Obutchénie
Revista de Didática e Psicologia Pedagógica

DOI: http://doi.org/10.14393/OBv6n3.a2022-65933

Activity Theory and Geographic Education: a pedagogical experience

Teoria Atividade e Educação Geográfica: uma experiência pedagógica

Francielly Naves Fagundes[1]
José Gilberto de Souza[2]

ABSTRACT
The pedagogical activity through projects is of significant importance in the teaching-learning relationship, since it combines acts of questioning and reflection upon reality. In this sense, the educational process should be based on the construction of the student's development as a cognizing subject, providing opportunities for questioning and for the elaboration of investigative questions. These cognitive actions-objectives allow the appropriation of the content with analytical meanings and senses, denoting the capacity and the level of mediations that can be performed in the teacher's work-activity. In view of the above, this article presents the unfoldings of the teaching-discourse experience in the discipline of Socio-Spatial Information Analysis, developed in the process of Geographical Education at university level, which aimed to promote the development of analytical foundations of a geographical phenomenon: the logics of monopolization and territorialization of capital in São Paulo's agriculture.

Keywords: Geography teaching. Activity theory. Research project. Meaningful learning.

RESUMO
Na relação ensino-aprendizagem a atividade pedagógica por projetos se constitui em instrumento de significativa importância, pois amalgama atos de interrogação e de reflexão sobre a realidade. Deste modo, o processo formativo deve estar alicerçado na construção do desenvolvimento do aluno, como sujeito cognoscente, para estranhar, questionar e elaborar para si questões investigativas. Estas ações-objetivos cognitivos permitem a apropriação do conteúdo, com significados e sentidos analíticos e denotam a capacidade e o nível de mediações passíveis de serem realizadas no trabalho-atividade do professor. Diante do exposto este artigo apresenta os desdobramentos da experiência docente-discente na disciplina de Análise de Informação Socioespacial, desenvolvida no processo de Educação Geográfica em nível superior, que teve por objetivo promover o desenvolvimento de fundamentos analíticos de um fenômeno geográfico: as lógicas de monopolização e territorialização do capital na agricultura paulista.

Palavras-chave: Ensino de geografia. Teoria da atividade. Projeto de pesquisa. Aprendizagem significativa.

[1] Graduated in Geography, PhD in Geography - Instituto de Geociências e Ciências Exatas - UNESP, Brazil. Orcid: https://orcid.org/0000-0003-2277-8430. E-mail: fran_xadrez@hotmail.com.
[2] Graduated in Geography, Associate Professor - Instituto de Geociências e Ciências Exatas - Unesp, Brazil. Orcid: https://orcid.org/0000-0002-5961-714X. E-mail: jg.souza@unesp.br.

DOI: http://doi.org/10.14393/OBv6n3.a2022-65933

1 Introduction

The teaching-learning-development process conceived from the Activity Theory is embodied in a conceptual and methodological formation path that considers the construction of knowledge as an effective reading and apprehension of reality. This cognitive development mirrors the theoretical elaboration about the material concreteness of human beings, itself a reflection of reality and not a mere abstraction. Teaching-learning-development is constituted in a working activity, mediation of students and teachers on reality in a pedagogical interaction.

According to Duarte (2001, 2002), the Activity Theory is based on the cultural-historical psychology, built from the work of Vygotsky, Leontiev, and Luria, as an unfolding of the reflections of the German thinker Karl Marx. We consider it to be a theory materialized from a conception of method, in which the construction of the social being is established through mediations that result in primary and secondary teleologies (LUKÁCS, 2018).

Libâneo (2004) argues that the Activity Theory, produced from Leontiev's, began to be used in Cuba by university teachers dedicated to the methodologies of higher education, spreading to Latin American countries, especially in graduate programs. Regarding the purposes of the Activity Theory, the author highlights some characteristics:

> [...] to assist in the ways of developing theoretical thinking (valid for students, but also for teachers); to understand the structure of teaching activity; to make procedures explicit and to increase the effectiveness of learning; to propose methods and procedures for studying and analyzing practices, especially the sociocultural contexts of activity, to promote the transformation of institutional spaces [. ...] of the sociocultural influences of context in object-oriented action, of the criteria for analyzing practices in institutional contexts and their transformation towards emancipatory goals. (LIBÂNEO, 2004, p.22).

In this sense, teaching through projects is a unique activity in the learning-development process, since it synthesizes acts of questioning and reflection on reality. It develops in the students a scientific thinking and

DOI: http://doi.org/10.14393/OBv6n3.a2022-65933

intellectual capacities that correspond to the contents, requiring the role of the teacher to insert the students, effectively, in a work activity for learning.

