

Discussions about technology from a Historical-Critical Pedagogical perspective

Discussões sobre Tecnologia a partir da Pedagogia Histórico-Crítica

Debates sobre la tecnología desde una perspectiva pedagógica histórico-crítica

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How to cite: PERTILE, E. B.; STEFFEN, L. L.; BORTOLOTO, C. C. Discussões sobre Tecnologia a partir da Pedagogia Histórico-Crítica. *Revista Diálogo Educacional*, Curitiba, PUCPRESS, v. 26, n. 88, 503-516, jan./mar. 2026. <https://doi.org/10.7213/1981-416X.26.088.DS19EN>

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Resumo

O entendimento dos conceitos tecnologia, educação e trabalho remete à necessidade de análises que considerem que essa sociedade é baseada na diferença de classes, em que o fim último é a reprodução do capital. Assim, neste trabalho, teve-se o objetivo de estabelecer uma reflexão, com base na Teoria Histórico-Cultural, sobre as questões que envolvem a tecnologia e a formação do trabalhador, a fim de verificar como essa relação é discutida na produção acadêmica da Pedagogia Histórico-Crítica (PHC). Para tanto, fez-se uma pesquisa bibliográfica contemplando autores que se alinham à PHC, debatendo a interferência da tecnologia nos processos humanizadores. A pesquisa considerou buscas nas plataformas: Periódicos CAPES, SciELO, Google acadêmico e Biblioteca Digital Brasileira de Teses e Dissertações. Constatou-se que, embora não tenhamos um número expressivo de produções, a PHC tem fundamentos consistentes para análise das contradições que marcam o uso das tecnologias. Pode-se refletir que o domínio dos recursos tecnológicos, bem como a aplicação no campo educacional para que a escola cumpra com seus fins, a socialização do conhecimento, é espaço de litígio entre a classe trabalhadora - que necessita apropriar-se daquilo que há de mais desenvolvido - e a classe hegemônica - que não poupa esforços para manter a posse da riqueza.

Palavras-chave: Educação. Trabalho. Teoria Histórico Cultural. Humanização. Luta de classes.

Abstract

Understanding the concepts of technology, education, and work leads us to the need for analyses that consider that this society is based on class differences where the ultimate goal is the reproduction of capital. Thus, the objective of this work was to establish a reflection, based on Historical-Cultural Theory, on the issues involving technology and worker training, and to verify how this relationship is discussed in the academic production of Historical-Critical Pedagogy (HCP). To that end, a literature review was conducted, including authors aligned with the HCP, discussing the interference of technology in humanizing processes. The research considered searches on the following platforms: CAPES Journals, SciELO, Google Scholar, and the Brazilian Digital Library of Theses and Dissertations. It was found that, although we do not have a large number of productions, HCP has a solid foundation for analyzing the contradictions that characterize the use of technologies. It can be argued that the mastery of technological resources, as well as their application in the educational field so that the school can fulfill its purpose, the socialization of knowledge, is a space of contentment among the working class - which needs to appropriate what is most developed - and the hegemonic class - who spares no effort to maintain possession of wealth.

Keywords: Work. Historical-Cultural Theory. Humanization. Class struggle.

Resumen

Comprender los conceptos de tecnología, educación y trabajo nos lleva a la necesidad de realizar análisis que consideren que esta sociedad se basa en diferencias de clase, donde el objetivo último es la reproducción del capital. Por lo tanto, el objetivo de este trabajo fue establecer una reflexión, desde la perspectiva de la Teoría Histórico-Cultural, sobre las cuestiones relacionadas con la tecnología y la formación laboral, y verificar cómo se aborda esta relación en la producción académica de la Pedagogía Histórico-Crítica (PHC). Para ello, se realizó una investigación bibliográfica que incluyó autores afines a la PHC, quienes debaten la injerencia de la tecnología en los procesos de humanización. La investigación consideró búsquedas en las siguientes plataformas: Revistas CAPES, SciELO, Google Scholar y la Biblioteca Digital Brasileña de Tesis y Disertaciones. Se constató que, si bien no contamos con un gran número de producciones, PHC tiene una base sólida para analizar las contradicciones que caracterizan el uso de las tecnologías. Podría argumentarse que el dominio de los recursos tecnológicos, así como su aplicación en el ámbito educativo para que la escuela pueda cumplir su propósito, la socialización del conocimiento, es un espacio de disputa entre la clase trabajadora - que necesita apropiarse de lo más desarrollado - y la clase hegemónica - quien no escatima esfuerzos para mantener la posesión de riqueza.

Palabras clave: Educación. Trabajo. Teoría histórico-cultural. Humanización. Lucha de clases.

1. Introduction

Discussions involving technology, education, and work have contemporarily taken on meanings that require reflection on the core of this society, constituted by class differences, in which the ultimate goal is the reproduction of capital. Capitalist logic strips these concepts (technology, education, and work) of the humanizing character originally inherent in the processes of work and education, subjecting them to the demands of the productive system that changes with industrial capitalist society, as well as to the challenges of post-industrial society.

