# Collaborative research and the process of forming knowledge networks[1]

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**ABSTRACT**

The article is based on the experiences of collaborative research in the consolidation of knowledge networks, based on the experience of the Redecentro – Network of Researchers on Teachers in Brazil's Midwestern Region. It aims to contribute to the debate about the presence of epistemological obstacles that interfere in the processes of metacognition and epistemological surveillance, compromising the social quality of knowledge production. Inspired by the systematization of experiences, we structured the article around two central categories: 1. collaborative and network research, especially in the context of the Redecentro; and 2. the training process of researchers, with focus on the guiding principles of metacognition and epistemological surveillance. We conclude that the collective and collaborative coexistence consolidates a space that is both open and sensitive to the socialization of questions and experiences, in addition to influencing the collaborative-critical sense in carrying out research with more security and autonomy, and thus strengthening emancipatory and humanizing processes, in addition to research networks.

**KEYWORDS:** Collaborative Research. Knowledge Networks. Metacognition. Epistemological surveillance.

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*Investigação colaborativa e o processo de formação de redes de conhecimento*

**RESUMO**

O artigo tem por tema as experiências da investigação colaborativa na consolidação de redes de conhecimento, a partir da experiência da Redecentro – Rede de Pesquisadores sobre o Professor da Região Centro-Oeste, Brasil. Tem por objetivo contribuir com o debate acerca da presença de obstáculos epistemológicos que interferem nos processos de metacognição e vigilância epistemológica, comprometendo a qualidade social da produção do conhecimento. Inspirados na sistematização de experiências, estruturamos o artigo em torno de duas categorias centrais: 1. a investigação colaborativa e em rede, especialmente no contexto da Redecentro; e 2. o processo formativo de pesquisadores(as), com foco em princípios orientadores da metacognição e da vigilância epistemológica. Concluímos que a convivência coletiva e colaborativa consolida um espaço aberto e sensível à socialização de dúvidas e experiências, além de influenciar o sentido colaborativo-crítico na realização das investigações com mais segurança e autonomia, fortalecendo processos emancipatórios e humanizadores, para além das redes de pesquisa.

**PALAVRAS-CHAVE:** Investigação Colaborativa. Redes de Conhecimento. Metacognição. Vigilância Epistemológica.

*Collaborative research and the process of forming knowledge networks*

**RESUMEN**

El artículo tiene como tema las experiencias de investigación colaborativa en la consolidación de redes de conocimiento, a partir de la experiencia de Redecentro - Red de Investigadores del Docente de la Región Medio Oeste, Brasil. Tiene como objetivo contribuir al debate sobre la presencia de obstáculos epistemológicos que interfieren en los procesos de metacognición y vigilancia epistemológica, comprometiendo la calidad social de la producción de conocimiento. Inspirándonos en la sistematización de experiencias, estructuramos el artículo en torno a dos categorías centrales: 1. Investigación colaborativa y en red,

especialmente en el contexto de Redecentro; y 2. el proceso de formación de investigadores, con un enfoque en los principios rectores de la metacognición y la vigilancia epistemológica. Concluimos que la convivencia colectiva y colaborativa consolida un espacio abierto y sensible a la socialización de dudas y experiencias, además de incidir en el sentido colaborativo-crítico en realizar investigaciones con más seguridad y autonomía, fortaleciendo procesos emancipadores y humanizadores, además de las redes de investigación.

**PALABRAS CLAVE:** Investigación colaborativa. Redes de conocimiento. Metacognición. Vigilancia epistemológica.

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The trajectory of doing research collectively is demanding in relation to the indispensable dialogue as a fundamental work method. Dialogue also implies the development of tolerance in order to listen to and respect the interlocutors, accept and/or confront different positions and develop critical thinking and intellectual humility, among other aspects (...) that are important in the fabric of collaborative work
Ana Maria Saul (2016, p. 15).

## Introduction

The abovementioned epigraph supports us as to the importance of collective dialogue in the research trajectory, above all by pointing to it as fundamental in transforming our own ways of being, feeling, perceiving and thinking about the world and with the world. It also helps us to realize that changes involve the resignification of action in research as the result of metacognitive processes. According to Vygotsky (1991), changes are anchored in mediations, and from them it becomes possible to build superior psychological tools that will influence the subjects' decision-making; tools aimed at proactive, critical, emancipatory and humanizing development.

The same discussion can also be brought into the debate established by Pérez, Gómez-Galindo and González Galli (2021). From our translation

and interpretation, they help in the conjunction of collective interlocutions (or mediations) to metacognitive processes, which ends up consolidating a conjunction responsible for overcoming linear thinking, based, for example, on common sense (ZANOLLA, 2012).

Through what the aforementioned authors state, it is still reinforced that linear thinking is very present among researchers – beginners, undergraduate, graduate, scholarship holders, etc. This combines difficulties in apprehending certain theoretical or conceptual references, thus causing subjects to persist in the nature and functioning of misconceptions, and, in many cases, blocking progress in learning, which influences even their own knowledge production.

