PHILOSOPHY AND SCIENCE IN EDUCATION: BETWEEN FRAGMENTATION AND COMPLEXITY

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ABSTRACT
This article aims to critically analyze the fragmentation of scientific and human knowledge, often confined to school disciplines and university departments, in the light of the history of the relationship between philosophy and science. To do so, we used the Cartesian paradigm and the emergence of the complexity paradigm as a reference. We investigate, in particular, the pedagogical models derived from the Cartesian paradigm, with emphasis on the pedagogy of competencies and skills that, with the reform of High School promoted by Mendonça Filho, became the official guideline of the school curriculum in Brazil. In this context, we question to what extent this curricular and pedagogical change can overcome the Cartesian model and whether the roles attributed to philosophy and science in these legal documents contribute to the articulation of knowledge from a perspective of complex thinking.

Keywords: Cartesian paradigm. Paradigm of complexity. Education.

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INTRODUCTION

Since the last decades of the twentieth century, a central theme of debate has presented itself as a pressing challenge, namely: what is the most appropriate way to train the new generations? This questioning gains relevance in a context where the historical process of education has resulted in the fragmentation of knowledge into methodological and epistemological compartments that interact and collaborate very little with each other. Philosophy, traditionally recognized for its interdisciplinary nature and for its capacity for dialogue with other fields of knowledge, has also been impacted by this fragmentation that characterizes the contemporary panorama of knowledge. To structure our analysis, we organized this work into three parts: in the first, we addressed how science, by moving away from philosophy, caused an epistemological rupture between the human sciences and the natural sciences; in the second, we examine the pedagogical implications of this Cartesian paradigm; and, finally, in the third part, we analyze the Brazilian educational reform that adopts the model based on competencies and skills.

THE DIALOGUE BETWEEN THE HUMANITIES AND SCIENCE

Philosophical knowledge, which should be the epistemological instance for the meeting of the various knowledges and a pedagogical instrument for reflection and understanding of human formation, also suffers from the modern fragmentation of reality in various areas. As a result, philosophical-pedagogical work ends up being organized in a way that is contradictory to its own open and transdisciplinary nature and assumes the methodological posture of determining specific contents and traditional pedagogical ways of dealing with knowledge. Such an anti-philosophical attitude - brought to the environment of reflection and pedagogical practice of professional philosophers, philosophy teachers and teachers in general - generates systems that disintegrate the entire range of knowledge produced and that goes against the complexity of reality that cannot be understood in an atomized way without serious damage to human formation and social life.

> These systems cause the disjunction between the humanities and the sciences, as well as the sciences in hyperspecialized disciplines, closed in on themselves.
> In this way, global and complex realities are fragmented; the human moves; its biological dimension, including the brain, is enclosed in the departments of biology; its psychic, social, religious, and economic dimensions are at the same time relegated and separated from each other in the departments of human sciences; Its subjective, existential, poetic characters are confined to the departments of literature and poetry. Philosophy, which is by nature the reflection on any human thought, has in its turn become a field closed in on itself. Fundamental problems and global problems are absent from the disciplinary sciences. They are safeguarded only in philosophy, but are no longer nourished by the contributions of the sciences (Morin, 2007, p. 40).

The fragmentation of knowledge inappropriately called human and scientific (wouldn't all knowledge be human?) and the consequent mischaracterization of philosophy brings an impoverishment from the epistemological point of view both for the natural sciences and for philosophy. Furthermore, without a philosophical conception that is capable of integrating the various knowledges between the parts and the whole without simplification, there is no way to develop a pedagogy that is favorable to the formation of individuals capable of understanding and dealing with reality in a global and solidary way.

For the natural sciences, hyperspecialization removes the possibility of bringing to their research the central and more general aspects that give meaning to human life. They produce a cold discourse in which the imaginative, mythical, and subjective aspects of culture are set aside as an obstacle to true knowledge. And so, such scientific knowledge is restricted to the descriptive aspect of reality to the extent that it is capable of being translated into technological productions to be somehow consumed. For philosophy, on the other hand, the division of areas distances researchers from the physical, chemical and biological knowledge produced about man and the universe. This situation is at odds with the history of thought itself, which, until the emergence of modern physics with Newton (1643-1727), treated bodies, movements and energies present in nature as philosophical problems.