Work is a humanizing activity, constitutive of human capacities, both in the phylogenetic and ontogenetic sense, that is, through work and the entire cultural framework, we have transformed ourselves over time into a dialectical process of knowledge transmission, which is remade with each new generation, with education as a related activity in this process of human development. However, in the current context, workers' job and training opportunities are limited by the interests and demands of the productive system. Work is therefore marked by the ambiguity of being both a formative activity and a destructive process, a situation in which, under the logic of capital, training is superficial, lightened, and focused on the logic of pragmatism. Thus, in this study, the objective was to reflect on issues involving technology and worker training to verify how this relationship has been addressed by academic production in the field of Historical-Critical Pedagogy (HCP).

In order to do so, bibliographic research was conducted, considering authors who align with the HCP framework and who debate the interference of technology in humanizing processes. The reflections established consider the concept of education, work, and technology from the perspective of humanization as opposed to the precarious and alienating forms of work established in capitalist society. The research considered searches on scientific platforms: CAPES Journals, Google Scholar, SciELO, Brazilian Digital Library of Theses and Dissertations – BDTD, using the descriptors: Technology, education, “Historical-Critical Pedagogy”. Quotation marks were used around the last words to select texts that included the other keywords and HCP, which was an exclusion criterion that allowed us to deselect publications that did not consider this pedagogical trend.

According to Marconi and Lakatos (2003), bibliographic research, also called secondary source research, covers all the production already available on the topic investigated. Its objective is to provide the researcher with direct contact with the accumulated knowledge, allowing them to identify contributions, gaps, and perspectives already developed in the area.

Ergo, the bibliographic study of discussions on technology and education, based on HCP, grounded in Marxist conception, considers that the concept of work as a humanizing activity is opposed to the pragmatic conception of capitalist society in which labor is considered a mere commodity. The theoretical framework, linked to the field of Marxism, presents the concepts of education, work, and technology as inseparable dimensions of a humanizing perspective, insofar as they respond, to some degree, to the interests of the working class. With this purpose in mind, this study is structured in two main parts. Initially, it discusses these concepts, especially human formation from an omnilateral perspective. It contemplates aspects of communal society, called primitive, organized without class differentiation, its transformations with the emergence of private property and the institution of class differences, as well as the use of instruments for the reproduction of capital. Subsequently, it considers how academic studies have been discussing the categories of technology and education in worker training, with an emphasis on HCP.

2. Education, work, and technology: from comprehensive training to the exploitation and accumulation of capital

The analysis of the concepts of education, work, and technology becomes more consistent when linked to the study of different modes of production, because considering the meaning that these concepts (education, work, and technology) take on in different historical contexts allows for a better understanding of these concepts within capitalist

society, comprehending that their genesis does not refer to class society, but is founded on what Lukács (2012) recognized as omnilateral formation or the full, multiple, and integral development of human capacities.

Arocho (2018) highlights the development of higher psychological functions achieved through the process of mediation on nature, understood as a historical movement related to the emergence of culture, which, by transforming the behavioral procedures of social man, modified his natural inclinations and functions, creating new forms of behavior, specifically cultural ones. Such transformations became possible thanks to the creation, use, and mastery of cultural tools, which not only allow the development of complex psychic functions, such as voluntary attention, logical memory, abstract reasoning, and imagination (creativity, feelings, and self-regulation), but also influence the way these functions are expressed. In this sense, the author recognizes that information and communication technologies are mediating cultural tools capable of causing transformations in the mental configurations of subjects. In other words, according to the author, technologies have the potential to alter cognitive processes.

From a historical perspective, education in so-called primitive societies was linked to the manner in which knowledge was transmitted between generations. Work, understood in Saviani's (2025) terms as the action of man who adapts nature to his advantage and, in doing so, transforms it and transforms himself, constitutes a central element of this process, defining human existence. The author addresses the primitive, communal mode of production, characterized by the absence of social classes, a context in which, dealing with the land, with nature, and relating to each other, men educated themselves and educated new generations (Saviani, 1996).

In discussing the relationship of man's self-transformation through his process of action on nature, Lukács (2012) characterizes work as the genesis of social being, as it enables the transformation of his natural potentialities into social capacities, while adapting the result of his intervention, becoming more social and less natural.

Vygotsky & Luria (1994) differentiated two types of tools that perform mediating functions in the development of work as a specific human activity: artifacts and signs. An artifact is not just a physical object created by humans, since it also incorporates social, cultural, and historical meanings. Thus, it consists of an “imaginary” that is formed during its use and in the sociocultural interactions it produces.