We can infer, from our experience as researchers at the Redecentro (Network of Researchers on Teachers in Brazil's Midwestern Region), that the presence of linear thinking is a recurrent and very common difficulty among our students. Let's say that they do not learn (perhaps in many cases they are not even taught) the most basic and conceptual models according to the rules of scientific paradigms, which gradually compromises the resolution of basic problems in the field of training at the graduate studies level. For this reason, Pérez, Gómez-Galindo and González Galli (2021, p. 28) emphasize that several lines of research seek to investigate what they define as an "epistemological obstacle". For them, this type of obstacle directly influences the general ways researchers think and, in most cases, it becomes an "obstacle in the forms of reasoning required in learning new models/paradigms or scientific content". The authors theoretically define the term epistemological obstacle, indicating its main characteristics: 1. Transversality - they have a certain degree of generality in relation to the phenomena that allow them to be explained (...) they underlie the conceptions of different fields of knowledge. 2. Functionality - they have an explanatory function for the subject (...) they generate a network between concepts with which the subjects describe, explain and predict the world in which they live. 3. Conflict - they make it difficult to learn and/or accept the scientific model being taught, as

they explain the same phenomenon that explains the reference scientific model (PÉREZ, GÓMEZ GALINDO; GONZÁLEZ GALLI, 2021, p. 29. Our translation ).

Based on the above concept, the presence of the epistemological obstacle generates a certain degree of generality in relation to the phenomena as it supports an explanatory function based on common sense for all phenomena. Furthermore, due to the effort to maintain certain explanations, it ends up hindering new learning and/or the acceptance of aspects related to the scientific model adopted in collaborative research. We know that many researchers are reluctant to change their "certainties" and theoretical traditions or, at times, they seek to sustain certain fads, in theoretical terms, and deny the theoretical-methodological principles that would give them greater ability to read reality, such as Freire (1971)[5] warned.

Souza (2017), when orienting himself to Freire (2011a), recognized the need to use concrete reality as a starting point, as an access route to build critical awareness so that opportunities for the problematization of reality could be provided. It is necessary to consider, therefore, that knowledge is built from concrete reality. For Freire (2011b), knowledge is a process of collective construction mediated dialogically in a dialectical interaction between practical life experience and rigorous, critical systematization.

In this sense, the epistemological obstacle is responsible for regulations of thought, causing distortions of reality so that it fits into crystallized concepts in order to maintain doxa, which occurs almost automatically, in a simplified way, precluding critical questions in the interpretations of and about reality.

We live with the same problem and, in our understanding, it requires constant training postures so that researchers are able to join knowledge networks with theoretical and methodological consistency, In addition, we should consider Feuerbach's third thesis, which has already alerted us to the

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[5] "For many of us, the concrete reality of a certain area is reduced to a set of material data or facts whose existence or not, from our point of view, is worth noting. For me, concrete reality is something more than facts or data taken more or less for themselves. It is all these facts and all these data, plus the perception that the population involved with them is having of them" (FREIRE, 1971, p.35).

need to also educate the researchers because as intellectual workers, they are involved in a human activity (research) that understands the world through the subjective activity that transforms them. Therefore, research generates changes in the researcher. However, as the historical-social conditions are always interrelated, the phenomena can only be understood through a radical criticism that manages to break with the apparent, provided that this is connected to a revolutionary praxis (MARX, [1846] 1986).

Collaborative research alludes to praxis and it always requires an interlocution supported by dialogue, dialogicity and respect, in a formative posture that aims to change the subjects' thinking in order to change the way they act in research. Of course, there are possibilities to overcome epistemological obstacles, and therefore, the ability to maintain epistemological surveillance will be expanded (SOUZA; MAGALHÃES, 2019; MAGALHÃES; SOUZA, 2018; 2019). New metacognitive processes will continue to help in overcoming epistemological obstacles, as announced by Gómez-Galindo and González-Galli (2021). This changes knowledge production and strengthens the field of educational research.

The understanding described permeates the experience of collaborative research at the Redecentro - Network of Researchers on Teachers in Brazil's Midwestern Region, as previously announced. The idea reinforces the importance of keeping the focus on the training process of our researchers so that they can overcome epistemological obstacles that interfere with and regulate not only their own thinking, but also the logic and quality of academic production.

The methodology that anchors this textual production can also be approximated to the Systematization of Experiences, by Holliday (2006). It enhances an in-depth understanding of the experiences we have lived and carried out within the Redecentro, whose ultimate purpose is to encourage the improvement of our own practices in the constant exercise of critical-theoretical reflection on knowledge derived from experienced concrete social practices.

According to Holliday (2006, p.29), the systematization of experiences "is always a *means* according to certain objectives that guide and give it meaning. That is to say, in terms of the concrete *utility* that we are going to give it, in relation to the experiences we are carrying out". In this sense, we systematize our experiences around two central categories: 1. collaborative and network research, especially in the context of the Redecentro; and 2. the training process of researchers, focusing on the guiding principles of metacognition and epistemological surveillance so dear to collaborative and network research.

