THE INDISSOCIATABILITY BETWEEN SCIENCE, EPISTEMOLOGY AND EDUCATIONAL RESEARCH

A indissociabilidade entre ciência, epistemologia e pesquisa educacional

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Resumo: This work investigates the inseparable connections between science, epistemology and educational research, once the production of knowledge happens through the unveiling of man, and his own historical production. So, the educational research involves the education phenomenon as an object in construction which, besides the scientific and epistemological contributions, assembles the idea of the unity in the diversity. This article explains this connection and the need of understanding it as a totality in the scientific savoir-faire.

Palavras-chave: Science. Epistemology. Educational research. Unity. Diversity.

Abstract: Este trabalho investiga as interfaces entre ciência, epistemologia e pesquisa educacional, uma vez que a produção do conhecimento se dá através de desvelamentos do homem e de sua produção histórica. Desta maneira, a pesquisa educacional compreende o fenômeno educação como objeto em construção, que paralelamente às contribuições científicas e epistemológicas reúne a ideia de unidade na diversidade. Este artigo explica esta conexão e a necessidade de entendê-la como uma totalidade no savoir-faire científico.

Keywords: Ciência. Epistemologia. Pesquisa educacional. Unidade. Diversidade.

INTRODUÇÃO

The epistemological structures revelation of the educational research, articulated with the social - historic conditions that it processes, constitutes the main problematic of this work, requiring from the investigator a triadic delineation (science - epistemology - research in education) as a conductive wire of the investigation process. From the science, that is characterized as human knowledge register and that is extended and remade, it makes possible and it corrects the new distinctive reading of a world that needs to be rediscovered and rethought in every single meeting and scientific discover that it has to be studied and comprehended to the light of its intrinsic and extrinsically relations given to the extension of the "totality" that the term science implicates on its own. So, the science is the mobilizing element of man who knows that his knowledge is relative and that there is a lot to be discovered yet.

From epistemology because it provides the necessary instrumental for centering the science and the philosophy as a study objects, guarantying the pertinent researches in its basic principles or foundations, inter and extern epistemological structures, validity conditions etc., in the same time that propitiates the critics and the recurrence of this articulated elements to the social-historic reality of the studied object, its relations and inter-relations. So, from the own definition of epistemology, its genesis and development, it will be discoursed about its performance field evolving the analytical and theory pertinent aspects, and in the same instant looking for nexus with the scientific production. That's why is necessary to rescue some tips of "epistemologies" that will serve as a support of the present intention, being each one of them with its own conception of science and world vision.

And finally, from the educational research, because beyond constituting the main point of this work, its study requires a critical and reflective vision about the social-historic reality of the scientific production in the education field, articulated obviously, with the triadic delineation as we mentioned before, of which it makes part and it's an essential element. In the other hand, the epistemological research in the educational field emerges the concern of representing itself as an evaluative tool as well, having as a primordial purpose going beyond of a simple reflection and criticizing, using this instruments, composing guiding ways of the development process of scientific production in this specific field, and detecting its course, evaluating the quality of this "production" and of the main paradigmatic influences that suffers that it brings in the scientific world.

Like the perspective of the *"truth"* in the sciences field was changed by the different and new readings of the mediate and immediate world as we could perceive in Bachelard, it wasn't made in a different way in the educational field. That's why is needed to be considered some basic questions by science

itself as a world and man revelation at the first moment, at the second moment is proper emphasize the epistemological vision as a critical-reflective possibility about the knowledge object. And yet in the third moment, the educational research as a continuing and systematical study in the educational field. Sequent, some researches must be caste: what's the educational research? which is its principal study object? which are its represented contributions in educational scientific knowledge? Why is needed to analyze the educational research of "research"? And finally, in the fourth moment are established the necessary nexus between science, epistemology and educational research, providing analysis important elements, which are characteristics of epistemological research constructed by the human experience. The main text concern is not to provide a final answer of these questions but finding ways that could provide possibilities of comprehending in a multidimensional universe which is the scientific research - because "[...] it's a mistake thinking that the investigative activity could be isolated from the most extensive dimension where is inserted and can find its foundation" (VON ZUBEN, 1995, p. 14).

