

# The ontological dimension: a possible way for the realization of interdisciplinarity<sup>1</sup>

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## Abstract

This article aims to critically analyze the idealistic and non-historical conceptions of interdisciplinarity wide-spread among Brazilian academic-scientific literature. The intent is to display the uncertainties contained in the so-called interdisciplinary theoretical proposals, having the ideological, phenomenological, abstract and arbitrary field as the grounding that supports knowledge fragmentation; through epistemological discourse solely, not reaching the ontological dimension - the possible path to build interdisciplinarity. It is essential, primarily, to historically review the movements that originated the fragmented approach of reality. Hereafter, a brief introduction and discussion about the state of knowledge regarding interdisciplinarity among Brazilian qualified publications. Following, there is a discussion focusing the fragmentation and its results, from a historical movement of increasingly social reality complexity. Finally, this standard is criticized. For such purpose, the dialectical and historical materialism is used as the guideline, from an ontological, political and epistemological perspective.

## Keywords

Interdisciplinarity – Epistemology – Ontology – Historical-dialectical materialism.

## Introduction

In contemporary times, there are many debates about how to establish interdisciplinary processes. Interdisciplinarity is presented as a way of overcoming the problem of the fragmentation of knowledge, which has been structure since modernity.

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The assumptions of this model constitute a gnosiological<sup>6</sup> approach, that is, an approach that has in the individual the primacy of knowledge. It is noticeable, then, that the practice of approach induces to a distortion of the problem of knowledge, since it does not allow to be seen the existence of other ways. It prevents, therefore, the formation of a really critical<sup>7</sup> way of thinking about the problem of knowledge. Thus, the existence of another perspective is greatly hampered today, because the research of scientific methodology has as its starting point the same postulates that support modern scientificity (TONET, 2013).

In this way, it will be necessary to propose that a fair understanding of the problem of knowledge implies that it is always approached in its particular articulation with the whole historical and social process, thus providing an understanding of its linkage, even indirectly, with certain social interests. In this sense, for a better understanding of the totality involved in this process, a more accurate reflection on its foundations is indispensable, especially considering its historical-ontological dimension.

The present article aims to critically analyze the idealistic and a-historical conception of interdisciplinarity, which can be identified in authors such as Japiassú (1976) and Fazenda (1991). These two authors have become obligatory references on the subject in Brazil, both to reiterate or to oppose their ideas. The intention is to demonstrate that, despite its attractive character and its apparent results, this proposal is not a very effective practice, because it does not take into account the multiple determinations<sup>8</sup> that constitute it, that is, the concrete totality<sup>9</sup>. It seems that both authors do not consider that both disciplinarity and interdisciplinarity are historical constructions resulting from tensions between the individual and the material and objective conditions that surround them and that, inexorably, interfere with these productions and elaborations. In this way, the relations between disciplines would not be able to be reduced to creations derived from an abstract subject inserted only in the world of ideas and separated from its object.

According to Tonet (2005b, p.11) it is important to point out that

[...] traditional - modern scientific methodology does not begin by explaining that the problem of knowledge can be treated from two points of view: gnosiological or ontological. Of course, it does not clarify why, for her, there are not two paths, but only one. It is simply based on the assumption that the approach is the only correct one. Similarly, it also does not clarify

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**6-** In the gnosiology's perspective, the subject is the privileged locus of the production of knowledge, since it is a reason, who establishes methods And rules, qualification and quantification, organizes the law (TONET, 2013).

**7-** According to Tonet (2013), the critique, in the Marxian sense, always means the search for the historical and social foundations that gave rise to a determined Social phenomena, thus allowing us to understand its deeper nature and not simply the questioning of gaps or imperfections.

**8-** "Concrete is concrete because it is the synthesis of multiple determinations, therefore, unity of diversity. For this reason, concrete Appears in thought as the process of synthesis, as a result, not as a starting point, regardless of whether it is the effective starting point And consequently also the starting point of intuition and representation. In the first way, full representation was volatilized in a abstract determination; In the second, abstract determinations lead to the reproduction of concrete by means of thought. This is why Hegel fell in the illusion of conceiving the real as a result of the thought that is synthesized in itself, deepens in itself and moves from itself, while the method of ascending from the abstract to the concrete is only the mode of thinking of appropriating the concrete, of reproducing it as a mental concrete. But it is by no means the process of the genesis of concrete itself "(MARX, 2011, 54).

**9-** The concrete totality, according to Kosik (1978), is not everything and is not the search for the founding principle of everything. To investigate within the conception of Concrete totality means seeking to make explicit, from a delimited research object, the multiple determinations and historical mediations that constitute it.

the fact that this approach has a gnosiological character. This path is without justification. Its presentation is its own justification.

In addition, it must be considered that “knowledge is always, mediately or immediately, a means for social intervention. Thus, there is no doubt that this has broad social consequences” (TONET, 2005b, p.12). Thus, it is intended to point out in this article that the maintenance of this approach obstructs the identification of social interests that cross the production of knowledge.

## **The fragmented view of reality**

According to Fazenda (1991), historically the interdisciplinarity movement emerged on the European continent, particularly in France and Italy, in the 1960s, when student movements claimed a new statute of university and school. The author also states that interdisciplinarity was born as an opposition to all the knowledge that privileged the epistemological capitalism of certain sciences, as the opposition to the alienation of the academy to the daily questions, to the curricular organizations that showed the excessive specialization, and the “whole and Any proposal of knowledge<sup>10</sup> that incited the student’s gaze in a single, restricted and limited direction to a pathology of knowledge” (FAZENDA, 1991, p.19).