In this sense, Arocho (2018) explains that when an artifact undergoes new dynamics of use, a qualitative leap occurs: the rules, conventions, and traditional ways of using it cease to be fully valid, opening space for new forms of use and new meanings. Vygotsky & Luria (1994) emphasized the distinction between artifacts and signs, as both operate in the activities developed by subjects; however, the former guide external activities, such as those produced by individuals to ensure their existence; signs, on the other hand, guide internal activities, in the realm of psychic development; it is, therefore, the meaning that the subject attributes to that which is the result of their creation that allows them abstraction, generalization, and the formation of concepts.

In other words, an artifact is always more than its materiality, since it is culturally shaped, transforms over time, and also modifies human activity; thus, it is also an instrument of knowledge, abstracted by the human being who produces it and is aware of its meaning in their social relations. From this perspective, the production and use of tools or artifacts mark the difference between humans and animals (Arocho, 2018).

Although many animals manufacture and use tools, develop observation and problem-solving skills — which demonstrate their practical intelligence —, live in groups, have the ability to transfer skills through observation, imitation, and repetition, and can engage in exchange relationships, they are still unable to expand the ability to produce signs. In line with this premise, Aranha and Martins (2003) emphasize that this occurs because animals possess concrete intelligence, which is therefore blind and limited, not advancing beyond biologically determined actions.

From this perspective, unlike animals, humans possess abstract intelligence, which, due to symbolic production, guarantees them the ability to create from what already exists, allowing them to transform nature and themselves through their actions, thus developing culture. The construction of artifacts and signs is both a promoter and a result of the development of higher psychological functions and the ability to extend this development to other generations through culture, mediated by education.

Arocho (2018) highlights three changes in the way humans have historically recorded this action, which is uniquely human: the ability to document this form of knowledge transfer to other generations; future uses; and uses to modify according to new needs and demands of the environment. Initially, the way of recording culture and memory was limited, with little voluntary development, since there were no means of communicating with other people; it was, therefore, a personal associative memory, rather than a shared and collective memory. This changed with the emergence of mimetic memory, as the invention of behavioral and mimetic gestures allowed a leap in communication and representation of experiences not directly lived; this leap favored life in society and cooperative activity among men. The third leap consists of the development of abstract culture and memory, made possible by the invention of writing and numerical systems. This made it possible to overcome the limitations of direct interpersonal relationships for communication and information distribution. Currently, we live in this stage, in which the use of information and communication technologies has enabled digital evolution and the sharing of any information, including false information.

In the long term, a complex relationship has been established between the production of knowledge, its applications (technologies), and the sociopolitical order (Arocho, 2018), so that technologies, understood as the result of this process, originating from the first tools created and developed by man through work, operationalized by action on nature to adapt it to his needs, are considered by Peixoto (2015) as a human, social, and historical production, fueled by the techniques that make up human culture. Thus, education, work, and technology have their origins in the absence of class differences and predate the domination of one class over another. This process indicates the importance of studying the development of productive forces in order to understand how they mark technological development, making it a synthesis of how work has historically been organized in different modes of production. This analysis, according to Saviani (1996) and Ruiz (2014), starts from the discussion of work in communal society, also called primitive society, passing through Greco-Roman, feudal, and finally capitalist society.

Saviani (2025) emphasizes that it is in the relationship based on communal society that the historical-ontological foundations of the work-education relationship are found, with primitive communism being the unifying force of the tribe, based on “[...] collective appropriation of land, constituting tribal property in which human beings produced their existence in common and educated themselves in this same process” (Saviani, 2025, p. 79).

When referring to historical processes and the transformation of these periods, Ruiz (2014) emphasizes that class differences were established as a result of the historical movement that led humans to settle on the land, which gave rise to private property. In the words of Saviani (1996, p. 152): “[...] as he (man) settled on the land, which was then considered the main means of production, private property emerged. Private ownership of land divides men into classes.” What had previously been collective property in primitive communism became private property concentrated in the hands of a minority. This transformation promoted a division between owners and non-owners (masters and slaves), giving rise to a social structure in which a privileged group began to sustain itself through the labor of others. Thus, work, education, and technology began to primarily serve the interests of the class that owned the means of production. (Saviani, 1996, 2025; Ruiz, 2014).

Saviani (1996) highlights Greco-Roman society as the milestone for the institutionalization of class differences, and thus the existence of a group that became privileged due to its ownership of land, the main means of production, legitimizing non-work as a hallmark of a group that freed itself from it, given its ownership of the main means of production, the land. The dispossessed, on the other hand, were assigned manual labor. Thus, in primitive society, education coincided with the work process, being an education for work and at work, in which man learned to deal with reality, act on matter, and transform it. With the emergence of class differences, marked by the existence of a group that began to live off the labor of others, a differentiated model of education was established (Saviani, 1996).

This transition to a class-based society, which arose with the existence of private property, led to the emergence of the school, which means, in Greek: place of leisure, since those who accessed it were the leisure classes.

Corroborating Saviani (1996), Ruiz (2014, p. 122) points out that: “for the first time in humanity, education is differentiated and takes place in different ways for different classes.”