SCIENCE: WORLD AND MAN REVELATION

Even being considered by its contemporary human benefits, science causes disenchants in its pernicious way when its purpose is the life destruction and legitimating benefits only for a hegemonic part of society. The science can be useful and/or prejudicial, a kind of liberation and/or imprison, a way of searching the truth as a process and/or a stumbling block itself. Created by the men for a systematization and knowledge development, the science, uprooted from the heart of philosophy assumed ramifications in several areas knowledge, generating, crises in its identity and purpose; and then the doubtful nature and the inadequate use of this term. About these conflict points Chalmers (1993) affirms that it has to be rescued the concrete and necessary conception of science (therefore of its identity), as well as of its mission, function and authority in a world that lives in constant transformation. So, from the title of his book *"What is science, at last?"* he keeps weaving insight about the science nature and during this, he suggests improvements for turning it a real instrument of mans liberation, making possible the revelation of its own and of the world. Through the analyzes of these questions it is searched the opportunity of reflecting about the science and its practice and situating it as an object of human knowledge, consequently, critics susceptible, elaborations and consonant re elaborations with the advances or reconsiderations of (re)constructed knowledge.

Conant (1958, p. 28) defines the science like a correlated series of concepts and conceptual systems resultants of experimentations and observations, which are susceptible of experimentations and posterior observations too. This kind of vision, according Chalmers (1993, p. 23), it's a characteristic of the XVII century, which appears as a Scientific Revolution consequence and having like precursors Galilee, Newton and Bacon. Thus, these studious used to proclaim the separation from the philosophy and the attachment to the nature as a guarantee of having a trustful scientific knowledge, been classified as an objective proved knowledge. To the perception of science and scientific method as generators of information observed results, able of experimentations and generalizations, the author denominates as an *ingenuous inductivity* explication, emphasizes that only through observing facts could be proceeded the elaborations of laws and pertinent theories, and these in a deductive way would be proceeded in their previsions and explications.

However, even in the end of the XVII century the science still remains linked to the philosophy, but since the last century would begin having somehow "exact" outlines, mainly with the *"positivism gestation".* This science conception entered in the XX century taking a new vision, denominated with the neopositivism and it was present in the scientific researches in a predominant way till decades of 1970. For the neopositivists the science is comprehended as the "searching of truth at its last signification" whose validity should be submitted to the verification/experimentation as a basic scientific methodology, which is characteristic of the logical mathematics and physics in which were based the science conceptions. Therefore, the problems (any of them) were studied in the light of exclusively technician slants (RAMOS LAMAR, 1998), characterized by the information analyzes predominantly quantitative, whose influence is noted in a considerable level in the scientific researches in a general way and in the educational research in a specific way. In the opposite of this object reading perspective and the particular world vision Popper (CHALMERS, 1993, p. 65), proposes the falsification way. This conception "[...] sees the science as a conjoined hypothesis that, experimentally proposed, with the description purpose or to accurately explain the behavior of any world and universe aspect". On the other hand, the *sine qua non* condition so that one of its hypotheses or conjunction may be founded as the law and the scientific theory is based in the obligatory of these hypotheses that are shown falsiable.

The falsiable hypotheses to Popper are those susceptible of observations "[...] inconsistent with it, that means, if established as truths, would falsify the hypothesis" (Idem, p.66).

The Marxism with its ruts in the materialistic dialectic determination, conceives the science as a result of the material life production. And the material life production conditioning the social, political, economical, and intellectual processes, provide the necessary material conditions for the human knowledge development and its several ways of representation.

For the phenomenology, the science must be the comprehension and interpretation vehicle of phenomenon, not being its last objective the explication of the world in a cumulative way, as the neopositivism or other similar do, however, the concern about the phenomenon research and description, not for the extern vies, but as a conscience prerogative, that means by the attention, by the reflective perception and attitude that the phenomenon causes. The phenomenological science, as the existentialism claim that the world of facts must be "put between parentheses", according the reflective conscience is projected. It doesn't mean that there is a dispensability of the material world, and what in fact happens it's a perspective changing in the reading world direction, not being explained any more but being lived *(Lebenswelt),* experimented in an intentional way.

In the perspective of Bunge (1980a, p. 31), the science mustn't be confused with the technique, since the first one is reveled as a human institution which the proposition is characterized by discovering laws that "explain" the truth in its totality, while the second one is a control instrument of determined sectors of the reality, so in this way, the author concludes that the scientific problems are *"purely known",* in the other hand, the techniques are practical and particulars, that means, they study the natural resources and facts instead of studying the hole universe, for example: to the author, the science is a complex object that is compound by independent units and that's why it must be considered as a conceptual system compounded of subsystems that are inter - related (Ibidem, p.41-42). Consequently, the science is "[...] conducted by certain biologic, economic, cultural and political conditions, that don't change so much, from one society to the other one "(Ibid., p. 49).