Follari (1982), in his analysis of the origins of interdisciplinarity, emphasizes the ideological aspects related to the theme. According to the author, interdisciplinarity was a response to student yearnings and aspirations that aimed more at containing the movement than the commitment to a profound academic reform. The first academic initiatives under the design of interdisciplinarity far removed the idea evoked by the term, being more a naïve attempt of overlapping disciplines and academic contents. For Follari (1982), interdisciplinarity operates in the ideological field of the dominant sectors, because:

[...] the interdisciplinary acts as a propagandistic element of a social sector in its socio-political struggle. The interdisciplinary is exposed by the hegemonic social sectors, such as: 1) A supposedly superior form of the construction of scientific knowledge. [...] 2) Solution of urgent practical problems that capitalist society cannot structurally solve and which cause concern in the population. In this case, the proposition is also ideological in the two-pointed sense: false representation of the solution of a problem, and in turn specific form of justification by the hegemonic social class of its domain situation. (FOLLARI, 1982, pp. 108-109).

According to Tonet (2005b), one of the intriguing issues that possibly bothers us at the present time is that knowledge is excessively fragmented; that each discipline deals with a particular issue - economic, historical, sociological, psychological, philosophical, artistic, and so on -; and that, therefore, it is not possible to present an overview of the objects studied. The result of this is a formation based on disconnected and juxtaposed

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**10-** Expression used by Japiassú in *Interdisciplinarity and pathology of knowledge* (1976).

fragments. Because of this fragmented view of reality, practical intervention to confront social problems is also compromised, leading to the search for isolated solutions. For this fragmented formation, it would also favor the intense specialization that would lead to an increasingly focus on limited dimensions, making it impossible for the individual to have a wider perception of totality. The individual hardly realizes that within this context the production and expansion of knowledge are not alien to the contradictions, antagonisms and relations of forces that are established between classes or social groups. The production of knowledge is part and expression of this struggle.

The most common reason for this fragmentation is the increasing complexity<sup>11</sup> of social reality and the successive expansion of the territory of knowledge. It is important to emphasize the importance that this territory has acquired, especially in modernity. It is a widely admitted fact that the extremely rapid advance of knowledge in the most varied historical periods, beginning with the Renaissance. If in antiquity the existence of a philosopher of encyclopedic knowledge as Aristotle, who was not the only, but possibly the greatest, on the other hand, in the Renaissance, Leonardo da Vinci can be considered a mind that dominated vast and diverse knowledge; and today, in the face of the immensity of what has already been discovered, the existence of this genius is perhaps unthinkable, the existence of someone who could contain, minimally, the set of all knowledge. The industrial revolution and the spread of capitalism across the globe also greatly contributed to the expansion and variety of the domains of knowledge (TONET, 2005b).

The result of this is a progressive specialization, necessary for the deep mastery of a given field of knowledge. This expansion and specialization would lead to the compartmentalization and the increasingly sharp separation of each field of knowledge. In this way, complexity, specialization and fragmentation would be necessary results in the social process journey (TONET, 2005b).

Given the recognition of the negative results of this process, it is sought to find a way that brings back to the knowledge that character of totality that it provided, both in professional training, in the performance of theoretical researches and in the analysis of social problems, thus exceeding the atomized vision of Objects. Hence the emergence of the proposal of interdisciplinarity. The main point of the question is that the approach of the same object under different perspectives, in the case of the human sciences - philosophical, sociological, economic, biological, anthropological and so on-; would be the way to overcome this fragmentation of knowledge. On the other hand, reality itself would determine the need to avoid the rigidity of compartmentalization. The recent appearance of some new fields of science, whose limits are very fluid, would show that it

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**11-** Tonet (2005) resorts to Lukács's thinking to clarify that the social being is a complex of complexes mirrored by work. The author explicitly states that bourgeois society is a concrete totality. It is not a whole made up of functionally integrated parts. Rather, it is a concrete totality, inclusive and macroscopic, of maximum complexity, constituted by totalities of less complexity. None of these Totality is simple - what distinguishes them is their degree of complexity. And if there are totalities that are more decisive than others, they are distinguished by the legality that governs them: the trends operating in a totality are particular to it and can not be transposed directly into other Totalities. If this were the case, the concrete totality of bourgeois society would be an amorphous totality - and its study reveals that it deals with a structured and articulated totality. It is up to the analysis of each of the complexes constituting the totalities in order to clarify the Tendencies that operate specifically in them. On the basis of this, it is possible to affirm that, from Marx onwards, the necessary Indispensable for social theory, in order to glimpse the overcoming of capitalist sociability and to consolidate a society Humanly emancipated.

is almost impossible to define specifically and clearly where a certain scientific territory begins and ends (TONET, 2005b).

Thus, it is possible to question what makes such a proposition so attractive, and that questioning it will probably provoke an immediate reaction of astonishment or rejection. This attraction seems to result from its truism, its reliance on empirical aspects that are easily identifiable, to present itself as the only way to overcome the fragmentation of knowledge and to present supposedly positive results (TONET, 2005b).

Throughout the history of humanity, but especially in the last centuries, and even more in recent decades, a great fragmentation of social reality and a significant expansion of the territory of knowledge has been noticeable. It also seems to be undeniable that this has led to a growing specialization given the impossibility of a single individual mastering the whole of knowledge and given the birth of new fields of professional activity. Throughout this process, several disciplines have been created without connection between themselves, making teaching and research a real quilt. As a result, formation occurs through the juxtaposition of disconnected parts, preventing a vision of wholeness. In the same way, the varied and complex social problems that emerged from the industrial revolution and the impossibility of solving each one in isolation are also clear (TONET, 2005b).