Based on this, the aim of this article is to contribute to the debate about the presence of epistemological obstacles that interfere in metacognitive processes and epistemological surveillance. In our understanding, they end up compromising the social quality of knowledge production. For this, we theoretically present some structuring training principles - theoretical, epistemological, gnosiological, ontological, methodological, political and ideological, and relational, due to their influences on the consolidation of new thinking about reality. Certainly, the principles indicated end up helping to consolidate a conceptual change in the thinking of researchers about research by consolidating their theoretical and philosophical training. Of course, by helping to build a new way of thinking about research – theoretical and philosophical, it directly influences the possibilities of "epistemological surveillance", and therefore, the social quality of research (SOUZA; MAGALHÃES, 2017).

## Collaborative research from the Redecentro – Network of Researchers on Teachers in Brazil's Midwestern Region

Franco and Morosini (2001, p. 36) state that "networks are usually built to keep people with similar skill levels and experience together, people who, by combining their efforts, can achieve better results than if they each work alone". Adding to this issue, we agree with Morosini (2003, p. 221)

when he also states that "networks are one of the most favorable ways to establish a multicultural space".

In the terms of the aforementioned authors, we affirm that the collaborative research developed by the Redecentro began with the following institutions: the Federal University of Goiás (UFG/Brazil), the University of Brasília (UNB/Brasil), the Federal University of Uberlândia (UFU/Brazil), the University of Uberaba (UNIUBE/Brazil), the Federal University of Tocantins (UFT/Brazil) and the Federal University of Goiás/Catalão (UFCAT/Brazil). With the consolidation of this group, including institutionally, and 15 years of joint work, we seek to expand by associating international researchers. Our objective was to expand studies and portray the reality of professors and the reality of education in Latin America, as proposed by Severino (2019).

In the process, international researchers affiliated with the College of Human and Social Sciences at the National University of Jujuy (UNJu/San Salvador de Jujuy/Argentina) and with the College of Human Sciences at the National University of Central Buenos Aires (Unicen/Tandil/Argentina) were incorporated into the process. This new group that joined the Redecentro brought new experiences and reflections, thus expanding the object of studies and analysis focuses. Currently, we continue reinventing collective work methodologies together through the use of digital media to carry out studies and discussions on the directions of research, data analysis and the publication of results.

With the new partnerships, we continue to consolidate the Redecentro's common objective, which is to create other forms of personal and institutional cooperation that favor collaborative research in and for the improvement of education and teaching activities.

In our case, the union between the research teams was formalized through a specific partnership agreement - the Interinstitutional Partnership Agreement. This contract establishes forms of collaboration, which is not only natural, but also legitimate. After all, we know that

several people simply working together does not necessarily mean that a situation of collaboration is being implemented. Therefore, the partnership term stipulates rights and duties that need to be understood and respected, not as an objective in itself, but as a means to achieve common goals.

In the end, working relationships are defined in a hierarchical, elected and rotating relationship between institutions, but on a basis of equality so that there is mutual help to achieve goals that benefit the entire research group. The document, which was signed by the chancellors of each institution, defines the organization of the research teams, guiding principles, objectives and methodologies common to all members of the Redecentro. Once agreed, the work that started to be undertaken by the collective was based on a common foundation that has to do with the objectives of the aforementioned Network.

Thus, a collective, interinstitutional, and now international project was instituted, which has a common general objective shared by all. In this sense, coordination is an important part of collaborative and network research, which takes care of managing the activities of people and resources to achieve a goal. According to Alves (2007), it is based on three variables: *the task* (collaborative activity developed by working together and helping all members), *the constitution and composition of the group* (factors such as size, homogeneity or heterogeneity in relation to age, experience, technical knowledge, training, etc.) and *motivation* (promoted through means that favor socialization, particularly knowledge networks). As a whole, these aspects need to be managed and implemented by a democratic leader.

The Redecentro currently has approximately 15 senior professor-researchers and 20 collaborating researchers (students and former undergraduate and graduate students, teachers from the school system, undergraduate research scholarship holders, tutors and Prolicen scholarship holders) that consolidate a broad, heterogeneous group that is subject to constant changes due to, for example, the completion of master's and doctoral courses and or the end of undergraduate research scholarships.

Therefore, we have a constant need for new strategies so that the group can creatively and constructively overcome the demands for its permanence and recycling, including theoretical.

The strategies that make up our work methodology, which involves study groups, discussions, debates, technical meetings for the improvement and reformulation of methodologies, the construction and review of analysis instruments, the presentation and publication of results, and constant (re)evaluation of the process, always articulate the objective of giving greater clarity of purpose and detachment from the instrumentalist and mechanistic sense of doing academic research. In the process, we have sought to make the journey less erratic and to make it clear that the group's task is primarily formative and made up of ourselves and other researchers associated with us.

From the point of view of theoretical, epistemological and methodological bases, the Redecentro has been based on the presuppositions of historical-dialectical materialism and phenomenology, also opting for a qualitative research approach to problematize its objects of study in their complexity. As for the critical sense, inherent to the theoretical aspects with which we work, there is always the need for specific training, in addition to strengthening the political and ideological position against the hegemonic position, based on the theoretical-epistemological presuppositions of authors, which also includes the Latin Americans.