Postman (1994, p. 47), based in Bacon affirms that the science is the "[...] best arm of humanity in the battle for better conditions and consequently without ever stooping to do it", so, the science is considered as a power and progress source. According to the author, this isn't the conception of Sigmund Freud when evaluates the human inventions, even the development of the science, as "[...] improved means that don't reach better results in the end"(Ibid., p. 16). So, according to the presented counterfeits_the science can't be other than the "[...] search for discovering the mutable and universal laws that rule the processes, supposing that there are relations of cause and effect between them"(Ibid., p. 155). The author believes that this science conception it doesn't fit when the object is the observation and the comprehension of the human behavior and feelings, because, according attests, if that would happen, the scientific rigor would be susceptible of the missing congruence, as the objectivity of any study object would be compromised with subjective interpretations and vies.

Ziman (1979, p. 36) emphasizes that the German word *Wissenschaft* that is translated as *Science*, includes all the studies branches, even the literal and historical, therefore, fragmenting it means "[...] making a big misunderstanding", because basically the science aim (its mission and function) must attend "predominantly to the production interests of the human knowledge", more than of the "other class interests, ideologies or personals"(CHALMERS, 1994, p. 58). In that way, Chrétien (1994, p. 39) concludes that the science must be comprehended as a social web of men and institutions, equipment, publications, information and capital sources, etc., as a collective web of the truth conquering, not imposing**,** but showing itself to the challenges that the social - historic conditions provided. Therefore, the science must be conceived as a world revelation and at the same time as a man revelation.

THE EPISTEMOLOGICAL VISION

The epistemological vision about the scientific production pretends situating the questioning focus and the critic not as an end of itself, but throughout it, providing ways that can make possible a better reflection and comprehension about of what is produced, how is produced, why and for what is produced. Therefore, since the epistemology, the science and its production are gaining new outlines, new and distinctive world visions distancing itself from the concept stagnation of the absolute truth and entrenching in the searching of the truth as a process, where the "approximated", "the improvement ways" are considered as orientations in the construction of a knowledge and its transformation and in transformation. The comprehension itself that it comes being the epistemology and its contribution to

the science and to the scientific research it the main evidence of this conception. From Greek *episteme* (knowledge, science) + *logos* (speech, theory, treaty**,** study of) we have the etymology of the word epistemology, consisting in the theory about the science or the knowledge theory. According to Wartfosky (1971, p. 416) in a scientific literature level, this term was used at the first time by James F. Ferrier in his book *"Institutes of Metaphysics"* in the year of 1854, but its emerging as neologism started on 1886 in the Vocabulary of the Philosophy of Lalande and in the supplement of Illustrated Larousse, resultant of Bernardo Bolzano book (1837) *"Wisseschaftslehre"* and the Willian Whewell book (1840) denominated *"Philosophy of inductive sciences".*

The *Wissenschaftslehre* word inspired in Greek means literally epistemology in the German language, consisting in the science theory, that is not always distinguished from the term *Erkenntnistheorie*, that means *the theory of knowledge* in general presenting a philosophic character. In the Bolzano work, *Wissenschaftslehre* is comprehended in an exact sense, considering the scientific knowledge as the only trustful way of knowledge. Starting from Whewell, with the inauguration of the historical-critic method, the epistemology will have a systematical unfolding, that means, the object it comes to be studied according to the historical focus, critical and philosophical in a interacting way, as is described in the *"Philosophy of the inductive sciences, founded upon history."*

The Whewell work it was considered as an initiative one in this direction, followed by Antoine Augustin Cournot (cen. XIX) with its books *"Essay about the human knowledge foundations and about the philosophical critic characters"*(1851) and his *" pact about the chaining of the fundamental ideas in the sciences and in the history"*(1861) and by E. Mach as well, Austrian philosopher with a historical-critic inspiration, in his book *Die Mechanik und ihrer Entwicklung* (1883), had his big influence, with the Vienna circle, the birth of one of the principal epistemological chains of this last half century (BLANCHÉ, 1975, p. 11-15). The history, for the epistemology, is a mediator element and it is not an ending point. In this way, "[...] it offers a good way of analyses separating, by the date and by the circumstances of its appearing, the several elements that contributed to form little by little the notions and the principles of our science", in a critic way, and in the same time dynamical. (Ibid., p. 46-47).