According to Tonet (2013), it is on this subject studies of authors that are well-known in Brazil, such as Ivani Fazenda and Hilton Japiassú. These authors, in their theorizing, limit themselves to seek to overcome fragmentation by epistemic, pedagogical or behavioral ways, not realizing that fragmentation is simply a natural result of the social process, the former being a necessary consequence of the latter. For Tonet (2013), both Ivani Fazenda and Hilton Japiassú have a misunderstanding of reality because they ignore the dominant ideology and the historical process that give it its effectiveness. In this way, they end up assigning to knowledge an autonomy that it does not really have, thus treating the fragmentation of knowledge as a process that occurs within the knowledge itself.

In order to support the basis of this statement more clearly, what is meant by ideology must be made explicit. Chauí (1994a) states that ideology is the process in which the ideas of the ruling class become ideas of all social classes, becoming dominant ideas. In this way, using the Marxian perspective, Löwy (2003, p.15)

[...] impossible to understand the development of an ideology, a theory, a form of thought, whether religious, scientific, philosophical or otherwise, unrelated to history and observation of the materialistic process of development of social classes.

Thus, ideology is understood as a movement of concealment of reality, used with the purpose of attending to specific interests, in the great majority of times of the hegemonic class. After all, it is understood, based on Marx and Engels (2009: 67), that “the ideas of the ruling class are, at all times, the dominant ideas.” It is in the interest of the ruling class that the production of knowledge is as individualized and fragmented as possible. That is why Marx and Engels (2009, p. 17), when dealing with

the method of knowledge, oppose idealism, saying that “abstract determinations lead to the reproduction of concrete by thought.” For the authors, it is a mistake to think of the ideas dissociated from social practice.

## **Interdisciplinarity in the Brazilian scenario**

Interdisciplinarity came to the country in the late 1960s, and since then, several authors have discussed this issue in the Brazilian scenario. Among these theorists, there are those who seek to contextualize the emergence of interdisciplinarity itself with academic debate; The beginning of this process was in the 1970s. They indicate, as an initial reference, the work of Gusdorf (1974, 1977), one of the pioneering scholars of interdisciplinarity in France. Considered a radical humanist and an idealistic rhetorician, whose propositions about interdisciplinarity would have been developed in the Brazilian context by authors like Jupiassú e Fazenda (ALVES; BRASILEIRO; BRITO, 2004).

In the 1970s, Hilton Japiassu began to deal with interdisciplinarity in his book *Interdisciplinarity and Pathology of Knowledge*, in which he posed questions about the theme and reflected strategies based on experiences about the method of interdisciplinary work. On interdisciplinarity, Japiassú (1976) states that it is characterized by the degree of real integration of the disciplines within the same research project and by the intensity of the exchanges among the specialists.

Fazenda (1991) corroborates the thinking of Japiassú, when he discusses the importance of the interdisciplinary exercise for the expansion of knowledge. According to the author, the fragmentation of knowledge weakens the professional intervention. In this way, the interdisciplinary attitude, which must be intrinsic to the individual, must be of reciprocity, seeking the exchange, the dialogue with identical pairs, anonymous or with himself, besides the humility before the limitations of the own knowledge and the perplexity before the discoveries of New knowledge. It is about dedication and commitment to the projects and people included in this project. Ivani Fazenda developed her master's research on *Integration and interdisciplinarity in Brazilian education - effectiveness or ideology* (apud FAZENDA, 1991), and continued her doctoral thesis entitled *Education in Brazil - 60's - the silence pact* (apud FAZENDA, 1991) in which it had the aid of Japiassú and Gusdorf.

Gusdorf (1976) has a critical thinking about the fragmentation of knowledge that he associates with the nineteenth century, which resulted in the expansion of scientific work and quantitative accumulation of knowledge, which had, as a negative consequence, the compartmentalization of knowledge in increasingly deeper, but limited fields. To this specific vertical dive, Gusdorf (1976) wants to oppose new horizontal connections, in search of a lost totality. For the author, the processes of specialization and disciplinarity are understood as diseases to be cured by interdisciplinary praxis.

Still regarding interdisciplinarity, Gusdorf (1976) comments that everyone defends the interdisciplinary character of the educational institutions throughout university reformations. But for many, this means just joining several colleges in the same place, or joining several experts with their particular languages side by side. And his proposal for



this is a general and superior knowledge, a human science regrouping and rearticulating a convergent humanism.

There are several studies that explicitly recognize the difficulty of developing a homogeneous conception of interdisciplinarity, which seems paradoxical considering the unifying ambitions of such a platform. Most of them tacitly accept interdisciplinarity as a solution. But not all. An interesting and well-argued perspective is found in the article by Maria Cecília Minayo (1994), *Interdisciplinarity: Functionality or Utopia?*, which presents some views on the subject. One of them, according to Carneiro Leão, puts in suspense the transforming and allegedly critical potential of Gusdorf's humanistic view of interdisciplinarity, indicating its functionality for the status quo. Interdisciplinarity, in this case, would be an operational necessity for scientific knowledge to continue being produced and transmitted in the same terms. Carneiro León (1991) puts a spotlight on interdisciplinarity, accusing the rhetoric of persuasion that it implies, in the clearest subservience to the functionalist character of science that is practiced.

Ely (2003, p.16) states that

[...] the decade of 90 represents for Brazil the apex of contradiction in studies and research on interdisciplinarity, growing, especially in Education, the number of projects titled interdisciplinary, stemming from the idiom, but without explicit rules, abandoning traditional routines and improvising ways of working.

In contrast to all affirmations of interdisciplinarity as a practice of expanding knowledge, exchange of experiences, etc., Tonet's critique (2009, p.735) is based on the foundations of the proposal of interdisciplinarity, which the author claims to be "a wrong solution for an ill-considered problem." According to the author, the theory of interdisciplinarity does not have as its starting point a theory of fragmentation, it only recognizes its negative consequences.