With the transition from Greco-Roman to feudal society, slavery was replaced by serfdom and the ruling classes, previously made up of citizens, were reconfigured and came to be represented by feudal lords and the clergy. Slaves, who previously performed manual labor and had no access to any of the fruits of their labor, became serfs, that is, they worked the land and, after paying all taxes to the ruling classes, were left with a small portion of what remained of their labor (Martins, 1994). However, this change did not alter the relations of domination based on class differences and private property ownership, which still remained and made land the main means of production. Schooling continued to be reserved for the ruling class, while the ruled class, as in ancient society, was educated through the process of work.

The development of craft activities strengthened the trade guilds, which, combined with the level of accumulation achieved by the feudal economy, enabled the emergence and expansion of a mercantile activity that gave rise to the formation of capital. This activity was concentrated in cities, initially organized in fairs and large exchange markets. Over time, these spaces became permanent, giving rise to cities in the proper sense. These transformations shifted the countryside, as the center of the productive process, to the city and agriculture to industry, thus consolidating a new mode of production: the capitalist or bourgeois mode, also called the modern mode of production (Saviani, 1996). The opposition between the countryside and the city, and industry as the main productive process, ideologically made cities synonymous with progress; conversely, the countryside became synonymous with backwardness, so that individuals who lived in cities were considered citizens, endowed with rights and civilized, while those linked to the countryside were considered rude and uncivilized.

The development of society was then marked by urbanization and industrialization, which, according to Saviani (1996), required the expansion of school education, not only because of the productive process, but also in response to demands related to the development of habits necessary for life in cities or, in political terms, the formation of citizens, who, in capitalist society, are individuals who fulfill duties and possess rights. In the meantime, schools took shape in line with the development of capitalist society.

Modern capitalist society made industry the main means of production, and the city took the place of the countryside, which was previously where the production process took place. With the subordination of the countryside to the city, workers were deprived of the means of production, leaving them with only their labor power, which they sold as a commodity. There was a breakdown in natural production relations, which mainly took place in relation to the land. In modern society, these relations ceased to be natural and became social, breaking with the idea of community to impose that of society, in which there are only two classes: bourgeoisie and proletariat.

According to Saviani (2025), in the capitalist mode of production, there is a centralization of production in industry, which makes knowledge an instrument of power, developed by science that enables greater control over nature. This was not the case until feudalism, and it was during the Renaissance and the Enlightenment that the challenge arose that knowledge was subordinated to religious dogmas to the detriment of reason, ideas that were consolidated with the transition to capitalism and positivism, which marked rational scientific development (Martins, 1994).

According to Saviani (1996), industry is nothing more than the incorporation of science as material power in the production process. Industrialization is based on a society founded on the city, a social, artificial construction, no longer something natural, which organized society based on positive law, which, in turn, valued the generalization of writing, as it became fundamental to legitimize property and the right of possession.

Thus, until the Middle Ages, writing was considered secondary, as it was hardly required; in contrast, in the Modern era, with the incorporation of science into the production process, the dissemination of formal codes, such as the code of writing, became necessary. With the inefficiency of oral communication, there was a demand for writing, which became a widespread necessity. This issue links the development of schools to the development of urban

relations. The more the urban industrial process develops, the more is required of schools, which is where the understanding of the defense of universal education arises; thus, schools:

[...] are linked to this process, as an educational agency linked to the needs of progress, to the needs of civilized habits, which correspond to life in cities. And linked to this is also the political role of school education as training for citizenship, training of the citizen. It means training for life in the city, to be a subject of rights and duties in modern society, centered on the city and industry (Saviani, 1996, p. 157).

School education has become the dominant form of education; this leads to it being confused with education itself, in a broad sense. When we think of education, we think of school, and so banners are raised in favor of education, but what is at stake is the problem of schooling. Other forms of education are subordinate to school education, so that any education is always referenced from its most developed form, school education. This allows us to understand why, currently, we are witnessing a hypertrophy of school; thus: “[...] there is a tendency to consider and attribute to school everything that is educational; school has to absorb all the educational functions that were previously developed outside of school” (Saviani, 1996, p. 157). School is extended from early childhood education beyond basic education. The educational function, which was previously the responsibility of the family, is now attributed to the school, as well as the period during which the child remains in the family environment.

There is an expansion of school both vertically and horizontally; the former shows that access to it has been happening earlier and earlier and for longer periods throughout life; the latter refers to the extension of the length of stay; thus, according to Saviani (1996), the hypertrophy of the school takes effect, which is when the universalized school is assigned school functions beyond the pedagogical, which fragments knowledge and makes it secondary. This is a condition for the universalization of this school, because having knowledge means having power, so hypertrophy of the school means hypertrophy of knowledge; thus, the power of conscious social action that could be accessed by the working class through the school is reduced.