In fact, Newton called his inaugural work of modern physics Mathematical Principles of the Philosophy of Nature. The founder of modern science himself still understood his research as philosophical or as an integral part of various other integrated knowledges, which in the seventeenth century had not yet been atomized. However, in the title the Cartesian element of mathematics already appears as the language of a knowledge that is intended to be distinct and clear to the detriment of the other metaphysical discourses of nature that have mythical aspects as a language of expression: to the Judeo-Christian Scriptures as a source of knowledge and language of nature, the Cartesian science henceforth opposes mathematics as a model of pure knowledge, certain and verifiable.

Newton synthesizes the scientific knowledge of his time and offers them a system based on simple principles that would account for all the mechanics of bodies, from the smallest elements of the world to everything that constitutes the universe. From Galileo Galilei, he inherits the conception that the Aristotelian view of the division of the celestial spheres into supra and infralunar spheres is inadequate, especially because through empirical observations of the sun (with a spyglass), the moon and the stars, he can perceive that there were "holes" in the moon and "faults" in the sun and planets, that is, the thesis that everything above the moon lived in a state of perfection that only did not it would be absolute because they revolved around the earth. The movement of the stars would be the only imperfection within this ancient and medieval conception that understood mutation as negative.

From Galileo, Newton also absorbs the conception of a world written with mathematical characters. A harmonious, perfectly symmetrical universe that would form a web of Euclidean geometric relationships, in which all the behaviors of bodies could be described with geometric shapes and in a quantifiable way with numbers and proportions. The clear and distinct language here of mathematics would possess an ontological status of equivalence with reality and would make the world not only known but also possible to investigate.

There is already a drawing here of a physical science that will be improved in the Principia from the cosmology presented by Copernicus. Thus, the earth ceases to be the center of the universe and becomes a dwarf star that orbits like a satellite around the sun. Furthermore, the movement of our planet would follow a fixed and elliptical trajectory within a mechanics that would obey an immutable order. For the Catholic priest and scientist, there would be plenty of evidence that the earth would have no edge or cosmic centrality, but it was necessary for Newton to develop this thesis, which had already been defended by Galileo within a work in the form of a dialogue called "On the Two Great Systems". However, here the defense was made in an apologetic way within a style of writing in which the author could advocate his (Copernican) ideas without compromising his life that could be set on fire by the fires of the Catholic Inquisition.

The scientific basis of these revolutionary ideas for the time only really came in Newton's greatest work. No doubt, Johannes Kepler had already presented the three laws of motion that explained why the planets revolve around the sun. However, the understanding of the fact that they moved the way they did had remained open. The Newtonian answer to this unknown was the law of attraction between bodies, which states that the force of gravity between two bodies is inversely proportional to the square of the distance (Hawking, 2005, p. 154), that is, the elliptical movement of the orbits of the stars around the sun is the result of the massiveness of the sun and the distance in relation to the planets that function as its satellites.

The formulation of the law of universal gravitation unified what would be inconceivable in Aristotelian optics, namely, the same force that attracts objects to the center of the earth causing an apple to fall on someone's head is the same that attracts and keeps the planets in their orbits. Based on this theory, which unified all terrestrial and celestial phenomena, linking the tiny infinite to the cosmic infinite, science followed in the nineteenth century a dogmatic path of determinism, which was expressed very well in the pretensions of the French scientist Marquis de Laplace, who stated that the universe and all physical processes in it would obey a set of fixed laws. These would determine the state and behavior of bodies, movements and energies existing in nature (Hawking, 2015, p. 75). Within this view, it would be conceived that if we knew the current state of the universe or the position and velocity of the sun, we could predict everything that would happen to this star and its celestial system, from the macro to the micro elements.

Within this deterministic paradigm of the nineteenth century, in which uncertainty is overcome by the illusion of the causal linearity of a supposed universal legislative order, a fissure has emerged through which an epistemic hemorrhage has erupted. "A hemorrhagic principle of degradation and disorder (second principle of thermodynamics) has been discovered in the physical universe [...]" (Morin, 2015, p. 14). The macro analysis of the behavior of steam engines has led scientists to observe that, in the production of work or movement through the use of hot springs, the yield of the machines can never be one hundred percent, because it is impossible for there to be full use or transformation of the heat received into work. Therefore, a part of the heat is rejected by the thermal system within a phenomenon of entropy, namely, from a principle of disorder and spontaneity. In other words, the greater the degree of disorder within the system, the greater the functionality and spontaneous organization of the phenomenon.

