

**Artificial intelligence in educational research: beyond the
ethical-liberal critique**

***As inteligências artificiais na pesquisa em educação: para
além da crítica ético-liberal***

***Inteligencia artificial en la investigación educativa: más allá de
la crítica ético-liberal***

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Abstract

Academic production and manuals on the use of artificial intelligence in educational research have referenced the need to ensure the safe, responsible, and ethical use of these technologies. This is because these forms of use could solve the problem of user data capture and reduce or create mechanisms to suppress plagiarism in academia. We point to technological fetishism and the alienation of labour as fundamental aspects of the instrumental and reductive appropriation of these technologies, in such a way that, to overcome the concealment of the massive labour required to feed the algorithms, it is necessary to move beyond the appearance of the phenomenon, apprehending its multiple determinations. We propose the foundations of historical-dialectical materialism as guiding principles for educational research that aims to contribute to investigations ethically committed to overcoming structural social inequalities.

Keywords: technology fetish; alienation of labour; instrumental appropriation.

Resumo

A produção acadêmica e manuais sobre o uso de inteligências artificiais na pesquisa em educação têm feito referência à necessidade de garantir um uso seguro, responsável e ético dessas tecnologias. Isso porque essas formas de uso poderiam resolver o problema da captura de dados e reduzir ou criar mecanismos para reprimir o plágio no meio acadêmico. Indicamos o fetiche da tecnologia e a alienação do trabalho como aspectos fundamentais da apropriação instrumental e redutora dessas tecnologias, de maneira que para superar a ocultação do trabalho massivo necessário para alimentar os algoritmos, se faz necessário avançar para além da aparência do fenômeno apreendendo suas múltiplas determinações. A crítica ético-liberal não permite superar a dita falta de ética na pesquisa apoiada em sistemas de inteligências artificiais. Propomos os fundamentos do materialismo histórico-dialético como orientadores da pesquisa em educação que pretende contribuir para investigações eticamente comprometidas com a superação das desigualdades sociais estruturais.

Palavras-chaves: fetiche da tecnologia; alienação do trabalho; apropriação instrumental.

Resumen

La producción académica y los manuales sobre el uso de la inteligencia artificial en la investigación educativa han hecho referencia a la necesidad de garantizar el uso seguro, responsable y ético de estas tecnologías. Esto se debe a que estas formas de uso podrían resolver el problema de la captura de datos y reducir o crear mecanismos para suprimir el plagio en el ámbito académico. Señalamos el fetichismo de la tecnología y la alienación del trabajo como aspectos fundamentales de la apropiación instrumental y reduccionista de estas tecnologías, de modo que, para superar la ocultación del trabajo necesario para alimentar los algoritmos, es necesario ir más allá de la apariencia del fenómeno comprendiendo sus múltiples determinaciones. La crítica ético-liberal no permite superar la supuesta falta de ética en la investigación sustentada en sistemas de inteligencia artificial. Proponemos los fundamentos del materialismo histórico-dialético como principios rectores de la investigación educativa que busca contribuir a investigaciones éticamente comprometidas con la superación de las desigualdades sociales estructurales.

Palabras-clave: fetiche tecnológico; alienación del trabajo; apropiación instrumental.

1 Introduction

The production of “artificial intelligence” is commonly associated with the work of software engineers or highly qualified professionals linked to large companies or startups. However, the development of smart technologies also depends, in different stages, on a multitude of precarious, underpaid, and invisible workers around the globe, who perform repetitive, fragmented activities, which are paid per task and completed in seconds. These workers annotate data, categorize images, transcribe audio, act in content moderation and in the generation of artificial engagement in digital networks known as “click farms” (Echalar, 2025; Engster; Moore, 2020; Faustino; Lippold; Sousa, 2025; Lima; Ferreira; Carvalho, 2024; Moore, 2023; Pasquinelli; Vladan, 2020; Peixoto, 2025; Peixoto; Echalar, 2026; Peixoto; Oliveira, 2025; Silveira; Avelino, 2025; Silveira; Souza; Cassino, 2021).

In this context, we pose this question: does the safe, responsible and ethical use of artificial intelligence, in itself, alter the relations between capital and labour? Will the safe, responsible, and ethical use of artificial intelligences decrease, maintain, or increase water consumption and environmental destruction caused by data centre maintenance? Will this use change the exploitative conditions of artificial intelligence systems labourers: labellers, content moderators, system trainers among others?