Schools reproduce class differences, being organized differently according to this class organization, that is, a school focused on training the working class, so that it is trained, disciplined, and incorporates, based on this institution, bourgeois liberal values for the reproduction of the workforce; and a school focused on the ruling class, which allows it to maintain its privileges and power. Hypertrophy, therefore, relates to public schools with fragmented knowledge and inadequate functions to offer only part of scientific knowledge. Fragmented schools, organized to train labor to serve capitalism and reproduce bourgeois values, lack quality, and the struggle for quality threatens the dominance of the ruling class, which has historically used schools to rid itself of manual labor and maintain its privileges.

In this sense, by understanding the organization of schools and knowledge as a power relationship in which technology is a product of this knowledge and access to it constitutes a form of maintaining this power, we sought to analyze how this relationship has been investigated in the academic field.

3. Technology in academic productions of Historical-Critical Pedagogy

The research conducted on issues involving technology and worker training and its approach within the scope of HCP considered a survey of the main scientific search engines: CAPES Journals, SCielo, Brazilian Digital Library of Theses and Dissertations – BDTD, using the keywords: Technology, education, “Historical-critical pedagogy.” The research conducted on the platforms revealed a small number of publications, despite the relevance of HCP to understanding this topic, which is controversial in light of the contemporary appeal that emphasizes the use of technology in education as if it were the solution to all problems affecting the schooling of the working class. Among the available publications, the following were selected, considering the conceptual discussions on a closer relationship between technology and education: the articles by Neves and Camargo (2020) and Barbosa et al. (2024); the dissertations by Oliveira (2023), Zandonadi (2021), Souza (2017); and the thesis by Gonzalez (2022). Some of the works

found addressed reports of the application of technologies in specific areas or activities, so they were not included at this time.

Criteria used for analysis was the authors' position on the relationship between technology and education. In this sense, we sought to identify the main arguments for and against the use of technology in education, as well as the contradictions present in both the adoption and absence of technological resources in the educational process. Thus, the question that guided the selected research was to investigate the extent to which technology contributes to the schooling process, in light of the assumptions of HCP.

Faced with this problem, authors Neves and Camargo (2020) conducted a search of articles in scientific databases, seeking to analyze the articulation between Science, Technology, and Society approaches and HCP in the context of critical and emancipatory training in education. According to these authors, the 1970s engendered productive restructuring, creating a new work culture that reinforces common sense in professional education within schools, in addition to continuing the conservatism of schooling provision, reiterating educational inequality between different classes. Thus: "Theories and ideologies about education linked to liberal and neoliberal thinking – human capital – have attributed to education and professional training the power to improve productivity, income, and well-being" (Neves and Camargo, 2020, p. 3).

Thus, ideological mechanisms propagate from this context, referred to by the authors as cultural hegemony, such as the presence of discourses based on schools focused on the development of skills, employability, entrepreneurship, and total quality. We could include in this area the civic-military schools, which have been intensively disseminated since 2016 in Brazil. Furthermore, according to Neves and Camargo (2020), throughout capitalist development, there have been different forms of separation between the purposes of knowledge and the means of production with the refinement of the social and technical division of labor, subsuming workers to capital. Regardless of the intensity of what is done, the workforce remains captured as a special commodity.

In this sense, work, which in its genesis was understood as a process of humanization of man, constituting him as a social being, given the transformation of nature and his own transformation, has become a commodity that feeds, through its exploitation, the increasingly predatory accumulation of capital. Technology has not been excluded from the duality of classes; since the Industrial Revolution, it has been increasingly used to expand the exploitation of man through work. Otto and Oliveira (2020) consider technology as a product and process of collective life, which occurs in the relationships established between man and nature and between man and the means of production; thus: "It is a social construct that contains within itself the principle of scientific thought, the result of intentional activity, producing human social life" (Otto; Oliveira, 2020, p. 89).

Gonzalez (2022, p. 32) contributes to the analysis of productions on technology based on HCP and, among other issues, differentiates between technology and technique; moreover, he understands that the latter is "as old as human beings themselves"; while the former is "constituted in relation to science in the process of capitalist development." Thus, in close relation to science, technology is part of the productive forces and, dialectically, is both a product and a constituent part of the mode of production.

Regarding technology as a historical product, which, in capitalist reality, is related to the social context of classes and linked to the economic field, Oliveira (2023, p. 75), explains in his dissertation that it is also "[...] a productive force that is constantly changing, simultaneously with the development of capital" and, thus, contributes to the improvement of this productive process. In other words, the development of technology and its application are related to the capacity for capital to reorganize itself in order to continue its logic and reinvent itself, since technological innovation intensifies transformations in the productive process, increases the extraction of surplus value, and enhances the accumulation and concentration of wealth.

Just as the already frustrated expectation that the application of machinery in the production process would benefit workers, one might assume that technology would free workers from tedious or time-consuming tasks, allowing

them more free time. However, instead of liberating them, it increases oppression, increasingly characterized by precarious working conditions and a scarcity of employment opportunities (Gonzalez, 2017, p. 33).