Leaving aside the material roots of the fragmentation of knowledge, and even admitting that it is a natural process, it presupposes that it is a purely epistemic problem and can therefore be overcome in the epistemic plane as well. At most, beyond this merely epistemic plan is also added a moralistic plan, emphasizing the need to have pedagogical integrative attitudes. (TONET, 2009, p.735).

According to Tonet (2005a), all these dominant theories that try to problematize the question of interdisciplinarity are partial. This assumption is based on the assumption that complexity and fragmentation are only natural results of the social process, and fragmentation is a necessary consequence of the former. Nor does it take into account the ontological dependence of knowing in relation to being. As much as they make references to the historical process that led to the fragmentation of knowledge, one cannot perceive the association of ontological submission of knowledge in relation to material conditions. In this way, knowledge is attributed to an autonomy that it does not really possess, thus treating the fragmentation of knowledge as a process that occurs within the knowledge itself.

From this, it seems evident the need to redo the totality lost, through the rapprochement of these new fields. Therefore, it is assumed that, from the sum of these several fragments, it is possible to reach a totalizing knowledge of a given object (TONET, 2005a).

## **Interdisciplinarity and material relations of production**

The problem of whether human thought corresponds to an objective truth is not a problem of theory but a practical problem. It, in reality, means that man has to demonstrate the truth, that is, the reality, and the force, the earthly character of his thought. The debate about the reality or the unreality of an isolated thought of the practice is a purely scholastic problem.<sup>12</sup>

From this statement, one can see that the critique of interdisciplinarity is not only the critique of interdisciplinarity, but the critique of the world that produces and needs this form of production of knowledge. The initial and fundamental question is to understand what world this is, and who is interested in putting reality, denying the possibility of the knowledge of totality, as methodological, ontological and historical necessity demands - since capitalism is intrinsically expansive and totalitarian. It is necessary, then, to investigate who is interested in reducing the possibilities of knowledge of the real and its contradictions. It seeks to know who benefits from the concealment of the horizon of the conscious action of individuals, which reduces any perspective of social transformation and contestation to particularistic and fragmented understandings.

Considering these presuppositions, before proposing any formula for overcoming the fragmentation of knowledge, it is necessary to clarify this phenomenon and not accept it as something natural. For this, it is necessary to understand, from its material roots, the process that led to this result. However, the understanding of this process cannot start from an already well-advanced situation of the social being that is modernity<sup>13</sup>. To take modernity as a starting point is a situation that is already the consequence of a certain historical process. It would correspond, once more exactly, to take as presupposition exactly what must be explained (Tonet, 2005a).

According to Frigotto (2008), in order to understand how this situation has been reached, it is necessary to grasp the trajectory of the social being from its original bases, both in historical terms and ontological terms. The point is to verify when the fragmentation of knowledge began. It seems that it began with the emergence of private property and social classes, with the social division of labor, alienation, division between those who think and those who do, between manual and intellectual labor, and deepened with positivism, the development of capitalist society and the division between capital and labor, which reinforces the division between those who think and those who do the

**12-** Marx. *Il Tese sobre Feuerbach*. Textos I. São Paulo: Edições Sociais, 2007.

**13-** According to Hobsbawm (2001), modernity refers to the style, custom of life or social organization that emerged in Europe from the seventeenth century. This, in turn, can be characterized from the revolutions that are its own. Hobsbawm's option is to understand the Modernity, considering the revolutions that marked its constitution. Thus, in order to understand Marx's thought, it is necessary to in the three great revolutions of modernity: the sixteenth-century scientific revolution, starring the modern science of Bacon, Locke, and Hobbes; The French or bourgeois revolution, a political framework of the rise of the bourgeoisie to power and the industrial revolution, as a radical implantation of the mode Of capitalist production. In this way, we would have the modernity defined from its aspects: scientific, political and economic.



work and deepens alienation. That is, the division and fragmentation of knowledge have to do directly with the form of social organization and production of material life founded on class division. Frigotto (2008, p.60) emphasizes that

The division which is produced and developed in the realm of the relations of production of the social man, as a concrete totality, is necessarily explained in the plan of consciousness, of the representations and conceptions of reality.

Frigotto (2008) states that ideas and conceptions do not have a life on their own. They express the historical moment and the form of organization of the way to produce the material life of the man in each moment. The split that is present in the plan of social relations of production is reproduced in the plan of thought and representations. When there were no social classes, wisdom and knowledge occurred through life and were directed to life. There was no need to deprive anyone of any information and experience, there was no fragmentation. It is from this perspective that both the deeper nature of social praxis and its unfolding throughout history are understood.

According to Tonet (2005a), it is only possible to understand both the process of complexification and the process of fragmentation comprising the unitary character of the social being and the social process that led to the breakdown of that unity. This is due both to its materiality and to what is attributed to the process of knowledge. For this, it is necessary to start from what underlies the social being. According to Marx, it is understood that this act is work.

