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Artificial intelligence and innovation in educational processes: for what?[1]

Inteligência artificial e inovação em processos educacionais: para quê?

Inteligencia artificial e innovación en los procesos educativos: ¿para qué?

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Abstract: The article examines the contradictions of capitalism and the role of Artificial Intelligence (AI) as an instrument for reproducing social inequalities and intensifying labor exploitation. The analysis situates technological hegemony as an expression of the structural crisis of capital and problematizes the advance of technocentrism and technological solutionism in education. It discusses how public policies and the emerging legal framework in Brazil, influenced by neoliberal logic, confront the structural precariousness of schools and deepen historical inequalities. Grounded in historical-dialectical materialism, the study proposes a counter-hegemonic teaching praxis aimed at the critical and collective appropriation of technology by teachers. This movement seeks to overcome alienation and to restore the autonomy and recognition of teachers, who ultimately must be seen as workers, and defended as class subjects.
Keywords: Teaching work; Artificial Intelligence; Technology and Education; Public Policies.

Resumo: O artigo examina as contradições do capitalismo e o papel da Inteligência Artificial (IA) como instrumento de reprodução das desigualdades sociais e de intensificação da exploração do trabalho. A análise situa a hegemonia tecnológica como expressão da crise estrutural do capital e problematiza o avanço do tecnocentrismo e do solucionismo tecnológico na educação. Discute-se como políticas públicas e o marco legal em elaboração no Brasil, influenciados pela lógica neoliberal, confrontam a precariedade estrutural das escolas e aprofundam desigualdades históricas. Fundamentado no materialismo histórico-dialético, o estudo propõe uma práxis docente contra-hegemônica, voltada à apropriação crítica e coletiva da tecnologia pelos professores. Tal movimento busca superar a alienação e restituir a autonomia e o reconhecimento do trabalhador docente enquanto sujeito de classe.
Palavras-chave: Trabalho docente; Inteligência Artificial; Tecnologia e Educação; Políticas Públicas.

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Resumen: El artículo examina las contradicciones del capitalismo y el papel de la Inteligencia Artificial (IA) como instrumento de reproducción de las desigualdades sociales y de intensificación de la explotación del trabajo. El análisis sitúa la hegemonía tecnológica como expresión de la crisis estructural del capital y problematiza el avance del tecnocentrismo y del solucionismo tecnológico en la educación. Se discute cómo las políticas públicas y el marco legal en elaboración en Brasil, influenciados por la lógica neoliberal, enfrentan la precariedad estructural de las escuelas y profundizan las desigualdades históricas. Fundamentado en el materialismo histórico-dialéctico, el estudio propone una praxis docente contrahegemónica orientada a la apropiación crítica y colectiva de la tecnología por parte de los profesores. Este movimiento busca superar la alienación y restituir la autonomía y el reconocimiento del trabajador docente como sujeto de clase.
Palabras clave: Trabajo docente; Inteligencia Artificial; Tecnología y Educación; Políticas Públicas.

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Contradictions of Capitalism and Artificial Intelligence[5]

Perhaps the most intriguing aspect of the contradictions of capitalism, is that they are simultaneously observable and unobservable. The contradictions manifest as objective and subjective forces, operating both in consciousness and the unconscious. In this scenario, class struggle unfolds under objective conditions of technological "progress," which progressively restricts the possibilities of revolutionary subjectivity, which is here understood as class consciousness and the manifestation of a shared understanding of the need for real social change.

Class struggle exists in material conditions dominated by technology, which is ever-present in human societies, but is portrayed as the only solution, becoming indispensable to the capitalist imagination. This process exacerbates the contradictions of this mode of production, demanding that we incorporate digital transitions with pride, repeatedly demonstrating, in daily life, the observable conditions of our own exploitation. Closer inspection reveals that technology has not automatically led to prosperity, to improvements in productivity, to better education, and increasingly, we cannot even say liberalism, anymore. In this article we discuss how public policies and

[5] The first section of this article is based on the participation of Professor Dr. Phoebe V. Moore in the 1st Goiano Meeting on Education and Technology (Potyrõ), organized by Kadjót (Interinstitutional group for studies and research on the relationships between technologies and education) on May 29, 2025 in Goiânia, Goiás, Brazil. The recording of the round table "Artificial intelligence and innovation in educational processes" is available at the following link: https://youtu.be/lJLedttEt-I?si=akUj5u7xLeVfD5yc.