According to Wartofsky (1971, p. 416-417) the epistemology is oriented to know and to work the nature and the action camp of the knowledge, as well as the sources and the origin of the same, questioning how the knowledge is acquired, how is justified and by which authority, which are its knowledge objects and which are the knowledge limits. The author observes that the epistemology executes and identifies itself with two central activities: the analytical and the theoretical. As an analytical activity, the epistemology submits the knowledge relation to the sensation, to the perception, to the memory, to the imagination, to the conviction and judgement, recognizing and distinguishing the different ways of knowledge. As a theoretical activity, generates systematic knowledge theories which consider how it is given and processed the knowledge nature, its resources, its acquisitions forms and its limits. These theories present concerning distinctions between subject that knows and the object that it is known, and concomitantly, they establish their own conviction foundation as a truth.

Mora (1993, p. 216) declares that since the ending of the XIX century and the beginning of the XX century, many conceived the "epistemology" and the "gnoseology" as synonyms, both having the same meaning as the knowledge theory. However, after some time, as the "gnoseology" term was used very much by philosophical currents, it started to be used in a general signification of the knowledge theory without their concerning to specify what kind of knowledge was deal about, the term "epistemology" assumed the status as the scientific knowledge theory, used for comprehending the sciences as much as for studying its principal problems and implications. That's why its utility became more scattered and accepted in the scientific literature.

On the other hand, Durozoi (1993, p. 158) says the epistemology isn't properly a "philosophy of the sciences" or even a "knowledge theory", but it's a discipline which its object is the science, and the purpose is "[...] to study in a critical way the principles, the general hypotheses, the conclusions of several sciences so that can be appreciated its value and the objective pursuit".

The epistemology of Karl Popper is denominated as critic - rationalist, searching to delimit the science field, establishing standards for its comprehension and activity field and throughout it making a distinction between the scientific knowledge and the others knowledge tips. The "falseness" propounded by Popper, as we could perceive in the last topic, is focused in the possibility that the theory is empirically refuted and following such a direction the science must be conceived and worked throughout the conjectures and refutations, which ways can be convergent to the knowledge objective,

and throughout of it will have a centripetal and centrifugal action about the empirical analyzed objective. To legitimate his empirical science idea, Popper (1975 a, p. 273) distinguished three requisites to content his empirical-theoretic system. Respectively, he must be *synthetic,* so that can represent a *possible* world, without contradictions; in the second place, it must be delimited very well being absented completely from the metaphysics and having to represent a world with a possible *experience* and, in the third place must be distinguished from other similar systems for representing *our* world of experience. So the author affirms that the logic of scientific research, or the knowledge logic is "[...] to provide an analyze of this procedure, or, to analyze the method of empirical sciences" (POPPER, 1975b), not by induction, that he by himself refutes in a tenacious way, however, through the deductive way.

His critic to the induction, that the author denominates as "[...] inference based in a great number of observations", dwells on considering it as a myth, not as a psychological fact, a fact of the quotidian life or a scientific procedure, according the real method of science engages the conjectures, being appropriated by generic conclusions, even after a unique observation (POPPER, 1982, p. 85).

