

ARTIFICIAL INTELLIGENCE IN BASIC EDUCATION: TEACHER REPLACEMENT OR RECONFIGURATION OF TEACHING PRACTICE?

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Abstract

This study aims to analyze national and international scientific evidence on the role of artificial intelligence in Basic Education, discussing whether this technology constitutes a mechanism for replacing teachers or for reconfiguring their professional practice. This is a narrative literature review based on scientific articles, official documents, and reports published primarily between 2020 and 2026, supplemented by seminal references on educational technologies and teacher education. The findings show that artificial intelligence does not replace teachers but redefines their roles, shifting the focus from content transmission to pedagogical mediation, the development of critical thinking, personalized

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learning, information curation, and the promotion of social-emotional competencies. The literature also identifies challenges related to teacher education, digital inclusion, data protection, algorithmic transparency, and the ethical use of these technologies in school settings. It is concluded that the effectiveness of artificial intelligence in Basic Education depends on the coordination of technological innovation, continuing teacher education, adequate infrastructure, and stronger teacher autonomy, recognizing teachers as key agents in educational processes within a society increasingly shaped by intelligent technologies.

Keywords: Artificial Intelligence, Basic Education, Educational Technologies, Pedagogical Innovation, Teaching Profession.

INTRODUCTION

Artificial intelligence (AI) has become established as one of the leading disruptive technologies of the twenty-first century, driving significant transformations across different sectors of society, including health care, the economy, industry, communication, and education. Advances in systems capable of processing large volumes of data, recognizing patterns, generating texts, images, and videos, and providing complex responses in natural language have expanded the possibilities for applying AI in school settings, redefining pedagogical practices, modes of learning, and educational management processes.

In Basic Education, the incorporation of artificial intelligence-based tools intensified particularly after the COVID-19 pandemic, a period during which the digitalization of educational processes accelerated the adoption of virtual platforms, intelligent learning environments, and automated teaching-support systems. Resources such as intelligent tutors, virtual assistants, adaptive platforms, automated grading of assignments, predictive analysis of academic performance, and generative models have become part of teachers' and students' daily routines, expanding opportunities for instructional personalization, the production of teaching materials, and the monitoring of learning.

However, the rapid dissemination of these technologies has also prompted intense debate about the future of the teaching profession. The development of generative models capable of answering questions, preparing lesson plans, creating assessments, correcting texts, and providing detailed explanations has raised questions about whether teachers might be replaced by intelligent systems. This discussion extends beyond technological considerations and encompasses ethical, pedagogical, legal, and social dimensions related to the role of schools in human development, the cultivation of critical thinking, and the preservation of the interpersonal relationships that characterize the educational process.

Contemporary literature demonstrates that artificial intelligence significantly changes teachers' work but does not eliminate the need for human involvement. According to Luckin (2018), AI has considerable potential to support pedagogical decision-making, provided that it is used as a technology that complements teachers' work. From a similar perspective, Holmes, Bialik, and Fadel (2019) argue that intelligent systems enhance the capacity to personalize learning, yet remain incapable of replacing distinctly human competencies such as empathy, ethical judgment, conflict mediation, cultural sensitivity, and the building of affective bonds. Selwyn (2019), in turn, cautions that the indiscriminate use of these technologies may exacerbate educational inequalities, reinforce algorithmic biases, and diminish teachers' professional autonomy when implementation occurs without critical reflection.

Internationally, organizations such as the United Nations Educational, Scientific and Cultural Organization (UNESCO) have emphasized that artificial intelligence must be guided by ethical principles, transparency, inclusion, and a human-centered approach. The Recommendation on the Ethics of Artificial Intelligence (UNESCO, 2021) and the Guidance for Generative AI in Education and Research (UNESCO, 2023) maintain that these technologies should strengthen, rather than replace, educators' work. Similarly, the Organisation for Economic Co-operation and Development (OECD, 2024) emphasizes that integrating AI into education systems requires investment in digital infrastructure, artificial intelligence literacy, and continuing teacher education for the critical and responsible use of these tools.