In this article, based upon education research, we propose to approach the topic through principles that will allow for a concrete analysis of the situation – not an analysis through abstractions that do not see or that dismiss the living and working conditions of teachers and researchers in education in Brazil.

Overcoming an instrumental and reductive appropriation of Large Language Models or LLMs (commercially called artificial intelligence) implies understanding them as a concrete field where antagonistic projects of society are in dispute. Thus, we will address two of the aspects that characterize technology in capitalist society: (i) the fetish of technology and (ii) the alienation of labour (Marx, 2011, 2013). In his book, “Capital”, Marx (2013, p. 121-122) argues that:

A commodity is therefore a mysterious thing, simply because in it the social character of men’s labour appears to them as an objective character stamped upon the product of that labour; because the relation of the producers to the sum total of their own labour is presented to them as a social relation, existing not between themselves, but between the products of their labour. [...] In that world the productions of the human brain appear as independent beings endowed with life and entering into relation both with one another and the human race. So it is in the world of commodities with the products of men’s hands. This I call the Fetishism which attaches itself to the products of labour, so soon as they are

produced as commodities, and which is therefore inseparable from the production of commodities (Authors' translation).

The process of attraction to, adoration of, or dependence on technology, known as the fetish of technology or commodity, in capitalist society, is the mechanism whereby the human being and their capacity to transform nature are dichotomized, promoting the concealment of the formation process of our humanity and overvaluation of products.

The fetish operates through an optimized activity in capitalist society – the split between product and process, content and form, intellectual and manual, resulting in the alienation of labour. Thus, “the alienation of humanity, in the fundamental sense of the term, means ‘loss of control’: its embodiment in an ‘external force’ that confronts individuals as a ‘hostile and potentially destructive power’” (Mészáros, 2006, p.14, emphasis added to authors' translation). Human beings, not understanding their own productive activity in relation to others, become alienated from themselves and their humanity. Labour subsumed to capital is alienated, since it transforms vital human activity into a means of survival, not into life.

Capitalism hides the massive work (developers, data annotators, users, etc.) needed to “feed the algorithms”. In this way, the value generated by this collective work is presented as a natural and mysterious quality of the algorithm in a process of fetishism. In addition, generative artificial intelligence tools capture general social knowledge, converting it into a means of production. This may be aimed at transferring investigative processes to automated systems.

We propose a critique of ethical-liberal discussions as an emerging category of the present to express the hegemonic view of artificial intelligence. Discussions that, though taking into account themes such as environmental damage, safety, responsibility, and ethics in the use of these technologies, operate in an abstract way, since they disregard and, at the same time, hide the material basis of the capitalist mode of production (Facer; Selwyn, 2021; Pasquinelli, 2024; Peixoto, 2025; Wright *et al.*, 2025).

The superficiality of this type of criticism focuses on the apparent effects or alleged good or bad use of technology without problematizing the structures that produce it. It also ignores the concrete and precarious work that sustains technology, in addition to the exploitation necessary for the accumulation of capital, making different forms of labour expropriation invisible. In the same way, it does not see or just dismisses the real conditions of life and work, resorting to abstractions that do not capture the contradictions of the system, such as the environmental impact (water consumption) and the relations between capital and labour.

Finally, it does not show the exploitative basis of collective work that generates algorithms, treating technology as an autonomous and almost mysterious phenomenon, instead of a field of disputes between antagonistic projects of society. In short, an ethical-liberal critique is insufficient because it proposes a reflection on technology without touching on the roots of the capitalist society that engenders it.

Artificial intelligence, like other technologies produced by human beings in society, is a right of all. While the reviews presented discuss ethical and unethical uses, the devices themselves, and their potentialities and limits (D'andréa; Mintz, 2025), we aim to question these arguments. In the next section, we propose a critical-dialectical discussion of the appropriation of artificial intelligence by education research.

2 Limits of ethical-liberal criticism in discussions about artificial intelligence: algorithmic fetish and invisible work

If the appearance and essence of things coincided, science would be unnecessary
(Karl Marx, authors' translation)

Appearance and essence are part of human history in society, which is procedural and dialectical, containing in itself both conservation and ruptures. Immediate reality, which is the phenomenal world of humans, determines in appearance its constitution and development. However, the phenomenal world is not identical to essence and consequently poses issues for scientific thought.

