability, and human-centred values, particularly guided by human rights (Miao, 2021; OECD, 2023a; UNICEF, 2025).

Artificial intelligence (AI) in education can be understood both as a **field of study and research** (Colonna, 2025) and as a **field of application of AI systems in educational contexts** for pedagogical, administrative, or management purposes (Holmes et al., 2022). In contemporary debate, the relationship between AI and education is often framed along two analytical axes: **"learning with AI"** (using systems to support teaching and learning processes) and **"learning about AI"** (developing knowledge and skills to understand the functioning and limitations of these systems). These dimensions are important because they show that AI

is not limited to digital tools used in the classroom but also involves curricular, epistemological, regulatory, and political disputes related to both the ways of producing knowledge and the ways of organising educational practices and evaluating learning (Vicari *et al.*, 2023; Menezes *et al.*, 2024).

International organisations and reference documents have noted that AI systems—based on predictive models, including those with generative capabilities—can operate across multiple dimensions of educational policy, with applications that include support for learning (e.g., tutoring and personalisation), support for teaching (preparation of activities, suggestions for teaching strategies, production of materials, and feedback), and support for management (monitoring of school trajectories, planning, and automation of administrative routines) (Centeno et al., 2025; CIEB, 2024a). Although these applications are already part of the daily lives of schools and education systems, their expansion occurs amid infrastructure asymmetries, dependence on private platforms, data protection challenges, risks of algorithmic bias, and uncertainties about the pedagogical validity of certain uses, especially when these uses are close to evaluative and decision-making functions (European Union, OECD, Code.org, 2025).

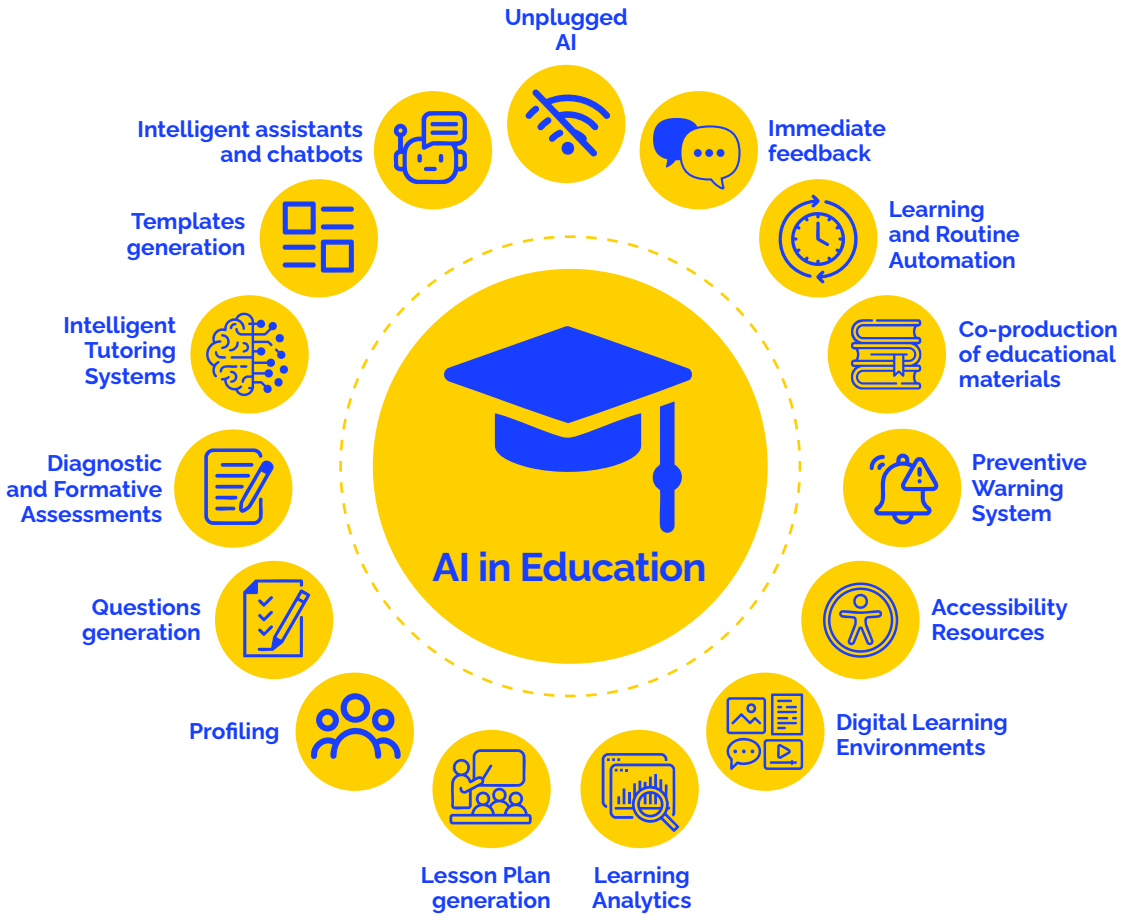
Generative AI / Predictive AI

Generative AI: "Generative Artificial Intelligence (GAI) is an artificial intelligence (AI) technology that uses machine learning to generate new content (text, image, code, audio, video, etc.) in response to commands ("prompts") provided by the user (which we call "natural language"). It generates its content by analysing the statistical distributions of words, pixels, or other elements in the the data on which the system was trained, and identifying and reorganising common patterns (for example, which words usually appear followed by other words)." (Adapted from Unesco, 2023).

Large Language Models (LLMs): are a specific type of GenAI specialized in written language. LLMs don't "know" things in the conventional sense: they estimate the most likely sequence of words from a given context.

Predictive AI: In industry regulations or technical guidelines, predictive AI is often described as the use of machine learning models to estimate or anticipate future behaviours or outcomes based on patterns extracted from historical or training data.

Most frequent uses of AI in education



Learning: AI-focused learning systems are designed to interact directly with students to support teaching and learning processes, personalise educational paths, provide real-time feedback, and enhance pedagogical experiences. They can operate in both formal and non-formal educational contexts.

Examples of tools

- **Intelligent tutoring systems** that adapt content, pace, and activities according to students' performance;
- **Educational chatbots or pedagogical agents**, used to clarify doubts, support study, and mediate content;
- **Personalised digital learning environments** with personalised recommendations for activities and educational resources;
- **Maker spaces and creative labs**, where AI can support problem-solving, simulations, and interdisciplinary projects;
- **Immersive experiences and virtual or augmented** reality focused on exploring complex content and on historical, scientific, or technical simulations.

Teacher support: Teacher support AIs are systems that assist teachers with pedagogical and administrative activities without replacing pedagogical judgment, helping optimise time, support lesson planning, and expand possibilities for evaluating and monitoring learning.

Examples of tools

- **Automated grading and plagiarism detection**, including analysis of written work and exercises;
- **Generation and co-production of didactic materials with AI suppor**t, such as texts, activities, images, or scripts;
- **Generation of lesson plans, didactic sequences, or presentations**, based on objectives defined by the teacher;
- **Automated assessment** focused on response analysis, diagnosis of learning difficulties, rubrics, or formative feedback.
- **Support for instructional planning**, assisting teachers in organising learning objectives, content, and pedagogical strategies;
- **Expansion of accessibility in educational materials**, including the generation of summaries, content in multiple languages and accessible formats (such as Braille), text simplification for children with ADHD, image descriptions, and the use of multiple media to represent content;

Management support: AIs supporting educational management are systems used by managers, education systems, and institutions to support planning, monitoring, decision-making, and administrative processes, operating primarily at the institutional or systemic level.

Examples of tools

- **Analysis of educational data**, focusing on performance, dropout rates, attendance, and educational indicators.
- **Planning courses, classes, and schedules**, optimizing resources and allocating teachers;
- **Prediction of educational trajectories** and identification of dropout or retention risk;
- **Curriculum management and alignment**, including organising competencies, learning objectives, and assessments;

Non-educational AIs: text, video and image generation tools, research assistants, etc., are not developed specifically for the educational field, but are widely used in school and academic contexts by students, teachers and education leaders and managers, and can serve multiple pedagogical, administrative or communicational functions.

Examples of tools

- **Generative text models** used for writing, reviewing, translating, and summarizing content.
- **Tools for generating images, audio, or video**, used in producing educational materials and school projects;
- **AI-based virtual assistants and search systems** for research, information organisation, and study support;
- **Productivity tools**, such as organising tasks, emails, minutes, and planning;
- **Analysis and programming systems** used in technical, scientific, or computational thinking educational contexts;
- **Tools for transcription, summarization, and report generation** from meetings, assessments, or administrative records.

In educational contexts marked by inequalities in digital infrastructure, the international community has also discussed approaches that develop solutions adapted to environments with limited or intermittent connectivity. One such perspective is known as Unplugged AI in Education (AIED Unplugged), which proposes designing AI applications that can operate with minimal technological resources, using devices already available in schools and interfaces that require low levels of digital literacy from teachers and students (Isotani et al., 2023; Portela et al., 2024; Uema et al., 2025). This approach seeks to expand opportunities for the pedagogical use of AI in contexts where access to the internet, equipment, and digital skills remains limited, helping reduce inequalities in access to educational innovations and promoting more inclusive solutions adapted to local realities.

In this guiding document, the Ministry of Education emphasises that these dimensions should be understood in an integrated way, avoiding both a strictly instrumental approach and a non-pedagogical adoption of technological solutions. To facilitate understanding, we propose grouping **teaching and learning with AI** at a first level, focusing on the **field of application and use of AI in education**. This includes institutional and pedagogical decisions about **when, how, and for what purposes** to employ AI systems, as well as guidelines to reduce risks and ensure transparency. In parallel, we propose treating **teaching and learning about AI** as a **curricular** dimension, aimed at training students and professionals to critically understand AI systems, identify their limits and social implications, and develop technical, ethical, and political competencies to act in contexts mediated by data and algorithms. This framework allows us to treat AI not only as an occasional pedagogical resource but also as a structuring theme of curriculum and training policies, especially given the growing presence of automation and algorithmic mediation in broader educational and social processes.

How to approach AI in education?

Teaching and learning ABOUT AI

Artificial intelligence as an object of knowledge, implying decisions concerning curriculum development regarding its understanding and its relationship with the world.

Teaching and learning WITH AI

Artificial intelligence as an educational resource, entailing decisions regarding whether, when, and how to use these resources in teaching about AI or for academic support.

> AI literacy represents the technical knowledge, durable skills and future-ready attitudes required to thrive in a world influenced by AI. It enables learners to engage, create with, manage and shape AI, while critically evaluating its benefits, risks and ethical implications. This preliminary definition builds on existing definitions from the EU AI Act (European Union, 2024), the OCDE, UNESCO, and other organisations (European Commission, OECD, Code.org, 2025)

1.2 AI in the brazilian educational context

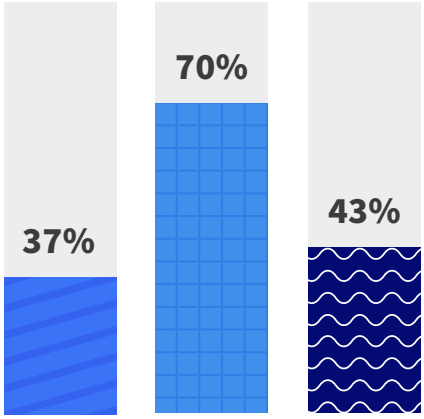
Understanding artificial intelligence in education matters for several reasons. First, the AI models most used by students and teachers in Brazil are not developed locally but imported from large global companies—especially generative language models and commercial platforms—which implies external technological dependence and challenges in adapting to the country's cultural,

linguistic, and pedagogical specificities (UNESCO, 2023). The educational world is also experiencing an **accelerated, uneven, and poorly mediated incorporation** of these technologies, both in Brazil and globally. According to a study published by the EU/OECD, 49% of young people aged 17 to 27 have difficulty critically evaluating and identifying AI shortcomings, such as whether AI systems can invent facts. Most children and young people of Generation Z also learn about AI on social media (55%), while few learn about it in schools and from teachers (only 15%) (Merriman & Sanz Sáiz, 2024, cited in European Union, OECD, Code.org, 2025, p. 7).

This presence is already verifiable in Brazil: according to the 2024 ICT Education survey, **37% of internet-using students reported using generative AI platforms for research and school activities**, and **among high school** students, this proportion reaches **70%**, showing that AI has already become a central informational resource for a significant portion of students (Cetic.br/NIC.br, 2025a). On the teaching side, **43% of elementary and high school teachers reported using generative AI tools to prepare teaching materials**, with a higher concentration in high school and in urban and private schools, indicating that the technology is also spreading as support for pedagogical work.

Despite this, the data **suggest low institutionalisation and limited pedagogical guidance**: while **33%** of students reported receiving guidance on how to identify incorrect, false, or biased content produced by AI, only **19%** said they had discussed with teachers how to use generative AI in school activities, revealing a significant asymmetry between practical adoption and critical mediation (CGI.br, 2025a). Beyond its use by students and teachers, AI is also beginning to consolidate at the organisational level of educational policies, whether through the use of AI-based systems and resources in assessment processes (as mentioned by teachers) or through the expansion of digital platforms in the school routine and in educational management (CGI.br, 2025a; Observatório Edutecia, 2025).

How are teachers and students using AI in Brazil?



37% of students have already used generative AI platforms.

70% of high school students have already used generative AI platforms.

43% of primary and secondary school teachers reported using generative AI tools in the preparation of teaching materials, with a higher concentration in higher secondary education and in urban and private schools.

Source: TIC Educação Research 2024.

Research conducted by Cetic.br in 2025 with specialists and school communities (CGI.br, 2025b) shows that **artificial intelligence is perceived in a dual light, with both risks and benefits.** According to the research, school leaders identify benefits such as reduced teacher overload, the creation of teaching materials, and better monitoring of students (AI as a teacher's assistant). Among the risks, education managers recognise practical difficulties in implementing AI tools, the need for training, and possible negative impacts on learning. Regarding students, the research finds that **many already demonstrate an understanding of how generative artificial intelligence works**, even questioning the reliability of the answers and the impacts on learning. The study identifies a large difference in the use of AI, particularly between public and private schools: the former tend to avoid its use, while the latter present a more open scenario of use. In both cases, however, the teacher's mediation remains limited.

Understanding this context is fundamental so that education managers and school communities can decide on their relationship with the world of artificial intelligence, reduce inequalities in access to and use of technology, **promote critical and ethical training** in AI from the early stages of education, and ensure that the potential benefits are accompanied by pedagogical, ethical, and data protection criteria appropriate to the Brazilian reality.

1.3 National and international policy and regulatory frameworks

Artificial intelligence, particularly generative AI, has been the subject of international regulatory discussion, which will shape how it may be used in educational institutions in the coming years.

In the field of education, guidelines for the use and teaching of AI in schools have been provided through GUIDES or FRAMEWORKS. These international frameworks, which we translate here as "normative references" or "guides to normative guidelines," are instruments that support public policies and have become fundamental for influencing and facilitating communication among multinational agencies and nation-states. These normative frameworks establish general parameters and limits—including principles, values, operational and managerial objectives, and modalities—to guide public policy actions and initiatives. In the educational field, for example, entities such as UNESCO, UNICEF, and the OECD have been actors in this international public governance of education, creating a series of international references.

The main international documents (included in Annex I) establish a global strategic vision for integrating Artificial Intelligence (AI) into education, grounded in a human-centred approach and respect for fundamental rights. Initiatives such as the Beijing Consensus (2019) and the European Union AI Act (European Union, 2024) argue that technological development must be accompanied by robust regulatory frameworks that ensure **transparency, data protection, and continuous human oversight,** while avoiding discriminatory or surveillance practices. The central aim is to leverage innovation to achieve Sustainable Development Goals (SDGs) 4, 10, and 12, ensuring that AI systems in management and education promote **equity and inclusion**, especially for vulnerable groups and in less developed countries.