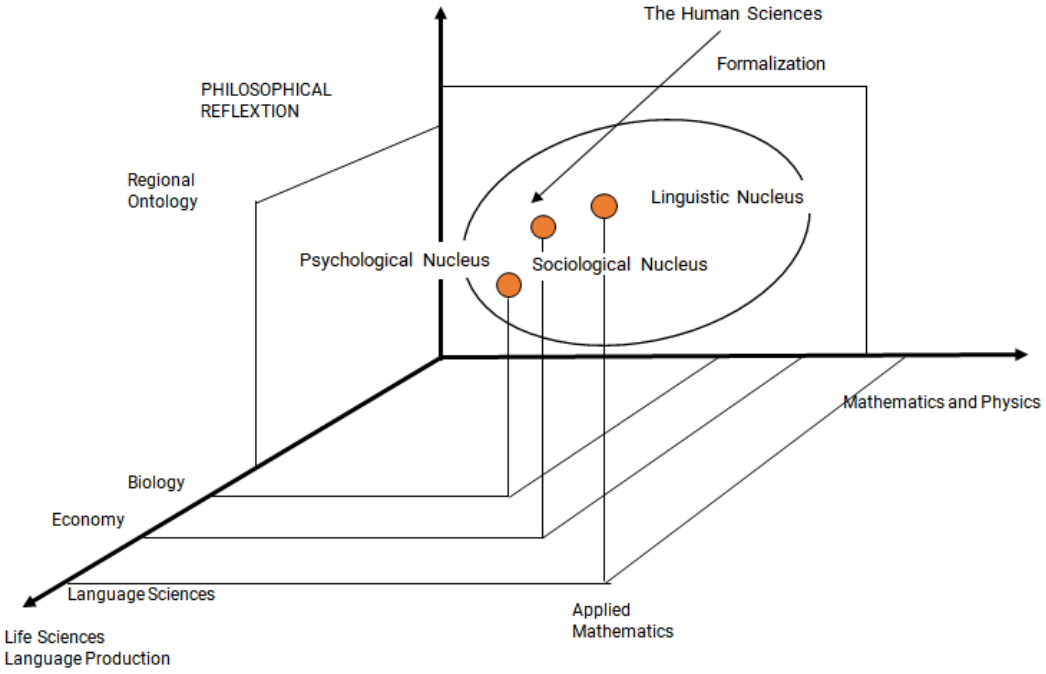
According to this orientation, the objective epistemology for Popper (Ibid., p. 41) or the knowledge theory as preferred, is the analyze of the proper process of the empirical science that he described as "theory of the empirical method", or, an "experience" theory. popper recognizes one empirical or scientific system only if it is a passive evidence of the experience, , having as a delimited criterion not the examination, but the refutability of a system, or that, "[...] *its logic form can make possible its value through the resource to the empirical proves"* (Ibid., p. 42). Other authors break the traditional concept of epistemology too, we can mention some of them like Michel Focault, Gaston Bachelard, Jean Piaget, Jürgen Habermas e Edgar Morin, which will be considered hereafter due to the relevance and epistemological influence on the construction course of the scientific investigation.

In his *"Archeology of knowledge",* Focault centers the knowledge history of man as a proper epistemological field that warrants the comprehension of its cultural organization, as well as a process which is responsible for the scientific knowledge construction. While epistemology, the focaultian archeology is concerned with the "foundations of sciences", taking care of a system of a fundamental order, which primordial direction is to orientate and to rule the sciences, constituting to a *historic priori,* being an experience that determinates the "general space of knowledge" and the nexus between the sciences. According to Focault, the most important for the epistemology is not the treated object by a science, but the place and the role that one or another science take place in the space of knowledge (JAPIASSU, 1977, p. 127).

For Focault (1966, p. 450 – 451) the dominion of *episteme* and even its discussion take place in a space of three connected dimensions. In one of the dimensions, are founded the mathematics and physics sciences to whom "[...] the order is always a deductive concatenation and linear of evident propositions e verifiable". In another dimension are founded the sciences such as the life language, the production and the distribution wealthiness, preparing between itself relations of "[...] discontinued elements, but analogous, in such a way that can be established between them causal relations and of a constant structure". The third dimension is the philosophic reflection that in a general way will orientate the two first dimensions, being developed together with the biology and economy dimension.

The "triadic knowledge" of Focault tries to include the human sciences in the intermission of knowledge or in the defined content by these three dimensions, can't be situated on anyone of the three axles. Considering this inclusion, the human sciences, will form "[...] a kind of cloud of represented disciplines, in the triadic interior, and making part somehow, in a varied way, of its three dimensions" (JAPIASSU, 1977, p. 115), as can be verified in the 1 Picture.

Picture 1 - The sistem of human sicences by Michel Foucault



Source: Japiassu (1977, p. 114)

From this triadic comprehension, Foucault (1995, p. 158) is concerned on distinguishing the ideas history of its knowledge archeology, showing that the first one describes without interruption the passage from non-philosophy to the philosophy, from non-science to the science, from non-literature to the workmanship. Moreover, the author points out that its analyze is a "analyze of the deaf nativity" that is attached to the genesis, continuity and history totality, therefore, with a delimited ending. That's why the author propounds his archeology, as an abandonment of the ideas history, which means, looking to construct a human knowledge history, in a different way from the conventionalizing accepted in the scientific field.