Zandonadi's thesis (2021, p.105) addresses the uses of technologies and emphasizes that these are embedded in the sociometabolic process of capital, “[...] increasingly linked to work and consumption, promoting the false impression of freedom both in consumption and in improvements in the world of work.” Although they are the result of collective human labor, technological innovations serve to expand the processes of exploitation of productive forces, especially the production capacity of workers. Under the contradictions between capital and labor and in a reality where work is collective, but the results are appropriated by a few, workers become oblivious to the possibilities of using technology to satisfy their interests. These limits of access and the meaning that technology takes on in the life of the worker are, in fact, the limits of capitalist society, which is structured under maximum exploitation and causes the alienation of the vast majority of the population in relation to material and cultural wealth, which includes the restriction of effective benefit in relation to technologies. Zandonadi (2021, p. 30) considers that: “Globalization promoted by capital and mediated by new technologies does not aim at the well-being of the population and society, but rather at the expansion and intensification of the exploitation of human beings by capital.”

According to Neves and Camargo (2020), the changes resulting from the private appropriation of technological advances, coupled with the intensification of the withdrawal of rights, express the deepening crisis of capital and highlight the need to recognize the unequal distribution of educational opportunities, conditioned by the global reproduction of material life in class society.

Technologies have been given a lot of space in the field of education, whether in the organization of institutions, the development of teachers' bureaucratic activities, teaching methodologies, or student activities. However, as in the productive process, technologies in school education present interferences that need to be critically analyzed: they are accompanied by the announcement of innovation and problem solving, but they reaffirm perspectives that undermine and disorient educational action, subjecting it to technical practices and processes that escape the teacher's direction, which weakens the intentionality of mediations. As an example of this, Barbosa and Alves (2023), analyzing the articulation between Secondary Education Reform and the adoption of digital platforms in Paraná, found an intensification of mechanisms for regulating, monitoring, and controlling schoolwork. In addition, they denounce that this dynamic converges towards the disqualification of teaching work, by restricting pedagogical autonomy and favoring the expansion of processes of privatization of public education. Consequently, there are educational losses that contribute to a weakened education and the deepening of educational inequalities.

Historical-Critical Pedagogy (HCP), a counter-hegemonic and revolutionary pedagogical trend, is coherently linked to Historical-Cultural Theory (HCT), which is structured on the basis of studies in the field of psychology and explains human development as determined by the quality of mediations provided in the social context, among which school education stands out. Both theories have Marxism as their philosophical basis, understanding that man is the result of the historical moment in which he lives.

In this context, according to Saviani (2025), HCP enables the development of a pedagogical commitment to social transformation; therefore, it has ethical dimensions that are expressed in praxis and assume commitments to the mediations through which scientific knowledge can be appropriated. This perspective translates into the pedagogical practice adopted by teachers for the transmission of scientific content.

The recognition of the relevance of mediations, evidenced in THC and elaborated educationally in HCP, requires resistance to the fetish of innovation, which, according to Barbosa et al. (2024, p. 227), occurs “through the simple insertion of digital devices or teaching methodologies [...] in order to adhere to educational goals in their reformist foundations, since it reorients school content and teaching and learning processes in a way that promotes the adaptation of subjects to production processes.”

The reality divided by class differences refers to the history of society, in such a way that this antagonism is reflected in schools, a space where battles are fought between education for conservation or for transformation; thus,

it is necessary to highlight that the meaning attributed to technologies is not separate from this dichotomy. In this context, HCP is a pedagogical trend that conceives the importance of scientific knowledge for the emancipation of the working class, based on the dialectical nature of mediation, which is fundamental for overcoming both formal logical positivist knowledge, which was the object of the school in its traditional trend, and the pragmatic perspectives associated with neo-schoolism and neo-technicism, which dominate schools at the moment.

This school, under these models, reduces scientific content, which has limited the critical capacity of workers and their awareness of totality. The hegemonic and dichotomous understanding of the relationship between social subject and object therefore contains deterministic and instrumental perspectives, unlike the mediated dialectical category.

Mediating is not standing in the middle, in a neutral way, but appropriating the objectification of knowledge and organizing the forms of continuity of this appropriation. However, this dialectical character of mediation requires a conception of education that goes beyond pragmatic, utilitarian knowledge based on formal logic, which, in this society, produces an education limited to training for work and the ideological maintenance of capitalism. It is the knowledge of contradictions that defines reality, and the commitment to transforming these foundations is what places HCP in the purpose of an education that goes beyond formal logic, overcoming education and the applicability of technology as utilitarian and pragmatic means, which, by meeting the demands of the production system, limits the consciousness of the worker. Thus, Neves and Camargo (2020) point out that formal positivist logic has its hegemony and is limited to the dissemination of liberal-pragmatic content, which subordinates training processes to the specific and immediate demands of the market.