At the pedagogical level, the frameworks focus on developing "AI literacy" for students and teachers, enabling them to understand, create, and manage technologies critically and ethically. Documents such as DigComp 3.0 and the UNESCO Competency Framework for students highlight the need to balance **technical skills with uniquely human capabilities,** such as critical thinking and

creativity. PISA 2025 proposed measuring self-regulated learning in digital environments. Simultaneously, **the protection of the physical, psychological, and social well-being of the school community** is emphasised, with recommendations for practices that combat risks such as cyberbullying, digital fatigue, and misinformation, ensuring that technology serves as a resource for empowerment and autonomy.

At the time of publication of this Document, the regulation of artificial intelligence in Brazil is still under development and is part of a pre-existing normative framework. Sectoral laws, technological law, and data protection provisions already in force—such as the Innovation Law, the **Marco Civil da Internet (Brazilian Civil Rights Framework for the Internet), the General Data Protection Law (LGPD), and the ECA Digital (Digital Statute for Children and Adolescents)**—offer frameworks for the protection of rights, privacy, and innovation, as well as mechanisms for reviewing automated decisions and promoting principles of **"human-centred AI"** privacy, and ***child rights by design***. This regulatory landscape demonstrates that Brazil is not starting from a "blank canvas," as there are already regulations shaping the development and use of AI. However, it also highlights gaps that motivate the processing of specific bills, such as PL 2.338/2023, which seeks to establish principles, guidelines, and a national AI governance system, inspired by international models such as the European Union's AI Act.

In the field of education, the Ministry of Education has been monitoring school systems' curriculum revisions to implement **Digital and Media Literacy**, conceived as an integrated field primarily guided by the skills of Computing in the **National Common Curriculum Base (BNCC) and the Operational Guidelines established by CNE/CEB Resolution No. 2/2025.** In this context, some initiatives from state networks have been organised into three fronts: new curricula with specific competencies and subjects on AI (as in the case of Piauí); guides for the use of AI in schools (as in the case of Goiás and Sergipe); and teacher training (as in the case of Ceará).

Want to learn more about these international guidelines?

See Appendix 1 at the end of this document, which compiles the main references, cited documents, and other resources for further study. Information on the **General Data Protection Law (**LGPD) and the **Digital Statute for Children and Adolescents** (ECA Digital) will be detailed in Chapter 3.

CHAPTER 2

How can curricula for learning about artificial intelligence be developed?

2.1 What vision should guide AI in basic education curricula?

2.2 Fundamental learning objectives in the AI age

2.3 How does learning about AI relate to digital and media education and the BNCC (National Common Curricular Base)?

2.4 How should learning about AI be organised across stages of education?

2.1 What vision should guide AI in basic education curricula?

Guidelines for the use and learning of AI in basic education can provide education managers, school leaders, and teachers with a more integrated view of how to approach the set of learning, skills, and abilities related to AI and its necessary interdisciplinary dimension. Two documents can help develop these guidelines: the recent UNESCO reference document "AI Competency Framework for Students" (2024) and the National Operational Guidelines of the National Education Council on the use of digital devices in school spaces and the curricular integration of digital and media education (CNE, 2025). The first integrates the Brazilian agenda into an international movement aligned with a democratic vision that guarantees human rights. The second document supports integrating AI education into the existing learning ecosystem, favoring a less burdensome curricular review for education systems and schools.

Guidelines for using and learning about AI

1. **All teaching involving AI should be accompanied by instruction about AI,** ensuring that decisions about the use or non-use of AI systems rest with school communities, while intentional and meaningful learning about these systems is mandatory in school curricula.

2. Decisions about teaching and learning **WITH** or **WITHOUT** AI should be based on the primary objective of developing **cognitive and social skills**, avoiding dependence on these systems, and prioritizing the **balance and well-being** of children and young people.

3. **AI literacy** should be integrated with digital, media, and computational literacies and recognised as a dimension of scientific education.

4. Learning **WITH** and **ABOUT** AI should be **centred on society**, that is, on the problems and needs of local communities and of Brazilian society.

5. **Combating educational inequalities** and promoting environmental and social sustainability should be the central focus of decision-making in educational communities, moving beyond a logic of mere adaptation to the current context and promoting the empowerment of young people to help co-create sustainable futures, guided by an ethic of collectivity, inclusion, and sustainability.

6. AI curricula should be developed based on the principles of protecting individual and collective rights and fostering **digital citizenship**, while addressing inequalities and violence in the digital environment.

7. Teacher support and training should be designed to value the profession, guarantee **teachers' leading role in the pedagogical process**, and support their autonomy and pedagogical decision-making, thereby transforming them into **leaders** in digital citizenship in the AI age and ensuring they understand their rights and responsibilities.

What to consider before adopting AI-focused curricula?

According to UNESCO, certain conditions are necessary for the successful implementation of AI curricula in schools: "training and support for teachers, teaching resources on AI, needs analysis and research conducted in schools, up-to-date digital infrastructure in schools, and the provision of AI resources, including through the acquisition of hardware and software, as well as engagement with the private or third sector to share AI devices and systems. If these conditions are not met, it is unlikely that the curriculum will be implemented as intended or that it will achieve its intended learning and competency objectives." (UNESCO, 2022)

These guidelines reflect this Ministry's current understanding of artificial intelligence systems in education and can serve as a compass for decision-making amid rapid technological innovation in this field. In this sense, continuity and pedagogical intentionality, as well as balance and well-being in the school environment, remain the ultimate goal, so that children and young people develop their cognitive and socio-emotional skills in a healthy and meaningful way, while considering the demands of **protection** and **responsibility** in the digital context.

2.2 Fundamental learning objectives in the age of AI

Digital and Media Education, in its integrated conception within the **BNCC** Computing component (National Common Curricular Base) and the Operational Guidelines established by CNE/CEB Resolution No. 2/2025, constitutes the curricular foundation for preparing students for a world permeated by artificial intelligence. These regulations and guidelines already prepare students for many of the technical, ethical, and pedagogical challenges schools must address. Furthermore, in educational contexts with varying levels of digital infrastructure, teaching about artificial intelligence can be developed both through the direct use of digital technologies and through pedagogical activities that do not depend on constant connectivity or individual devices (for example, **unplugged AI** in education). In this context, it is equally important to identify how these learning experiences are interconnected and how they

can contribute to foundational knowledge and an ethical understanding of AI systems. Therefore, we present a set of **12 fundamental learning objectives** for the AI era, linked to these curricular frameworks.

Digital and media education

School systems are currently updating their curricula to comply with CNE/CEB Resolution No. 2/2025 for the inclusion of Digital and Media Education. According to this document, it is understood as:

*"**Digital and media education**: an interdisciplinary area that includes the competencies foreseen in the BNCC (National Common Curricular Base) related to the use of technologies, communication, reflection and analysis of information and media, digital culture, the digital world and computational thinking, in accordance with the indications of the School Digital Education axis of Law No. 14,533, of January 11, 2023" (Article 3, item V).*

12 Fundamental learning outcomes for the age of AI

1. **Understand computational language** and the use and processing of natural languages through artificial intelligence, from simple to more complex algorithms, distinguishing among the various language models and types of AI.

2. **Develop logical skills** by learning how computer systems and artificial intelligence function, using symbolic and probabilistic systems to identify patterns and classify information.

3. **Relate technical solutions to human and ethical problems** by learning to develop and execute collaborative projects between humans and technical systems that are relevant to their community.

4. **Understand the AI lifecycle** in terms of the natural resources and labour required to develop and sustain AI systems and their underlying business models, and for the development and disposal of the physical infrastructure involved in AI technology (strategic minerals, rare earths, semiconductor production, data centres, and the use and disposal of water and energy, among others).

5. **Identify how artificial intelligence uses and generates information and data**, including data collection and AI training, while paying attention to privacy risks and recognising the effects on the creation of information bubbles and the spread of misinformation.

6. **Recognise the limitations and biases of human communication and interaction,** and how they are reproduced in interactions with predictive/generative AI systems (confirmation bias, cognitive bias, racial and gender bias, language bias, affinity bias, among others).

7. **Enhance self-regulated learning** focused on analytical and critical thinking skills, supporting processes such as visualizing relationships among areas of knowledge, developing learning strategies, developing conceptual thinking, monitoring learning, identifying errors, and solving problems.

8. **Develop creative thinking with and without the use of AI systems**, paying attention to memory and cognitive offloading processes that can be impaired by excessive use without clear pedagogical actions.

9. **Identify the power relations and inequalities generated or present within the AI production ecosystem**, particularly racial/ethnic and gender inequalities, and recognise the role of public- and private- sector actors in mitigating risks for citizens.

10. **Understand the rights and responsibilities involved in digital environments**, with an emphasis on the rights of children and adolescents in basic education, relating them to everyday problems and the democratic values of Brazilian society, contributing to safe access to these systems, and understanding practices of political and gender-based violence as contrary to democratic life.

11. **Learn to act responsibly, safely, and ethically in AI-mediated environments**, promoting individual and collective well-being, and identifying the responsibilities, risks, and opportunities of AI integrated into the internet, applications, games, and social networks.

12. **Promote socio-emotional skills for autonomy**, grounded in an understanding of safe and healthy practices for using digital equipment and AI, while building strategies for sociability and coexistence with diversity, enabling the development of a repertoire of experiences mediated and unmediated by the digital environment.

These learning objectives can be grouped into sets so that their intentions and relationships with specific disciplines become clearer and help visualise how networked curricula can contribute to teaching about AI.

Learning set 1

Computational and Algorithmic Literacy

This set of learning objectives includes technical and ethical knowledge, strongly emphasized in the Computer Science skills outlined in the BNCC (National Common Curricular Base), but 3which here need a specific intentionality for understanding not only binary mathematical logic, but also other languages and logics used by AI systems. It is also important to consider the interaction between humans and machines ethically. Mathematical and logical knowledge can be integrated with disciplines such as Philosophy, Sociology, and Languages.

Learning Objectives: 1 2 3 4

Learning set 2

Digital, Informational, and Media Literacy

In this set of learning objectives, Digital and Media Education is central, allied with Computational Thinking so that students understand how a data-driven system transforms information into text, image, or video, or even predictive analyses. Analytical and critical knowledge of information must be further reinforced in the face of the proliferation of information generated by AI. Self-regulated learning and creativity are key pedagogical principles that should be reinforced. Subjects such as Arts, History, Languages, and Mathematics can be articulated here. The dimension of rights and responsibilities in digital media is also essential to consider.

Learning Objectives: 5 6 7 8

Learning set 3

Understanding the social, environmental, and ethical impacts of AI for building citizenship

In this axis, the human and ecological dimension is emphasized, particularly to understand the AI lifecycle, which includes not only large data infrastructures but also the environmental consequences of the massive use of AI. Although ethics permeate all axes, this axis is fundamental for thinking about the ethics of these systems not only from the point of view of their functioning but also their use and the human work behind AI. The disciplines of Geography, Sociology, Biology, and Philosophy are fundamental for developing these learnings.

Learning Objectives: 4 9 10 11 12

2.3 How does learning about AI relate to digital and media education and the BNCC?

At this point, it is essential to understand how AI learning has evolved in recent years and what still needs further development. In the National Common Curricular Base (BNCC), particularly in its Computing supplement, we find much of the knowledge related to computational thinking and languages, as well as the identification of these systems in everyday life and the recognition of aspects of information security and quality.

Digital and Media Literacy expands the critical dimension of this knowledge, guiding curricula towards a more systemic concern that affects citizenship: the recognition of rights and duties and the impacts of digital technologies. Finally, AI learning articulates these curricular documents, emphasising how various competencies, skills, and knowledge can be oriented towards instruction on the specificities of AI.

Within the context of the BNCC (National Common Curricular Base), especially in the field of Computing, learning about artificial intelligence contributes to developing knowledge of computational thinking and to understanding how the digital world functions, including ethical participation in digital culture. AI is understood as a technology that involves computational concepts, data analysis, process automation, and social impacts. Therefore, its inclusion in school programs allows students to understand the potential limitations and social implications of these technologies, strengthening their training to act critically, creatively, and responsibly in a society increasingly mediated by computer systems.

Media and AI literacy require specific knowledge and skills for contemporary life. Students cannot be expected to exercise critical thinking, creative expression, ethical judgment, social responsibility, or civic engagement if they are not fluent readers, lack a solid foundation in science and mathematics, do not have in-depth knowledge of scientific thinking, and are not exposed to a diverse set of knowledge and key ideas from the social sciences and humanities (Macgilchrist, 2021; Kasneci et al., 2023).

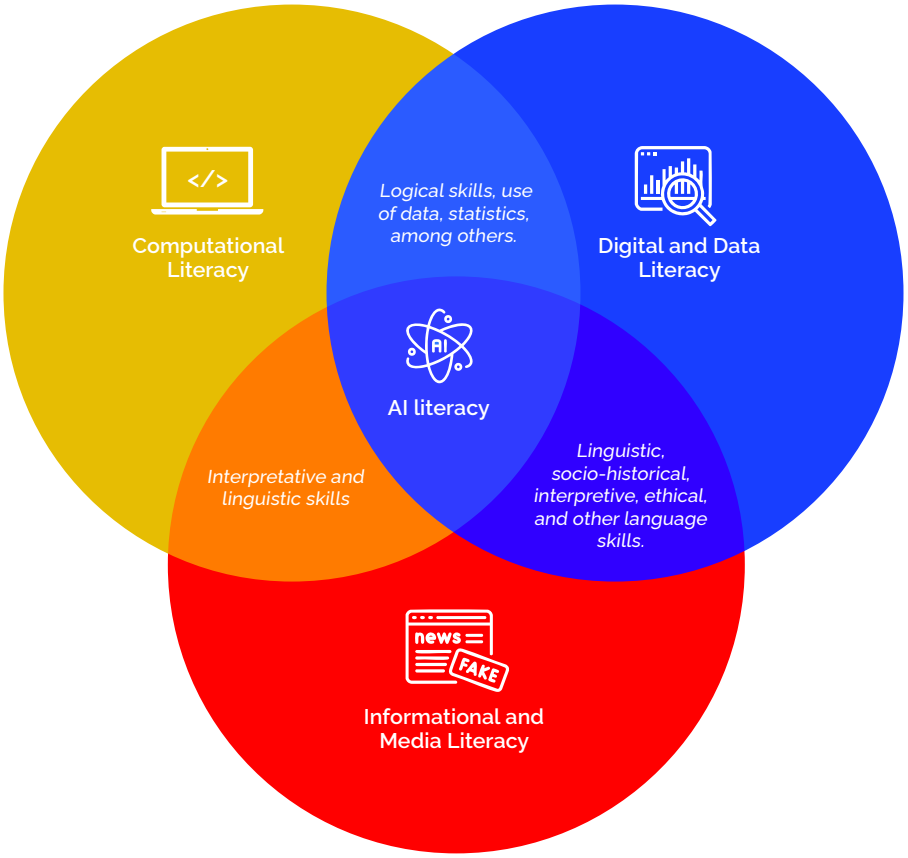
Computing, media, and AI are therefore cross-cutting themes relevant across all school subjects. Their teaching needs to promote research-based approaches that foster adaptability and creativity, enabling students to engage in critical and innovative problem-solving. The practice and development of digital skills are also essential for students to develop media and AI literacy.