In the same manner as Foucault, Bachelard propounded the construction of a critical-historic epistemology, that could study the science in its growth and development process, which is, its history and should be realized. The author point view converges to the conviction that the progress is the mobilization element, dynamic of the scientific culture, and it's this element that " the science history" must describe, in a judging way, valorizing it, eliminating any margin return to the mistaken conceptions, in this manner will be *"*[...] formulated a searching history, one history that it clarifies by the present purpose, one history that departs from the present certainty and finds out, in the past, the progressive formations of the truth" (BACHELARD, 1990, p. 205 – 207).

Bachelard defends (1990, p. 213) that the epistemology interest returns to the logic of the scientific truth discovering and this as a polemic against the incorrect, against the error, submitting the science approximated truths, as well as the methods utilized by itself 'to a permanent ratification... and its applicability will be done no longer to the nature and to the knowledge value, of a finished science, *"*[...] from which should be discovered only the possibility conditions, the coherence or the legitimate titles, but to the sciences so that they could happen in its real conditions of growth" (JAPIASSU, 1977, p. 71).

Piaget (1978, p. 34) on the other hand, defines the epistemology as 'theory' or the study of the valid knowledge constitution, whose process consists in the passage of a inferior validity to a superior validity, but not only a self terminated 'validity' as the isolated logic does, but extending its concern to the relation between the subject and the object, with the purpose to get closer to the determination of how the knowledge can reach the reality.

Piaget affirms that, as the genetic psychology is a science whose methods are very similar to the biology ones, it can't and it mustn't have compatibility with an epistemology that is presented as philosophical, because the connection between this two dominions would be considered illegitimate, because of the metaphysic position that the philosophy maintains and, if it happens, any scientific study would be reduced to any philosophy (Ibid., p. 32). Therefore the genetic epistemology proposition will be

constituted scientifically, demitted from every and any philosophical theory and pertinent ideologies about the knowledge.

Japiassu (1977, p. 58) affirms that in despite of Piaget, through his genetic epistemology, tries to overcome the positivism in all its forms, it is presented as a prolongation of the positivist tradition that tries to inaugurate one science of the science without any philosophical influence. However, the author warrants, "[...] the simple fact of justifying the pedagogical and social utility of a 'scientific epistemology', and to look for an identification of its own scientific statute, it is already a philosophic activity."

Dealing about the investigation of the positivism origin, Habermas searches, step by step, to show the reduction, in a progressive way, in the XIX century thought, of the knowledge to the scientific knowledge, and, consequently, of the knowledge Theory to the Science Theory and to the Methodology. Habermas pretends to revalidate the dimension of the knowledge Theory while constituting analyze of the scientific object being possible, only through this dimension to contest the scientific and reduction comprehension of sciences, and in an incontestable way can be considered "[...] in its interlacement with the social process" (MÜLLER, 1981, p. 7).

It is good to observe, as Müller says (1981, p. 8) that in the German language doesn't exist the term 'epistemology'. However, the most common and proximal expression that characterizes the epistemological reflection about the science is the "Theory of the Science" *(Wissenschaftsthoerie),* comprehended by Habermas as under obligated with the positivist inheritance, "[...] according to how it implicates the knowledge Theory reduction to the Scientific Knowledge Theory, therefore, to the Science Theory and to the Methodology."

According to this way is pretended that the Knowledge Theory in Habermas has as purpose the objectivity destruction of the pure and present theory in the positivist comprehension of the sciences through the dialectic materialism. Therefore, "[...] the Knowledge Theory in Habermas conducts to the dialectic question of the unity between theory and praxis". So it results the Habermasian preference as "gnosiology" instead of "epistemology" "[...] for avoiding possible decurrent misunderstandings of the non congruence between Epistemology and the Knowledge Theory"(Ibid., p. 9).

Through two fundamental theses, Habermas propounds the reconstruction of the Knowledge Theory, till now obscured by the positivism, with the finality that the science can be thought and rethought in its social totality, reintroducing the necessary nexus for the critical reflection, about itself and establishing the historic materialism as an epistemological foundation of the scientific reflection, where the knowledge is considered as mans production, promoted by the historic and social circling conditions, by which man is subordinated. Only in this point of view the epistemology (comprehended here as the Knowledge Theory) intrinsically associated to dialectic, is characterized in Habermas. Habermas (*apud* MÜLLER, 1981, p. 7) considers that:

1. One Knowledge Theory while radical critic of the knowledge it is possible only as Society and Evolution Theory, comprehended as a logic reconstruction of the humankind development in its principais dimensions, of the instrumental and strategic proceeding, and of the communicating proceeding.
2. One Society and Evolution Theory, that it pretends as dialectic, is possible only by reconsidering the epistemological and normative foundations of the historical Materialism. This reconsideration postulates the reintroduction of Knowledge Theory and of Practical Philosophy in the Marxist theory.