It should be noted that, through our experience, the potential of collaborative research has supported us in the profession, and it seems to us that we have also managed to invest in a double inseparable responsibility: creating the best working conditions and expanding the capacity to develop actions to promote ourselves and our colleagues (support in professional development).

As a whole, several aspects stand out as beneficial to the work of collaborative research. Over our years of collective work, the positive aspects become the most important and striking, which include defining the research movement as praxis (SOUZA; MAGALHÃES, 2017).

Based on this historical construction that coexists with several determinants, in this article we emphasize the importance of the Redecentro in regards to training processes that are capable of changing the ways in which its researchers think, remembering that the group brings together various types of thinking, which seek to maintain concepts and attitudes towards the same subject of study. Of course, if this aspect is not considered and guided throughout the Network's work, the group will be at odds and may even reach different and conflicting decisions.

Therefore, we acknowledge forms of motivation, the development of a thought that self-regulates metacognitive awareness, and the consequent high-level epistemological surveillance as key challenges of collaborative research. According to the outline proposed herein, we acknowledge that the adequate scientific expression of critical and collaborative thinking is affiliated with *metacognition* and *epistemological surveillance* (PÉREZ et al, 2021).

Giving centrality to the clarity of the concept, metacognition is related to how to think about thinking and, given that, it supports two dimensions: "metacognitive knowledge and metacognitive regulation" (PÉREZ, GÓMEZ-GALINDO; GONZÁLEZ-GALLI, 2021, p. 30). Both are linked to the importance of dynamism and the power of self-reflection (SOUZA, 2012).

Souza (2012, p.16) complements the idea by highlighting that the "ability to think about our own thoughts", in its social, intellectual, technical, internal and spiritual dimensions, is epistemologically linked to the metacognitive attitude. It emphasizes the denial of reductionist (linear – positivist) thinking, leading subjects to the identification of knowledge and their knowledge, in addition to favoring an ethical discussion about all knowledge (BRUNER 1996). From what is understood as denying reductionist thinking to support an ethical posture in research, they end up being dimensions promoted by metacognition.

In this sense, the training initiative that accounts for one's development also helps to ground one's importance in relating to oneself and to others with dignity. This involves preparing researchers, in their complexity, for

emancipatory, liberating, autonomous, creative and innovative thinking, aspects dear to collaborative research. It is implicit in this training, therefore, that metacognitive knowledge is what subjects have on their own, but it can be encouraged, and it still belongs to the cultivation of the utopian dimension as defined by Freire (1998), which is understood as learning how to build what is projected, autonomously and for the common good.

*Epistemological surveillance*, in turn, which is also metacognitive in essence, is theoretically related to the ability to overcome epistemological obstacles as it implies developing an ability to regulate the difficulties encountered during the construction or use of the scientific model of interest, in addition to involving and monitoring the political-ideological line taken.

In this logic, epistemological surveillance gives the guidelines for the theoretical construction of an adequate research problem, pertinent questions and compliant objectives. It also articulates the conceptual aspect of the method presented and taken on in the studies, its formalization and the explanation of the method's intention, such as the logic of conducting knowledge construction. It helps to maintain the constant concern with the theoretical position facing the methodological construction, as well as the adequate explanation of concepts, such as the pedagogical ideal, which should make affiliations clear. In short, it is up to epistemological surveillance to sustain the theoretical tradition that researchers adhere to, in addition to an explicit critical political stance, which reveals the concern with scientific rigor and the relevance of their studies (MAGALHÃES; SOUZA, 2018; 2019; MAGALHÃES, 2019a; 2019b).

And yet, it would be from epistemological surveillance that the expression of strong criticism becomes possible, based on the training and social conditions that condition intellectual practice. When the researcher expresses their vocation, and how it reflects on their own research practice, they are able to show their strength to generate changes in the social context. Thus, collaborative research requires a path that goes through theoretical-conceptual changes, which are concerned with remedying

training deficits among researchers. This is a reality at the Redecentro as the possibilities of expanding metacognition are present, emancipated thought is gradually consolidated, and through the epistemological surveillance it promotes, awareness is increased.

The methodology of consolidating collaborative research adopted here represents Redecentro's effort to recognize its actions as complementary, and not definitive, in the conceptual change of the researchers. Therefore, from this understanding, the Network is concerned with guiding and improving the training didactics of its researchers, which has helped to remedy deficiencies related to theoretical and philosophical training by strengthening means that allow for a new way to think about educational research.

**The training process of the guiding principles of metacognition and epistemological surveillance: theoretical, epistemological, methodological, axiological, gnosiological, and political principles**

All collaborative research in networks, such as that developed in and by the Redecentro, requires mastery of a theoretical, philosophical and methodological framework. This is a common point among its members. It is acknowledged that the researchers have this domain or need the support of the group so that there is mastery of the theoretical and methodological contributions that will support the research.