Marx (1982) points out that concrete is the unity of the diverse, synthesis of multiple determinations. In order to understand the abstract interdisciplinary category, it is necessary to analyze from the simplest categories, reaching the most complex so that the process of understanding the whole - synthesis - is more concrete, real. According to Marx (1982), it is from the analysis of work and its relations with the other dimensions of the social being, such as language, art, science, politics, law, education, philosophy, etc., that the social being is a totality, that is, a set of articulated elements, in constant process. Work, this exchange between man and nature, through which the material goods necessary for human existence are produced, is the event that founds the social world. In *The German Ideology* (2009, 27), he writes: "It is possible to distinguish men from animals by conscience, religion or whatever one wants. But they themselves begin to differentiate themselves from animals as soon as they begin to produce their livelihoods". However, the very realization of the work imposes the intervention of other dimensions, such as language, production of knowledge, education for its realization. However, the complexification of society based on work establishes new situations, problems and needs that demand other social dimensions to face it. Think of art, science, politics, law, religion. None of these dimensions is work, but they all originate from work. It is worth mentioning that they all have an ontological dependence on work. The social being is, thus, in the expression of Lukács (1979), a complex of complexes that has origin in the work. In this way, it becomes evident that the category of totality, even before being an epistemological category, is an ontological category, that is, belonging to the very essential nature of

the social being. Thus, the analysis of the work will also allow us to perceive that it is a category that always refers beyond itself, that is, it opens the possibility of permanent creation of the new and not only the replacement of the same, as occurs in the animal kingdom. In this way, it is characteristic of the social being to become increasingly complex and universal. This means that the complexification is not an imperfection, but an ontological determination of the social being (LUKÁKS, 1979).

Quoting Marx and Engels (2009: 37): “It is not the consciousness of men that determines their being, but, on the contrary, it is their social being that determines their consciousness.” This indicates that our way of being and thinking is always determined by the social relations of production. Hence the term materialism. In it, human consciousness is led to think of ideas arising from material conditions. Thus the way concrete individuals relate to each other in the process involving the transformation of nature is what underlies the way the knowledge of reality is structured. As a synthesis and example, Tonet (2005a) states that the science of the modern world is the way of scientific doing, historically conditioned by the modern world. It is therefore a question of understanding, on the basis of this original unity of the social being, how, in the course of history, its process of enlightenment has led to both complexification and specialization and fragmentation, both in material reality and in the sphere of knowledge.

Thus, from the perception that the act that founds the social being is work, one can understand how the complexification is an ontological characteristic, and, therefore, essential of the social being. From the most primitive and simple groups to the present world, there is a process by which social reality becomes increasingly complex and universal. On the other hand, the complexification will inevitably result in specialization, since in fact it is impossible for a single individual to grasp the totality of doing and social knowledge (LUKÁCS, 1979).

## **From the entire Greco-Roman world to fragmentation in modernity**

Tonet (2005a) argues that it is from this materiality of the modern world that it becomes possible to understand the reason for fragmentation, since if it is a characteristic characteristic of modern scientificity, it is because the proposal of interdisciplinarity, apprehended only from the gnosiological point of view, it is efficient. Modern science broke out in the period of transition from feudalism to capitalism. The central point of this transition in the production of knowledge lies in the passage from the primacy of the object, which is the Greco-medieval<sup>14</sup> knowledge pattern, to the primacy of the subject, which is the conception of modernity. This position, facing the world and the problematic of action and knowledge, will not undergo essential change until the end of the Middle Ages. It is essential to add that this change was only possible, firstly, thanks to the material changes that took place during this period. To a broadly static, finite, and hierarchically

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**14-** According to Tonet (2013), the Greco-medieval pattern prevailed in the search for the essence of being, establishing a way of thinking that determined the process of apprehension of reality. The quest for essence is, therefore, an epistemological inquiry.

ordered world, a world of slight transformation took place, ever larger and without any hierarchy. In a social order, in which the subject saw himself exclusively as spectator and beholder, an order took place in which the individual saw himself as an active constructor, both in practice and in theory. Knowing the world, particularly nature, to transform it, has become the fundamental characteristic of this new way of being in the world.

Chauí (1994b) argues that the construction of this new standard of scientificity entailed, however, the criticism of the Greco-medieval paradigm. According to the moderns, that way of producing knowledge could not, in fact, produce true knowledge, since its results were not verifiable. Its speculative and metaphysical character became an impediment to any empirical verification. However, a knowledge that is not capable of empirical verification lacks, according to them, a criterion that can determine what is true and what is false. Moreover, it has no use for the transformation of nature. Experimentation and empirical verification are two fundamental characteristics of this new form of scientificity. Any knowledge that is intended to be true has to go through the analysis of experimentation and empirical verification, otherwise it will only be an opinion. This knowledge, however, contrary to the contemplative and ethical-political or religious character of Greco-medieval knowledge, was now eminently active and practical. It was aimed at the transformation of nature in order to dominate it and put it at the service of human interests.

According to Marcondes (2005), for a better understanding of how this change occurred, one can resort to the criticism of Kant, known as the theoretician who realized, in the problematic of knowledge, the same revolution realized by Copernicus in the conception of the world. Hence he is known as the author of the Copernican revolution. In short, instead of the subject rotating around a world endowed with an objective and essentially immutable order, it is the world that revolves around the subject, that is, that is actively constructed, theoretically, by the subject. Having lost the foundations of the ordination of the world which in Greek-medieval thought would be in the nature of the world itself, that is, in its essence, man should seek these foundations in himself.

But this search for the foundations within one's own subjectivity implied the impossibility and the nullity of seeking the essence of things and, therefore, of finding the order established by the hierarchy of essences pertaining to reality itself, as proposed by the Greco-medieval conception. According to Aiub (2006), in the ancient world, the universe was a cosmos, it was ordering, and the human being was embedded in that organization, harmonizing with the nature and society around it. An example of this view of the world as a whole was the ideal of Greek formation, "the formation of the Greek citizen understood the dominion of all areas that allowed him to know nature, society and himself, aiming at the formation of the integral man" (AIUB, 2006, p.106). This ideal of Greek formation also continued in the Middle Ages: Trivium (grammar, rhetoric and dialectic) and Quadrivium (arithmetic, geometry, astronomy and music) made up the unified set of letters and sciences. Both in the medieval period and in classical antiquity, "knowledge could only be exercised within the scope of wholeness. Particular knowledge only made sense in so far as it referred to the whole" (JAPIASSÚ, 1976, p. 46). However,

as has been said previously, this unitary conception of knowledge begins to change in the Modern Age.