Table 1: Correspondences between Digital and Media Literacy and Learning about AI

Digital and Media Literacy (2025)	Learning about AI (2026)
Understanding computational language and AI.	Understanding algorithms and AI (data, algorithms, and models).
Computational Literacy	Developing logical reasoning through computational literacy and computational thinking.
Computational Literacy and Digital Citizenship	Collaborative Human-AI Projects for Computer Literacy and Digital Citizenship: Community Issues
Computational Literacy and Media Literacy	Data, algorithms, models, privacy, media, information bubbles and misinformation.
Understanding algorithms and complex capabilities.	Recognising human and AI biases.
Digital culture and complex skills	Self-regulated learning with or without AI support.
Digital culture and complex skills	Human creativity with and without AI; limits of cognitive offloading.
Digital Citizenship	AI lifecycle: labour, natural resources and environment.
Digital Citizenship and Digital Rights	Power relations and inequalities in the AI ecosystem.
Digital Rights: Digital Citizenship and Media Literacy	Rights and responsibilities in digital environments;
Digital Rights: Digital Citizenship and Media Literacy	Responsibility, ethics and secure AI use
Digital culture and complex skills	Socio-emotional skills autonomy in the face of AI.

Digital fluency, security, and responsibility in digital environments are developed when **multiple literacies** make sense of the digital world in relation to the non-digital world. This includes being able to identify, for example, how technologies are socially situated and how computational solutions are not neutral and are subject to ethical debates and decisions. Based on the Resolution CNE/CEB No. 2/2025, we must consider the integration of multiple literacies necessary for digital education.

Literacies for the 21st century



Computational literacy: refers to the set of skills and abilities necessary to understand **how computer systems work** (including artificial intelligence systems), encompassing concepts such as algorithms, data, programming, digital security, and **problem-solving** through computational thinking. This literacy also involves **understanding the digital world**, including how information is represented, processed, stored, and transmitted by computer systems, as well as critical and responsible participation in **digital culture**, enabling individuals to understand, use, and create digital technologies in an ethical, critical, and creative way.

Digital and data literacy: refers to the ability to understand, produce, and use information in different formats and sources in the **digital environment**. This includes reading, writing, and interacting with content on screens, platforms, and digital systems, expanding traditional forms of reading and writing based solely on printed materials. With the growth of data use in society, developing **data literacy** also becomes fundamental. This means knowing how to find data from different sources, understanding what it represents, analysing how it is presented, and evaluating whether it is reliable and useful for a given purpose. It also involves **critically interpreting data-based information** and considering ethical aspects in the use of this information.

Information and media literacy: Information literacy refers to the ability to **search for, select, evaluate, and use information critically and responsibly.** It involves recognising when we need information, knowing where to find it, and evaluating the reliability of sources. Media literacy, on the other hand, is related to **understanding the role of media in society** and the ability to critically analyse content disseminated through different media, such as television, social networks, newspapers, and digital platforms. UNESCO considers these two literacies complementary and essential in the digital society, as they help students and educators use information ethically, better understand the content circulating in the media, and make more informed decisions.

AI Literacy: Artificial intelligence literacy refers to the ability to **understand, use, and critically evaluate AI systems** in different educational and social contexts. This includes knowing, in an accessible way, how these systems work, what types of AI exist, and how they use data and algorithms to produce answers, recommendations, or predictions. Beyond technical use, AI literacy involves developing a **critical and responsible** stance towards these technologies. This implies recognising their limitations, potential biases, and social and ethical impacts, allowing students, teachers, and education managers to make informed decisions about when and how to use AI tools in learning processes, knowledge production, and problem-solving.

2.4 How should learning about AI be organised across stages of education?

Learning Set 1: Computational and Algorithmic Literacy

- **Early Childhood Education:** to promote exploratory experiences with non-digital materials and resources that help children recognise patterns, establish simple cause-and-effect relationships, and begin organising sduringes within play-based activities
- **Primary Education – Primary Education:** to encourage understanding of simple problems and the development of ordered steps to solve them, favoring the use of representations, basic algorithms, and logical reasoning in different situations.
- **Lower Secondary Education:** to consolidate the use of algorithms, problem decomposition, and abstraction, and to expand the ability to structure data, test solutions, and understand the principles that underpin digital systems and AI models.
- **Upper Secondary Education:** to deepen critical and technical analysis of computer systems, including algorithmic models and introductory AI fundamentals, with a focus on solving complex problems, research, and technological creation.

Table 2: Learning outcomes from Set 1 by educational stage

Learning Objectives	Early Childhood	Primary School	Lower Secondary	Upper Secondary
Understand computational language and AI (models, generative/ predictive).	Promote exploratory experiences with non-digital materials and resources that enable children to recognise patterns, establish simple cause-and-effect relationships, and begin organising sequences within play-based activities.	Exploration of sequences, step-by-step instructions, and simple examples of everyday automation.	Introduction to algorithms, flowcharts, and the distinction between types of AI through guided activities.	Critical analysis of AI models, comparing pattern recognition and symbolic and statistical reasoning, with real-world case studies.
Develop logical skills and computational thinking.		Pattern, classification, and problem-solving games using concrete materials.	Use of symbolic representations, problem decomposition, and algorithmic logic.	Modeling of complex problems, abstraction, analysis of computational systems.
Human-AI collaborative projects for community problems.		Simple projects involving the observation and resolution of local problems, with teacher mediation.	Guided interdisciplinary projects (Example: using data to map school problems).	Original and community-based projects integrating AI, ethics, and social impact.

Learning Set 2: Digital, Informational, and Media Literacy

- **Early Childhood Education:** to promote playfulness and initial contact with print media and languages through collective observation, narrative, and expressive practices, stimulating recognition of different communication formats.
- **Primary Education – Primary Years:** to develop the ability to search for, select, and understand simple information, identify reliable basic sources, and produce digital records with the support of accessible tools.
- **Lower Secondary Education:** to strengthen critical analysis of information, understanding of content circulation mechanisms, and the production of original digital media, including the evaluation of AI-generated content. Understand the language processes behind AI model construction to strengthen students' interpretive and analytical abilities.

- **Upper Secondary Education:** to enhance research, argumentation, and multimodal media production skills, expanding the ability to critically evaluate recommendation algorithms, automated content, and disinformation processes. Associate language models with learning models and understand the characteristics of current commercial models within the attention economy.

Table 3: Learning outcomes from Set 2 by educational stage

Learning Objectives	Early Childhood	Primary education	Lower Secondary	Upper Secondary
Data, Algorithms and AI models, privacy, bubbles of information and disinformation.	to promote playfulness, initial contact with print media and languages through collective observation, narrative, and expression practices, stimulating the recognition of different communication formats.	Pattern recognition, forms of organisation, and written symbolic reasoning, aiding in traditional literacy.	Analysis of sources, introduction to data, and concepts of digital privacy. Understanding types of machine learning—with everyday examples—and the potential for information bubbles.	Understand how predictive and recommendation systems work, with an in-depth study of data collection, AI training, information bubbles, and disinformation.
Identify human biases and AI biases.		Mediated discussions on differences, privacy, and ethics in data usage.	Analysis of biases in AI-generated texts, images, and videos.	Critical study of algorithmic biases (racial, gender, linguistic) and their social impacts.
Self-regulated learning with or without AI support.		Simple study planning and monitoring with teacher guidance and without the use of digital devices.	Guided use of digital tools for organising and reviewing learning.	Critical use of AI to monitor learning, identify gaps, and avoid over-reliance.
Creativity with and without AI; limits of cognitive offloading.		Creative manual production, distinguishing between digital and non-digital art (with or without AI).	Comparison between human- and AI-assisted productions, creating collaborative solutions.	Discussion on authorship and creative activities involving AI, paying attention to the risks of cognitive automation.

Learning Set 3: Understanding the social, environmental, and ethical impacts of AI on building citizenship

- **Early Childhood Education:** Introduce the understanding of rules and collaboration through social observation and play, promoting responsible attitudes in the shared use of objects.
- **Primary education – Primary Years:** Introduce concepts of respect, coexistence, and care for technology by understanding it as a cultural artefact, promoting responsibility and collaboration in the shared use of objects.
- **Lower Secondary Education Level:** Develop an understanding of the social and cultural impacts of technologies, including risks, inequalities, and the implications of automation, and stimulate ethical attitudes and critical thinking about algorithms and AI. Understand the AI lifecycle and the human elements in AI development.
- **Upper Secondary Education Level:** to deepen the understanding of the ethical, environmental, and political dimensions associated with AI and digital technologies, analysing their effects on work, democracy, privacy, sustainability, and social relations. To connect technical solutions with possible ethical and political consequences.

Table 4: Learning outcomes from Set 3 by educational stage				
Learning Objectives	**Early Childhood**	**Primary Education**	**Lower Secondary**	**Upper Secondary**
AI lifecycle: labour, natural resources, and the environment.	Introduce the understanding of rules and collaboration through social observation and play, promoting responsible attitudes in the shared use of objects.	Basic concepts of responsible consumption and environmental impact.	Study of production chains and natural resources linked to technology.	Critical analysis of the AI life cycle (mining, energy, water, data centres, disposal).
Power relations and inequalities in the AI ecosystem.		Guided conversations about justice, rules, and living together.	Discussion on digital inequalities and access to technology.	Geopolitical and economic analysis of AI; role of the State and public policies.
Rights and responsibilities in digital environments.		Rules for coexistence and safety.	Introduction to digital rights and online citizenship.	Study of digital rights, democracy, regulation, and citizen participation.
Responsibility, safety, and ethics in the use of AI.		Rules for coexistence and safety.	Risk analysis, safety, and online interaction.	Ethical assessment of AI uses in social networks, platforms, and services.
Social-emotional skills and autonomy in the face of AI.		Identifying healthy habits using non-digital technology.	Discussion on authorship, digital dependency, balance, and living with diversity.	Development of strategies for autonomy, well-being, and living with diversity.

Unplugged teaching strategies

Unplugged AI education refers to teaching fundamental AI concepts through physical, playful, and collaborative activities that do not require the use of computers or digital devices. This approach is suitable for educational contexts with limitations in digital infrastructure, such as restricted internet access, a scarcity of devices, or low levels of digital literacy among users (Isotani et al., 2023; Dermeval et al., 2025). From this perspective, AI-based educational solutions are designed to function preferably offline or with intermittent connectivity, using devices already available in schools and requiring the minimum possible technical skills from teachers and students.

In the specific field of AI, unplugged activities allow for an understanding of how intelligent systems operate based on data, rules, and models, avoiding learning focused solely on the use of digital tools considered "black boxes" and favoring conceptual understanding of classification, decision-making, and algorithmic limitations (Carrisi; Marras; Vergallo, 2025). In this way, AI ceases to be presented as an autonomous entity and begins to be understood as a socio-technical system built by humans, based on structured processes of representation and learning.

Unplugged AI can be progressively used in all stages of basic education, with increasing levels of conceptual complexity. In early childhood education, physical activities and organisational games allow working with sequences, rules, and pattern recognition, introducing the idea of automated instructions and decisions. In the first years of primary education, students can explore data classification and representation through physical groupings, cards, and simple diagrams, strengthening logical and mathematical reasoning associated with the functioning of intelligent systems (Carrisi; Marras; Vergallo, 2025). In lower secondary, it becomes possible to discuss model training and testing, as well as classification errors and algorithmic biases. In upper secondary school, activities that simulate pattern recognition and automated decision-making processes allow for the exploration of more complex concepts, such as machine learning and model generalization, linking technical fundamentals to the social impacts of artificial intelligence (Lindner; Seegerer, 2019).

Examples of unplugged activities include games based on decision trees, in which students construct criteria for classifying elements and test the accuracy of their own models, understanding that AI systems identify patterns in data but always operate under conditions of uncertainty (Lindner; Seegerer, 2019). Other proposals include neural network simulations with students representing different processing layers, as well as organisational activities, flowcharts, and algorithms that develop decomposition, abstraction, and logical sequencing—pillars of computational thinking (Alves; Fonseca, 2025). Such experiences allow for working with central AI concepts—data, models, training, inference, and error—while promoting collaboration, critical thinking, and an understanding of the technical and social limitations of these systems.

CHAPTER 3

How should the use of AI in education be guided?

3.1 What are the opportunities and risks of using AI in teaching and learning?

3.2 How to evaluate AI-based systems in education: balancing risks and opportunities during implementation

3.3 Fundamental principles for the adoption and use of AI platforms

3.4 Building good practices for implementing AI in education systems and schools

3.1 What are the opportunities and risks of using AI in teaching and learning?

The adoption of artificial intelligence systems in education must be evaluated in context. Educational AI resources often have a dual character (positive or negative), representing opportunities and risks in equal measure. This understanding should guide decisions about their use and about curricula.

As highlighted by major international guidelines on the use of AI in education, especially concerning children (UNESCO, 2019; 2022; 2023; UNICEF, 2025), there is no technological neutrality; technologies do not solve educational problems on their own. Furthermore, evidence of the educational effectiveness of AI systems is often produced in experimental or quasi-experimental contexts that differ significantly from real school settings using large-scale AI systems (Holmes and Tuomi, 2022). Given this context, the benefits of personalisation, accessibility, and support for teaching can be realised only when their use is guided **by pedagogical intent, with clarity on when, how, and why to use AI; by mediation, autonomy, and adequate teacher training; and by institutional safeguards, with shared responsibilities between the school community and the technology developers**. Without these conditions, the same tools can lead to curricular fragmentation, technological dependence, cognitive and autonomy losses for students, privacy violations, and increased inequalities.

The following table systematises how AI use in education can bring both opportunities and risks.

Table 5: Uses, opportunities and risks of AI in education		
AI used for	**Opportunities**	**Risks**
1 Personalise learning	AI adapts content to individual needs, identifies gaps and offers personalised learning pathways.	Excessive individualisation can fragment the collective experience and reinforce AI limitations and biases; discontinuity between the curriculum and the national reality and the approach presented by the resources; resource's inadequacy in relation to local language and didactic strategy.
	Example: A Portuguese language teaching platform offers a generative AI-based tutor for students from 6th to 9th grade, allowing them to ask individual questions as they arise, in a way adapted to their difficulties.	**Example:** The language of the generative AI tutor is generic and not adapted to students' developmental stage, and there is misalignment between the school's curriculum and the platform's contents. Students stop solving problems collectively.
2 Stimulate creativity and authorship	Generative tools can assist creative processes, offering references and repertoire to students.	Inadequate use replaces a genuine creative process and compromises the development of intellectual integrity. Students' safety in the digital environment may be threatened.
	Example: An image generation platform allows students to create illustrations for an interdisciplinary project on regional culture.	Example: Students rely only on typing prompts and submit the images generated by AI in their final work, without developing skills, and handing in visually similar works. The platform allows students to upload personal photos and photos of classmates with no security control, which are used to train its models without informing about that use.
3 Develop critical thinking	Contact with AI can help develop critical analysis, information verification and understanding of technological biases.	Without mediation, students develop excessive trust and accept information without verification.
	Example: In a composition class, students submit the same argumentative text to different AI chatbots and compare the analyses received, identifying divergences, checking cited sources and discussing in groups why each AI pointed to different aspects, thus developing critical analysis of the technology and the texts generated.	**Example:** Students accept the chatbot's first response as correct, rewriting their texts exactly as suggested by the AI without questioning the proposed changes. The chatbot presents biases on controversial topics, tending towards certain ideological positions present in the training data.