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the emerging legal framework in Brazil, influenced by neoliberal logic, confront the structural precariousness of schools, and deepen historical inequalities. Authors are part of the Kadjot[6] Network which is involved in transformational projects to influence these processes, and the following article lays out how we intend to encourage change, based on philosophical and political concepts.

The material conditions under which class struggle occurs are, ultimately, destructive. This is increasingly evident in the ways we destroy ourselves, and each other, transforming ourselves into supposedly disposable and exchangeable entities, with mutual exclusion mutations which objectify material conditions and make resistance difficult. Inequality itself destroys, where technology perpetuates it, under the guise of meritocracy. In the myth of a fully connected, inclusive, and democratic society, machines appear to become more attractive as supportive objects, more attractive than human subjects, which is a classic Machiavellian technique of divide and rule.

Social rights are continuously withdrawn from populations and austerity is prolonged with technological progress. We live in the perpetual crisis of subjective estrangement and objective alienation. It is imperative to reinforce the defense of the right to be a subject (Moore, 2023), as subject identification for shared and associational regard, recognition, and distribution (Fraser; Honneth, 2003) are the final frontiers for domination. In the Gramscian sense, hegemony advances, beyond consent, to the next phase of coercion and proto-fascism.

In this scenario, labor was supposed to be replaced by machines through automation. This has been observed occurring with entire jobs, then with manual tasks, cognitive tasks, and now, apparently, emotional ones. Automation advances with the mask of emotional competences. Technological progress, through automation and assistance with social design, has not averted the global poly-crisis we find ourselves in. This phenomenon is both the reason for the complexities of the crises and the reason for seeking technology as a solution, exemplified by the return of AI.

The initial ideas about this technology in Silicon Valley were based on optimization and idealized futures, sold to venture capitalists. Two eras of dot-com bubbles followed, but no golden age was reached. What AI is intended to do, is a simulation of innovation, and the question remains: is there empirical evidence that significant progress has been achieved due to AI, except a semblance, which only benefits a minority of the globe's populations? To provide a historical materialist analysis, AI is discussed here as an event occurring at a

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historical political moment of capitalism's failure. Societies are rapidly shifting to the extreme right, and AI is proselytized as a solution, but to what?

What does it mean to design a machine that is identical to a human? AI is officially said to have begun at Dartmouth College when a computer scientist organized a summer course to create a machine that was hoped, with the right programming, would begin fairly quickly, to behave just like a human. This "first era of research" was called symbolic, but neural networks were soon developed, capable of mimicking the world and even representing their own version of what humans could imagine.

Very serious criticisms rapidly arose after this original "summer" for AI. The phenomenologist Hubert Dreyfus, from University of Berkeley, argued that the project was limited, as it was based on Cartesian dualism and a rationalist view (Dreyfus, 1979). He maintained that conscious symbolic manipulation is not how human intelligence operates, and that much of our cognition operates at the level of the unconscious. Dreyfus argued that humans experience the world, not as representations, models or symbols, but the world itself. Although not a Marxist, Dreyfus was one of the few to criticize the epistemological foundations of AI, in its early stages.

The reason AI revived as a new AI summer, in the recent technological solutionism of the 2000s is the following: the industrial base of advanced economies and supply chain labor were exported, dispossessing societies and seeking not only to silence but to entirely eliminate local working classes. The automation of manual labor did not lead to sufficient prosperity for capitalists, and AI reflects a management-led project for the automation of not only manual, but also cognitive labor.

Dependence, in the context of advanced economies, on services and intellectual labor proved to be an unreliable economic foundation. Yet, the quantification of work has reduced visibility of affective labour, assumed to not exist in knowledge work (Moore, 2018). It is not that quantifying affective labor will provide a good solution. In fact, AI, and a myriad of EdTech[7] requirements that are infiltrating classrooms today, where they are used in work processes, threatens to reduce visibility even further. The affective labor of teachers that is occurring in educational environments across the world today, reflects the ongoing drive to automate mental and manual labour alike, but the terrain of affective labor is the site of class struggle we must now investigate.