The configuration of the social process of life, rather, of the material process of production, only gets rid of its mystical veil when, as the product of freely socialized men, it finds itself under their conscious and planned control (Marx, 2013, p. 154; authors' translation).

According to the critical-dialectical logic, the immediacy of phenomena presents us with governmental and media discourses, as well as studies and research that map applications and trends of artificial intelligence in education, substantively dedicated to reflecting on conditions for a responsible and ethical use of these technologies.

Liberal critique has allowed for the analysis of the technical and ethical challenges posed by artificial intelligence, emphasizing the need for auditing, transparency, and governance mechanisms (metrics, “efficiency”, and control), some of which we discuss below.

When discussing auditing, we encountered literature reviews that indicate the role of artificial intelligence in mobilizing greater efficiency, accuracy, and textual objectivity for

scientific writing (Coelho, 2026; Santaella, 2026). Coelho (2026, p. 1) informs us that technologies are used as tools to “support the generation of ideas, the production of sketches and initial drafts, and the structural organization of texts.” The author also asserts that the research she analysed shows “gains in the synthesis of information, in improving accuracy, in adapting to academic style, in formatting references and in organizing sources” (Coelho, 2026, p. 2).

This movement materializes the fetish of technology discussed earlier by transferring the attributes of living work to the product (technology and, more specifically, language models). After all, the one who synthesizes information, assesses epistemological accuracy, establishes the principles of accuracy, and masters the shared specifics of academic activity is the historically and socially determined human subject. We insist that it is not the hoe (or its newer or older variations) that cultivates the earth, just as the typewriter will never be responsible for the text that it prints. No matter how recent or old certain machinery is, it will continue to be objectified dead labour (Marx, 2013).

Aligning the principles of scientific research and social justice, the uncritical adoption of artificial intelligence is questioned and the demand for transparency of models and rigorous evaluation is presented (Cheung *et al.*, 2025; Gabay; Funa; Ricafort, 2026; He; Krajcik, 2026).

Heggler, Szmoski and Miquelin (2025), in their literature review, identified several “algorithmic biases”, namely: classification (racism), classification parity (gender), calibration (gender), classification (new users), proxy (programming), data training, racial bias (systemic biases), oppressive algorithm, predictive analysis – inequality, harm mitigation, lack of transparency, stakeholder co-participation, biased algorithm (discrimination and data distortion), ethics and information manipulation. They propose an algorithmic audit, an “ethical and collaborative approach to ensure that AI contributes to a fairer education” (Heggler; Szmoski; Miquelin, 2025, p. 1).

The incorporation of ethics by design in the development of artificial intelligence systems is linked to this perspective, defending that values such as transparency, justice, and non-discrimination need to be technically operationalized so that they can effectively guide technological development (Borba, 2025; Cantarini, 2021; Tomasiello; Barone; Romeo, 2026; Heggler; Szmoski; Miquelin, 2025).

It is important to highlight that the contradictions present in Large Language Models for different identities and classes are essentially objectifications of relations between labour and capital. Thus, demands that these technologies be built in a more transparent,

inclusive, and coherent with regulations, constitute practices that are necessary and reformist, as, in the long run, they end up reproducing the capitalist mode of production, since they do not call into question the very system that reproduces injustice.

Technologies are not neutral, since they are the product and process of human life in society, which in capitalist society is accumulated capital (essentially dead labour that comes to apparent life) at the expense of the worker. Under capitalism, technology is used to cheapen production, expropriate worker humanization, and subjugate the human being to the logic of profit.

Research such as reported by Deshen, Harari and Aharony (2026) and Ramirez-Correa, Grandón and Mariano (2026) discusses ethics through the introduction of the concept of literacy in teaching artificial intelligence, understood as a multidimensional competence that necessarily integrates an ethical dimension, involving critical understanding of social impacts and the ability to morally evaluate interactions with intelligent systems.

Discussions about digital literacies and other forms of adjectivization of the educational process are euphemisms that hinder the right of appropriation of digital technologies to human production, since they are effective in an economic, political, and social system that is based on social and educational inequalities. The exclusionary inclusion of digital inclusion policies in developing countries such as Brazil once again materializes in proposals that address the problem on its surface, suggesting access and the utopia of social inclusion through digital inclusion (Peixoto; Echalar, 2017; Echalar; Peixoto, 2017).