Chauí (1994b) states that it is possible to perceive that this new pattern of knowledge eliminates two categories that were fundamental in the Greco-Medieval paradigm: the categories of the essence and the totality. In summary, in this shift from the Greco-medieval world to the modern world, there is a shift from an ontological perspective (the centrality of being, though of a metaphysical nature) to a gnosiological perspective (subject centrality).

From this, it is inaugurated, at the origin of modern science, also a fierce dispute between the conception of the Christian world and the new secular tendencies of knowledge. This dispute was not merely theoretical, but had practical consequences of the greatest impact. The intermediate solution found was to give each science the competence to speak about a particular field of reality. In this way, the various sciences were unable to extract considerations of the world in general from their research.

Marx (1985) bases the theory of social being, considering ontology as a theory of being, being as indivisible totality, and concrete as everything representing a totality, human being, history, social class. The Marxian ontology<sup>15</sup> is precisely directed to reflect and express man in his actual effectiveness. The social being is understood as a real, historical, concrete and dialectically based being in life, as opposed to the idealistic conception. In turn, this conception exists and is objectified in everyday experience and in the present, in a society that is divided by class relations. As we know, bourgeois society is determined by an intense social division of labor which is the result of the very logic of production and reproduction of capital. This division intensified in an extraordinary way with the arrival of the industrial revolution.

Marx (1985) states that bourgeois society would be the expression of human nature itself. In this way, it was not fair that this division of labor had been considered the natural form of manifestation of this nature. In turn, the naturalness of this social division of labor was at the birth of the so-called human sciences, each emerging from the delimitation of a specific location. This delimitation was based on the assumption that social reality could not be a set of intimately articulated parts, but a sum of parts with no essential connection to each other. These transformations were certainly the basis for each of the disciplines - economics, political science, sociology, psychology, anthropology, and so on - to claim the isolated treatment of a part of the social reality.

According to Tonet (2005b), it is important to point out that the theory of interdisciplinarity does not begin by seeking an explanation for the process of knowledge fragmentation. It only recognizes this result and its negative consequences. Even when it refers to the fragmentation of the productive process of capitalism, the connection with what occurs in the scientific dimension is very tenuous. In this way, the premise of overcoming the fragmentation of knowledge gains a markedly subjective character. By not considering the material roots of the fragmentation of knowledge, and even agreeing

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**15** - Tonet (2013) states that the nature of the dialectical materialist method has an absolutely ontological character, since it seeks to understand being in its totality and in its processuality. Thus, it does not depart from a theoretical elaborations on the subject.

that this is a natural process, it presupposes that it is a purely epistemic problem that can even be overcome in the same plane. At most, beyond this merely epistemic project, a moralistic plan is added which emphasizes the need for integrative pedagogical attitudes.

In turn, the articulation between the phenomenal nature of modern scientificity, already mentioned above, and the fetishism of the commodity, contributes so that the social reality is reduced to appearance, to the phenomenon, to the empirical elements, thus losing categories of essence and totality, which, as seen earlier, are constitutive of the nature of the social being.

However, this positive stimulus suffers a considerable negative inflection when the bourgeoisie becomes the ruling class. From then on, the bourgeoisie has the need to hamper a deeper understanding of social reality. From the point of view of this class, it is a question of understanding social reality in a way that allows the reproduction of this social order, not at all compatible with human nature. None of this is intentional in the conspiratorial sense, but in the sense that theorists are aware of what they are doing and believe that this is the most appropriate path for humanity. Thus the social sciences emerge with the intention of giving an answer to the fragmentation of the materiality of the social being, but also the need to legitimize the new form of sociability. They are shaped around isolated dimensions of social reality, which can only be connected to each other in an absolutely superficial way and at the discretion of the subject itself. Thus, economics, political science, sociology, psychology, anthropology, and so on, and in each of them, multiple subdivisions, all with the purpose of delimiting their fields of study and their methods of approach of objects as if they were completely autonomous parts.

According to Netto (1989), with the elimination of the categories of essence and totality of social reality, it is necessarily required that the subject of knowledge make cuts of the object to be studied and that gives unity to the empirical data. The appearance and the empirical become the material on which modern scientificity works, that is, they are the “two fundamental positions in the face of the knowledge of the social, within the scope of contemporary rationalism” (NETTO 1989, 430). The first is the analysis of the phenomena from their empirical expression. In this perspective, the theoretical work has in the systematization carried out on the empirical material - selection, organization, classification, categorization - a previous stage: it is on it that the theory is structured, producing an ideal similarity that seeks to contemplate the intrinsic organization of Empiria, addressed through a strong and rigorous analytical treatment. The result of the theoretical elaboration, the theoretical product, is a model that reason elaborates from the empirically given object.

## **The development of criticism in favor of human emancipation**

According to Bernstein (1996), the way society classifies, selects, distributes, transmits and evaluates knowledge is a reflection of the distribution of power and the principles of social control. The fragmentation of knowledge has its origin in the social division of labor, arising with private property and, in its specific modern configuration,

in the fragmentation of the capitalist system of production of material wealth, and is functional to the reproduction of capitalism. Therefore, the process of knowledge is not realized independently of material relations. Marx and Engels (2009, pp. 39-40) state the following:

[...] The first assumption of all human existence and of all history is that men must be able to live in order to make history. But to live, we must first of all eat, drink, have housing, and a few other things. The first historical act is, therefore, the production of the means that allow the satisfaction of these needs. The second point is that, satisfied with this first necessity, the action of satisfying it and the instrument of satisfaction already acquired lead to new needs - and this production of new needs is the first historical act.