The phenomenon of entropy deconstructs the idea of a nature that comes out of a disorder and necessarily goes to an order and brings the understanding that disorder is an inherent part of systems, including being the factor that provides organization and spontaneity. It was understood from this that "[...]the cosmos is not a perfect machine, but a process in the process of disintegration and organization at the same time" (Morin, 2015b, p. 14). The same constitutivity of chaos understood by thermodynamics in the macro context is also found in the dimension of microphysics. “[...] then, in what was supposed to be the place of physical and logical simplicity, extreme complexity was discovered [...]; the particle is not a first brick, but a frontier on a perhaps inconceivable complexity" (Morin, 2015, p. 14).

Deterministic science, which had been shaken by the experiments that technologies such as steam engines provided to thermodynamics, from the twentieth century onwards will see its world collapse again. This time, the infinity in question is the minuscule, which cannot be seen with the naked eye. The mechanics in question here is not that of the functioning of large bodies and masses, but of particles. From photovoltaic experiments and the observation of energy emission, paradoxes arose that led to the emergence of quantum mechanics. The name of this branch of physics comes from Max Planck who suggested that the idea prevalent until 1900 that from a hot body (such as a star) radiates an infinite rate of heat – which could be extended to any emission of light that would produce electromagnetic waves – was absurd. Therefore, he stated "[...] that light, X-rays and other waves could not be emitted at an arbitrary rate, but only in certain packets that he called quanta" (Hawking, 2015, p.76).

The postulation of the *quantum* became a coup de grace in scientific determinism when Wener Heisenberg formulated the uncertainty principle in 1926. Contrary to what Laplace expected, it was proven that at the micro level of the universe there is no way to predict the future behavior of a particle from the determination of the position and current motion of the observed object. This is precisely due to the uncertainty caused in the investigator's own act of observation. The German scientist realized that to predict the future speed and position of a particle it would be necessary to accurately measure the current position and speed. The point is that for this to be possible, the observer needs to shine light on the object in a very small amount equivalent to a wave crest.

The problem is that, according to Planck's conclusions, this emission cannot be done arbitrarily, but using at least one quantum of light. "This quantum will disturb the particle and change its velocity in a way that cannot be predicted" (Hawking, 2015, p. 77). With this, the uncertainty principle shows that the more accurately we can determine the position of a particle, the less we can determine its velocity, and the opposite is also true. This conclusion is the beginning of the reformulation of mechanics that is then called quantum mechanics and which basically postulates that it is not possible to measure and define precisely (or separately) the position and velocity of microphysical objects.

The role of science then becomes to establish the quantum state, that is, to predict the various possible outcomes of an experiment, showing the probability of each of the outcomes. Hence, instead of being deterministic, the role of the investigator of nature becomes probabilistic insofar as when analyzing varied and similar systems, he can only predict that the result is one in certain conditions, another in others, and so on, predicting only an approximate number of how many times each effect can occur. As a result, science begins to admit randomness and unpredictability as constitutive of its work.

Of course, here we refer to physical and cosmological works considering studies on the macro and the micro separately, so that we have to understand that the understanding of science of some is not yet accepted by others. Albert Einstein is one of these scientists who revolutionized the understanding of macro knowledge and, together with the Dane Niehls Bohr, sought to unify the understanding into a single theory (just as Newton had done in the seventeenth century) that explained both the behavior of particles (quantum mechanics) and that of the stars (Hawking, 2005, p. 201). Regarding the mechanics of bodies, Einstein at the beginning of the twentieth century made a paradigmatic change in relation to the Newtonian system from the introduction of the Theory of Special Relativity and the Theory of General Relativity.

Special relativity revolutionized the understanding of reality by modifying the Newtonian understanding of time and matter. For classical physics, time is mathematical and absolute, that is, it flows infinitely and continuously, regardless of any factor external to its reality. Mass would also be something of an algebraic nature, but relative to gravity that would be absolute within the definable and calculable relationship between bodies. In Einsteinian theory, the speed of light is the reference constant for thinking and establishing other quantities, so that for observers who are in varied movements, the measurement of the time of the displacement of light does not vary. "Einstein held that all observers should measure the same speed of light" (Hawking, 2005, p. 200). However, for the same observers, their time is measured from their own speed in relation to the speed of light. If we do not perceive this difference with the clock, it is due to the fact that we make speed experiments that are infinitesimally smaller than in light, which has repercussions on a difference in time between subjects that are imperceptible without technological mediation.