The reflections of Neves and Camargo (2020) address the issue of technology in the context of integrated education and, based on a Marxist orientation, present the development of a manual for the implementation of education based on the integration of content and omnilateral training. The text presents central concepts for the organization of pedagogical practices that associate technological and professional education with basic education, aiming at the development of human capacities for the formation of dual economic and social citizenship in contemporary societies. It is based on HCP with an emphasis on some keywords for the organization of an integrated curriculum that overcomes hegemonic trends in the ideology of competencies, with theoretical and methodological notes based on work as an educational principle, starting from the relationship between work, culture, science, and technology.

In revisiting Pistrak (2009), Neves and Camargo (2020) emphasize that education should enable students to glimpse aspects of the physical and social world by understanding the mediations that make up the concrete whole. The opposition between manual and intellectual work and the social and technical division of labor are the origins of different types of education, reflecting the separation between production and school. This division is not in line with a society based on responsibility, equality, and cooperation, which guide human relations.

The practical perspective of integrated education is part of the struggle to overcome capitalism. The authors present the concept of integrated education from an emancipatory perspective. Integrated education, as the organization of professional and technological education, is based on the concept of comprehensive human education that combines manual and intellectual work. It is not limited to preparing students for the world of work or higher education, but rather to providing an education that overcomes the duality that has historically marked educational institutions.

Integrated education is, therefore, a way of organizing education that enables young people and adults to internalize historically constructed knowledge, with which they will be able to produce and create new solutions to the problems faced in concrete reality, ensuring their dignified insertion into productive and community life. This education not only provides systematized scientific knowledge, but this knowledge, linked to culture, develops a critical and creative sense of social, artistic, cultural, and historical standards.

Authors Neves and Camargo (2020) highlight, as fundamental to integrated training and curricular practice, the recognition of knowledge and professional practice, the union between theory and practice, since this is valued not only for its formal character, but also for its pedagogical character; Therefore, the authors argue that the recognition of knowledge must come from an alliance between productive institutions, non-governmental institutions, and unions, which represent the culture of workers in articulation outside educational spaces. This work, by guiding what a school with the organization of knowledge for emancipation would be, provides a basis for those schools organized according to Historical-Cultural Theory with the methodological application of HCP, as well as enabling the understanding of this institution as a space for struggle, to also meet the demands of human formation in its entirety, even within the limits of capitalist society.

Another article analyzed in the search engines was that of Barbosa et al. (2024), who researched the concepts of technology-education and approaches to technological development in research based on the Science, Technology, and Society (CTS) approach. The authors selected articles that reported experiences based on analyses of teaching practices, teaching, and learning, considering the relationship between technology and education.

When analyzing the results found in various search engines, the authors showed that the different pedagogical approaches identified in the articles appropriated technology to think about their teaching methods and content; these, in different results, did not express a critical conception of technology, but only its use as a didactic tool to teach content. Thus, according to the authors, using Oliveira (2019), they emphasize that the use of resources as a means of making students learn content is identified with the reproduction of content, without providing conditions for its appropriation. Subjects who assimilate the reproduction of content are oriented toward insertion into the productive chain, but not toward changing their condition as a class. This aspect was discussed by Saviani (2025), who emphasized the limits of education based on formal logic, which does not overcome the reproduction of content and the permanence of consciousness shaped by bourgeois ideology. This differs from mediated dialectics, in which content, based on conscious and critical training, in addition to enhancing training for work, develops critical thinking and broadens awareness of reality and its transformation.

Barbosa et al. (2024) emphasize that educational work is the conversion of elaborated knowledge into school knowledge that is directly linked to the repertoire of didactic-pedagogical resources that teachers identify, select, and organize in order to perceive the structuring of their activity, with the objective of students' appropriation of historically systematized knowledge, thus establishing an inseparability between form and content. The emphasis on practice over theory directs education toward immediate and alienated needs, without considering the essence of the relationship between subject, knowledge, teaching, and context. Under the guise of promoting social inclusion, fragmented education is limited to the reproduction of content, rather than enabling its true appropriation.

In the results of the articles analyzed by Barbosa et al. (2024), they found that teachers dissociate content and form when using technological resources to teach content, limiting them to its reproduction. Most of the articles did not present a conception of education and were reduced to a teaching proposal. The limitation of these to teaching, in itself, is not sufficient to characterize the totality of the dimensions that structure Education, especially its ontological determinations. Most studies were linked to a technocentric logic, therefore being an instrumental and deterministic conception.

In the face of the analysis of the contradictions that accompany the emphasis on technologies in contemporary times, the question arises: what should be the place of technology in education? Should it relate to the educational process or does its incorporation necessarily carry a vicious and alienating character? In order to problematize this issue, we highlight the thesis of Gonzalez (2022, p. 171), which contributes to this reflection by expressing that "The place of techniques and technologies in education lies, beyond technicism and neotechnicism, [...], in the understanding of education as a mediator within social practice, as advocated by historical-critical pedagogy."