[7] In this article, we understand EdTech as the set of companies that produce technology geared towards educational contexts. These products are based on technocentrism, in which their presence is seen as a guarantee of improved education.

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This reveals the contradictions of capitalism: management work is steeped in cognitive, and affective, labor. However, is AI truly designed for managers to automate themselves? Can we even remotely imagine that the seizure of the means of AI production could, in fact, automate management in a liberating sense? To identify if this is possible, we turn to empirical and theoretical arguments to see where the points of tension for potential infiltration and critique lie.

There is a specific set of AI modalities with a correspondence in how they reflect the social relations of production, such that AI supposedly reflects humans as we are and is designed in our image. "Assistive" and "collaborative" robots in warehouses and call centers are ultimately a way to reduce labor costs. On the one hand, "prescriptive" intelligence is a practice based on performance analysis in people management, that allows for the reduction of management responsibility and the duty of care. On the other, "descriptive" intelligence leads to interpretations of work and performance by AI software that can be used in ways not disclosed to workers (Moore, 2020).

"Predictive" intelligence is a technique used in criminal recidivism decisions and, in the workplace, aims to identify talented workers, as well as seeming troublemakers, with calculating precision; but with the paradoxical risks of unfair and even illegal, discrimination. Furthermore, "affective" intelligence—where chatbots respond similarly to Eliza, or are used for emotion representation in facial interview footage for recruitment techniques—is based on the premise that emotion and affect are equally important for intelligence, an area that Professor Rosalind Picard pioneered in the late 1990s.

The recently enacted European Union Artificial Intelligence Act (European Union, 2024) establishes a prohibition on the use of "emotion recognition" technologies in the workplace. However, most global jurisdictions do not adopt a similar regulatory approach. Currently, one of the main contexts of application lies in the evaluation of the emotional state of call center operators, although the evaluation metric primarily focuses on the impression generated for the customer, to the detriment of the worker's well-being.

The existing legal framework considers body movement to be representative of emotional states. The conceptual challenge lies in the polysemy of physical manifestations: a smile can be indicative of happiness or nervousness, just as an increased heart rate can reflect anxiety or excitement. With AI, we are witnessing a proliferation of the types of biometric data that can be captured.

This technological evolution necessitates a legal differentiation between an inert physical movement (like moving an arm) and a physical movement interpreted as an emotional reflection. Given this scenario, it becomes imperative to question the extent of the subject's

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autonomy and agency in determining which emotion or activity will be subject to evaluation and subsequent classification based on the collection of this data.

The relevance of this discussion transcends the work environment, manifesting in other areas, such as Educational Technology (EdTech). In this context, it is appropriate to inquire why the assessment of students' emotions—a practice inherent to the teaching role—is expected with the intermediation of AI tools.

Technology is not neutral: it is used for the metabolism of nature and acts to assimilate labor to mechanistic forces, instead of being seen merely as an objective tool. The obvious place is the "general intellect." As regards how AI engages at this historical point, there is a dominant mode of intelligence propagated, rather than one that stems from a social economy perspective. It would be easy to simply say that this results in estrangement, alienation, pure surplus-value extraction. What is happening is the imposition of a homogenizing force, exemplified even in how laws have attempted to regulate the worst uses of AI, where victims, labeled as "data subjects" in the law, apparently face the same risks.

This homogenizing force of AI, imposed by global capital and instrumental rationality, requires that the analysis shift from abstract critique to concrete social and material reality. In the context of countries like Brazil, technology is not only a vector for the extraction of surplus-value and alienation, but also an instrument that verticalizes historical inequalities. AI, sold as a panacea for education's "problems," needs to be examined in light of historical-dialectical materialism, questioning its insertion into an educational system already marked by precariousness, neoliberal logic, and deficient infrastructure, here particularized by the relationship between education and AI in Brazil.

Education and AI in Brazil

According to Vieira Pinto (2005), throughout history, the expansion of human reason underpins new ways of relating to and understanding phenomena, just as this relationship contributes to the construction of knowledge and other techniques. In each social context, different techniques are proposed for resolving the contradictions of reality, as means of production that reflect the social relations in which they are embedded. The educational process, in which subjects appropriate historically constructed techniques and knowledge, is determined by objective conditions and social class inequality.