As far as matter is concerned, Einstein associated mass with speed and energy production. According to his postulate, later demonstrated experimentally, the mass of a body changes as its velocity changes. Thus, the acceleration of a particle to a speed equivalent to eighty-six percent of the speed of light doubles the mass of the corpuscle. Hence, from this it was understood that, symmetrically to the massive increase of the particle by the velocity, there is an increase in the energy generated. From this realization came the famous formula described as the equality between energy (E) and mass (m) times the square of the speed of light (c), which indicates that with a minimum amount of matter (such as an atom) an enormous amount of energy can be produced. This encouraged the world of science and technology to work on the fissure of atoms producing a (nuclear) weapon, the result of which would be a great atomic explosion of colossal proportions and very damaging.

If special relativity modified the Newtonian understanding of time and matter, general relativity altered the meaning of the conception of space. For classical physics, space is unlimited, geometric, and does not suffer any influence from matter: bodies act for each other in proportion to their mass and in the inverse ratio of distance, and space is only the stage where this web of attraction between celestial or terrestrial bodies occurs. Gravity is the very force of attraction. The problem with this conception is to disregard that it is not only matter that is responsible for the relations of forces of the celestial bodies. Space is a complex system that can only be understood in its relationship with time, in such a way that space is actually a structure called space-time by contemporary science. And gravity is not the simple force of attraction between bodies that gravitate to each other. That's also it, but not only... it is the influence that mass exerts on space-time, causing a curvature in it and producing an effect of movement on bodies.

Both Einstein's physics and quantum mechanics (Borh's, for example) are proven by scientific experience. The theory of general relativity was observed on May 29, 1919 by a scientific expedition in Sobral, in the interior of Ceará: they realized that the position of a star during the solar eclipse was in a different position from the one it occupied at night, and this showed that the light of the star when passing through the sun suffered a curve. Quantum physics, on the other hand, is present in modern technologies "it governs the behavior of transistors and integrated circuits, essential components of electronic devices such as televisions and computers." (Hawking, 2015, p. 78).

Both theories[2] brought new elements to think about science, thought itself, reality and, as a consequence, also education. Now, how to think about the organization of knowledge within school curricula while maintaining a rigid separation between philosophy and science or between human sciences and natural and exact sciences arising from the determinism of the nineteenth century? It seems to us that the separation between philosophy of nature and natural science, in the twentieth and twenty-first centuries, begins to be rethought within the urgency of overcoming a Cartesian-Newtonian paradigm that no longer explains reality so well.[3]

THE CARTESIAN PARADIGM AND PEDAGOGICAL MODELS

And so, what was not possible to occur in the seventeenth century because of the persistence of the philosophy of nature in the physical conception of bodies, from the nineteenth century onwards will become the rule in the world of sciences, creating an abyss

[2] Edgar Morin does not hide his preference for Niels Bohr over Einstein, but in both he finds elements that show the emergence of a complex paradigm (2015, p.14). In Bohr's quantum mechanics, he sees the relationship of opposites that become complementary, that is, he brings the contradictory into logic. In Einstein, he perceives the inseparability of the separable and the separation of the inseparable (space-time). "Although Einstein's genius did not influence me as Bohr's, his conceptions revealed that time and space, which, for us, are two separate entities, to a certain cosmic degree of observation, are inseparable entities. I was quite fascinated by the immense paradox of inseparability in separation and separability in the inseparable" (2020b, p. 146).

[3] "What from an interpretative perspective can be considered a crisis of contemporary scientific thought, from our point of view, is a manifestation of a powerful rupture with old ideals, norms and values" (Morin, 2016, p. 42).

between philosophy and the natural sciences. And also between philosophy and the other sciences, given the birth of sociology and psychology, whose model of epistemological organization was that of Newtonian physics. It is worth remembering that the founders of sociology defined this knowledge in direct reference to the science of nature, see Auguste Comte (1798-1857) who called sociology "social physics" and Émile Durkheim (1858-1917) who defined its object as being the "social fact" or that which can be quantifiable and analyzed empirically. The Cartesian epistemological-paradigmatic background of this movement of sciences in modernity will be responsible for this fragmentation and hyperspecialization, according to Edgar Morin.

> It is necessary to evoke here the "great paradigm of the West" formulated by Descartes and imposed by the unfolding of European history from the seventeenth century onwards.
> It is certainly a paradigm: it determines the sovereign concepts and prescribes the logical relation: disjunction. Failure to obey this disjunction can only be clandestine, marginal, deviant. This paradigm determines a double vision of the world - in fact, the unfolding of the same world: on the one hand, the world of objects subjected to observations, experiments, manipulations; on the other hand, the world of subjects who question themselves about existence, communication, consciousness, destiny. Thus, a paradigm can at the same time elucidate and blind, reveal and conceal. It is within it that the key problem of the game of truth and error is hidden (Morin, 2007, p. 27).