In Brazil, the expansion of artificial intelligence is occurring alongside the implementation of the National Common Curricular Base (Base Nacional Comum Curricular—BNCC), the National Digital Education Policy (Law No. 14,533/2023), and growing discussions concerning teachers' digital competencies. These regulatory frameworks recognize the importance of using digital technologies critically in education while reinforcing the need for teachers' continuing education to address the challenges arising from society's digital transformation.

Despite technological advances, schools continue to perform functions that extend beyond content transmission. Students' comprehensive development involves processes of socialization, social-emotional development, citizenship building, ethical education, and cultural mediation, all of which depend on teachers' conscious, reflective, and context-sensitive involvement. In this sense, artificial intelligence tends to reconfigure teaching practice by shifting the focus away from repetitive tasks and toward functions of greater intellectual, pedagogical, and relational complexity, without eliminating the educator's central role in the teaching and learning process.

Against this backdrop, the following research question is posed: How has artificial intelligence reconfigured the role of teachers in Basic Education, and to what extent can its applications replace or complement functions traditionally performed by teachers?

Based on this problem, the study aims to analyze national and international scientific evidence concerning the impacts of artificial intelligence on Basic Education, discussing whether this technology constitutes a mechanism for replacing teachers or for reconfiguring teaching practice. It seeks to understand the potential, limitations, ethical challenges, and pedagogical implications of AI, thereby contributing to the debate on teacher education, educational innovation, and the role of teachers in a society marked by the growing presence of intelligent systems.

THEORETICAL FRAMEWORK

ARTIFICIAL INTELLIGENCE: CONCEPTS, DEVELOPMENT, AND APPLICATIONS IN EDUCATION

Artificial intelligence (AI) is an interdisciplinary field of computer science devoted to developing systems capable of performing tasks that traditionally require human intelligence, such as learning, reasoning, decision-making, pattern recognition, and natural language processing. Russell and Norvig (2021) define AI as the construction of intelligent agents capable of perceiving their environment, interpreting information, and acting rationally to achieve specific objectives. Kaplan and Haenlein (2019) add that recent advances in machine learning and deep learning have significantly expanded the capabilities of intelligent systems, enabling applications in different fields of knowledge, including education.

In the educational context, artificial intelligence has assumed a strategic role in transforming teaching and learning processes. Luckin (2018) states that AI provides resources for personalizing instruction, continuously monitoring student performance, identifying learning difficulties at an early stage, and supporting pedagogical decision-making. Holmes, Bialik, and Fadel (2019) emphasize that intelligent systems make it possible to adapt content to students' individual needs, fostering more flexible and student-centered learning experiences. Selwyn (2019), however, cautions that incorporating these technologies requires critical analysis that considers ethical, social, and pedagogical issues related to teacher autonomy, data privacy, and potential algorithmic biases.

International organizations also recognize the transformative potential of artificial intelligence in education. UNESCO (2021) establishes that the use of AI must respect ethical principles, human rights, inclusion, and transparency, preventing technology from exacerbating educational inequalities. Subsequently, UNESCO (2023) reinforces the view that generative artificial intelligence represents an opportunity for pedagogical innovation, provided that it is used as a complementary tool in teachers' work and is accompanied by teacher professional development and technology governance policies.

ARTIFICIAL INTELLIGENCE AND THE RECONFIGURATION OF TEACHING PRACTICE

The expansion of artificial intelligence has significantly changed the role of teachers, shifting their work away from the mere transmission of content and toward functions related to pedagogical mediation, information curation, the development of critical thinking, and the personalized monitoring of learning. Nóvoa (2022) states that twenty-first-century teachers are assuming an increasingly strategic role in creating learning experiences, acting as mediators in knowledge production within environments permeated by digital technologies.