From the perspective of the Redecentro's training experience, we seek to support the construction of structuring principles - *theoretical, epistemological, gnosiological, ontological, methodological, political and ideological*, and *relational principles*, understanding that they can direct the reflections and actions of the group that make up the Redecentro, as well as the coexistence, respect and ethics of researchers, as proposed by Saul; Giovedi, (2016).

Thus, entry and permanence in the Redecentro requires participation in its *Study and Research Groups*, whose training material varies according to the group of researchers: whether they are beginners or not. Each study

and research group is coordinated by a rotating doctorate member, from each institution, chosen by the group. Our concern with maintaining study groups has been central, first due to the need to level the understanding of concepts central to research, and second, because these groups support debates at Technical Coordination Meetings and Graduate Student Meetings, in addition to supporting scholarship holders and tutors at meetings dedicated to discussions about data collection, systematization, discussion and analysis of data, and construction material for the dissemination of results through articles, dissertations and theses.

Each of the moments mentioned consolidates, gradually, what we define here as principles, and this includes everything from doctorate advisors to undergraduate students. Thus, the research environment is consolidated.

With regard to the *theoretical and epistemological principle*, it is directly related to the metacognitive and critical surveillance processes of knowledge production as theoretical rigor in the definition of conceptions belongs to it. It helps to "unveil" and pursue the "radical and radiant" dimension of each concept, which presupposes thinking about the concreteness of its historicity (SAVIANI, 2017). From this perspective, when researchers propose to investigate, they need to keep in mind that their theoretical logic interferes with the way they see and think about phenomena, and that their thinking is always supported by theoretical contributions that will influence the research ste

The theoretical and epistemological principle supports intellectual work and the production of ideas, concepts and representations, which are related to the possibilities of understanding and transforming reality. Without this principle, there is only an intellectual exercise, a reflection of action through action that breaks the dialectical dynamic between theory and practice in research (VÁZQUEZ, 1968; SOUZA; MAGALHÃES, 2019).

It should also be highlighted that this principle is necessary for the maintenance of rigor and epistemological surveillance of research, but it takes place in thought, which requires dialectics in the dynamics of the

construction of meanings, or as the Marxist proposal states, in the elaboration of concrete thought.

Magalhães and Souza (2019) argue that the theoretical principle can be based on two confronting epistemologies: the epistemology of practice and the epistemology of praxis. In the field of epistemology of practice, the theoretical perspective is positivism (MAGALHÃES; SOUZA, 2018; 2019; MAGALHÃES; MOURA, 2020). It represents an epistemological base that supports the hegemonic political-ideological position, which understands social relations as given and ahistorical, and therefore, there is no perspective of social transformation, but only the maintenance of social relations.

The epistemology of practice, therefore, focuses on the idea that knowledge production can be reduced to practical knowledge of an instrumental and pragmatic character, submitting production to the theory and practice of dichotomy. Tello (2013) stated that knowledge built from this epistemology is not a social construction, but rather refers to the individual appropriation of objective, partial reality, in addition to being limited to immediate perception, organizing itself as pragmatic knowledge. The truth criterion of knowledge for this epistemological basis is its practical utility for the maintenance or improvement of the established order.

As stated by Souza and Magalhães (2019), the epistemology of practice supports academic, pedagogical and political conceptions, supported by individuality and an alienated posture, ensuring a gnosiological basis to help worsen social conditions of inequality generated by capitalism, which prevents the realization of humanization, democracy and full citizenship. Scalcon (2008) states that the view of the epistemology of practice is based on a paradigm that understands knowledge as individual, circumstantial, partial and reduced to the contingent and immediate practice.

The epistemology of praxis, on the other hand, is based on the dialectical relationship between theory and practice, reaffirming their inseparability, which consolidates praxis in the context of research. For this

epistemological basis, knowledge has a collective and social meaning that is characterized as emancipatory and humanizing. This same sense can be identified from the ideological counter-hegemonic political stance of researchers, who, therefore, assume the need to promote perspectives of social transformation through confrontation with hegemonic practice.

The epistemology of praxis asserts a rationality whose knowledge production, about any phenomenon, requires highlighting its historicity, materiality and context. We present a conception of education from this epistemological base as an illustration. Therefore, we consider that education is:

> (...) a form of intervention in collective life, in the sense of maintaining a certain reality or overcoming it (...) education should serve projects that build freer, fairer, more human and more democratic societies (SAUL; GIOVEDI, 2016, p. 214).

We can also consider, according to Freire (1998, p.98, emphasis added by the author), that education is a form of intervention in the world, which implies the effort of "*reproduction* of the dominant ideology and its unmasking", in a dialectical, and at the same time, contradictory movement. For this reason, it is not and will never be neutral.

This conception of education, which is endorsed in a critical and political approach, makes it clear that education must "contribute to the processes of struggle to overcome the various current forms of exploitation and domination".

For the group that makes up the Redecentro, the study of critical theorists is required and consolidates the principle of this epistemology. After all, it does not allow for neutrality because research and education, as we have said, are political actions that depend on the professor-researcher for the materialization and reinvention of propositions and practices in the construction of problematizing, emancipating and liberating research.