As a product of labor, technology is inserted into the most diverse contexts of social practice, among which we highlight education as a process of humanization. Among the

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technologies transposed to this field, such as artificial intelligence in contemporary times, we ask: how has AI been related to education? How is it proposed for pedagogical processes? To what extent can it contribute to human formation?

Artificial intelligence is recurrently indicated as an innovation capable of performing tasks more efficiently and quickly, solving problems and productive processes, as a potential substitute for labor. There is an inversion between the producer and the product of labor, as technology, as a product, is placed in the role of the worker (producer), which demonstrates adherence to technocentrism and instrumental rationality. This technological fetish contributes to the alienation of the worker, which favors the expansion of surplus-value extraction in capitalist society (Marx, 2017).

In education, technocentrism emerges as technological solutionism, where technology could be responsible for improvements in teaching work and pedagogical practices and, consequently, in learning. However, the insertion of technology into pedagogical processes is incapable of overcoming the structural exclusionary processes of capitalist society and achieving an emancipatory function. Thus, the critique of the technocentric context is not limited to explaining it, but also to the proposition of a critical-dialectical perspective, which allows for explaining reality in its contradictions and underpinning a counter-hegemonic pedagogical-didactic proposal (Peixoto, 2022).

The discussion about technologies and education, especially about Artificial Intelligence, is globally guided by the interests of international organizations based on neoliberal logic (Echalar, 2025). A key reference is the United Nations Educational, Scientific and Cultural Organization's (UNESCO) guide on AI and Education, which affirms the necessary AI literacy of subjects and the inclusion of this theme in basic education curricula, to build knowledge, skills, and abilities to deal with this technology in contemporary times (UNESCO, 2022). Initially, this document advocates for human centrality in the process, but ultimately embodies different contradictions, especially in a country like Brazil.

In the Brazilian legislative scenario, the main national initiative for regulating artificial intelligence is Bill n. 2338 of 2023, which aims to establish a legal framework for the use of Artificial Intelligence in the country. The text proposes a set of rights and duties for AI agents and systems, including, in turn, discussions on the country's educational systems. Synthesized in Article 5, these involve:

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> I – the right to prior information regarding interactions with artificial intelligence systems;
> II – the right to an explanation regarding the decision, recommendation, or prediction made by artificial intelligence systems;
> III – the right to challenge decisions or predictions by artificial intelligence systems that produce legal effects or significantly impact the interests of the affected party;
> IV – the right to human determination and participation in decisions of artificial intelligence systems, taking into account the context and the state of the art of technological development;
> V – the right to non-discrimination and the correction of direct, indirect, illegal, or abusive discriminatory biases; and
> VI – the right to privacy and the protection of personal data, pursuant to relevant legislation (Brazil, 2023, our translation).

How would these rights be guaranteed in the context of teaching work in Brazil? If the varied dimensions of teachers' work were subjected to the results of students on AI-supported platforms, what kind of autonomy would be produced in this process? Are the specificities of educational processes guaranteed when, through neoliberal and technocentric logic, AI is vertically submitted to school contexts? How does the legal framework under construction relate to the protection of Brazilians concerning BigTechs and the process of platformization of education?

In Brazilian public policies, such as the "AI for the good of all: Brazilian Artificial Intelligence Plan - PBIA" (MCTI, 2025), adherence to technocentrism can be identified in various aspects, by assigning AI the role of innovation with the potential to transform productive sectors, promote social inclusion, and change the country's role from a passive consumer of technologies to a global protagonist. A highlight is the recurring justification that it is imperative to break with traditional social structures and keep up with technological innovation, in its implications for social development.

Regarding education and teaching, the PBIA indicates that AI can offer opportunities for: personalized instruction, improved learning, better school management, reduced school dropout and evasion in basic education, prediction and protection of student trajectories, formative and diagnostic assessment for literacy and reading, computer vision and tutoring for mathematics instruction, promotion of well-being in teaching processes for students, management of technical-vocational education, and partnership with federal institutes for training professionals in ICT-AI, and support for technology companies for AI educational solutions.