According to Tardif (2014), teachers' work is grounded in professional knowledge built through experience, education, and human interactions, dimensions that cannot be fully reproduced by automated systems. From a similar perspective, Imbernón (2017) argues that contemporary teacher education must include digital competencies that allow technologies to be integrated critically and on a sound pedagogical basis into curricula.

Holmes et al. (2022) emphasize that artificial intelligence-based tools automate repetitive activities, such as grading exercises, organizing data, and preparing reports, allowing teachers to focus their efforts on activities of greater cognitive complexity, including pedagogical planning, problem-solving, individualized support, and the development of social-emotional competencies. According to Luckin (2018), artificial intelligence should be understood as a technology that supports teachers rather than as a mechanism designed to replace human involvement.

Similarly, the OECD (2023) emphasizes that the future of the teaching profession will depend on education systems' ability to integrate intelligent technologies while preserving professional autonomy, pedagogical judgment, and the centrality of human relationships in educational processes.

LIMITS TO THE REPLACEMENT OF TEACHERS BY ARTIFICIAL INTELLIGENCE

Although technological advances have expanded the capabilities of intelligent systems, the literature reflects broad agreement that artificial intelligence is not capable of fully replacing teachers.

Freire (2021) understands education as a dialogical practice grounded in interaction among individuals, a process incompatible with exclusively automated models of instruction. For the author, teaching involves dialogue, listening, problematizing reality, and collectively constructing knowledge, all of which transcend algorithmic processing.

Biesta (2022) argues that education cannot be reduced to the efficient transmission of information because it involves ethical development, emancipation, citizenship building, and the development of students' intellectual autonomy. From this perspective, artificial intelligence can support pedagogical activities but remains incapable of reproducing aspects related to moral judgment, cultural sensitivity, context-sensitive creativity, and the mediation of interpersonal relationships.

Selwyn (2019) further emphasizes that algorithms reflect human choices embedded in computer systems and may therefore reproduce prejudices, discrimination, and inequalities present in the data used for their training. Consequently, the use of AI in education requires continuous teacher supervision to ensure that pedagogical decisions are not delegated exclusively to automated systems.

UNESCO (2023) reinforces that the ethical use of artificial intelligence presupposes transparency, algorithmic explainability, personal data protection, human oversight, and respect for the rights of children and adolescents, all of which are essential principles for its responsible use in school settings.

TEACHER EDUCATION, ETHICS, AND CHALLENGES IN INTEGRATING AI INTO BASIC EDUCATION

The consolidation of artificial intelligence in Basic Education presents new challenges for initial and continuing teacher education. Through the Technological Pedagogical Content Knowledge (TPACK) framework, Mishra and Koehler (2006) demonstrate that the effective integration of technology depends on connecting pedagogical, technological, and subject-specific knowledge. Almeida and Valente (2011) add that the educational use of technology produces innovation only when it is critically incorporated into curricula and pedagogical practices.

In the Brazilian context, Law No. 14,533/2023, which establishes the National Digital Education Policy, sets forth guidelines for developing digital competencies, technological literacy, and the ethical use of educational technologies. In parallel, the National Common Curricular Base (Brazil, 2018) recognizes digital culture as a general competency essential to students' education, increasing the responsibility of educational institutions to prepare learners for a society shaped by data and intelligent technologies.

Araripe and Lins (2020), however, show that many teachers still experience difficulties in developing advanced digital competencies, particularly regarding the critical use of artificial intelligence in pedagogical contexts. According to Fullan (2020), sustainable educational reforms require continuous investment in technological infrastructure, continuing education, a collaborative culture, and educational leadership, thereby preventing innovation from being limited to the mere acquisition of equipment.