The wide repertoire of concepts studied, always from a critical and dialectical basis, expands the appropriation that researchers make from the studied references and how they take them to the field of research. This seems essential to increase awareness levels of Redecentro members so that they can develop both a posture that questions reality and a mobilized and organized research attitude in the same terms. Certainly, this epistemological base, by providing theoretical support to research, requires a metacognitive process and maintains epistemological surveillance so that they can assume their socially relevant quality.

The next *principle is the gnosiological one*. The definition of gnosiology proposed here comes from the Greek term gnosis, whose meaning refers to the theory of knowledge. Its objective is centered on the study of the possibility, legitimacy, value and limits of human knowledge. Therefore, gnosiology is related to ideology (MAGALHÃES; ARAUJO; ARGÜELLO, 2020c), politics and the principles, values and beliefs implicit in knowledge. It differs, however, from epistemology that has scientific knowledge as its object, as explained by Saviani (1991 ).

According to the theoretical approach that supports us, the principle of gnosiology is part of research as a praxis. Praxis is considered herein as a founding category, not only of the epistemological position, but also of the gnosiological one, as it helps to conceive research as a human social activity that is fundamental for understanding the knowledge development processes and the omnilateral nature of human formation (VÁZQUEZ, 1968).

Like the epistemological principle, gnosiology can be based on the gnosiology of practice and praxis. When based on the gnosiology of practice, values that are linked to the immediacy and limits of empirical realism are highlighted. Its values begin to strengthen individualistic principles, reinforcing a thought that converges with domination/submission, which aggravates alienation processes and which, politically, express support and adherence to the neoliberal logic.

This proposal adheres to a disposable ethic characterized by changeable and momentary values. With regard to knowledge production, it becomes superficial, fragmented, discriminatory and a product that can be commercialized. It is against this logic that Freire (1998) proposes rebellion and the struggle for transformation.

On the other hand, when considering the gnosiological dimension of praxis, contradictions give rise to the need for historical projects that announce the type of society that one wants to build and with what means, purposes and values, since historical projects are linked to the conceptions of man [and woman] and society, which also influence the knowledge production

Of course, the gnosiological principle not only influences but directly participates in the processes of metacognition and epistemological surveillance. Depending on the gnosiological position taken, we will have behaviors that express the ideology and political choices of researchers, although we already understand that these can still be, unfortunately, hegemonic or, on the contrary, emancipatory and counter-hegemonic (SOUZA; MAGALHÃES, 2019).

Another guiding principle of collaborative and network research is the *ontological* principle, which is related to the level of being (ontological), considered in the interlocution of thinking (gnosiological) and that of knowledge (epistemological). Ontology is related to the idea of the totality of being, its materiality, how men produce their existence, how they are formed as social beings and how humanity is collectively produced (DUARTE N., 2004).

Likewise, following the theory, this principle also needs to be thought of from the ontology of praxis and the ontology of practice (MAGALHÃES; SOUZA, 2018; 2019; MAGALHÃES, 2019a; 2019b; MAGALHÃES; FORTUNATO; MENA, 2020). From the perspective of praxis or dialectical materialist ontology, knowledge is capable of promoting a transforming and constitutive activity of the historical

human being, and which in its awareness process aims for social, political and personal transformations. Therefore, men and women are historical subjects who question, for example, their adaptation, or purposeful resistance[6], to the neoliberal logic of individualistic, alienated and fragmented men [and women].

On the other hand, from the foundations of the ontology of practice, which are opposed to the idea of the possibility of praxis, knowledge is fragmented, idealized, pragmatic and decontextualized, and it is not supported by materiality, historicity or, in the possibility of political, social and cultural transformation. Therefore, it does not contribute to the social quality of knowledge.

The Redecentro invests in understanding these principles so that the researchers who are part of it are able to go against neoliberal pressures so as to avoid the continuity of professors who are researchers aligned with the ontology of practice, which, as Ball (2002, p. 5) states, imposes a certain performativity on professors and researchers, implemented to establish "new identities, new forms of interaction and new values". We assert that the neoliberal rationality brings drastic consequences to the ontological principle as it increases individualization and a fading of solidarity.

With regard to the processes of metacognition and epistemological surveillance, we continue to state that the ontological principle adheres to the dialectical principle of contradiction and can help to demarcate new paths of purposeful resistance, as proposed by Novais and Souza (2019).

The *methodological principle*, in turn, is anchored in a research conception that is inspired by the principles of the historical-dialectical materialism method, as well as, due to the specificity of some objects of

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[6] When dealing with purposeful resistance, we link it to the "popular" dimension. The formulation of the expression popular purposeful resistance incorporates, according to Novais and Souza (2019), the understanding and recognition that its construction requires open and democratic networks for the production and dissemination of knowledge and complex experiences, linked to different places, subjects, social groups and processes of overcoming any obstacle to human emancipation. Therefore, when identifying and analyzing resistance movements in school contexts, guidelines, propositions, dynamics and values are evidenced that can allow us to name them as popular purposeful resistance movements.

study, the phenomenological method. In any methodical contribution, characteristics are expressed that presuppose individual and collective learning and, although there is no certainty that "all participants have the same agenda or the same institutional or knowledge power", as expressed by MAGALHÃES; SOUZA (2018 ; 2019), this principle always requires the ability to negotiate the representations and values of each member of the group, which establishes the essence of collective and collaborative work according to a Marxist and Freirian approach.