Table 5: Uses, opportunities and risks of AI in education		
AI used for	**Opportunities**	**Risks**
4 Support teachers' work	AI automates repetitive tasks, allowing greater dedication to planning and individualised follow-up.	Institutional pressures can reduce teacher autonomy over pedagogical choices and limit professional creativity.
	Example: A teacher uses a generative AI tool to produce drafts of descriptive reports, which they personalise with specific observations for each student, reducing time spent on formatting and standard text.	**Example:** The teacher begins to receive demands that all reports follow the AI standard, losing space for qualitative observations and feeling that their knowledge about the students is disregarded. The tool collects metrics of teacher productivity (time to prepare, frequency of use) that can be used in performance evaluations without teachers' knowledge.
5 Develop curricular activities	Digital platforms deliver curricular content and facilitate continuity between in-person and remote activities.	Dependence on a proprietary platform creates vulnerability: discontinuation or change of services can interrupt pedagogical processes. Inequalities in network infrastructure can lead to unequal availability of the curriculum. Misuse of collected data can encourage abusive practices and commercial exploitation.
	Example: A platform that organises the curriculum by BNCC (National Common Curricular Base) skills allows teachers to post supplementary materials and students to access homework, maintaining continuity between classroom work and home activities.	**Example:** The company discontinues a platform feature, that was considered very useful for the school's teachers, preventing an established pedagogical strategy. The platform monitors each student's time of use and sends automatic alerts to families, creating a surveillance dynamic. Educational data are sold to market-analysis companies.
6 Develop teaching materials	AI helps create diversified materials, adapted to local contexts and different levels of complexity.	Generated materials may contain factual errors, cultural biases, or content inappropriate for certain age groups. Loss of teachers' intellectual property rights over the materials they produce. Lack of transparency about consulted sources.
	Example: A science teacher uses generative AI to create materials about ecosystems with examples of local species, contextualising the curriculum to the students' reality.	**Example:** The generative AI tool creates material that incorrectly classifies species and uses technical language inappropriate for students. Materials created by the teacher on the platform become the property of the company, which may commercialise them. Generated texts may contain passages from copyrighted works without appropriate citation.

Table 5: Uses, opportunities and risks of AI in education		
AI used for	**Opportunities**	**Risks**
7 Evaluate and grade assignments	Automated grading offers immediate feedback and allows for more frequent formative assessments.	Automated assessments privilege standardised responses and may fail to capture the complexity and creativity of thinking, and cultural nuances. Lack of clarity about evaluation criteria.
	Example: An automatic essay-grading system provides immediate correction on textual structure, allowing the student to rewrite their text and receive specific guidance on cohesion and paragraphing with each version.	**Example:** The system penalises a creative narrative structure, flagging an original text as erroneous and assigning a high score to a generic, standardised text. The grading algorithm penalises regional linguistic variations. The system's assessment of assignments does not match the teacher's evaluation, giving grades that are much higher or much lower than expected.
8 Learning Recovery	Adaptive systems identify specific gaps and offer personalised recovery pathways.	Reinforcement of patterns may prevent creative solutions, reinforce inequalities and social stigmatisation. Excessive focus on gaps generates negative experiences and may limit access to advanced content.
	Example: After a diagnostic assessment, an adaptive system identifies that the student masters basic arithmetic operations but has a specific gap in fractions, directing them to a focused sequence that starts from what they already know, optimising learning recovery time.	**Example:** A student spends excessive time on fraction exercises without access to other content the class is studying, developing an aversion to mathematics and feeling stigmatised for following a different path than classmates. Poor use of performance data can lead to inappropriate decisions about class placement and progression.
9 Promote accessibility and inclusion	AI offers resources such as translation to Libras, screen readers and content adaptation.	Implementation without attention to equity amplifies inequalities. Sensitive data may become vulnerable.
	Example: A deaf student follows a History lesson with automatic real-time translation into Libras, able to pause and review segments, while a classmate with low vision accesses the same content via a screen reader with AI-generated image descriptions.	**Example:** The tools only work with a stable internet connection; students cannot use the resource in real time, becoming more excluded than before, when they received adapted printed material. Data on students' disabilities are categorised and stored without anonymisation. The technology creates dependence: when it fails, there is no available alternative.

Table 5: Uses, opportunities and risks of AI in education		
AI used for	**Opportunities**	**Risks**
10 Prevent school dropout	Early-warning system cross-references attendance, performance, and participation data to identify students at risk of dropping out. The pedagogical team receives alerts and can initiate outreach and social support before the student leaves school, increasing the retention rate.	Algorithms can perpetuate discriminations present in historical data. Constant monitoring can create a surveillance environment. Risk classifications can stigmatise students.
	Example: Early-warning system cross-references attendance, performance, and participation data to identify students at risk of dropping out. The pedagogical team receives alerts and can initiate outreach and social support before the student leaves school, increasing the retention rate.	**Example:** The system can reinforce stigmatisation of certain students without providing family or qualitative context, which is only accessible through conversations with teachers. School management may make decisions based on these systems without consulting families or teachers.

3.2 How to evaluate AI-based systems in education: balancing risks and opportunities during implementation

It is difficult to find evaluations of AI systems grounded in relevant data that align with academic standards or real-world problems. Without standardised or easily accessible benchmarks, meaningfully comparing or tracking AI performance is challenging. Fairness and safety concerns persist, as LLMs used in education should be unbiased and safe for diverse learners. Furthermore, student data is sensitive, making it difficult to evaluate technologies without compromising privacy. Balancing transparency, fairness, and privacy can be an obstacle. Despite these limitations, researchers are exploring several methods

to make AI evaluation more reliable, explainable, and accessible (e.g., Kaggle and FlexEval).

Evaluating AI-based systems is not just about measuring results, but about ensuring that AI technologies are fair, effective, and reliable for educators and students. Given this, how can education managers and school leaders make informed choices about AI technologies?

Given that all educational use of AI involves risks and opportunities, it is fundamental that decisions about adopting AI systems be guided by the principle of **proportionality**, balancing technological risks with learning objectives. Furthermore, every decision must prioritise **the best interests of the child**, a principle present in the **ECA Digital** (Law 15.211/2025) and the **LGPD** (Law 13.709/2018).

When selecting AI systems for educational use, public managers should prioritise developers whose solutions comply with these laws, follow development criteria that guarantee **Children's Rights from the Design stage** (see Annex II of this guide), and align with the recommendations of the chapter on Interactivity in the Ministry of Justice and Public Security's Content Rating Guide (2025). It is recommended that AI resources be adopted only if they offer significant educational gains compared to other non-digital resources. Furthermore, it is important to consider whether the financial and operational costs of adopting the solution are justified by the mapped risks and whether they devalue or threaten the continuity of non-technological pedagogical solutions or practices already consolidated in the school community.

Implementation should be preceded by pedagogical and institutional planning to ensure that systems integrate into the school routine in an organic, intentional way, aligned with the curriculum and free of overload, fragmentation, or disjointed use. When adopted, the tools should prioritise minimising risks to learning and cognitive development, the well-being of students and teachers, and the safety and protection of the school community.

To ensure this, education systems adopt clear criteria for evaluating the adequacy of the resources. It is up to the education managers and technicians involved in implementation to demand clear, robust information from the developers: the learning principles underlying the resources, the measures

taken to ensure compliance with the LGPD (Brazilian General Data Protection Law) and the ECA Digital (Digital Statute for Children and Adolescents), and information on how biases are handled and how the algorithms function. This information should be analysed before adopting the resources and throughout the other phases of implementation, enabling a consistent, critical evaluation of the tools and ensuring transparency within the school community.

LGPD, ECA Digital and Rating System: framework vs. regulatory framework for the adoption of AI in education

Any artificial intelligence initiative in schools must adhere to two key legal frameworks. The **LGPD** (Law No. 13.709/2018) establishes that all processing of students' personal data must respect the principles of purpose, necessity, and transparency—in the case of children, specific consent from parents or guardians is required (Art. 14). Sensitive data, such as health information or biometrics, receive enhanced protection and can only be processed in restricted circumstances (Art. 11). The law also guarantees rights of access, correction, and deletion of data, and prohibits processing for discriminatory purposes.

The **ECA Digital** (Law No. 15.211/2025) complements this framework by requiring that technology products and services targeted at and accessed by children and adolescents adopt, by default, the most protective privacy configuration (Art. 7). The law prohibits profiling for advertising targeting (Art. 22), imposes age verification, mandates risk assessments for safety and health (Art. 8), and requires parental supervision mechanisms.

Complementing this framework, the **Content Rating Guide - Audiovisual, Applications and RPGs**, published in October 2025 by the Ministry of Justice and Public Security, in alignment with the Statute of Children and Adolescents, establishes boundaries and limits for the use of AI by children and adolescents. The chapter on **Interactivity** provides clear guidelines for age-based limitations, including for educational use, which must be followed by developers and respected by schools.

Together, these regulations define that no AI tool aimed at basic education can be adopted without concrete guarantees of data protection and the best interests of children and adolescents.

Best Interests of the Child

The **principle of the best interests of the child** is enshrined in Article 3 of the Convention on the Rights of the Child (CRC), adopted by the United Nations General Assembly in 1989 and ratified by Brazil in 1990. It establishes that in all actions concerning children, their best interests must be the primary consideration. Therefore, it is a binding obligation for all instances of the Brazilian State, including education systems.

The principle is present in three central legal frameworks for Brazilian education managers. The Statute of the Child and Adolescent (ECA) adopts it as an interpretative guideline for all children's rights. The ECA Digital (Law No. 15.211/2025) translates it to digital environments, placing the protection of privacy, mental and physical health, access to information, freedom of participation, and well-being as mandatory parameters for technology products and services intended for children and adolescents. The LGPD (Brazilian General Data Protection Law) conditions the processing of minors' personal data to their best interests, requiring schools and suppliers to justify the collection and use of data based on this criterion.

In practice, this means that when evaluating any AI tool for school use, the education manager and the school leader should ask: does this solution prioritise the well-being and development of students, or does it primarily serve the interests of the provider? This question should guide everything from contract analysis to monitoring classroom use.

Proportionality: How to scale the use of AI in education systems?

The principle of proportionality establishes that any technological measure adopted must be compatible with the objective to be achieved—neither more nor less than necessary. In Brazilian legislation, this principle appears in the LGPD (Article 6, III), which defines that data collection should be limited to the minimum indispensable for the purpose of the service; and in the ECA Digital (Law No. 15.211/2025), which determines differentiated treatment according to the nature and risk of each service.

For the education manager, this translates into three practical questions when faced with any AI resource: (1) is the data collected strictly necessary for pedagogical functioning, or is there excessive collection? (2) is the level of complexity and risk of the tool compatible with the problem it solves, or is it possible to achieve the same result with a simpler solution? (3) is the planned level of supervision and monitoring proportionate to the impact that the tool may have on students? Applying proportionality means recognising that not all technology requires the same level of caution, but that none should be adopted without an analysis of the necessary care and monitoring.

Four key criteria for evaluating AI-based systems in education

To support decision-making and implementation processes, this document proposes four key criteria that can inspire critical evaluation of the use of AI-powered educational solutions in education systems and schools. This roadmap can help education managers and school leaders mediate collective decisions with the school community, always prioritizing the ethical principles of public administration.

1 Consistency and continuity in teaching

How are the tool's pedagogical objectives ensured? Are they clear and aligned with the curriculum and network guidelines?

Is it validated, or does it reinforce good pedagogical solutions already used in the territory, as supported by research evidence (not funded by the developer)?

Do they lead the network to become dependent on the contracted solution?

Does automated content promote critical learning or standardise thinking?

Are there protocols for technical review of the generated content before use?

How does adopting this tool weaken the pedagogical value of the resource?

How do the contract clauses, budget balance customization, and collaborative learning interact? Are they transparent and consistent with the network's needs?

Does the feature allow downloading data and usage history in an open format?

2 Student well-being and development

- What cognitive benefits does this technology demonstrate?
- Does it affect their motivation and self-esteem?
- Does the platform generate images and content appropriate for the age group and developmental stage?
- Does the tool foster personal expression and creativity among students?
- Does the proposed use of this resource respect appropriate screen time for students, particularly those with low academic performance?
- Does exposure to AI foster autonomy in students and teachers, or technological dependence?

3 Well-being and integrity of teaching work

- Does adopting this resource respect the teacher's autonomy?
- Does the teacher have access to the criteria for automatic evaluation and to the sources used in content generation?
- Can the teacher change grades, assessments, and automatic feedback?
- Does the data collected by the tool and its use by management compromise teacher autonomy?
- Does the use of this resource reduce or increase the teacher's workload?
- Is there adequate training available for teachers to use this training tool and adapt it to their teaching routines?

4 Security, privacy, and fairness

- Does the feature comply with the LGPD's data processing requirements?
- Does the contract provide for liability regarding the privacy and security of the ECA Digital?
- How is the security of sensitive data ensured?
- Is there protection against exposure to inappropriate content in responses?
- Does the system include filters for inappropriate or dangerous language?
- Are there mechanisms for reporting and blocking content?
- Does the resource meet the security specifications?
- Is there accessible documentation explaining how the algorithm works, in simple, clear language for the school community?
- Are there mechanisms to identify and correct algorithmic discrimination?
- Does the tool offer features for people with special needs?

How to ensure compliance with the LGPD* and the ECA Digital**?

What documents should be requested from the developer?

- Clear statement of the tool's purpose, target audience, and the age groups for which it was designed;
- Evidence of pedagogical effectiveness that supports claims of educational impact (e.g., a report or test demonstrating that AI contributed to students' reading learning);
- Documentation on the system's operation, including information about the data used to train it;
- Compliance report with the General Data Protection Law (Law 13.709/2018) and the ECA Digital (Law 15.211/2025);
- Personal Data Protection Impact Assessment;
- Risk assessment of the rights of children and adolescents.

What should be included in contracts signed with developers?

- Obligation to collect data is limited to what is strictly necessary for the pedagogical functioning of the tool;
- Prohibition of the use of students' and education professionals' personal data for commercial or advertising purposes, or for training new models, without explicit consent;
- Obligation to deliver usage reports in formats understandable to non-specialist professionals;
- Inclusion of security mechanisms against malicious use, such as attempts to disable data manipulation;
- Inclusion of integrated filters that prevent access to or generation of inappropriate content for children and adolescents, such as violence, pornography, and self-harm;
- Inclusion of real-time alerts for supervisors when prohibited content is accessed or generated;
- Obligation to keep activity records accessible to the management team; Contractual commitment to regular bug fixes and security tests before updates;
- Flowchart of the algorithm's operation, appropriate for the users' age group; Obligation of the system to offer clear privacy notices in accessible language.
- Support in the development of materials, together with school or network management, for communication with the school community;

* **LGPD**: General Data Protection Law
** **ECA Digital**: Digital Statute for Children and Adolescents

3.3 Fundamental principles for the adoption and use of AI platform

To use AI platforms and other digital resources safely in schools, minimise risks, and maximise the potential benefits, we must observe some fundamental principles. UNICEF determines that the Convention on the Rights of the Child (CRC) should be the foundation of any AI policy involving children, and in the case of rights in the digital environment, the provisions of General Comment No. 25 on the Rights of the Child in the Digital Environment (CRC, 2021) should be observed; in addition, UNESCO (2019, 2022, 2023) also recommends specific fundamental principles for the implementation of AI in educational contexts. Based on these guidelines, we suggest the following principles for the adoption of AI in Brazilian education systems:

Fundamental principles for the adoption and use of AI platforms

1

Pedagogical purpose and human-centredness

The integration of AI systems into education should be guided by clear educational goals aligned with each school's Pedagogical and Political Project (PPP). AI-enabled resources should be adopted only when they clearly outperform non-AI alternatives. Teachers should have the autonomy to decide whether and how to use these tools, based on pedagogical and well-being considerations, while safeguarding the formative relationship between teachers and students.

2

Safeguarding learning and critical and creative thinking

The use of AI should be carefully managed to develop critical skills, foster reasoning and autonomy, and prevent "cognitive offloading" (Kosmyna et al., 2025; Gerlich, 2025). When an AI-enabled educational resource is adopted, students should also be taught to engage critically with the technology, including its social and environmental impacts.