By focusing on ethical use as a primary issue, liberal criticism contributes to the fetishization of technology and the alienation of subjects. Given that the same technology that promises to meet individual student needs can, if not carefully designed and monitored, reproduce and deepen historical exclusions. Such a phenomenon arises from the fact that it is neither neutral nor dissociated from the interests of the ruling class.

Treating artificial intelligence as a tool that can be good or bad, depending on who uses it, obscures the fact that the very architecture of systems, their private property, their scale, and their business model are constitutive of their social effects. The issue is not one of making good use of a neutral tool, but of facing a power device that concentrates predictive and decision-making capabilities in the hands of a few.

Discussions on transparency raise questions on the issue of personal data protection, as data privacy and algorithmic transparency are fundamental requirements for the responsible use of artificial intelligence. Regarding policies, Gatti (2019) and Aravantinos

et al. (2026) point to the need for public policies that guarantee equitable access and ethical use of artificial intelligence.

With technological capabilities limited to only a few countries, nations need to deal with the effects of dependence on foreign technology on their own digital sovereignty, defined as a nation's ability to control its digital infrastructure, data flows, and epistemic structures (Faustino; Lippold; Sousa, 2025; Silveira; Avelino, 2025; Cecchini; Ferrari, 2025; Penteado; Pelegrini; Silveira, 2023; Silveira, 2024; Dantas, 2026; Rodrigues da Silva, *et al.*, 2025b).

Considering the existence of algorithmic biases and the concentration of power in large technology corporations, the creation of regulatory frameworks and the improvement of systems within the current logic may be a solution. However, this assumes that the challenges lie in the misuse or lack of guiding principles for developers and users, thus incurring a kind of fetishization, because, despite recognizing that technology is not neutral, they continue to treat it as an autonomous entity, which can be redeemed by good intentions or good regulations, obscuring the fact that artificial intelligence materializes concrete social relationships.

Humanist research, such as Rodrigues *et al.* (2025a; 2025b) and Santaella (2026) propose that, to some extent, technology may be “tamed”, subjecting it to universal values such as goodness, justice, and respect, without questioning whether these values are compatible with the commodity form and content that artificial intelligence takes on in capitalism. This type of criticism relies on the possibility of correcting the identified deviations without transforming the social relations that produce them.

Proposing solutions within the scope of state regulation or individual awareness disregards how the contemporary neoliberal state is deeply implicated in the interests of capital and that user awareness is insufficient when faced with the structural asymmetry of power between corporations and populations. Ethical debates, in these terms, end up legitimizing hegemonic power, since they suggest that the problem is enclosed in the symptom, not demanding, therefore, radical transformation and emancipation, which is collective.

Ethical-liberal criticism does not advance in the transformation of the phenomenon, since the structural conditions are not called into question. In this sense, educational technology policies are based on an instrumental logic and subsidized by the movement of global educational reforms, promoted by multilateral organizations, such as the Organization for Economic Cooperation and Development (OECD) and the United

Nations Educational, Scientific and Cultural Organization (UNESCO). These institutions determine policies in developing countries that follow, through metrics, the process of standardization and evaluation of teaching (Dantas, 2026; Lima; Peixoto, 2025; Peixoto; Echalar, 2026; Saura; Adrião; Arguelho, 2024; Silva, 2026).

Responsible use is intrinsically linked to the observance of regulatory frameworks such as the General Data Protection Law,¹ which positions student and teacher privacy as a fundamental right to be guaranteed. Amiel *et al.* (2021), for example, relate data extraction by educational platforms with artificial intelligence to geopolitical dynamics of economic power and social control. In this context, digital sovereignty is suggested as a mechanism to ensure public control of technological infrastructures (Almeida; Fernandes Junior; Fernandes, 2025; Lemos, 2024; Penteado; Pellegrini; Silveira, 2023; Nyaaba; Wright; Choi, 2026).

A growing movement in Brazil is the defence of popular digital sovereignty, a movement that is based on the potential of communities and social groups to control their own technological and data infrastructure in order to guarantee their self-determination and sovereignty. In this way, overcoming the exclusive charge of foreign companies for data transparency, we must ensure that public policies are developed by the Brazilian state to promote and guarantee open and democratic technological systems in the development of programming languages that work with the extraction and management of data.