Frigotto's (1996) proposition has been adopted by us upon reinforcing that the methodological principle should promote research as a human activity of production and transformation, which develops from a wealth of experiences of the subjects (content) and in the relationships with the group (form), generating a collective contextual field for the production of historical and cultural experience, as proposed by Freire (1998). We also think that the methodological principle, as a dimension of collaborative research in a network, requires that its members share themes, objects of study, approaches that represent the dialectical perspective, types of research that respond to the need to clarify the historicity and conditioning aspects of the object of study, objectives (general, specific and shared), broad theorization and systematization of knowledge regarding the object of study and consistency in the construction of common exploratory questions, which, as they are already widely supported by theoretical and epistemological principles, begin to consolidate the path of research. Therefore, this principle requires a collective construction from the beginning of the methodological design: instruments and their validation in data collection, analysis, interpretations, collective publication and interventions based on the results obtained.

This principle, which adds to the others already discussed, inspires and improves the metacognitive capacity and the epistemological surveillance of research, making it a humanizing and emancipatory praxis.

This idea is present in our movement of thinking about collaborative research, so we reinforce the research space as a possibility to re-exist, reinvent and create open contexts for all members to talk, question and report divergences and convergences, which seems quite pertinent to strengthening the group.

Certainly, the training process that requires collaborative and networked research reaches the origin and strengthening of the *political and ideological position*. It must be committed to the processes of struggle to overcome the various current forms of exploitation and domination. We evoke Freire (1998) who confirmed that the political vocation of education is focused on human specificity. By carrying this idea to collaborative research, we express the importance of politics, making it inherent to the nature of research and knowledge production. Both must contribute to the political struggle for the transformation of today's society.

If the neutrality of education is impossible, so is the production of knowledge. As explained by Freire (1998, p. 110), although he was talking about education, he states that it "does not become political because of the decision of this or that educator. It is political." The same occurs with collaborative network research. It does not become political because of the decision of this or that researcher. It already is political because it represents groups and because it carries concepts and values that reinforce the political position of researchers.

The political position, being critical and counter-hegemonic, can highlight a special focus on the consolidation of metacognitive processes and epistemological surveillance, above all directing them to purposeful resistance to neoliberal action.

Another *important principle is the relational principle*. Collaborative research can generate the opportunity to create and consolidate various benefits of an association of people. Certainly, they will give emancipating strategies "by the political power conquered by

scientific research and by the legitimacy received from the academic community" (FRANCO; MOROSINI, 2001, p. 20).

Our experience allows us to realize that there is a need for the intertwining of reason and desire in the construction of responses capable of helping the group. This involves taking on and facing challenges and always seeking gratifying results for everyone. In this sense, the group insists on creating and consolidating what it understands as the benefits of this association, maintaining aspects of purposeful resistance (NOVAIS; SOUZA, 2019) and socio-educational emancipation (MAGALHÃES; FORTUNATO; MENA, 2020; MAGALHÃES; ARAUJO; ARGÜELLO, 2020c).

Among the various aspects that are articulated in this collaborative work, the relational principle gives centrality to the communicative-critical, expressive, tolerant and true dialogue.

The group of researchers deepens the process of being more, establishing a trajectory of doing research in relation to the indispensable dialogue, as a fundamental method of work, and to the development of tolerance in order to listen to and respect the interlocutors, accept and or confront different positions and develop critical thinking and intellectual humility, among other Freirian categories that are important in the collaborative work plot proposed by Freire (1997).

As strategies conducted and designed based on this principle, the seminars promoted by the group still stand out; seminars which gained privileged space and constituted a mechanism for articulation between researchers in order to meet the needs of planning, data collection and organization and discussion of results. They are structuring pillars that necessarily imply the constant review of the relational process.

Supported by Gasparotto and Menegassi (2016), we highlight some pertinent aspects of collaborative research that go through the relational principle:

**Negotiation and interaction**: in the process of theoretical-methodological study and knowledge construction, the discussion of values, concepts and ideas is valued, making the work significantly contribute to both parties (...); **Responsibility and engagement**: the researcher's responsibility is to be the conductor of the entire process. Even in co-participation, it is the researcher's duty to make sure that actions are always being negotiated to guarantee a favorable space for criticism, reports, reformulation (...); **Co-participation and autonomy**: the joint elaboration of the objectives, of the phases of the collaboration process and of the activities to be developed in the classroom that are necessary for the connection between theory and practice, considering the confluence of experiences and knowledge that can be very positive (...); **Theory + practice + subject + context connection**: when acquiring new knowledge, the teacher should not be expected to make a direct transposition to practice. The new information is actually incorporated and added to previous knowledge and experience. This cannot be disregarded (...); **Reflective sessions**: meetings between researcher and professor can take place throughout the collaborative work. It is essential that this occur so that there is negotiation and interaction. These meetings can be for theoretical-methodological study, joint elaboration of actions or activities, discussion about the progress of activities in development, evaluation, reassessment, reformulation of objectives or activities (GASPAROTTO; MENEGASSI, 2016, p. 954-955. *Our emphasis*).