The interpretation of this passage requires that an analysis be made from the dialectical process between objectification and appropriation as one that synthesizes in Marx's work the essential dynamics of work and, consequently, the essential dynamics of the production process, of reproduction Human culture and knowledge processes.

Thus, there is no possibility of overcoming the fragmentation of knowledge by the strictly epistemological way, and not even by any pedagogical or behavioral impulse. The autonomous treatment of the problem of knowledge is a huge misunderstanding. It would mean attributing ontological priority to knowing, not to being, besides admitting the possibility of understanding a category, separating it from the totality in which it is inserted. It is necessary to understand that the longer this form of sociability lasts, in which what predominates is the logic of capital, the more fragmentation is intensified, the stronger the mystification of knowledge becomes, irrespective of the efforts employed to overcome it Purely epistemological (TONET, 2005a).

Tonet (2005a) states that knowledge is always produced in a particular historical-social situation, in response to certain issues faced by humanity. The modern gnosiological perspective is born with the rise of the bourgeoisie. In this way, it affirms to be the object a theoretical construction of the subject. On the other hand, when observing the ontological perspective, knowledge is a theoretical reconstruction of the object, that is, a theoretical translation of the historical-social process that gave rise to that specific object and the various elements that constitute it. As Marx (1985, p. 16) asserts, in demarcating his method in relation to the Hegelian method:

My dialectical method, by its foundation, differs from the Hegelian method, being entirely opposite to it. For Hegel, the process of thought [...] is the creator of the real, and the real is only its outward manifestation. For me, on the contrary, the ideal is nothing more than the material transposed to the head of the human being and interpreted by it.

It can be seen, then, that the effective overcoming of this split in the sphere of knowledge passes, possibly, by the radical transformation of the world that originated and needs this model of production of knowledge. Only the constitution of a world that



can exclude the social division of labor, which can suppress the division of classes with their antagonistic interests, it is worth mentioning that a world that is an unbroken human totality will overcome the fragmentation of knowledge. The search for an integral knowledge must have in the category of totality its fundamental principle. Now, this category, as it has been said before, before being *gnosiológica* should be ontological, therefore, it would express the character of the world itself.

Tonet (2005a) argues that despite this, it is not being argued that it is not currently possible to produce a knowledge that is not fragmented. On the contrary, this is not only possible but also necessary. After all, if a fragmented knowledge is functional and necessary for the maintenance of the interests of the ruling class, a knowledge that has in the category of totality its methodological key of historical and social character, and which allows the demystification of the social reality, is fundamental for there to be Model. In this way, the production of a knowledge that is not fragmented is supposed to overcome the centrality of subjectivity, which is characteristic of modern scientificity. In this case, the path invariably passes through the centrality of objectivity, of a social-historical character.

According to Luckacs (1979), it is through this model that social reality can be understood as a complex of complexes that obtains at work its ontological-primary category. It is also through this principle that it becomes possible to understand the intrinsic nature of the social being, its complexification and fragmentation, both materially and spiritually, as well as the articulation between these two moments.

Thus, according to Tonet (2005b), fragmentation is a social process typical of class society and, in its most developed form, a characteristic movement of capitalist society. It is worth emphasizing that overcoming fragmentation in the process of producing material goods and overcoming fragmentation in the process of knowledge production are two articulated and concomitant moments.

## **Final considerations**

Here are some important considerations of what has been said so far. The first one concerns the understanding that interdisciplinary work is not effective if it is not able to break with idealism and its metaphysical conceptions. It is necessary to demystify the old belief that ideas lead the world. The overcoming of fragmentation from the strictly scientific point of view does not go through the juxtaposition, sum or, still, by the attitudes and efforts of the subject in integrating several areas of knowledge. The elimination of the fragmentation of knowledge can be thought of by overcoming the perspective of modern scientificity, of the gnosiological characteristic in which the centrality is in the subject, and by the appropriation of the onto-methodological perspective founded by Marx in which the object - Social and non-metaphysical - has the predominance. In this case, the subject has the task of theoretically translating the social process.

The second consideration is to point out that the current form of the world, governed by capital, demands and grounds the fragmentation of knowledge as a necessary instrument for its reproduction. This fragmentation expresses the historical moment and

the form of organization of the way of producing the material life. Hence, as long as capital is the dominant process, the fragmentation of knowledge will also be its dominant form. In short: a fragmented knowledge is a knowledge of a fragmented world.

It is clear that the Marxian formulation is opposed, in the most radical sense, to the current perspectives in relation to interdisciplinarity, since, as it has been presented, it is not the sum of juxtaposed parts that produces a totalizing knowledge. This knowledge can only be produced from methodological principles radically different from those that underlie the perspective of modern scientificity. These principles imply a general theory of social being, a social-historical ontology of the social being, and brings together in the ontological category of the totality its understanding. Investigating within the conception of concrete totality means seeking to make explicit the multiple determinations and historical mediations that constitute a delimited research object. The historicity of social facts is fundamentally based on the explication of the multiplicity of fundamental and secondary determinations that produce them.

Therefore, from what has now been exposed, it is noticeable that Marx's method is a valuable procedure of investigation and critical exposure to the ways in which interdisciplinarity has been approached. The main reason is that they do not consider the internal contradictions of the totality of bourgeois society, marked by the antagonism between the forces of production and the relations of production, between capital and labor. Marx's method is emancipatory, since it is a necessary vehicle for the transformation of this totality, and indicates that knowledge is only a part of the social totality, that is, it can not be visualized and perceived in isolation from its reality - praxis Social - nor of its historical trajectory, which is exactly what this whole theorization of the fragmentation of knowledge does.