In this perspective the epistemology consists on the Critical Knowledge Theory, having as a methodological support the materialist dialectical. In the historical materialism the man and the nature own the "synthesis referential value"(Habermas, 1982, p. 46), and the work makes part of this synthesis. That's why the author will affirm that "[...] the social work system is, in each case, the work result of past generations", consequently, the present cognoscente subject, must comprehend his work as a continuing work of subject production which lived before him (Ibid., p. 56).

Since the *"science sociology"*, that considers the material, social, historical conditions, of the study object, Vieira Pinto (1979, p. 69) affirms that the science is incontestable a collective work , corroborating with the ratiocination line of Habermas. In this direction the author emphasizes that "[...] it is impossible... to appreciate the science out of the condition of social fact, in which will be necessary the application of the general categories that explain the particular social facts as moments of a historical process, which evolves them, engenders, explains and interprets" (Ibid.).

It is in this perspective that the epistemology on the dialectic sense avoids conceiving the science as abstract rationality effect, where are submitted the objective informations to its laws *priori ,* in this way the dialectic sense disapproves that kind of conception, for verifying that: a) the rationality appears into the man together with the organic process and is constituted as a consequence of the work about nature, b) the man is a cognoscente subject and able to reflect into his conscience and c) the man keeps constituting concomitantly the world rationality, that is presented on the regularity format, the legality of the experience events he has (Ibid., p. 71).

However, as the "totality" is an angular category of the materialist dialectic, accepts the character of logical – historic phenomenon, or with other words, the production and the development process of the social reality of it, considering man as a social – historic subject that transforms his reality, at the same time that is transformed; unifies in the dialectic method the ontology, the gnosiology, and the logic. Therefore, as Kopnin says (1978, p. 184), the historical – logic character will be indispensable for an adequate knowledge of the object, as the description points out the temporal transformations occurred by the object and the logical will be the interpretation and knowledge vehicle of this process and of the own object, therefore the importance of its unity, without whom the "totality" would be studied in an incomplete and dissatisfaction form.

The epistemological thought of Edgar Morin presents the totality not simply on the relation part – totality and totality – part, as we had the opportunity to analyze in the former chapter, but as in an hologram in which each part or each point contains the totality and vice versa, not admitting a mutilated thought enrolled by the reductionism that it doesn't show itself able to order the informations and the knowledge of a dynamic world, but what considers as "iceberg" in all its dimensions: the incidental, the uncertainty, the incomplete, the possibilities of the ranges and limits, therefore, of its overcoming or not.

This vision doesn't consider, by one side, that the brain is a hyper - complex *unitas multiplex,* bihemispheric and that its functioning is resultant of the supplementary and antagonism "[...] between a left hemisphere, more polarized about the abstraction and analyze, and a right hemisphere, more polarized about the global apprehension and the concrete..." and that the communication between the spirits (brain activities) "[...] does never succeeds to deny and erase in a total way an uncertain inscripted principle on the proper nature for our knowledge". On the other side, uses the knowledge sociology in a reducing way, for example reducing the epistemology to the sociology. Incontestably the social-cultural conditioners have a relevant responsibility on the scientific knowledge construction and of the knowledge in a general way, however, as Morin points out, it has to be considered the indeterminate processes as a historic and cultural complex and communicative inscription with the spirit – brain, with its uncertainties and indeterminate processes too. (Ibidem).

The most complexity undertaking is "[...] to render accounts of broken articulations by the sections between disciplines, between categories and between knowledge kinds", tending to the multidimensional knowledge, which is, to study and to respect the several dimensions of one phenomenon, since man is considered a biological – social – cultural being and that the phenomenons emerge and are, on the economic, psychological, cultural, etc. context. Consequently, the complex thought in its multidimensionality, "[...] sluices in its interior a principle of incomplete sense and uncertainty" (MORIN, 1996a, p. 177). In this terms, Morin defends that the knowledge objective is not to furnish an absolute and complete answer as the last word by itself, but to open the dialog and not to cloister it, not only uprooting from this universe what it can be "[...] clearly determined, with precision and exactness, as the nature laws, but, to enter too, in the dark – clear game which is the one of the complexity" (Ibid., p. 191).