Based on the contributions of Luckin (2018), Selwyn (2019), Nóvoa (2022), UNESCO (2023), and the OECD (2023), it can be observed that artificial intelligence does not represent the replacement of teachers but rather a profound reconfiguration of pedagogical practices. Teachers remain central agents in the educational process, responsible for interpreting contexts, promoting meaningful human interaction, developing social-emotional competencies, and ensuring that technologies are used ethically, critically, and in alignment with the objectives of comprehensive education.

METHODOLOGY

This study is characterized as a qualitative, descriptive, and exploratory narrative literature review developed to analyze scientific evidence concerning the use of artificial intelligence in Basic Education and its impacts on teaching practice, discussing whether this technology constitutes a process of replacing teachers or reconfiguring their professional work. According to Gil (2022), bibliographic research makes it possible to gather and critically interpret knowledge produced about a given phenomenon, while

Lakatos and Marconi (2021) emphasize its relevance to constructing scientific syntheses grounded in different theoretical perspectives.

The choice of a narrative review is based on its capacity to integrate findings from national and international studies, institutional documents, and seminal references in the field, enabling a broad discussion of the transformations brought about by artificial intelligence in educational contexts. According to Rother (2007), this type of review supports interpretive analyses of emerging topics, particularly when scientific production is expanding rapidly. The bibliographic search was guided by predefined criteria intended to broaden the scope and consistency of the selected sources, without claiming the exhaustiveness characteristic of systematic reviews.

The bibliographic survey was conducted between May and July 2026 in Scopus, Web of Science, the Education Resources Information Center (ERIC), SciELO, the Virtual Health Library (Biblioteca Virtual em Saúde—BVS), IEEE Xplore, the ACM Digital Library, and Google Scholar. It also included documents published by UNESCO, the Organisation for Economic Co-operation and Development (OECD), the European Commission, the Ministry of Education (Ministério da Educação—MEC), and other organizations concerned with education and digital technologies.

The following descriptors were used: “inteligência artificial,” “educação básica,” “educação digital,” “inteligência artificial generativa,” “prática docente,” “formação de professores,” “artificial intelligence,” “generative AI,” “AI in education,” “educational technology,” and “teacher professional development.” These terms were combined using the Boolean operators AND and OR to enhance the sensitivity and specificity of the search strategies.

The inclusion criteria encompassed scientific articles, books, book chapters, technical documents, legislation, and reports published primarily between 2020 and 2026; available in full in Portuguese, English, or Spanish; and directly addressing the use of artificial intelligence in Basic Education, its impacts on teachers’ work and teacher education, and ethical issues related to the implementation of these

technologies. Seminal works considered essential to understanding educational technologies, teacher education, and the integration of technology and pedagogy were also included.

Duplicate studies, non-peer-reviewed works, abstracts from scientific events, opinion pieces, materials without access to the full text, and studies focused exclusively on technical applications of artificial intelligence unrelated to pedagogical processes or Basic Education were excluded.

Following the selection of the literature, an exploratory reading was conducted, followed by an analytical and interpretive reading of the selected studies. The evidence was systematized through thematic content analysis, as proposed by Bardin (2016), which made it possible to organize the findings into four analytical categories: (a) foundations of artificial intelligence applied to education; (b) reconfiguration of teaching practice; (c) limits to the replacement of teachers by intelligent systems; and (d) ethical, educational, and policy challenges involved in integrating AI into Basic Education.

RESULTS AND DISCUSSION

Luckin (2018), Holmes, Bialik, and Fadel (2019), and UNESCO (2023) indicate that AI has been changing teaching, learning, assessment, and management processes in Basic Education. These transformations, however, do not constitute the replacement of teachers but rather a reconfiguration of their professional practice. AI-based technologies can perform functions related to automating operational tasks, processing large volumes of data, and personalizing learning, while pedagogical mediation, the building of human relationships, the development of critical thinking, and students' ethical education remain the responsibility of teachers.