As can be seen, the Cartesian paradigm of knowledge is the great guide for the formation of knowledge that has become too specialized in search of clarity and distinction within a cold rigor and disconnected from the problems of life. In fact, the sciences alone cannot deal with ethical, epistemological and meaningful questions. In fact, the question of the meaning of life as the primary engine of our existence and of the entire universe does not even arise, since what matters is the deciphering of the constant laws that govern the causalities of phenomena. In this way, we proceed to the simplification of reality that occurs by disjunction in the case of the separation of the human world from the world of nature or by the reduction of the human to the natural.

The Cartesian paradigm prevents one from thinking about reality in the way that Morin calls uniduality in which there is no simplification of the processes of man's relationship with the world, but a concomitant separation and implication. In this case, reality is thought of in a complex way in which the game of truth is found in an apprehension of reality in which subject and object are interrelated without the superimposition of one over the other. The truth in this case is not absolute and linear, but open to criticism and transformations of the world as well as to the processes of reformulation, unlike several other formative models that are founders of different pedagogical knowledge.

In the case of the hyper-specialized modern paradigm – in which truth is thought of as a mirror of nature within what the Scholastics said was an *adequatio mens et res* (adequacy of the mind to things) – the predominant formative model is the traditional one. Paulo Freire (1921-1997), in his famous Pedagogy of the Oppressed (2015), calls this practice banking education, because knowledge is seen as something merely objective which the holders of knowledge transmit in a verbose way to the students, who in this case are not subjects of the process, but objects of training. As in a bank, teachers, after depositing knowledge in students, demand a return on investments through tests that aim to punish those who did not retain the information and repay/recognize/promote the merit of those who proved capable of answering the questions and problems proposed in the same way they were taught.

In opposition to this Cartesian model of truth and the corresponding traditional pedagogy, numerous alternatives and epistemological conceptions have appeared, which have been put into practice in various school experiences and in many cases have been adopted as normative in various pedagogical policies of various educational systems. We highlight here, by way of example, some models that we consider to be of great relevance given the influence they exert on our teaching practices and on the organization of the curricular structure of our schools and our teacher training courses, namely: progressive model; pragmatic model; technical/business model/competencies and skills; and complexity model.

Progressive pedagogy is founded on a conception of dynamic and historical truth in which the movement of knowledge production is not linear. Contradiction, conflict and socioeconomic issues are the aspects in which reality presents itself. And the school is seen sometimes as reproducers of the dominant ideology, sometimes as an opportunity to free themselves from the shackles that imprison individuals in alienation. The most radical, the reproductionists, argue that there is no way out of the situation of exclusion and oppression through state institutions, as these were created to reproduce the *status quo ante* through symbolic violence and as an ideological apparatus of the state. Others, such as Paulo Freire, preserve the hope that education can be liberating when it is taught to read the world in an ontological, ethical and aesthetic commitment to be more (2011). In this model, students are subjects of their knowledge, which is conceived as something historically and socially constructed.

The pragmatic model understands truth within an aspect of utility. True is that which is capable of solving a problem or producing a meaningful experience. Concepts are understood as tools that provide thought and aesthetic experiences. From the pedagogical point of view, knowledge is seen as an experience mediated by concepts or affections and the role of students is seen in an active way and the classroom as a research laboratory guided by the teacher. This orientation served as a basis for the New School reformers and influenced Paulo Freire, although he was not a liberal.

In the case of technicist/business pedagogy, we perceive the influence in Brazil from the period of the military dictatorship in which the MEC-USAID agreements took place. In this orientation, what counts is the preparation of individuals for the world of work. The school is a kind of citizens' industry. These are understood as specialized professionals and ready to meet the demands of the market. From the point of view of the conception of truth and pedagogical practice, there is no innovation, as it follows the same traditional epistemology added to behaviorist practices of conditioning and adapting individuals to the expected corporate results.

Although with a different epistemological conception, we understand that the model of competencies and ability follows the same purpose as technicist pedagogy. Created for the training of workers in the 1970s in the corporate world, it was promoted by large international organizations such as the World Bank and the OECD (Zabala; Arnau, 2014, position 178). In the 90s, it was also promoted by UNESCO when it encouraged work on what education in the twenty-first century should be like, given Philippe Perrenoud's Ten Skills: Invitation to Travel (2014). For us Brazilians, this pedagogical model is very important since it received from our public authorities the normative and legal character of a parameter for the design of our school curricula. It remains to be seen whether this pedagogy responds to the demands of complex thinking.