As Gasparotto and Menegassi (2016) systematized, the relational principle also adds ethical posture, motivation, creativity, respect and affection, which ends up favoring metacognition, self-knowledge, humanization and the emancipation of those involved around a common goal.

It is understood from this that the grouping strengthens other aspects, such as interpersonal relationships between team members, which in our case began in 2004. This signals the appreciation of established relationships as an important feature of collaborative research in the Redecentro. The presence of trust also stands out. As Hargreaves (1998) points out, it helps to establish a climate of respect and care, which is manifested at both the personal and professional levels.

Trust is manifested when we realize that group participants feel free to openly question each other's ideas, values and actions, respecting them and also knowing that their work and values are respected. Established trust is, consequently, associated with the willingness to listen carefully to others, with the appreciation of contributions and with the feeling of belonging to the group, indicating openness to one another as recommended by Freire (1998). Without trust between the participants and without trust in themselves, there would be no collaborative work in the Redecentro.

Collaboration, another important aspect, can be developed between peers and between professor-researchers who work in the coordination positions of each institution. It can also, in the same way, take place among professors and students, between the students themselves or even within the teams that make up the Redecentro, thus bringing greater understanding of the reference frameworks and working styles of the members.

There is still the emotional expression. Studies confirm that it plays an essential role in the ability to actively perceive the feelings and needs of others, and in being able to motivate helping behaviors (NEWCOMBE; ASHKANASY, 2002; MAYER, SALOVEY, 1997), altruism (ORGAN, 1988), self-learning and learning about human relationships (OLSON, 1977), and other types of interpersonal assistance. The ability to understand the feelings of others and re-experience them, as if they were our own, is a competence that seems to be important for the maintenance of constructive social relationships (MAYER, SALOVEY, 1997). Through emotional expression, the group is able to communicate emotions and this allows for the effective exchange of information about their needs and other emotional information, in turn facilitating the achievement of collaborative work goals.

## Conclusion

The coexistence of professor-researchers in collective actions shows how and how much they can get involved in the search for understanding and answers to various problems that present themselves to the group in the research movement. This coexistence increases our certainty about the complexity that characterizes collaborative and network research. When in groups, researchers dialogue, debate, question, deconstruct and reconstruct paths and truths, generating a movement guided by uniqueness and complexity that is revealed from and in the work of the research.

Thus, the collective raises the dialogue of discourse as a possibility for the exercise of tolerance, respect, sharing and acceptance necessary in the pursuit of critical-reflective thinking, which configures inevitable paths to overcome individualism, dehumanization and alienation.

The importance of collaborative and network research stands out for its immediately collective requirements: enabling with regard t*o theoretical, epistemological, gnosiological, ontological, methodological, political and ideological, and relational principles*, which influence subjectivities, languages, learning, knowledge, professional relationships, but also, and above all, the metacognitive capacity and epistemological surveillance of each researcher in the research process.

These aspects are present in the Redecentro's organization. The specifics of the experience place it as a live, supportive experience, which imposes the need to take it as an object of metacognition, and report it as a way of improving our own praxis as network researchers.

Collaborative research is rooted in inclusive presuppositions and provokes the co-construction and awareness of the subjects, which allows for the resumption of previous experiences of the subjects who, in interaction and by dispensing with coordinated and synchronized activities, provide opportunities for inclusion, the generation of opportunities for sharing and

reflection, which can be assumed as a dimension of collective teaching work. Our experience reveals that collaborative and network research has enabled the construction of non-linear, non-sequential knowledge, based on an approach that allows changes in the teaching identity through the consolidation of methodologies adopted by the Redecentro.

The group continues to make efforts to continue the collaborative processes. They present dynamics that are also facilitators of academic knowledge networks. Virtual academic networks, for example, are now an established and fundamental reference.

Our experience elucidates that the breadth of the work requires collaboration as a driving force for the quality of what is developed, thus favoring collective teaching work. From a certain relational balance, whose basic rule is learning by collaborating, a system of values associated with autonomy, reflection, criticism, self-criticism, humanization, emancipation and active commitment is inscribed. In this order of thought, there is no denying that academic networks provide knowledge networks capable of promoting changes in knowledge production in the professional development of the professor-researcher, as well as in their subsequent pedagogical praxis.

We can conclude that collaborative work in a network and, in our case, at the Redecentro, from a counter-hegemonic perspective, allows for the consolidation of an open space sensitive to the socialization of questions and experiences, in which the collaborative-critical sense helps us to carry out research with more security, autonomy, and without neglecting the reflections and conflicts experienced during the course of the research, consolidating it as an important educational and collective experience.

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