Holmes et al. (2022) identify the personalization of teaching and learning processes as one of the primary possibilities offered by artificial intelligence. Intelligent systems can continuously analyze student performance, identify specific difficulties, and suggest learning pathways adapted to individual needs. This capacity expands the possibilities for pedagogical monitoring, particularly in large classes, enabling faster and more data-informed interventions. Kaplan and Haenlein (2019) add that advances in

machine learning and, subsequently, in AI applications have enhanced support for content production, problem-solving, and the organization of pedagogical activities.

Personalization mediated by artificial intelligence, however, depends on teachers' interpretation and intervention. Luckin (2018) argues that algorithms can identify learning patterns but cannot fully understand the emotional, cultural, and social factors affecting student performance. Tardif (2014), in turn, emphasizes that teachers' work is grounded in experiential, relational, and ethical knowledge developed throughout professional practice. AI therefore increases the availability of information for decision-making but does not replace pedagogical judgment or teachers' ability to interpret complex educational contexts.

Holmes et al. (2022) and the OECD (2023) also identify possibilities for automating administrative and pedagogical activities, such as the preliminary preparation of materials, organization of records, performance analysis, and report generation. Reducing the time devoted to repetitive tasks may increase teachers' availability for more complex activities, including instructional planning, individualized support, the development of interdisciplinary projects, and the strengthening of social-emotional competencies.

Selwyn (2019), however, warns that algorithms are not neutral because they may reproduce values, interests, and limitations present in the data used in their development and training, including prejudices and inequalities found in society. UNESCO (2021; 2023) reinforces the need for algorithmic transparency, human oversight, personal data protection, and respect for the rights of children and adolescents, while also maintaining that significant educational decisions must remain under human responsibility.

The expansion of generative artificial intelligence has introduced new challenges into teaching and assessment processes. The ability to generate texts, solve problems, produce code, and answer complex questions requires a review of assessment practices based predominantly on content reproduction. The OECD (2023) draws attention to the need to develop practices that value problem-

solving, authorship, argumentation, creativity, and critical thinking. In this context, methodologies based on projects, inquiry, and students' active participation become increasingly relevant.

The incorporation of artificial intelligence also requires new professional competencies. Almeida and Valente (2011) argue that integrating digital technologies must connect technological innovation with pedagogical foundations, as merely providing equipment or platforms is insufficient. Araripe and Lins (2020) identify difficulties among teachers in developing more advanced digital competencies, particularly those related to the critical use of technologies. Through the TPACK framework, Mishra and Koehler (2006) reinforce that technological knowledge makes a greater pedagogical contribution when combined with pedagogical knowledge and subject-specific expertise.

Inequalities in access constitute another barrier to integrating AI into Basic Education. UNESCO (2023) draws attention to disparities in infrastructure, connectivity, equipment availability, and professional development that may deepen inequalities among schools, education systems, and social groups. In Brazil, the National Digital Education Policy (Brazil, 2023) establishes guidelines to expand digital culture, but its implementation requires continuous investment in connectivity, technological infrastructure, technical support, and the professional development of education professionals.

Nóvoa (2022) emphasizes that competencies such as empathy, communication, pedagogical leadership, conflict mediation, creativity, and support for student development remain directly associated with the human dimension of teaching. Biesta (2022) broadens this discussion by arguing that the purpose of education extends beyond the efficient transmission of knowledge and encompasses ethical development, social participation, responsibility, and the construction of autonomy. These dimensions reinforce the teacher's continuing centrality in organizing educational experiences.

In this context, artificial intelligence does not necessarily represent the elimination of the teaching profession but does change some of its responsibilities. Teachers are likely to assume expanded functions related to knowledge curation, learning mediation, the planning of educational experiences, guidance on the critical use of technologies, and students' comprehensive development. This reconfiguration requires

continuing education, the development of digital competencies, the preservation of professional autonomy, and public policies capable of guiding the ethical, inclusive, and pedagogically grounded use of AI.

The main findings are summarized in Table 1.