3

Pedagogical reliability and learning monitoring

AI systems should meet rigorous technical and pedagogical standards and provide accurate, consistent information that meets educational needs. The pedagogical and learning models underpinning these solutions should be understandable to technical staff and teachers and adaptable to curricular requirements. AI-supported learning should be periodically monitored and evaluated using appropriate indicators and mechanisms to review and update relevant rules and policies.

4

AI literacy

The adoption of AI-enabled educational resources should be accompanied by appropriate professional development for educators. Digital and media literacy should be promoted to help students and educators understand how these technologies work and to assess their risks and limitations. Learning should progress in ways appropriate to students' developmental stages and aligned with the BNCC.

5

Agency and participation

Students, teachers, families, and caregivers should play an active role in decisions about adopting AI in schools, in ways that reflect their maturity and capacity to contribute. AI use should align with each institution's Pedagogical and Political Project, strengthening context-sensitive practices that reflect its educational identity. Teachers should mediate students' digital engagement while preserving their pedagogical and instructional autonomy.

6

Data protection and non-surveillance

Data collection should be limited to what is strictly necessary for pedagogical purposes and must comply with Brazil's General Data Protection Law (LGPD, Law No. 13,709/2018) and the Digital Statute for Children and Adolescents (ECA Digital, Law No. 15,211/2025). Facial recognition, emotion-detection technologies, and automated behavioural monitoring should not be used for mass surveillance. Their use should be restricted to specific circumstances and require explicit consent.

7

Equity

Reducing inequality should be central to decisions about AI use. The adoption of AI systems should prioritise accessible, open, and adaptable resources—including unplugged approaches to AI—to mitigate disparities in access. Special attention should be given to measures that identify and counter algorithmic biases that reinforce gender-, race-, or class-based prejudice, while promoting epistemic diversity in education in accordance with Laws No. 10.639/2003 and No. 11.645/2008.

8

Well-being

Schools and education systems should reject platforms that use persuasive design, targeted advertising, or data collection for commercial purposes. Educational resources should respect students' development, be appropriate for each age group, and avoid exploiting their attention. Technology use should be balanced with technology-free activities to safeguard students' physical and emotional well-being.

9

Sustainability, transparency and non-dependence

Educational institutions should ensure pedagogical continuity and long-term system sustainability—including environmental sustainability—by preventing excessive dependence on particular providers and accounting for environmental impacts.

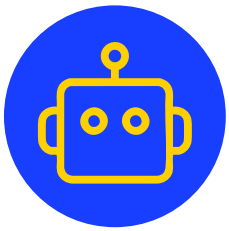
10

Technical-pedagogical grounding, transparency and explainability

AI-enabled resources should be grounded in research and evidence demonstrating tangible pedagogical benefits. When evidence is insufficient, implementation should take the form of a pilot project with clear evaluation metrics, a defined timeline, and mechanisms to reverse the decision. AI systems should clearly disclose their objectives, operating criteria, data sources, and operational limitations, making it possible to audit automated decisions and establish accountability.

What AI does and what only humans can do

AI can be a powerful support tool, but it does not replace human judgment. In educational contexts, meaningful human involvement is indispensable to ensure ethical standards, fairness, and the protection of the rights of children and adolescents.



Human Beings	Skill	AI
Ability to understand causes and correlations. Ability to adapt reasoning to new situations.	**Cognition**	Ability to identify correlations and understand statistics in large volumes of data. Lacks cognitive ability to understand causality and adapt reasoning. Not very sensitive to subtle changes in context.
Ability for metacognition, allowing one to review, question, and correct one's own thoughts before expressing them.	**Capacity for self-criticism**	Does not spontaneously check what it produces. Can generate false information and reproduce biases.
Ability of intentional and original expression and creation. The self-expression reflects experiences and worldview.	**Creative capacity**	Recombines existing patterns in new ways. It can tend to homogenize content.
Senses, identifies, and responds to the emotions of others with empathy.	**Emotions and Empathy**	Can infer emotions from data (text, voice, emotions and facial expressions). Does not have feelings, awareness or personality.
It is a moral agent: it reflects, chooses, and can be held accountable for its decisions and how they affect others.	**Responsibility and moral decision-making**	It has no morality, nor ethical self-judgement. Ultimate responsibility is always human.

3.4 Building good practices for implementing AI in education systems and schools

The ethical, safe, and pedagogically responsible use of AI in education is not limited to teachers, education managers, and leaders; it concerns the entire school community. Therefore, it is essential to define roles that guide the adoption of good practices, promote the involvement of different stakeholders in building ethical and safe approaches, and align with developers to enable the application of the fundamental principles that guide the use and implementation of educational tools with AI.

In addition to defining pedagogical and ethical guidelines, all AI use must be accompanied by transparent and continuous communication with the school community. AI practices should be built collectively, documented, and debated through consultation, listening, and review of agreements and arrangements, which may change as the work develops. Transparent communication strengthens the school community's trust and ensures that protecting children and adolescents is treated as a shared responsibility, in a dynamic and active way, with periodic review of agreements and practices considering the rapid evolution of AI technologies.

How to transform principles of AI use into good implementation practices?

To support education managers in developing effective AI implementation practices, we present a set of suggestions to guide actions at each institutional level of implementation: what actions to take at the educational network level and how to guide and involve school stakeholders in adopting AI. Each suggestion is linked to one of the fundamental principles for using AI in educational contexts. The guidelines are not exhaustive but offer starting points for managers and school teams to implement AI resources in ways

that prioritise educational objectives, the well-being and safety of the school community, and ethics, while adapting to their specific realities and leveraging existing best practices.

Suggestions for establishing good practices

Principle 1: Pedagogical purpose and human-centeredness	
Education Systems	**School**
It is suggested that, in dialogue with the technical team and representatives of the teaching staff, management carry out a diagnosis and document a) which pedagogical objective the AI tool intends to support, b) how it connects to the network's educational objectives, c) why the AI solution is preferable to a non-AI solution, and d) how adoption balances opportunities for students with responsible use.	Whenever possible, consult the teaching staff about the relevance of adoption, ensuring that the decision considers actual pedagogical needs.
It is important to ensure that the network's guidelines preserve teacher autonomy, ensuring that no teacher is penalised for choosing not to use a particular tool.	To maintain teacher autonomy, ensure that teachers can choose not to use a given tool if they assess that it does not meet the needs of their classes, without suffering pressure or penalties.
At the same time, it is considered a good practice to monitor whether implementation in schools maintains human mediation and oversight as a central element of pedagogical processes.	Even with the use of AI systems, ensure that human mediation will always be present and that decision-making factors are always human.
Evaluation is fundamental: on the one hand, analyse educational outcome indicators and understand whether the tool helps achieve strategic educational objectives. On the other, listening to school teams to understand whether the adopted tools remain aligned with the network's pedagogical objectives can be productive.	Pedagogical coordination meetings with the teaching staff to collectively assess whether the adopted tools continue to make pedagogical sense, and whether the educational objectives that motivated adoption are being achieved. These moments cannot, however, replace daily and urgent pedagogical priorities.

Principle 2: Safeguarding learning and critical and creative thinking	
Education Systems	**School**
To preserve learning, it is suggested that the network develop guidelines indicating which types of pedagogical activities may involve AI and which should be preserved as exclusively human.	Remember that this is a process under construction: together with the pedagogical coordination and teaching staff, agree on clear guidelines about which types of activities AI use will be permitted, restricted, or prohibited for, differentiating tasks of creation, research, revision, and assessment.
Training the team to deal with the challenges is a best practice: prepare and circulate reference materials and trainings so that schools and teachers can plan pedagogical mediation of AI use, preventing "cognitive offloading."	Planning together with pedagogical coordination and teachers is fundamental, since it establishes how the tool's use will be mediated and guided to avoid "cognitive offloading."
Share good practices among schools in the network about activities that integrate AI without compromising cognitive engagement.	The pedagogical coordination can systematise teachers' perceptions about the impact of the tools on students' cognitive engagement, evaluating whether they are developing autonomy and critical thinking or becoming dependent on the responses provided by the AI.

Principle 3: pedagogical reliability and learning monitoring	
Education Systems	**School**
With pedagogical coordination and teachers who are subject-area specialists, conduct technical evaluations or tests of the AI resource to verify the quality of the content and curricular alignment.	With pedagogical coordination and teachers who are subject-area specialists, conduct technical evaluations or tests of the AI resource to verify the quality of the content and curricular alignment. This practice helps engage the team around productive use of the adopted tool.
Seek to prioritise tools that indicate their sources and that are transparent about the criteria for generating or recommending content.	Encourage teachers not to use tools indiscriminately, ensuring a balance with pedagogical diversity, such as the use of textbooks, art education, and other activities that place students in motion.
Whenever possible, analyse logs of errors and inconsistencies to support decisions about continuing to use the tool. With technical support, verify whether the tool maintains a quality standard over time or whether there have been changes in its operation that compromise its reliability.	

Principle 4: AI Literacy	
Education Systems	**School**
AI literacy is an essential practice: seek to ensure instruction about AI accompanies any use of AI systems.	Through pedagogical coordination, schools can guide the incorporation into the curriculum of activities that help students understand what AI is, how it learns, which data it uses, and why it can make mistakes or reproduce biases.
Include in the network's continuing professional development plan training dedicated to understanding the basic functioning of AI systems, their ethical limits, and their pedagogical use.	A good practice is to create channels (such as discussion groups, collaborative noticeboards, or periodic meetings) for teachers to share experiences, questions, and discoveries about the use of AI in their practices.
Produce reference materials on AI for network managers, coordinators, and teachers, suitable for different levels of familiarity with the technology.	It is recommended that AI use always be accompanied by the development of projects and content about AI, so that its critical intent is made clear.

Principle 5: Agency and Participation	
Education Systems	**School**
To ensure the school community is heard, it is recommended to create institutional channels so that families, students, and education professionals can contribute to the decision-making process about technologies in the network.	Create regular spaces for dialogue, such as school assemblies, discussion circles, or suggestion boxes, so the school community can express opinions about ongoing practices.
Ensure that information about tools adopted in the network is accessible and transparent to the entire school community	The perspective of students is very important: it is recommended to listen to and consult students about the solutions adopted, taking into account their perceptions of impacts on learning and well-being.
It is recommended to include the school community's perspective in the network's evaluation cycles, systematising the perceptions of families, students, and teachers.	A strong school practice is to involve students in the construction of the school's AI usage rules, respecting their age group and promoting their agency and leadership.

Principle 6: Data protection and non-surveillance	
Education Systems	**School**
Reject biometric systems (such as facial recognition, emotion detection, or automated behavioural monitoring) for mass control or surveillance, using them only in specific cases and with explicit consent.	Schools can organise training for the school staff on data protection and data security practices in online environments.
Disseminating information helps compliance: seek to establish data protection guidelines for the network, advising schools on minimum compliance requirements with the LGPD and the ECA Digital for the adoption of AI tools.	Staff meetings can be good opportunities to monitor how teachers are guiding students regarding the preservation of their data, from personal information to images. Pay attention to ensuring that students are not sharing their own images or those of classmates on networks and platforms.
With the support of the technical manager or the technology department, monitor whether there have been changes to the privacy policies of tools that require contractual renegotiation or discontinuation.	Whenever possible, organise guidance sessions for students and the school community about data protection at school and at home.

Principle 7: Equity	
Education Systems	**School**
When evaluating, selecting, and contracting AI tools, include equity and accessibility criteria in the procurement process.	With the support of pedagogical coordination and specialised educational services, it is advisable to verify whether the tool offers adequate accessibility resources for students with disabilities so that they have equitable access to the solutions adopted.
Training is a key process to ensure diversity: seek to organise workshops on algorithmic bias and digital equity for teachers and managers.	Remember that fostering critical literacy is fundamental for equity: encourage teachers to promote discussions with students about how algorithms can reproduce inequalities and prejudices present in society.
Monitor, together with pedagogical coordination and based on performance data and teachers' reports, whether the adoption of the tool is widening or reducing inequalities of access and learning among different groups of students.	

Principle 8: Well-being	
Education Systems	**School**
Based on the references of ECA Digital and the Guide on the Use of Digital Devices, seek to establish guidelines for the network regarding time limits for the use of digital tools and AI systems by age group.	It is important that teachers observe and report signs of digital fatigue or excessive use by students, communicating concerns to the pedagogical coordination.
Whenever possible, offering training on digital literacy can help in identifying techniques of commercial manipulation on digital platforms.	Through specific training, teachers can include in their practices activities that help students identify techniques of commercial manipulation on digital platforms, as part of digital literacy education.
Regularly monitor whether there are reports of negative impacts on students' physical or emotional well-being associated with the use of the tools.	Keep the pedagogical coordination and teachers alert to changes in tools that introduce elements of commercial exploitation, establishing channels for reporting to the management team.

Principle 9: Sustainability and non-dependence	
Education Systems	**School**
Whenever possible, prioritise the adoption of open solutions or those that guarantee interoperability and data portability, in order to avoid dependence on a single vendor.	AI systems should be understood as just one more pedagogical resource in the learning process. This helps avoid dependence, so as not to harm students' cognitive and socio-emotional development.
When drafting calls for proposals and contracts, it is important to include clauses on pedagogical continuity, data minimisation and transparency about the operation of the systems.	It is very important to value the solutions and resources developed by the team. How would your team be able to maintain its pedagogical practices if it needed to replace the tool being used?
It is advisable to reevaluate existing contracts in light of market evolution, checking whether there are more suitable or less dependent alternatives, such as, for example, open solutions.	

Principle 10: Technical-pedagogical grounding, transparency and explainability	
Education Systems	**School**
Remember that the network's educational objectives, well-being, and safety and protection are priorities: analyse whether the objectives and pedagogical functioning of the tool to be adopted are consistent with these values.	When the team understands the purpose, pedagogical uptake is greater: involve your team in analysing the pedagogical foundations, benefits, and limitations of the adopted tool.
Before launching any pilot, establish clear objectives, defined evaluation metrics, and a limited timeline. Seek to map out reversibility mechanisms that allow discontinuing the tool if results are unsatisfactory.	If the tool is implemented through a pilot, encourage the development of a productive critical attitude: the team can record and discuss the observed results in relation to the metrics established for the pilot.
When evaluating the pilot, consider teachers' and students' experiences regarding the suitability of the tools and their well-being during use.	Based on the evidence collected, base the school's decision regarding the continuity, expansion, or discontinuation of the tool.

CHAPTER 4

How should teacher education and professional development be organised?

4.1 Teacher education and professional recognition

4.2 Teachers at the centre of pedagogical decisions about and with AI

Incorporating AI in education expands pedagogical possibilities, reorganises school practices, and demands new professional skills. In this context, teacher training and professional development assume a central role, as teachers translate curricular guidelines, educational policies, and technological resources into concrete learning experiences. Preparing teachers to work with AI involves expanding their technical, pedagogical, and ethical repertoires and strengthening their intellectual autonomy and capacity for critical mediation. More than learning how to operate tools, it means developing institutional conditions and professional development opportunities that allow teachers to understand how these technologies work, evaluate their educational impacts, and actively participate in decisions about their use in schools.

4.1 Teacher education and professional recognition

Rapid technological innovation drives institutional changes that can leave teachers feeling threatened, distrustful, or positively motivated. Understanding how these technologies work, their ethical limits, and how they interact with diverse pedagogical models is fundamental for teachers to act as intentional guides and mediators for their students and to provide a safe school environment.

To begin a training plan, education systems must first define the objectives of teacher professional development. To this end, a proficiency assessment can serve as an initial motivator, mobilising teachers to engage in training programmes and gain a clearer vision for developing more appropriate training plans.