This understanding leads to the realization that, just as it is not coherent to understand technologies as a solution to all problems (because they are not), it is also not appropriate to reduce them to disadvantages or to

renounce the possibilities they carry. The challenge is to use them in all spaces and forms in which they can favor human emancipation. Thus, according to Gonzalez (2022), in the organization of pedagogical work, technologies must relate to the content-form-subject triad, that is, it concerns "what" is taught, "how" it is taught, and "who" is taught, with technologies being subordinated to the purposes of the educational process.

The understanding of technologies, understood in their potential for human formation, is also indicated in the studies of Souza (2017, p. 34), who emphasizes, however, that attention must be paid to avoid falling into the traps of assuming a reality that escapes the determinations of the capitalist mode of production without its revolutionary overcoming.

In this understanding, considering the evident impact of technologies on modern life and the potential they have to facilitate problem-solving, reduce distances, and communicate, as well as the undeniable fact that all this is a historical result of collective human effort, it is understood that their instruments

[...] must be appropriated by revolutionary pedagogy and placed at the service of the humanization process. In this way, technologies must be incorporated into pedagogical practice based on the dialectical relationship between ends and means, and not as an end in itself, as means that should enrich and improve the objective conditions for the development of educational practice, the process of transmission, assimilation, and production of elaborated knowledge (Souza, 2017, p. 49).

The mastery of technological resources and their uses, as well as their application in the educational field so that schools can fulfill their purposes—the socialization of knowledge—is a space of contention between the working class—which needs to appropriate what is most developed—and the hegemonic class—which spares no effort to make this and any other possibility a factor of alienation that contributes to reactionary forces, which keep them in possession of wealth. Thus, technologies should not assume centrality as autonomous ends, but should be understood as means at the service of the purposes of education for emancipation.

4. Final considerations

When discussing the relationship between technology, education, and work, it became clear that the discussion permeates the concept of work in different societies. Technique is the historical form developed by humankind to transform nature; and technology is the result of this process, based on human intervention in nature and their constitution as social beings. Work and education were carried out simultaneously in communal collective societies; from the moment this social organization ceased to exist, it provided the basis for the emergence of different classes due to the private appropriation of the means of production. Education, therefore, transitions from a good accessible to all through the act of work, to one reserved for a group that, historically, denied work as they freed themselves from it due to their privileges. In capitalism, this becomes more evident, since the system, upon consolidating itself, produced the organization of a school based on class difference. Technology, the result of the productive process and knowledge historically developed by humanity, was appropriated by the dominant class, applied to the development of capital, which allowed this class to reproduce its domination. Thus, as seen in this work, it is based on scientific knowledge and is a power relationship.

Reflecting on how the relationship between education, work, and technology, in conjunction with HCP, has been addressed in scientific publications, research on platforms revealed that, although studies on the subject present depth—by mobilizing the categories of the historical-dialectical materialist method—there is a particular emphasis on criticizing the use of technologies under the fetish of innovation. This perspective opposes emancipatory education, restricting it to the interests of capital. However, although capitalism shapes the school according to its interests, it is a space of contradiction, where the working class strives to organize this education according to its interests. This is evident in the perception of how technology and education have been used within the school, aimed at emancipation;

although we have this clarity, the studies do not identify how this has happened, which does not mean that there are no practices aimed at this purpose, since what we lack is theorizing and reflecting on it.

As noted, few references were found that address the categories analyzed within the scope of HCP, which indicates the predominance of a discourse that defends the indiscriminate use of technology in schools. However, studies point out that, from a critical perspective, this production is still limited. This allows us to infer the need to overcome the conception of technology as a fetish, associated with the superficiality of content, moving towards a critical analysis that goes beyond formal logic. Furthermore, the research revealed that, in addition to not having a significant amount of production, these are recent, with the oldest work dating from 2017.

Thus, the studies revealed the need for discussions about this relationship from the perspective of humanizing and emancipatory education, since technology has predominantly been analyzed only within the scope of education from the perspective of formal positivist logic, not as a result of social relations, of human construction, but as a technical construct thought of separately from the relationship between subject and society, being meritocratic and accessible to few.

Technology, conceived by teachers solely as a didactic and methodological resource for their use, limits content to mere assimilation in the sense of reproduction, a hegemonic tendency in education from the perspective of formal positivist logic, which has dominated Brazilian education. This conception tends to widen school inequalities and distort the very conception of technology for those who seek to access it, such as teachers. Currently, we are faced with a positivistic education focused only on worker specialization and the application of science in the production process; however, for a comprehensive education, we need, above all, a philosophy that leads to reflection on technology as a result of human construction and the social function of its access. It is imperative to constantly discuss reality in order to raise awareness and expand spaces to break the logic of accumulation that prevails in the capitalist model.

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Responsible Editor: Alboni Marisa Dudeque Pianovski Vieira

Recebido/Received: 17.11.2025 / 11.17.2025

Aprovado/Approved: 19.02.2026 / 02.19.2026