The relationship between education and artificial intelligence goes against a dialectical perspective, which attributes interdependence between subject and object. The neoliberal logic of financialization and commodification prevails, in which data collection and teacher expropriation are indispensable elements to maintain power and accumulate capital (Dantas, 2026; Lima; Peixoto, 2025; Marx, 2017; Peixoto; Echalar, 2017; Silva, 2026).

Consequently, the figure of the quantified teacher-researcher emerges as the materialization of the real subsumption of intellectual work to digital platforms and, therefore, to quantified work itself (Moore, 2017). If liberal-ethical criticism focuses on individual conduct and the transparency of systems, material reality imposes life production processes in which the activity of researchers is fragmented into data units that can be captured by a system. Beyond the use of auxiliary artifacts, technocentric relationships are at play within which teaching and research are summarized in metrics, which identify the “quality” of training and human “development” from the data in algorithmic systems.

¹ T.N.: *Lei Geral de Proteção de Dados*, Brazilian legislation concerned with privacy protection (c.f. https://www.planalto.gov.br/ccivil_03/_ato2015-2018/2018/lei/113709.htm).

The surveillance and quantification of teaching and research are intensified through technologies that ultimately overlap with the very nature of teachers' activities. Workers in this system are coerced into a process of extreme individualization, in which the capture of their interactions on different platforms (such as Lattes, Orcid, Google Scholar, for example) are the absolute criterion for their "efficiency".

From this perspective, the possibility of appropriation and development of knowledge becomes a device for extracting subjectivity, reducing intellectual autonomy to the strict fulfilment of goals dictated by graduate programs' arbitrary predictive systems of classification, from the process of competition to promotion, among others.

In the field of scientific research, this dynamic directly affects the management of production time, originality, and density. When institutional documents and manuals fetishize artificial intelligence as support for researchers in the field of formatting, writing, and rapid productivity, what happens is an induction to the submission of an entire intellectual activity to the condition of commodity.

If large databases are the starting and finishing point, it is not surprising that both research products and processes may be quantified by the owners of certain technologies. New syntheses of human activity are expropriated by an algorithmic pattern that ultimately serves as free raw material for the ongoing training of privately owned language models.

The old inversion between creator and creature is renewed when the data generated by teachers, as part of their work, returns to them as mechanisms of domination. When quantifying articles, lectures, accesses, citations, searches by name, number of downloads, social networks and the like, it is easy to internalize a technological "failure" as a personal one, leading teachers to exhaust themselves when not reaching the statistics of a machine that never rests.

Finally, liberal ethics proves powerless when not questioning who owns the infrastructure that measures life. It proposes moral norms for a device that fundamentally aims at the devaluation of historically constructed human capacities to subject them to the command of dead work embedded in algorithms.

The quantified researcher is the worker who sees their teaching and research activity being converted into a commodity, in a process that requires not only external regulations but the recognition that technology must be reclaimed as human heritage under the conscious control of those who produce it: the workers.

3 Precarious work, intellectual expropriation and the quantified researcher

Marx (2013), when proposing the category “labour alienation”, referred to the essence of labour in the scope of capitalism as it was established in the period of the industrial revolution. His method demands that the phenomenon under consideration be understood not only in its appearance, thus permitting an understanding that in capitalism labourers are increasingly expropriated of their own productive force, no longer being able to attribute meaning to their work.

Over the years, this phenomenon has not been restricted or abolished; on the contrary: to guarantee the maintenance of a capitalist logic in society, the bourgeoisie have created new ways to keep the means of production and the labour force under their control. The lack of change in the distribution of power ensures that even in different times this category continues to be relevant as, in contemporary contexts, the base structure of society remains unaltered. Machines, appropriated by the dominant class, continue to be a source of labour alienation, with, however, an additional degree of perversity, as, assisted by artificial intelligence, they further disguise themselves as humans endowed with consciousness and creative capacity.

However, the essence put as a way to consciously read the world and, thus, as a mirror of reality, may establish consciousness, leading to analyses and confrontations between contexts of reality itself.