Both the Ministry of Education and international organisations have produced documents that guide teacher training in using digital technologies and developing AI literacy. In this context, UNESCO published the AI Competency Framework for Teachers, launched in 2024, which organises teacher training into **five competency dimensions** with three levels of progression focused on the pedagogical and responsible use of AI. These dimensions are **A human-centred mindset** guides the use of AI, with a focus on human development and teacher autonomy. **AI ethics** involves the responsible use

of these technologies, with attention to privacy, transparency, and potential biases. AI fundamentals and applications cover a basic understanding of how these systems work and how to use appropriate tools. AI pedagogy refers to integrating these technologies into teaching and learning strategies. Finally, AI for professional development addresses using AI to support continuing education and improve teaching practice.

UNESCO AI Competency Framework for Teachers

Table 6: High-level structure of the reference framework of AI competencies: aspects and progression levels

Aspects	Progression		
	Acquire	Deepen	Create
1. Human-centred mindset	Human autonomy	Human responsibility	Social responsibility
2. AI ethics	Ethical principles	Safe and responsible use	Joint creation of ethical rules
3. AI foundations and applications	Basic AI techniques and applications	Application skills	Creation with AI
4. AI pedagogy	AI-assisted teaching	AI-pedagogy integration	Pedagogical transformation enhanced by AI
5. AI for professional development	AI that enables lifelong professional learning	AI to improve organisational learning	AI to support professional transformation

Source: UNESCO. Reference Framework of AI Competencies for Teachers. 2024.

In 2024, the Ministry of Education in Brazil launched the Framework for Digital Skills for Teachers, accompanied by a national training programme for education managers, school leaders, and teachers, with the goal of supporting the critical, ethical, and intentional use of digital technologies in schools. In this context, the diagnosis of teacher proficiency can be carried out in two stages:

FIRST STAGE The **first stage** consists of applying the Self-Assessment of Teachers' Digital Skills, an instrument foreseen in the Framework of Teachers' Digital Skills (RSDD), which allows identifying the level of proficiency of teachers in three dimensions of professional practice: the incorporation of digital technologies in pedagogical practice, critical and safe teaching, and professional development. Although artificial intelligence can be understood within the set of digital technologies, a specific diagnosis on AI can contribute to greater clarity in defining training strategies.

The tool is available at: https://avamec.mec.gov.br/#/autodiagnostico.

SECOND STAGE The **second stage** involves holding debates or meetings in schools, with the support of the pedagogical coordination, to discuss the results of the self-diagnosis and reflect on the use of AI in the educational context. These meetings can help identify the training needs of teachers and plan training actions that are more aligned with the reality of each school or school network.

Source: MEC - Ministry of Education. Framework of Digital Knowledge for Teachers. 2024.

By articulating the guidelines of the UNESCO Framework for AI Competencies for Teachers and the Brazilian Ministry of Education's Framework for Digital Knowledge of Teachers, we propose an analytical synthesis for teacher training purposes. The four dimensions presented below derive from and reorganise the five dimensions proposed by UNESCO, adapting them to the context of Brazilian teacher training policies and the critical use of AI in education. By combining these two key teacher-training documents, we highlight four dimensions of teacher training necessary for a critical education about and with AI.

1 Critical Understanding of AI

(UNESCO: Axis 1 – human-centred approach; Axis 3 – fundamentals and applications of AI / RSDD: Axis 2 – digital citizenship)

Objective: To equip teachers with the technical, ethical, and socio-political knowledge needed to teach about artificial intelligence, strengthening their role as informed digital citizens and as educators of critical thinkers.

Formative dimension: The teacher as a critical intellectual and digital citizen; a mediator of public debate on technology; and an agent of basic scientific training in AI.

Topics included:

- Fundamentals of AI: the distinction between predictive and generative systems; concepts of algorithms, language models, and machine learning.
- AI lifecycle: data collection and processing, training, validation, implementation, and monitoring.
- Business models of AI solution developers and their social and environmental impacts.
- Algorithmic biases and automated discrimination.
- Technical limitations (hallucination, opacity, data dependency).
- Social, environmental, and economic impacts (data extraction, energy consumption, market concentration).
- Brazilian regulatory ecosystem: LGPD, Marco Civil da Internet (Brazilian Civil Rights Framework for the Internet), ECA (including debates on the ECA Digital), AI Bill.
- Notions of technological sovereignty and platform dependency.

2 Intentional Pedagogical Use of AI

(UNESCO: Axis 4 – AI pedagogy / RSDD: Axis 1 – teaching and learning with digital technologies)

Objective: To empower teachers to exercise pedagogical autonomy in deciding when, how, and whether to use AI systems, ensuring human-centredness, didactic intentionality, and the preservation of essential learning outcomes.

Formative dimension: Teacher as a critical mediator; specialist in learning experiences with and without AI; evaluator of technological relevance.

Topics included:

- Criteria for evaluating and selecting AI resources (pedagogical quality, transparency, data protection, and evidence of effectiveness).
- Analysis of pedagogical risks: cognitive overload, impoverished reasoning, excessive dependence.
- Classroom mediation strategies: guided and non-substitutive use.
- Media literacy.
- Critical co-authorship practices.
- Planning hybrid activities (with and without AI).
- Assessment of learning in AI-based contexts.
- Adapting and personalising teaching materials.
- Documentation and reflection on practices (formative assessment of AI use).

3 Protection of Rights and Well-being

(UNESCO: Axis 2 – AI ethics / RSDD: Axis 2 – digital citizenship)

Objective: To strengthen the teacher's role as the first line of defence for the school community against technological risks, thereby safeguarding students' fundamental rights, integrity, and well-being.

Formative dimension: Teacher as an agent of protection; guarantor of digital rights; ethical reference within the school community.

Topics included:

- Identification of risks to privacy, security, and data integrity.
- Consent and processing of children's and adolescents' data.
- Recognition of persuasive design practices, algorithmic manipulation, and commercial exploitation.
- Balanced management of screen time and mental well-being.
- Incident reporting and referral protocols (cyberbullying, undue exposure, misuse of data).
- Copyright and responsible use of AI-generated content.
- Culture of protection and prevention within the school environment.
- Cultura de proteção e prevenção no ambiente escolar.

4 Professional Development and Teacher Well-being

(UNESCO: Axis 5 – professional development / RSDD: Axis 3 – professional development)

Objective: To ensure conditions that enable teachers to critically integrate AI into their professional development while preserving their autonomy, self-worth, and mental health.

Formative dimension: The teacher as a reflective professional; a citizen with rights and a professional with pedagogical autonomy; and a protagonist in the institution's technological governance.

Topics included:

- Ongoing education in AI grounded in scientific principles.
- Use of AI to support the planning, organisation, and production of materials, without replacing professional judgment.
- Prevention of work intensification and algorithmic surveillance.
- Labour rights in the face of automated evaluation systems.
- Teacher participation in selecting and implementing technologies in schools.
- Self-care strategies and management of the cognitive effects of hyperconnectivity.

Use AVAMEC to build teachers' capacity

The **AVAMEC (Virtual Learning Environment - Ministry of Education)**, maintained by the Ministry of Education, can strategically support teacher training by articulating institutional diagnosis and structured training offerings. A school or education system can begin the process using the **Digital Skills Self-Assessment tool**, which allows mapping teacher competencies, identifying training gaps, and prioritizing critical areas—such as the pedagogical use of digital technologies, media literacy, data protection, formative assessment, or classroom management with digital resources. This diagnosis guides the construction of a training plan aligned with the real needs of the team, avoiding generic actions or those disconnected from the local context.

Based on the results, management can indicate courses available on the platform, such as:

- Digital Education and Technologies in Pedagogical Practice;
- Digital Culture in Education;
- Training for the Pedagogical Use of Technologies;
- Digital Competencies for Teachers;
- Data Protection and Digital Security at School.

The main advantage is that AVAMEC allows you to combine:

- Institutional diagnosis;
- Organised training paths;
- Institutional certification;
- Monitoring of staff progress.

Communities of practice

Communities of practice strengthen teacher training by promoting collaborative, continuous, and situated learning. Instead of isolated actions, they create structured spaces where teachers share experiences, discuss concrete classroom challenges, and collectively reflect on the pedagogical use of technologies and AI systems. To create a community of practice, the school can begin by posing a mobilizing question—how have students been using AI, and what pedagogical gains or losses have we observed? From this question, teachers can share real-life situations, analyse work produced with AI support, discuss impacts on learning, and collectively think about more intentional pedagogical strategies. Management can support this by offering institutional time and recognising the value of these exchanges, fostering an environment of trust, listening, and experimentation.

4.2 Teachers at the centre of pedagogical decisions about and with AI

The integration of artificial intelligence in education will be pedagogically consistent and socially responsible only if **teachers occupy a central position** in the decision-making processes involved. This means going beyond technical training and encouraging the use of tools that recognise teachers as professionals with **epistemic and pedagogical authority to evaluate, select, adapt, reject, and propose uses of AI in their contexts of practice**. As this document argues, the risks associated with adopting AI in education—curricular fragmentation, loss of professional autonomy, surveillance, technological dependence, among others—are exacerbated when teachers do not substantively participate in decisions about educational technology.

Available data on the Brazilian context (CGI.br, 2025a) indicate that AI adoption in schools has occurred rapidly, yet with limited teacher involvement. The low proportion of students who report discussing the use of generative AI with teachers, coupled with the concentration of AI adoption decisions at administrative levels far removed from the classroom, reveals a structural problem: teachers often receive pre-contracted tools without being consulted about their pedagogical relevance, without adequate prior training, and, in some cases, under institutional pressure to use them. This scenario compromises not only the quality of use but also the legitimacy of educational policy itself, since decisions with direct implications for curriculum, assessment, and pedagogical relationships are made without adequate consultation with those who operate them daily.

To reverse this scenario, institutions need to establish **mechanisms that ensure teacher participation** at every stage of the AI decision-making cycle in education: from identifying needs to evaluating results, including selecting resources, defining usage criteria, and periodically reviewing adopted policies.

How can we ensure community participation in all stages of AI adoption?

Participation in the evaluation and contracting of AI resources

As a best practice, education departments and school management teams can include teacher representatives in the technical and pedagogical evaluation of AI resources before contracting. The criteria proposed in Table 6 of this reference—pedagogical consistency and continuity, student well-being and development, integrity of teaching work, and security, privacy, and equity—offer a roadmap for this evaluation, but their application requires the perspectives of those who know the concrete teaching conditions, the characteristics of the students, and the curricular dynamics of each network and school. It is recommended that no AI resource be adopted on a large scale without teachers from the relevant subject areas participating in testing phases and providing opinions on its suitability.

Advisory committees with teacher representation

Creating committees or working groups on educational technology within education departments, comprising teachers from different educational levels, areas of knowledge, and school contexts, is a strategy to institutionalise teacher input. These committees can set guidelines for the network's use of AI, analyse supplier proposals, monitor implementation, and propose adjustments. It is important that this participation be remunerated and carried out during working hours, preventing it from becoming yet another unrecognised demand on teachers' time.

Policies for listening, feedback, and continuous review

The good school practices proposed in Chapter 3.4 of this document assume that the AI usage policy is dynamic and subject to periodic review. To this end, teachers need permanent, accessible channels to document their perceptions of how the adopted resources function, report identified problems, and propose alternatives. These records should feed into ongoing processes.

Journals reviewing network policies treat the evidence collected by teachers as qualified input for decision-making, not merely as a simple report. Teachers' experience with the daily use of the tools is a form of practical knowledge indispensable for evaluating public policy.

Protecting teacher autonomy against institutional and commercial pressures

Placing teachers at the centre of AI decisions also means protecting them from dynamics that undermine their autonomy. This includes ensuring that the use or non-use of a particular AI tool is not used as a criterion for evaluating teacher performance; that usage data collected by platforms is not used to monitor or rank teachers; and that a justified refusal of a resource is recognised as a legitimate exercise of pedagogical autonomy. The centrality of the teacher in AI policy is not merely a matter of participatory management: it is a condition for Brazilian education to maintain its commitment to critical thinking, equity, and democracy in the face of the challenges posed by the increasing algorithmic mediation of educational processes.

Teaching materials and assessment policies

Two of the most concerning issues for teachers are their lesson planning and assessment practices, as these are fundamental to their autonomy and negotiation with classes, directly shaping their professional identity. Allowing teachers to use AI to support these processes, rather than mandating its use, ensures that their teaching repertoire remains diverse and situated, that is, always responsive to the specific pedagogical needs of the classes. Assessments are equally sensitive, given the indiscriminate use of AI by students. The school should support clear decision-making mechanisms regarding what can and cannot be done in assessment processes, always encouraging a balance of assessment methods, and assisting professionals in rethinking and creating assessment methods that support students' cognitive development.

CHAPTER 5

Where to begin? Integrating teaching about AI and teaching with AI

Throughout this document, it has become evident that integrating education **about** and **with** AI is not limited to adopting technological tools but involves a **complex set of pedagogical, institutional, technical, ethical, and legal decisions** that directly affect daily school life and the actions of education managers, school leaders, teachers, students, and support staff. Therefore, this process requires **intentional planning, clear governance, and continuous monitoring.** To lead this process, it is important to mobilise the school and the community to understand these challenges.

In this sense, education management and leaders must assume a leadership role in guiding this process, mobilising both the school and the community to understand the challenges, risks, and opportunities associated with the use of AI systems in education. This movement is not merely technical: it is also pedagogical and political in a democratic sense, as it calls on the school to reflect on its role in forming critical individuals in a world permeated by automated systems, algorithms, and digital platforms. By promoting this debate, the school helps strengthen Digital and Media Literacy and build an institutional culture of responsible technology use, observing that this field is marked by tensions, conflicts of interest, and differing views on responsibilities and limits.

Where to begin: some examples of curricular advancements in Brazilian schools

Piauí Artificial Intelligence Initiative: Piauí (PI) launched the pioneering IA@Escola initiative, introducing Artificial Intelligence as a mandatory curricular component for the 9th grade of Lower Secondary School and for Upper Secondary Education. The project is a partnership between SEDUC-PI, IFFar, Unipampa, and UFRGS, aiming to benefit 120,000 students and train more than 800 teachers. The methodology adopted is the Flipped Classroom, using prior video lessons and synchronous meetings for practical deepening. The curriculum covers technical topics such as Data Curation, Machine Learning, and Natural Language Processing, balanced with reflections on ethics and privacy. The approach focuses on "thinking with AI" (problem-solving) and "thinking about AI" (understanding risks and how it works). In 2024, the initiative received international recognition when it was presented at UNESCO headquarters in Paris as a cutting-edge model in the integration of AI into the public-school curriculum. In 2025, the project was awarded the UNESCO Prize for the Use of Information and Communication Technology (UNESCO King Hamad Bin Isa Al-Khalifa Prize).

AI in Schools Initiative: Ceará (CE) implemented the "AI in Schools" course, promoted by the Training and Development Center (FormaCE) of the State Department of Education (Seduc), with the goal of qualifying teachers in the state network in the pedagogical use of technology. Started as a pilot project in 2024 with 81 teachers of Natural Sciences, the programme expanded in 2025 to encompass all areas of knowledge in 40 large schools. The training consists of 40 class hours, prioritizing in-person instruction and technical visits to schools to strengthen dialogue among peers. The course is divided into four modules: origin and ethics of AI; prompt engineering; practical tools for the classroom; and technology-mediated assessment processes. In addition to the main course, the State offers specific workshops in Digital Humanities and AI-assisted Essay Correction in the ENEM model, aiming to personalise learning and expedite feedback to students.

The "Educating with AI" initiative: Sergipe (SE) has launched the guide "Educating with Artificial Intelligence," a pedagogical material developed by the State Department of Education in partnership with the TECLA research group from the Federal University of Sergipe (UFS). The initiative focuses on supporting teachers in integrating Generative Artificial Intelligence (GAI) into daily school life, covering elementary to high school levels. The material uses mediating characters—Professor Caio, Marina, and the algorithmic consciousness Aión—to address topics such as algorithmic literacy, ethics, and privacy. Aligned with the BNCC (National Common Curricular Base) for Computing, the proposal offers practical examples of projects in areas such as Mathematics, Chemistry, and History, encouraging the use of AI to personalise learning and optimise lesson planning. The goal is to transform students from passive consumers into critical protagonists, capable of identifying algorithmic biases and applying technology in a socially responsible way.