Starting from this point the complex epistemology will have as function and utility of the limits conscience taking advantage, in this way, the knowledge of our knowledge and, therefore, its progress in new spaces and moments by means of a confrontation with "[...] inexpressibility and the indecision of the real" (MORIN, 1996 b, p. 32).

The educational research as a dialogue must do much more than producing scientific knowledge by the scientific knowledge about the education, it must be concerned principally, inside its communicative action, to tame ways that can turn possible the benefactions for the scientific community, to the society, and in a special way to the education. Is the educational research responsibility, than, examine the epistemological problems that penetrate in the education field and, in this way, with a critical vision, to construct directive ways providing sustentation. So that this research can reach this *"tops"* the educational investigator must be a constant and careful studious, knowing that the research isn't

realized or thought simply by the application of this or that methodology or specific techniques, but through the epistemological formation of the investigator (during all his life), that has a substantial weight on the scientific investigation process, considering that "[...] the profound study of fundamental problems of education on its scientific, historical and philosophical aspects can't be substituted by the learning of discussing methodological itineraries" (AZANHA, 1992, p.11). This doesn't mean that it must be given less importance to the methodological dominion of the research in education, but having the conscience that is the epistemological formation of investigator that will make possible a better application of it, providing more sustentation to the occurred research and to its processes. Consequently, is from this relevant point that the research should be realized.

FINAL CONSIDERATIONS

There is no way of developing an epistemological research without considering the basic elements of its sustentation, because of the knowledge systematic investigation that it develops. This "systematic character" we believe, doesn't gives na end to the study of the development possibilities of scientific research in one vision, but as a way, it longs for following in an evaluating way the advance, retrocession or the stagnation of the research and the processes that make part of it, searching its best development and growth.

Science, epistemology and educational research are the "basic elements" of this work, where the first systematize the knowledge, creates theory and methods about a determined reality, elaborates principles and possibilities starting from the study object, searching its articulations with pertinent sources and making possible the reflective critic for the second one about its practice. The epistemology, however, will be the investigation vehicle, reflection and critic of the science text and of its development, having as a primordial purpose the plurality investigation and the text clarification (comprehended here as the science reality or the science in construction). After the object identification (the text), of the epistemological research (the plurality study and the text clarification) it is transferred to the epistemological method which is the "[...] resource to the classic categories of epistemology that deal with the possibility, foundations (origins or limits), and the knowledge truth" (ABIB, 1996, p. 222).

The educational research, in a very special way needs this epistemological vision, where its text and context can be investigated through the reality of its own history and of the forming processes. The big problem, however, as Pimenta (1996, p. 42) points out, is that the "[...] education it hasn't been sufficiently subjected as investigation area of a science", exactly for taking loaned na apparent scientific statute of the "education sciences" that it does not favor an adequate confrontation of epistemological questions in the educational field. This non-confrontation turns difficult not only the research articulation in this field, but to the formulation of necessary researches and to the educational social practice too. The epistemological question in the educational research is the vehicle which possibilities the necessary reflection in this specific field, transforming, reviewing and rethinking the studied universe, as well as pointing ways which wasn't trod yet, or if they were, pointing "new lights" of those ways. This speech must be retaken, making possible to the education being comprehended as a first science which opens way to the man knowledge, of its history and other sciences, permitting to the educational investigation to be constructed without speculation, but under the necessary epistemological prism.

On the other hand, the epistemological research must be worked on the historical and logical aspects. While the first one is concerned with the sprouting, development and the transformation phases of the object, the second converges its attention to the reading of the first one, not being concerned only on reproducing its history, but through it, showing its ways (of object), revealing the knowledge about the it, presenting new focuses and relevant discoveries to its development and making possible the critic reflection about its processes with the purpose to rethink its trajectory. So, to know the science, the epistemology, the educational research, history, man, abstract and concrete, cause and effect, ontological elements concepts, through the logical and the historical means to open ways on the knowledge revelation of the scientific productions and its processes, which instead of pretending to reveal all the faces of totality takes it as a way in construction for the comprehension of its reality.

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