Such indications are not implemented in isolation from a more egalitarian social structure (Echalar; Peixoto, 2017). Consequently, these concerns become more prominent in a country historically constituted by educational and social inequalities, since social inequalities produce educational inequalities and educational inequalities

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produce social inequalities (Libâneo, 2012). This movement would also extend to the relationship between education and technology, with the neoliberal advances in AI providing an opportunity for its deepening.

The TIC Education 2023 survey by the Brazilian Internet Steering Committee (CGI.br) indicates that, although 92% of public elementary and secondary schools—institutions where the children of Brazilian workers are enrolled—had Internet access in 2022, the quality of this connection is very low. Among these institutions, only 11% had a connection robust enough to allow for quality navigation (CGI.br, 2024). This disparity between having access and having conditions of use reveals that the basic infrastructure for the appropriation of technologies is still a privilege of a small portion of the Brazilian people, far from being a universalized right in the country.

When relating the data on internet access in Brazilian public schools and the AI policies mentioned above, the disparity between the material conditions and the propositions present in the documents is notorious. By establishing rights related to AI, this will only apply to subjects who access it, and even then, within the limitations of power disputes and class inequality. The various attributions given to AI for improving educational processes also demand materiality, such as infrastructure, and are, in fact, constructions of the relations between subjects and between these and technological objects. In this sense, we emphasize that in concrete reality, these propositions demonstrate an adherence to technological fetishism and technocentrism, not being feasible for effective implementation in the country's public education network.

Regarding the research developed in Brazil on Education and Artificial Intelligence, Fernandes, Araújo, and Cunha (2025) identified 31 articles on this theme. The authors organized the findings into four main thematic axes: the use of AI in learning, its application in higher education, ethical discussions, and, fundamentally, the direct impacts of technology on teaching work, providing an initial panorama of the concerns mobilizing researchers in the area.

Complementarily, the research by Araújo, Fernandes, and Vilas Boas (2024), by investigating publications on Artificial Intelligence and pedagogical-didactic work, located 26 relevant articles. The analysis of these works revealed three major focal points of discussion: the challenges and concrete impacts of AI on teaching practice; the crucial ethical issues emerging from this process; and, finally, the transformations in the pedagogical-didactic work itself involving these apparatuses.

In this set of productions, the relationship between artificial intelligence and education seems to have a technical-operational centrality. Thus, they distance themselves from

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grasping the origin and development of these relationships, as well as the contradictions involved in their production in the capitalist context. This causes the political, social, ideological, and pedagogical foundations to be reduced to an instrumental view of the relationship between education and technology, signified as capable of optimizing the unity between teaching and learning under the aegis of increased effectiveness and performance.

Thus, from one pole of technological determinism, artificial intelligence is neutral, autonomous, and inherently beneficial, besides being easily generalizable to any and all pedagogical-didactic situations. From the other, responsibility for the means and modes in which the relationship between this apparatus and educational processes occurs belongs exclusively to the subject. In both cases, it is concealed that in the context of capitalism, technologies are produced and reproduced as commodities, along with the possibility of understanding the dialectical relationship between subject and object.

This dynamic is inserted into a context of technological and economic dependence of Brazil on the global North, where the large technology companies (BigTechs) are concentrated. In the case of education, the fallacy of technological solutions for structural problems of class society conceals the social history of technology and education, producing in teacher formation and work forms of understanding reality that are reduced to their immediate appearance (Peixoto *et al.*, 2025).

It happens, however, that the dialectical view of reality reveals that the alienation of workers is never complete and insurmountable. Capitalism produces within itself the very paths of its overcoming, based on the contradiction that is objectified in the work of teachers who preserve the ontological-universal nature in teaching and learning processes. Regarding the relationship between technology and education, based on the reality in which technocentrism is evidenced and questioned, "the knowledge of necessity inaugurates the emancipatory possibilities of technologies in the mediation of pedagogical work" (Peixoto, 2022, p. 11, our translation). In this way, still regarding the relationship between technology and education, technocentrism is highlighted and questioned based on reality itself.