FINAL CONSIDERATIONS

In this same context promoted by UNESCO, we have The Seven Necessary Knowledges for the Education of the Future (2007) by Edgar Morin, which brings a reflection on what education in the twenty-first century should be like. The proposal is transdisciplinary and involves not contents, but basic issues, such as: 1 - the blindness of knowledge: error and illusion; 2 - the principles of pertinent knowledge; 3 - teach the human condition; 4 - To teach earthly identity; 5 - face uncertainties; 6 - teach understanding; 7 - The ethics of the human race.[4]

These seven knowledges are central problems that have a dynamic conception of truth, not simplifying, which propose to see reality in a complex and unidual way, that is, in a

[4] These themes are also found in the work Ensina a viver: manifesto para mudar a educação (Teach to live: manifesto to change education) (Morin, 2015).

relationship of disjunction-implication in which the whole and the parts are organized in such a way that the former cannot be seen as the sum of these, but in a systemic-organizational movement in which the whole is already found in the part (as in the hologram or in the cell), which recursively is composed of the parties in a process of interdependence (Moraes, 2015). That is why one could not determine the truth absolutely, but one could determine the principles of true knowledge that would be able to approach complex reality in an adequate way, namely: the context; the global; the multidimensional; and the complex. And based on the work A cabeça bem-feito (Morin, 2020a, p. 93-96) we could add some others of which we highlight: the systemic-organizational; the hologrammic and the recursive.

The context is the place where information or knowledge is found. The global and the systemic-organizational refer to the relationship between the whole and the parts in an organizational and inter-retroactive dynamic. Multidimensional is the perception that there are complex units that must be seen from many perspectives. The hologrammic principle states that in each part is the whole (e.g., society in the individual; all the genetic material in a cell). The recursive presupposes that all things are at the same time products and producers, effects and causes within the same process, so individuals produce society, but society produces humanity and individuality in each one. The complex means that all things are together in a unity of multiplicity. These principles serve as hermeneutical lenses to read reality in a believable way.

With regard to training, complex thinking is an approach that does not exclude the advantages of others, but brings the contributions of this knowledge to an epistemological conception that does not simplify reality and that seeks to overcome the fragmentation of knowledge. We understand that it is a philosophical conception capable of shedding light on the formative work of teachers (especially those of philosophy), regardless of their theoretical orientation. In this sense, we could ask: does what is in the pedagogy of competencies and skills and in the Brazilian educational reform correspond to the education necessary for the twenty-first century according to the principles set by Edgar Morin?

At first glance at these problems, it seems to us that it is, since the BNCC raises the issue of interdisciplinarity and makes the curriculum more flexible with the alleged purpose of making the learning process more attractive to the student. However, when we observe that the only thing that is really guaranteed (regardless of the choices of the systems and schools) is to learn to read and write and count in isolation, we suspect that it is a modern model in its pedagogical proposal, but not very effective in the results. In fact, within the five training itineraries, there is only Languages and Mathematics as a generous workload.

It seems to us that this model, by leaving components such as philosophy and sociology for negotiation, does not guarantee equal learning rights for all so much. Will the child of the worker and of poorer regions not feel pressured to give a pragmatic character to his curriculum at a time when he should be developing his general intelligence with philosophy, sociology and the arts? Is it not a way to continue reinforcing the school duality and preparing most students to become cheap labor?

When the spokespersons of the BNCC say that there is a huge possibility of negotiating the workload for other curricular components in the flexible part of the itineraries, do they take into account that teachers of Philosophy and sociology only began to be demanded by the education systems recently (2008) and that now they are no longer considered necessary? Not to mention Arts which, although it has always been in the curricular designs, only receives a status of filling the teacher's workload and animating civic moments at school. What negotiating power do these professionals have in the face of the imperative of the business mentality brought about in the midst of this reform? In our understanding, almost nothing!

In this sense, our answer to the question of whether the model of competencies and skills responds to the demands of complex thinking is categorical: no! We understand that the requirement to develop general intelligence in line with specialized thinking by putting complex principles into practice does not find a favorable environment in a model that does not recognize science as philosophical and philosophy as science. It is not possible to reform a "well-made mind" if those epistemological instances that caused the fragmentation continue to operate in this split: counting and reading obligatorily on the one hand and philosophizing, artisting, investigating, finally thinking, on the other hand and without curricular weight.

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