Table 1
Summary of the Main Findings on Artificial Intelligence and Teaching Practice

Dimension	Main finding	References
Personalization	AI makes it possible to adapt learning pathways and monitor student performance.	Holmes et al. (2022); Luckin (2018)
Automation	AI can reduce repetitive tasks, record-keeping, and administrative activities.	Holmes et al. (2022); OECD (2023)
Teacher mediation	The interpretation of contexts and pedagogical judgment remain under human responsibility.	Luckin (2018); Tardif (2014)
Teacher education	Integrating AI requires technological, pedagogical, and critical competencies.	Mishra and Koehler (2006); Almeida and Valente (2011)
Ethics and security	The use of AI requires transparency, data protection, and human oversight.	Selwyn (2019); UNESCO (2021; 2023)
Role of the teacher	AI reconfigures teachers' responsibilities but does not eliminate their centrality in the educational process.	Nóvoa (2022); Biesta (2022)

Source: Prepared by the authors based on the references analyzed (2026).

Thus, from different perspectives, Luckin (2018), Holmes et al. (2022), Nóvoa (2022), Biesta (2022), UNESCO (2021; 2023), and the OECD (2023) support a convergent understanding: artificial intelligence’s contribution to Basic Education depends on its coordination with human pedagogical action. Technology can expand possibilities for teaching, analysis, and personalization, while the interpretation of contexts, the construction of intellectual autonomy, citizenship education, and the relational dimension of the educational process remain linked to teachers’ professional work.

CONCLUSION

The incorporation of artificial intelligence into Basic Education represents a reconfiguration of teaching practice rather than the replacement of teachers. AI-based technologies broaden the possibilities

for personalized learning, task automation, educational data analysis, and the production of teaching resources, but they do not fully reproduce the human competencies essential to the educational process.

In this context, teachers assume new responsibilities. Pedagogical mediation, the building of interpersonal relationships, the promotion of critical thinking, social-emotional development, ethical education, and the interpretation of different sociocultural realities remain dependent on human intervention. Technology therefore tends to shift some teachers' work away from repetitive activities and toward functions related to planning, information curation, learning guidance, and students' comprehensive development.

The use of artificial intelligence also requires continuing education, the development of digital competencies, adequate infrastructure, personal data protection, algorithmic transparency, and ethical guidelines governing its use. Its implementation must remain subordinate to pedagogical objectives, thereby preventing significant educational decisions from being transferred exclusively to automated systems.

In the field of public policy, the National Digital Education Policy constitutes an important framework for expanding digital culture in Brazil. Its effective implementation, however, requires coordination among infrastructure, connectivity, teacher education, digital educational resources, and the development of competencies for the critical and responsible use of technology. These conditions are particularly relevant to preventing the deepening of inequalities in access and promoting greater digital inclusion.

Generative artificial intelligence also necessitates a review of assessment practices and teaching methodologies. Assessments focused solely on memorization and the reproduction of information become less suitable in the face of systems capable of producing complex responses in real time. It is therefore necessary to expand practices that value authorship, creativity, problem-solving, argumentation, collaboration, critical thinking, and the contextualized application of knowledge, while maintaining teacher mediation as a central component of this process.

The bibliographic nature of the study and the rapid evolution of artificial intelligence technologies constitute its principal limitations. Future research should conduct empirical and longitudinal investigations into the impacts of these technologies on learning, teacher education, social-emotional development, educational inequalities, and algorithmic governance.

It is concluded that artificial intelligence does not represent the end of the teaching profession but changes teachers' responsibilities and creates additional professional obligations. Teachers remain the leading agents in the educational process, particularly in pedagogical mediation, citizenship education, the development of critical thinking, and ethical guidance concerning the use of technology. The future of Basic Education will therefore depend on the ability to integrate human and artificial intelligence critically, inclusively, ethically, and in pedagogically meaningful ways.

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