Research in education as a counter-hegemony

In the field of research on teaching work and training, the Brazilian research group Kadjót proposes to contribute to the transformation of reality. As Peixoto (2022), our founder, affirms, overcoming appearance demands examining the social and historical determinations of the relationship between technology and education. Instead of passively adapting to what capital offers, the group advocates for the process of appropriation, by the teachers themselves,

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of the origin, development, and foundations of technology as a path towards counter-hegemony and the re-establishment of autonomy.

The group's first investigation, in 2016, analyzed the view of public school teachers in Goiás on formation for the use of technologies (Echalar; Peixoto and Carvalho, 2016). The analysis revealed that, despite a technocentric view and the fact that the formation received was limited to the instrumental dimension, there were indications of a teaching rationality moving towards the overcoming of alienation. Resistance to the capitalist educational project was identified, showing that alienation, although present, was not absolute and contained within it the seeds of critical thought.

The second collective research, in 2020, deepened this issue by investigating the appropriation of technologies by basic education teachers, based on the premise that instrumental rationality does not fully explain these subjects' estrangement from their work (Echalar; Peixoto and Alves Filho, 2020). The study followed the trajectory of two teachers and verified a shift from a purely instrumental view to an understanding of pedagogical work as an activity endowed with intentionality and aimed at human formation. From this, the hypothesis is supported that a historical objective rationality is concretely objectified in the teacher's work, as a movement of resistance, even in capitalist society.

Resistance to the alienating scenario and the struggle for the appropriation of technology are not in the interest of the dominant class and, obviously, will not be facilitated by BigTechs. This requires the conscious action of the workers themselves in promoting, among their peers, formation processes that enable this critical understanding and the collective construction of class consciousness aimed at emancipation. It was with this intentionality that the third and most recent research of Kadjót was structured, entitled "Appropriation and objectification of technologies in teaching work and formation" (Peixoto et al., 2025), whose results explicit a concrete example of a counter-hegemonic formation possibility based on the context of the state of Goiás, in Brazil.

This research was realized through a formation experience with a group of public basic education teachers in Goiás. Two central theoretical-methodological foundations were established for the course: the concept of appropriation, understood as an active and critical process of mastering technology, and the dialectical unity between work and formation. These concepts are the basis for explaining the dynamic between the appropriation and objectification of technologies in the context of the course proposed to the teachers.

Planned based on the assumptions of historical-dialectical materialism and historical-cultural theory (Leontiev, 2014; Leontiev, 2004), the formation project of appropriation-objectification of the relationship between technologies and education

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involved the articulation with the context, the participants, and, crucially, the living dynamic between the planning and the realization of the meetings. Data analysis emerged in real-time, demanding new studies and redirecting the paths of the research itself in the unity between theory and practice.

The formation course was structured into three thematic units: "Technology, Work, and Human Formation," "Relationship between Technology and Education: Different Perspectives," and "Technology in the Mediation of Pedagogical-Didactic Work" (Peixoto et al., 2025). The study tasks developed in the meetings were recorded through field diaries, photos, videos, and the course participants' own productions, which allowed for investigating the unity between objectification and appropriation in the context of the course.

About a year after its conclusion, the paths taken in the research signal the constitution of a historical objective teaching rationality beyond the instrumental. This rationality is supported by a process of collective construction of the appropriation of the dialectical relationship between technology and education, which was taken by its origin and development in human history and its objectification in capitalist society (Peixoto et al., 2025).

The Ecos, Trajetórias, and Apropriação research developed by Kadjót represent counter-hegemonic alternatives to the different types of technological determinism in the relationship between education and technologies. They constitute, like the present text, undertakings of resistance to the technocentric commodities imposed by capital, here particularized in artificial intelligences. It is possible, through critical and collective work and formation, to build paths where teachers recognize themselves as class subjects, in the constitution of a praxis that appropriates and objectifies technology and education as products and processes of human life in society.

Finally, we affirm that the insertion of technologies such as artificial intelligence in education, in the current configuration of capitalist society, serves the dominant ideology of exploitation of the working class and is disconnected from a pedagogical project focused on human development. However, being a product of labor, AI can integrate another formative project and another model of society, in which its appropriation by the working class is not limited by class inequality.

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