To facilitate the visualisation of the debates and decisions facing managers, we have included in this section a summary of the main points surrounding the integration of AI in education. Our aim is to support managers in visualising the **key decision-making and implementation flows** involved in integrating AI into education, organised into three inseparable dimensions:

- Curricula;
- Pedagogical use of AI systems; and
- Teacher training.

Recommendations for education managers

1. **Establish an institutional strategy for AI in education**, ensuring that all teaching **WITH** AI is accompanied by teaching **ABOUT** AI.

2. **Integrate fundamental AI learning into the implementation of Digital and Media Education aligned with the BNCC** (National Common Curricular Base), focusing mainly on digital culture, computational thinking, and the digital world, and explicitly stating learning objectives and priorities for each educational stage.

3. **Structure formal decision-making processes for the adoption of AI systems**, considering fundamental principles and key criteria (consistency and pedagogic continuity, student well-being and development, well-being and integrity of teaching work, safety, privacy and equity), as well as contextualized analyses of risks and opportunities (available infrastructure, connectivity, budget, faculty proficiency and demands of the school community).

4. **Establish protocols for prior evaluation, follow-up, and continuous monitoring** of adopted systems, ensuring that implementation is accompanied by clear indicators of pedagogical impact, data protection, equity, and the safety of children and adolescents.

5. **Plan and implement continuing teacher training policies**, based on periodic proficiency assessments, that cover the four formative dimensions identified in this document and value practices of supervised pedagogical experimentation.

6. **Create structured spaces for listening to and involving teaching staff**, recognising teachers and pedagogical teams as central actors in defining legitimate uses, pedagogical boundaries, and strategies for integrating AI into the curriculum.

7. **Engage students, families, and other members of the school community** to promote transparency, public debate, and shared responsibility regarding the use of AI systems in the educational environment.

8. **Ensure strict compliance with current legal and regulatory frameworks**, particularly the LGPD (Brazilian General Data Protection Law), the ECA Digital (Brazilian Digital Statute for Children and Adolescents), and the Content Rating Guide. Incorporate requirements for data protection, privacy, the rights of children and adolescents, and ethical principles as non-negotiable criteria for any technological adoption.

9. **Institutionalize cycles of continuous review and improvement**, recognising that integrating AI into education is a dynamic process that must be continually reassessed in light of pedagogical evidence, regulatory changes, and technological transformations.

10. **Support ethical, educational, and creative experimentation with and debate about** AI, in accordance with the criteria and principles of this document.

In short, responsibly integrating AI into education requires education management to transform guidelines into policies, policies into practices, and practices into institutionalised organisational learning processes. Beyond deciding "if" and "which" technologies to adopt, it is necessary to create conditions for the school to autonomously and critically fulfill its formative role in a constantly transforming digital ecosystem, **ensuring that AI is incorporated as a means for human development, the promotion of critical thinking, and the strengthening of democracy within the context of digital culture**.

.

Dimensions of AI in Basic Education

Teacher Training

Teacher training is the foundation that sustains and connects every pathway chosen by the education network

Teaching about AI
AI as an object of knowledge

Curricular Foundation
- Alignment with Computing BNCC
- Integration with Digital and Media Education
- 7 guiding curricular guidelines

Learning
- 12 essential learning outcomes
- 3 axes: computational, digital-media, and ethical-social

Organisation
- Progression by stage of education
- Interdisciplinary approach

Teaching with AI
AI as an educational resource

Principles and Criteria
- 10 fundamental adoption principles
- 4 key evaluation criteria
- Analysis of opportunities and risks

Legal Frameworks
- Compliance with the LGPD
- Compliance with the Digital ECA
- Best-interests-of-the-child principle

Implementation
- Good practices for the network and school

4 Domains of Teacher Training for AI

- **Critical understanding of AI**
- **Intentional pedagogical use**
- **Protection of rights and well-being**
- **Professional development**

Guidance by dimension

Teaching about AI: guidance by stages of education

Early Childhood Education	Non-digital exploratory experiences: patterns, cause and effect, and playful sequences.
Primary Education	Simple problems, ordered steps, and logical reasoning with basic algorithms.
Lower Secondary Education	Algorithms, problem decomposition, abstraction, and critical evaluation of AI content.
Upper Secondary Education	Critical analysis of AI systems, inquiry, technological creation, and social impacts.

Teaching with AI: 10 Fundamental Principles for Adoption

1. **Pedagogical purpose and human-centredness:** Clear educational objectives; human mediation as a central element.
2. **Safeguarding learning and critical and creative thinking:** Critical and creative thinking; avoiding cognitive offloading.
3. **Pedagogical reliability and learning monitoring:** Technical and pedagogical rigor; continuous monitoring of learning.
4. **AI literacy:** Adequate professional training; understanding risks and limitations.
5. **Agency and Participation:** Students, teachers, and families as active participants in decision-making.
6. **Data Protection and non-surveillance:** Data minimisation; compliance with the LGPD and ECA digital; non-surveillance.
7. **Equity:** Reducing inequalities; mitigating algorithmic biases.
8. **Well-being:** Age-appropriate use; balance with non-digital activities.
9. **Sustainability and non-dependence:** Vendor non-dependence; pedagogical continuity.
10. **Technical-pedagogical grounding, transparency and explainability:** Evidence-based grounding; explainability and reversibility.

References

5Rights Foundation. 2023. *Child rights by design: Guidance for innovators of digital products and services used by children*. London, 5Rights Foundation.

5Rights Foundation. 2025. *Children & AI design code: A protocol for the development and use of AI systems that impact children*. London, 5Rights Foundation.

Alves, L. dos S. and M. G. Fonseca. 2025. *Unplugged computing: A practical guide for teachers*. Brasília, Federal Institute of Brasília.

Bauer, E. et al.. 2025. 'Looking beyond the hype: Understanding the effects of AI on learning'. *Educational Psychology Review*, Vol. 37, Article 45. https://doi.org/10.1007/s10648-025-10020-8.

Brazil. 2018. *Law No. 13,709 of 14 August 2018: General Data Protection Law (LGPD)*. Brasília, Presidency of the Republic. https://www.planalto.gov.br/ccivil_03/_ato2015-2018/2018/lei/l13709.htm.

Brazil. 2025a. *Law No. 15,211 of 17 September 2025: Provides for the protection of children and adolescents in digital environments (Digital Statute of Children and Adolescents)*. Brasília, Presidency of the Republic. https://www.planalto.gov.br/ccivil_03/_ato2023-2026/2025/lei/L15211.htm.

Brazil. 2025b. *Resolution CNE/CEB No. 2 of 11 March 2025: Operational guidelines for digital and media education in basic education*. Official Journal of the Union, Section 1, 13 March 2025. Brasília, National Education Council.

Brazilian Internet Steering Committee (CGI.br). 2025a. *ICT Education Survey 2024*. São Paulo, CGI.br.

Brazilian Internet Steering Committee (CGI.br). 2025b. *Artificial intelligence in education: Uses, opportunities and risks in the Brazilian context*. São Paulo, CGI.br.

Carrisi, M. C., M. Marras and S. Vergallo. 2025. 'A structured unplugged approach for foundational AI literacy in primary education'. *arXiv*. https://arxiv.org/abs/2505.21398.

Centeno, C. et al.. 2025. *Promoting well-being in digital education: Proposal for a model of emerging practices*. Luxembourg, Publications Office of the European Union.

Center for Innovation for Brazilian Education (CIEB). 2024a. *Artificial intelligence in basic education: New applications and trends for the future*. Technical Note No. 21. São Paulo, CIEB. https://cieb.net.br/wp-content/uploads/2024/06/Inteligencia-Artificial-na-Educacao-Basica_2024.pdf.

Center for Innovation for Brazilian Education (CIEB). 2024b. *AI: Uses in the management of state education departments*. Technical Note No. 24. São Paulo, CIEB. https://cieb.net.br/wp-content/uploads/2024/12/CIEB-NOTAS-TECNICAS-24-Inteligencia-artificial-generativa-usos-na-gestao-das-secretarias-estaduais-deeducacao.pdf.

Colonna, L.. 2025. 'Artificial intelligence in education (AIED): Towards more effective regulation'. *European Journal of Risk Regulation*, pp. 1–21. https://doi.org/10.1017/err.2025.10039.

Committee on the Rights of the Child. 2021. *General Comment No. 25 (2021) on children's rights in relation to the digital environment*. CRC/C/GC/25. Geneva, United Nations. https://www.ohchr.org/en/documents/general-comments-and-recommendations/general-comment-no-25-2021-childrens-rights-relation.

Curí, M. E. et al.. 2025. 'A pedagogical framework to teach artificial intelligence from a Uruguayan experience'. In: *Proceedings of the 17th International Conference on Computer Supported Education*, Vol. 2, pp. 281–287. SciTePress. https://doi.org/10.5220/0013299900003932.

Dermeval, D., L. Rodrigues, S. Isotani and I. I. Bittencourt. 2025. *Unplugged artificial intelligence in education*. E-book. ISBN 978-65-01-59099-8. https://iaedu.nees.ufal.br/wp-content/uploads/2025/08/NT3-Inteligencia-Artificial-Desplugada-na-Educacao.pdf.

Edutecia Observatory. 2025. *Mapping AI in education*. Edutecia. https://www.edutecia.com/mapeamento-de-ias-na-educa%C3%A7%C3%A3o.

European Commission. 2022a. *DigComp 2.2: The Digital Competence Framework for Citizens*. Luxembourg, Publications Office of the European Union. https://joint-research-centre.ec.europa.eu/digcomp_en.

European Commission. 2022b. *Ethical guidelines on the use of artificial intelligence and data in teaching and learning for educators*. Luxembourg, Publications Office of the European Union. https://education.ec.europa.eu/news/ethical-guidelines-on-the-use-of-artificial-intelligence-and-data-in-teaching-and-learning-for-educators.

European Commission, OECD and Code.org. 2025. *AILit Framework: Empowering learners for the age of AI—An AI literacy framework for primary and secondary education*. Review draft. https://ailiteracyframework.org/wp-content/uploads/2025/05/AILitFramework_ReviewDraft.pdf.

European Union. 2024. 'Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence (Artificial Intelligence Act)'. *Official Journal of the European Union*, L series, 12 July 2024. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:L_202401689.

G20. 2024. *Report of the G20 on education*. G20. https://www.gov.br/g20/pt-br/documentos/trilha-de-sherpas.

Gerlich, M.. 2025. 'AI tools in society: Impacts on cognitive offloading and the future of critical thinking'. *Societies*, Vol. 15, No. 1, Article 6.

Holmes, W.. 2023. *The unintended consequences of artificial intelligence and education*. Brussels, Education International.

Holmes, W. et al.. 2022. *Artificial intelligence and education: A critical view through the lens of human rights, democracy and the rule of law*. Strasbourg, Council of Europe. https://shs.cairn.info/artificial-intelligence-and-education--9789287192363?lang=en.

Holmes, W. and I. Tuomi. 2022. 'State of the art and practice in AI in education'. *European Journal of Education*, Vol. 57, pp. 542–570.

Isotani, S. et al.. 2023. 'AIED unplugged: Leapfrogging the digital divide to reach the underserved'. In: *Artificial Intelligence in Education*, Vol. 1831, pp. 772–779. Cham, Springer. https://doi.org/10.1007/978-3-031-36336-8_118.

Kasneci, E. et al.. 2023. 'ChatGPT for good? On opportunities and challenges of large language models for education'. *Learning and Individual Differences*, Vol. 103, Article 102274. https://doi.org/10.1016/j.lindif.2023.102274.

Kosmyna, N. et al.. 2025. 'Your brain on ChatGPT: Accumulation of cognitive debt when using an AI assistant for essay writing tasks'. *arXiv*. https://doi.org/10.48550/arXiv.2506.08872.

Lindner, A. and S. Seegerer. 2019. *AI unplugged: Unplugging artificial intelligence—Activities and educational materials on artificial intelligence*. AI Unplugged. https://aiunplugged.org.

Macgilchrist, F.. 2021. 'What is 'critical' in critical studies of edtech? Three responses'. *Learning*, Media and Technology, Vol. 46, No. 3, pp. 243–249. https://doi.org/10.1080/17439884.2021.1958843.

Menezes, P. et al.. 2024. *Guide on artificial intelligence in education*. Rio de Janeiro, Edutecia.

Miao, F. et al.. 2021. *AI and education: Guidance for policy-makers*. Paris, UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000376709.

Ministry of Education of Brazil. 2024. *Digital knowledge for teachers*. Brasília, Ministry of Education. https://www.gov.br/mec/pt-br/escolas-conectadas/20240822MatrizSaberesDigitais.pdf.

Ministry of Education of Brazil. 2026. *Framework for the responsible use and development of artificial intelligence in education*. Brasília, Secretariat for Information Management, Innovation and Evaluation of Educational Policies, Ministry of Education. https://www.gov.br/mec/pt-br/media/segape/referencial-oficial-pt.pdf.

Ministry of Justice and Public Security of Brazil. 2025. *Content rating: A practical guide to audiovisual media, applications and role-playing games*. Brasília, Ministry of Justice and Public Security. https://www.gov.br/mj/pt-br/assuntos/seus-direitos/classificacao-1/classind-audio-visual-2025-vs-10-nova-faixa.pdf/view.

National Education Council of Brazil. 2025. 'Resolution CNE/CEB No. 2 of 21 March 2025 establishing the National Operational Guidelines on the use of digital devices in schools and the curricular integration of digital and media education'. *Official Gazette of the Union*, Section 1, No. 56, pp. 34–36, 24 March 2025.

OECD. 2023a. *OECD Digital Education Outlook 2023: Towards an effective digital education ecosystem*. Paris, OECD Publishing. https://doi.org/10.1787/c74f03de-en.

OECD. 2023b. *PISA 2025: Learning in the digital world*. Paris, OECD. https://www.oecd.org/en/topics/sub-issues/learning-in-the-digital-world/pisa-2025-learning-in-the-digital-world.html.

OECD. 2024a. *Meta-learning*. OECD Learning Compass 2030 Concept Note. Paris, OECD. https://www.oecd.org/content/dam/oecd/en/topics/policy-issues/future-of-education-and-skills/learning-compass-constructs/Meta-learning.pdf.

OECD. 2024b. *Artificial intelligence papers*. OECD Artificial Intelligence Papers, No. 26. Paris, OECD Publishing.

OECD. 2024c. *The OECD Truth Quest Survey*. OECD Education Working Papers, No. 369. Paris, OECD Publishing.

Portela, C. et al.. 2024. 'AI in education unplugged supports equity between rural and urban areas in Brazil'. In: *Proceedings of the International Conference on Information and Communication Technologies and Development*, pp. 143–154. https://doi.org/10.1145/3700794.3700810.

Redecker, C. and Y. Punie. 2017. *European framework for the digital competence of educators: DigCompEdu*. Luxembourg, Publications Office of the European Union. https://publications.jrc.ec.europa.eu/repository/handle/JRC107466.

Secretariat of Communication of the Presidency of the Republic of Brazil. 2025. *Children, adolescents and screens: A guide to the use of digital devices*. Brasília, SECOM. https://www.gov.br/secom/pt-br/assuntos/uso-de-telas-por-criancas-e-adolescentes/guia.

Uema, M. A. et al.. 2025. 'Designing for meaningful access: Towards a framework for AI in education unplugged'. In: *Artificial Intelligence in Education*, pp. 307–320. Cham, Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-98459-4_22.