A theoretical activity that is intended to emancipate possibly passes through the appropriation of a knowledge that allows the understanding of this society as a totality, to its deepest roots, and also allows to understand the origin, the nature and the social function of the fragmentation, demystifying, at the same time, its present form.

## References

AIUB, Mônica. A interdisciplinaridade: da origem a atualidade. **O mundo da Saúde**, São Paulo, p. 107-116, jan./mar. 2006. Available at: <<http://bases.bireme.br/cgi-bin/wxislind.exe/iah/online/?IscScript=iah/iah.xis&src=google&base=LILACS&lang=p&nextAction=lnk&exprSearch=430110&indexSearch=ID>>. Access on: nov. 2015.

ALVES, Railda; BRASILEIRO, Maria do Carmo; BRITO, Suerde. Interdisciplinaridade: um conceito em construção. **Episteme**, Porto Alegre, n. 19, p. 139-148, jul./dez. 2004

BERNSTEIN, Basil. **A estruturação do discurso pedagógico**: classe, códigos e controle. Petrópolis: Vozes, 1996.

CARNEIRO LEÃO, Emmanuel. Para uma crítica da interdisciplinaridade. **Revista Tempo Brasileiro**, Rio de Janeiro, 1991.

- CHAUÍ, Marilena. **O que é ideologia**. São Paulo: Brasiliense, 1994a.
- CHAUÍ, Marilena. **Introdução à história da filosofia**. São Paulo, Cia das Letras, 1994b.
- DESCARTES, Rene. **Discurso do método**. São Paulo: Abril Cultural, 1983.
- ELY, Fabiana Regina. Serviço social e interdisciplinidade. **Revista Katálysi**, Florianópolis, v. 6, n. 1, p. 113-117, jan./jun. 2003.
- FAZENDA, Ivani. **Interdisciplinaridade: a história, teoria e pesquisa**. Campinas: Papirus, 1991.
- FOLLARI, Roberto. **Interdisciplinarietà**. México, DC: Azcapotzalco, 1982.
- FRIGOTTO, Gaudêncio. A interdisciplinaridade como necessidade e como problema. **Revista do Centro de Educação e Letras da Unioeste**, Foz de Iguaçu, v. 10, n. 1, p. 41-62, 2008.
- GUSDORF, Georges. **Introduction aux sciences humaines**. Paris: Ophrys, 1974.
- GUSDORF, Georges. Prefácio. In: JAPIASSÚ, Hilton. **Interdisciplinaridade e patologia do saber**. Rio de Janeiro: Imago, 1976.
- GUSDORF, Georges. Present, passé avenir de la recherche interdisciplinaire. **Revue Internationale des Sciences Sociales**, Murcia, n. 29, p. 627-648, 1977.
- HOBSBAWM, Eric. **Era das revoluções**. Rio de Janeiro: Paz e Terra, 2001.
- JAPIASSÚ, Hilton. **Interdisciplinaridade e patologia do saber**. Rio de Janeiro: Imago, 1976.
- KANT, Immanuel. **Crítica da razão pura**. Lisboa: Fundação Calouste Gulbenkian, 1989.
- KOSIK, Karel. **Dialética do concreto**. Rio de Janeiro: Paz e Terra, 1978.
- LÖWY, Michael. **Ideologias e ciências sociais: elementos para uma análise marxista**. São Paulo: Cortez, 2003.
- LUKÁCS, George. **Ontologia do ser social: os princípios ontológicos fundamentais de Marx**. São Paulo: Ciências Humanas, 1979.
- MARCONDES, Danilo. **Iniciação à história da filosofia**. Rio de Janeiro: J. Zahar, 2005.
- MARX, Karl. **Grundrisse**. São Paulo: Boitempo, 2011.
- MARX, Karl. **O capital: crítica da economia política**. São Paulo: Nova Cultural, 1985.
- MARX, Karl. Para a crítica da economia política: salário, preço e lucro: o rendimento e suas fontes; a economia vulgar. In: OS ECONOMISTAS. São Paulo: Abril Cultural, 1982. p. 121-155.
- MARX, Karl. **Teses sobre Feuerbach**. Texts I. São Paulo: Sociais, 2007.

MARX, Karl; ENGELS, Friederich. **A ideologia alemã**. São Paulo: Ática, 2009.

MINAYO, Maria Cecília de Souza. Interdisciplinaridade: funcionalidade ou utopia? **Saúde e Sociedade**, São Paulo, v. 3, n. 2, p. 42-64, 1994.

NETTO, José Paulo. Notas para a discussão e sistematização da prática e teoria em serviço social. **Cadernos Abess**, São Paulo, n. 3, p. 142-16., 1989.

PASCAL, Georges. **O pensamento de Kant**. Petrópolis, Vozes, 1983.

TONET, Ivo. **A questão dos fundamentos: educação, cidadania e emancipação humana**. Ijuí: Unijuí, 2005b.

TONET, Ivo. **Em defesa do futuro**. Maceió: Edufal, 2005a

TONET, Ivo. Expressões socioculturais da crise capitalista na atualidade. In: ABEPSS/CFESS. **Serviço social: direitos sociais e competências profissionais**. Brasília, DF: ABEPSS/CFESS, 2009. p. 124-142.

TONET, Ivo. Interdisciplinaridade, formação e emancipação humana. **Serviço Social & Sociedade**, São Paulo, n. 116, p. 725-742, out./dez. 2013. Available at: <<http://www.ivotonet.xpg.com.br/>>. Access on: 25 maio 2015.

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