Subject-object relation, as a typical human relation, is an inter-relation between the subject and the object—and vice-versa—, in which none of the two components can be observed separately. Each act of objectivation of the object of praxis is, at the same time, an act of alienation. Ontologically, objectivation and alienation are located as a historical and continual relation. The social being always lives in a relation of interaction with nature and with the social world they create; this interaction is made concrete in each act of objectivation of the object of praxis (Borges, 2021, p. 38-39; authors’ translation).

In this way, critical dialectics opposes technocentric logic, aiming to clarify the multiple determinations that make up technological phenomena in capitalist society. It considers thought movements that identify both technological determinism – which presents technology as an autonomous force that, itself, transforms education – and instrumentalism which interprets technology as a neutral tool whose use depends only upon the user. Both perspectives, though opposed, dichotomize subject and object and hide subjacent social relations (Lima; Peixoto, 2025; Seki, 2023; Selwyn, 2017; Silva, 2013; Oliver, 2011; Peixoto, 2022; Saura; Adrião; Arguelho, 2024).

Ethical-liberal criticism relativizes critiques of existing concepts of artificial intelligence (Echalar, 2025; Silveira, 2024), as well as those of the fact that the material conditions for the development of technology, in practice, is based upon the expropriation of human labour, of which we can highlight three dimensions:

- (i) the precarious invisible work of thousands of labourers worldwide that label data, and moderate and sanitize content – though this work produces the material base upon which very sophisticated models are defined, the suffering and the very existence of these labourers is erased from the final product;
- (ii) the expropriation of intellectual and creative labour from all of us – whose cultural, scientific, and artistic productions are swept by robots to feed large language models, without any remuneration, consent, or possibility of control. What has been called “public data” by terms of service is, in fact, the accumulated labour of humanity being privatized by certain corporations;
- (iii) the expropriation of future labour – when automating intellectual tasks, artificial intelligence does not only eliminate jobs, but it devalues human skills that have been historically built, subordinating living work to the dead work incorporated in algorithms in greater intensity than any previous technology.

Dialectical criticism begins in what is concrete, the mediation of technology in pedagogical-didactic work and, through abstraction, seeks to understand its multiple determinations. This means analysing technology not as an isolated object but as something that has been built upon historical, economic, social, and ideological dimensions. Perhaps the greatest provocation of this movement of thought is that it demands that we understand technology as a dialectical unit (subject/object, technical/symbolic, instrument/sign, individual/collective), in a way that is articulated with the conditions of the mode of production and of social relations.

This is due to the fact that dialectical criticism locates the origin of phenomena in the material conditions of society, leading to investigations of how the production and use of technologies in education are linked to the logic of accumulating capital, expropriation of labour, and social control strategies. In other words, artificial intelligence does not represent a natural evolution but rather answers to the needs of certain classes.

In this perspective, technology is not simply an artefact (product) but also a process that carries with it the history of human labour. Thus, it is necessary to study it as something that is predicated on material and immaterial structures and that is projected onto consciousness and through techniques. Therefore, it is an objectification of human skills,

which, in capitalism, takes the shape of merchandise, largely contributing to processes of alienation, although, by contradiction, also contains possibilities for human training.

In light of what has been discussed, we believe that the Marxist categories of “fetish of technology” and “labour alienation” allow us to question the limits of the ethical-liberal criticism. This is partially due to how this criticism tends to naturalize artificial intelligence as an autonomous and neutral entity, operating upon the fetishization of technology. The idea of a technology endowed with mysterious and inherently beneficial qualities underlies this view, though these attributes are, in fact, the product of collective and precarious labour, which has been systematically hidden.

By ignoring how artificial intelligence tools capture general social knowledge and convert it into a means of production controlled by capital, ethical-liberal criticism becomes a subterfuge to conceal the process of labour alienation, in which workers are separated from the means of production and the products of both their material and intellectual activity.

In this way, the ethical-liberal criticism expropriates workers’ lives, as well as concealing from them the intellectual knowledge produced by humanity. The project of a humanised education is not favoured by capitalist society.

Thus, dialectical criticism finds itself upon the concrete reality of schooling and teaching work, avoiding empty abstractions and guiding itself through the investigation of processes, aiming to demonstrate that artificial intelligence, in the mediation of pedagogical work, as it has been conceived thus far, contributes to the disintegration of consciousness, reproducing the logic of merchandise.

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