UNESCO. 2019. *Beijing Consensus on artificial intelligence and education*. Paris, UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000368303.

UNESCO. 2022a. *K–12 AI curricula: A mapping of government-endorsed AI curricula*. Paris, UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000380602.

UNESCO. 2022b. *Recommendation on the ethics of artificial intelligence*. Paris, UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000381137.

UNESCO. 2023. *Guidance for generative AI in education and research*. Paris, UNESCO. https://doi.org/10.54675/EWZM9535.

UNESCO. 2024a. *AI competency framework for students*. Paris, UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000391105.

UNESCO. 2024b. *AI competency framework for teachers*. Paris, UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000391104.

UNICEF. 2025. *Guidance on AI and children*. Version 3.0. Florence, UNICEF Innocenti – Global

Office of Research and Foresight. https://www.unicef.org/innocenti/media/11991/file/UNICEF-Innocenti-Guidance-on-AI-and-Children-3-2025.pdf.

Valente, J. A.. 2019. 'Computational thinking, computational literacy or digital competence? New challenges in education'. *Revista Educação e Cultura Contemporânea*, Vol. 16, No. 43, pp. 147–168. https://mestradodoutoradoestacio.periodicoscientificos.com.br/index.php/reeduc/article/view/5852.

Varsik, S. and L. Vosberg. 2024. *The potential impact of artificial intelligence on equity and inclusion in education*. OECD Artificial Intelligence Papers, No. 23. Paris, OECD Publishing. https://doi.org/10.1787/15df715b-en.

Vicari, R. M. et al.. 2023. *Artificial intelligence in basic education*. 1st edn. São Paulo, Novatec Editora.

Vicari, R. M., C. Brackmann, C. Galafassi and L. Mizusaki. 2024. *AI@School: Curricular framework on artificial intelligence in basic education*. https://www.computacional.com.br/ia/referencial-curricular.php.

Xu, M.. 2025. 'Interaction between students and artificial intelligence in the context of creative potential development'. *Interactive Learning Environments*, pp. 1–16. https://doi.org/10.1080/10494820.2025.2465439.

Appendix 1

International reference documents

Beijing Consensus on AI in Education (2019, UNESCO, Beijing Consensus on Artificial Intelligence and Education)

Contents: Foundational framework for the integration of AI into global educational policies, guided by SDG 4. It advocates for human-centred AI, under human control, that strengthens the role of teachers, protects ethics, privacy and non-discrimination, and promotes international cooperation to reduce digital inequalities. Access: https://unesdoc.unesco.org/ark:/48223/pf0000368303.

Guidance on AI for Children 3.0 (2025, UNICEF – Innocenti).

Contents: Normative guidance based on children's rights for the development and use of AI that impacts children. Emphasises protection, equity, explainability, participation, and accountability, while warning of risks such as excessive surveillance and algorithmic biases. Access: https://www.unicef.org/innocenti/reports/policy-guidance-ai-children.

Recommendation on the ethics of Artificial Intelligence (2021, UNESCO)

Contents: First global recommendation on AI ethics adopted by Member States. Defines principles of human dignity, social justice, transparency, data governance, and sustainability, with direct implications for educational policies. Access: https://www.unesco.org/en/articles/recommendation-ethics-artificial-intelligence.

G20 Report on Education (2024, G20 – Brazilian Presidency, Report of the G20 on Education)

Contents: Consolidates G20 priorities in education, focusing on digital inclusion, information integrity, and AI governance. Highlights the Maceió Declaration and the development of AI readiness guides, emphasising the reduction of technological inequalities. Access: https://www.gov.br/g20/pt-br/documentos/trilha-de-sherpas.

Guidelines for the pedagogical use and safety of AI (2022, European Commission, Ethical Guidelines on the Use of Artificial Intelligence and Data in Teaching and Learning for Educators)

Contents: A practical guide for teachers, education managers and school leaders on the ethical use of AI and data in educational contexts. It highlights transparency, human oversight, inclusion, data protection, and accountability in pedagogical use. Access: https://education.ec.europa.eu/news/ethical-guidelines-on-the-use-of-artificial-intelligence-and-data-in-teaching-and-learning-for-educators.

Generative AI: Product Safety Standards (2025, UK Government – Department for Education)

Contents: Establishes safety standards for generative AI in education, aiming to protect cognitive, social, and emotional development. Prohibits anthropomorphism, mitigates excessive reliance, and requires active risk monitoring and safeguards. Access: https://www.gov.uk/government/publications/generative-ai-product-safety-standards/generative-ai-product-safety-standards.

Children and AI Design Code (2025, 5Rights Foundation, Children & AI Design Code)

Contents: Rights-driven design code for AI systems that impact children. Defines requirements throughout the technology lifecycle, focusing on transparency, harm prevention, developmental suitability for children, and redress mechanisms. Access: https://5rightsfoundation.com/resource/children-ai-design-code.

AI curricula for basic education: a mapping of approved AI curricula (2022, UNESCO)

Contents: International mapping of formal AI curricula in basic education, identifying approaches, teaching levels, and content. Provides input for the formulation of national curriculum policies. Access: https://unesdoc.unesco.org/ark:/48223/pf0000380602.

AI Competency Framework for Students (2024, UNESCO, AI Competency Framework for Students)

Contents: AI competency framework for students, structured in technical, cognitive, social, and ethical dimensions, with learning progressions for different stages of basic education. Access: https://www.unesco.org/en/articles/ai-competency-framework-students.

AI Literacy Framework: Empowering Learners for the Age of AI (2025, European Commission; OECD; Code.org, AI Literacy Framework (Empowering Learners for the Age of AI)

Contents: International AI literacy framework for basic education, proposing AI as a cross-curricular subject and integrating technical, critical, and ethical competencies. Access: https://ailiteracyframework.org/wp-content/uploads/2025/05/AILitFramework_ReviewDraft.pdf.

Learning in the Digital World (2023, OECD PISA 2025 – Learning in the Digital World)

Contents: Document that justifies the reformulation of PISA 2025, focusing on competencies for learning in digital and AI-mediated environments, such as problem-solving, critical thinking, and digital literacy. Access: https://www.oecd.org/en/topics/sub-issues/learning-in-the-digital-world/pisa-2025-learning-in-the-digital-world.html.

National Documents

Brazil. 2018. Law No. 13,709 of 14 August 2018: General Data Protection Law (LGPD). Brasília: Presidency of the Republic.

Contents: This law establishes the legal framework for the processing of personal data by individuals and public- or private-sector organisations. It seeks to protect the fundamental rights to freedom, privacy and the free development of personality and includes specific provisions concerning the best interests and data protection of children and adolescents. Available at: https://www.planalto.gov.br/ccivil_03/_ato2015-2018/2018/lei/l13709.htm.

Brazil. 2021. Law No. 14,180 of 1 July 2021 establishing the Connected Education Innovation Policy. Brasília: Presidency of the Republic.

Contents: The law establishes the Connected Education Innovation Policy, giving statutory status to the programme previously created by decree. It aims to expand access to high-speed internet and promote the pedagogical use of digital technologies in basic education. Available at: https://www.planalto.gov.br/ccivil_03/_ato2019-2022/2021/lei/l14180.htm.

Brazil. 2023a. Law No. 14,533 of 11 January 2023 establishing the National Digital Education Policy (PNED). Brasília: Presidency of the Republic.

Contents: The law establishes the National Digital Education Policy, structured around such pillars as digital inclusion, digital education in schools and professional education and training. It seeks to promote digital citizenship through the development of competencies related to digital culture, the digital world and computational thinking. Available at: https://www.planalto.gov.br/ccivil_03/_ato2023-2026/2023/lei/l14533.htm.

Brazil. 2023b. Bill No. 2,338/2023 on the use of artificial intelligence. Brasília: National Congress.

Contents: The bill proposes general rules for AI governance in Brazil, focusing on the protection of fundamental rights, the promotion of responsible innovation and the development and use of secure and reliable AI systems. Available at: https://www.camara.leg.br/proposicoesWeb/prop_mostrarintegra?codteor=2881712&filename=Avulso+PL+2338%2F2023.

Brazil. 2025a. Law No. 15,100 of 13 January 2025 regulating the use of personal portable electronic devices by students in public and private basic education institutions. Brasília: Presidency of the Republic.

Contents: The law restricts students' use of personal portable electronic devices during the school day, particularly for non-pedagogical purposes. It provides exceptions for pedagogical use, accessibility and assistive technology, health-related needs and situations of necessity or force majeure. Available at: https://www.planalto.gov.br/ccivil_03/_ato2023-2026/2025/lei/l15100.htm.

Brazil. 2025b. Law No. 15,211 of 17 September 2025 on the protection of children and adolescents in digital environments (Digital Statute for Children and Adolescents—ECA Digital). Brasília: Presidency of the Republic.

Contents: The law applies to information technology products and services designed for, or likely to be accessed by, children and adolescents. It establishes the best interests of the child as a guiding principle for technology design and requires high levels of privacy and data protection by default. Its provisions address age assurance, parental supervision tools, commercial profiling, advertising, loot boxes and social media accounts held by children and adolescents. Non-compliance may result in warnings, fines, suspension of activities and other sanctions. Available at: https://www.planalto.gov.br/ccivil_03/_ato2023-2026/2025/lei/L15211.htm.

Ministry of Education of Brazil. 2022. Computing complement to the BNCC. Brasília: Ministry of Education.

Contents: This document complements the Brazilian National Common Curricular Base (BNCC) by specifying competencies and skills related to computational thinking, the digital world and digital culture throughout basic education. Available at: https://www.gov.br/mec/pt-br/escolas-conectadas/BNCCComputaoCompletodiagramado.pdf.

Ministry of Education of Brazil. 2024. Digital knowledge framework for teachers. Brasília: Ministry of Education.

Contents: This framework guides teacher education and professional development concerning the pedagogical use of digital technologies. It is structured around three dimensions: teaching and learning; digital citizenship; and professional development. Available at: https://www.gov.br/mec/pt-br/escolas-conectadas/20240822MatrizSaberesDigitais.pdf.

Ministry of Education of Brazil. 2025. Digital and media education: How to develop and implement curricula in schools. Brasília: Ministry of Education.

Contents: This guidance document supports education systems and schools in developing and implementing digital and media education curricula. It brings together digital literacy, media and information literacy, digital rights and citizenship education. Available at: https://www.gov.br/mec/pt-br/escolas-conectadas/documentos/guia_eddigital_versofinaloficial.pdf.

Ministry of Justice and Public Security of Brazil. 2025. Content Rating Guide. Brasília: Ministry of Justice and Public Security.

Contents: The Brazilian Content Rating System is a public policy that provides information about the nature and age appropriateness of content, supporting family decision-making and protecting children and adolescents. The system assesses audiovisual works, games and applications according to content categories including violence, sex and nudity, drugs and interactivity. Available at: https://www.gov.br/mj/pt-br/assuntos/seus-direitos/classificacao-1/paginas-classificacao-indicativa/guia-de-classificacao.

Ministry of Science, Technology and Innovation of Brazil and Center for Strategic Studies and Management. 2024. AI for the good of all: Brazilian Artificial Intelligence Plan 2024–2028. Brasília: MCTI and CGEE.

Contents: This technical and strategic document sets out proposed directions, investments and initiatives for artificial intelligence in Brazil, with an emphasis on scientific development, technological innovation, public-sector capacity and the responsible use of AI. Available at: https://www.gov.br/mcti/pt-br/acompanhe-o-mcti/noticias/2024/07/plano-brasileiro-de-ia-tera-supercomputador-e-investimento-de-r-23-bilhoes-em-quatro-anos/ia_para_o_bem_de_todos.pdf/view.

National Education Council of Brazil. 2025. Resolution CNE/CEB No. 2 of 21 March 2025 establishing the National Operational Guidelines on the use of digital devices in schools and the curricular integration of digital and media education. Brasília: National Education Council.

Contents: The resolution establishes national operational guidelines for the use of digital devices in schools and for integrating digital and media education into basic education curricula. Available at: https://www.gov.br/mec/pt-br/cne/2025/marco/rceb002_25.pdf.

Secretariat of Communication of the Presidency of the Republic of Brazil. 2023. Brazilian Media Education Strategy. Brasília: SECOM.

Contents: The strategy brings together initiatives aimed at developing people's capacity to access, understand, critically evaluate and responsibly produce information through different media and information channels. Available at: https://www.gov.br/secom/pt-br/arquivos/2023_secom-spdigi_estrategia-brasileira-de-educacao-midiatica.pdf.

Secretariat of Communication of the Presidency of the Republic of Brazil. 2025. Children, adolescents and screens: A guide to the use of digital devices. Brasília: SECOM.

Contents: This official guidance document presents evidence, recommendations and practical guidance on balancing screen and digital-device use. It aims to foster healthier digital environments for children and adolescents and inform public policies on protection, health and education. Available at: https://www.gov.br/secom/pt-br/assuntos/uso-de-telas-por-criancas-e-adolescentes/guia.

Appendix 2

Children's Rights by Design: What Education Managers Need to Know

When an education system or school enters into contracts with AI platforms, a school management system, or any digital tool, it makes decisions that directly affect the rights of thousands of students. The international framework Child Rights by Design (CRbD), published in 2023 by the 5Rights Foundation of the United Kingdom, is based on the UN Convention on the Rights of the Child and its General Comment No. 25 on the digital environment, and offers concrete criteria to guide these decisions.

CRbD proposes incorporating children's rights to protection, provision, and participation from the outset of any technology—not as a later adjustment. In Brazilian educational practice, this aligns with the LGPD (Brazilian General Data Protection Law) and the ECA Digital (Digital Statute for Children and Adolescents), which already require privacy by default and risk assessment.

The central point is to ensure that rights are upheld when acquiring technologies. This means requiring suppliers to provide evidence of pedagogical benefit, impact assessments of children's rights, and proof of legal compliance. **The Children & AI Design Code guide**, developed by the same organisation (5Rights Foundation, 2025), is based on the CRbD principles and offers a protocol for developing and using AI systems that affect children and adolescents, serving as a reference for both developers and public administrators.

The checklist of the eleven CRbD principles, adapted to the school environment, can serve as a practical tool for verifying whether contracted solutions effectively protect students—or ignore their presence.

1. **Equity and diversity**—Ensuring that all students, regardless of origin, disability, or social condition, have equitable and inclusive access to digital products.
2. **Best interests of the child**—Prioritising children's well-being and rights in decisions about educational technologies, above commercial interests.
3. **Consultation** — Listening to children and meaningfully involving them in decisions about the digital tools they use at school.
4. **Age appropriateness** — Choosing and configuring digital tools that consider the capabilities and developmental needs of each age group.
5. **Responsibility** — Knowing and complying with applicable laws and regulations (LGPD, ECA Digital, Age Rating) and providing accessible channels for reporting and redress.
6. **Participation** — Allowing children to express themselves, access diverse information, and actively engage in digital learning environments.
7. **Privacy** — Adopting privacy by design: collecting only necessary data, being transparent about its use, and protecting it from unauthorised access.
8. **Security** — Incorporating protections against risks of inappropriate content, contact, and conduct into the design of the adopted digital tools.

9. **Well-being** — Ensuring that technologies promote physical and mental health while avoiding resources that generate compulsion, insecurity, or harmful habits.
10. **Development** — Prioritise technologies that foster learning, creativity, free play, cultural belonging, and social interaction. 11. Agency — Protect children from exploitative practices (dark patterns and manipulative advertising) and support their autonomy in digital decision-making.
11. **Agency** — Protect children from exploitative practices (dark patterns and manipulative advertising) and support their autonomy in digital decision-making.

MINISTÉRIO DA
EDUCAÇÃO