In the critical-historical pedagogy, the Activity Theory is imbued of centrality, since it implies:

(a) appropriation of the most developed forms of objective knowledge historically produced by humanity, recognizing the context of its production and the trends of its transformations;

b) "translation" of objective knowledge to make it assimilable by students in the space and time of this relationship;

c) providing the necessary means so that students not only assimilate the objective knowledge as a result, but also understand and develop its production (SAVIANI, 1997).

This process is linked to the methods of investigation and exposure of reality (MULLER, 1982), experienced in the pedagogical environment, scintillating the capacity of estrangement about reality and the production of questionings. The teacher's work ought to be based on the construction of one's cognizing capacity to question, i.e., to elaborate to oneself investigative questions that raise methodological paths of investigation and exposure of the behavior of natural-cultural phenomena, in their historical imbrications, their positive and negative inflections and/or their "normalities" or stabilities. By constructing a strangeness about reality, the cognizing subject elaborates an "entry point" to the phenomenon, an interrogation, choosing explanatory categorical postulates about it. From then on, intellectual mediations about reality are established, visualizing the transition from categories to concepts and, mainly, their capacities of deconstruction and analytical reconstruction of the object-phenomenon-process.

Souza and Fulino (2008) point out:

> Categories can be defined as universal instruments of analysis given their material mediations in human existence. Categories do not enclose a perspective of chronological time per se, but of historical-theoretical

DOI: http://doi.org/10.14393/OBv6n3.a2022-65933

> time, a relative representation of and in human reality. Thus, these instruments do not engender a reality, as Kant (apud, LUKÁCS, 1979) conceived it, of an essentially subjective characteristic, and it is in this sense that Marx and Engels (1991) provide a critique of this idealist conception, pointing out the practical-social function of certain forms of consciousness, regardless of whether they are false or true. Objectively engendered by reality, they refer to a theoretical construction of human thought about the materiality of human nature, in its essentiality: labor. The non-chronological dimension is established by the concreteness of theoretical-historical time that goes beyond chronological time, that is, the categories are built in light of the development of man and of the ways of thinking about this development. In a word: categories are historical-theoretical concreteness in the course of chronological time according to a certain stage of human development. In Marx, "the categories are forms of being, determinations of existence" (MARX, 1983, p.189), which implies that they are not constituted from "abstract concepts", on the contrary, it is their practical-historical dimension that allows the conceptual elaboration, as ontological representations of reality.(...) The categories do not present independent existence, they do not exist as natural and linearly "historical" forms, they are, effectively, mediated by concrete conditions of existence and of the thought about this same existence. (SOUZA, FULINO, 2020, p. 6-7).

The concepts thus represent the rebound of the categories with the reality, their level of singularity and universality, in the analysis of particularity, i.e., the concepts represent the real conditions and the most significant elements of a phenomenon, the reverberation of its concrete determinations. (SOUZA, 2008).

Within this cognitive process, actions-objectives of analysis are listed as objective mediations of the researcher about the initial question posed. The development of these actions-objectives responds to explanatory motivations of the reality, and its concrete and empirical achievement, gives the cognizing subject the meaning and sense of learning. The construction of actions or a procedural set of actions, not archetypes or paradigms, but of necessary

DOI: http://doi.org/10.14393/OBv6n3.a2022-65933

analytical processualities, is what will give prominence to the properties of the object-phenomenon-process in the thought of the cognizing subject: quality and quantity, interwining of opposites, movement of negation/surpassing and synthesis. In this intellectual process, meaning and sense are created, re-elaborated, and embodied in teaching-learning-development.

This is the movement. The path that the cognizing subjects construct in an effort to stabilize the meanings that have been submitted to the meanings confronted in the analyses/interpretations (mediations) made by professors and students. Understanding here the dialectical relationship between these terms, since this transience between meaning and sense is the movement of thought from which moves from abstract-negative to concrete-positive (MÁRKUS, 1974), in a dynamic of internalization and externalization, conscious construction on reality (concrete thought).

What does this movement represent? It indicates that the student has an 'a priori' understanding of a concept and/or phenomenon, of an empirical and/or theoretical nature, expressing an imminent development zone, i.e., this initial understanding allows the learner to build relations with the concepts proposed by the teacher and, at this level, establish the relations-confrontations sign-meaning-sense. This approximation of initial concepts with the empirical-analytical processes, elucidated by the mediation the professor establishes with the content, allows/corroborates the student to make mediations as well, i.e., intellectual activities that consolidate new meanings-senses. This movement is a "negation/transformation" of the student's initial conceptualizations (abstract-negative) to new conceptual inferences that are stabilized (concrete-positive) and will be materialized in a word-sign-meaning movement and, immediately become subject to new meanings and extensions. A process that Freire (2011) called soaking the everyday with meanings.

Since the word, no matter how contrived, is never dissociable from sign-meaning (VIGOTSKI, 2001), it, the word, engenders the sign, immediately the meaning and in its concrete appropriation (thought) forms the meaning, mediated by culture (word-sign-meaning-meaning), by a social

DOI: http://doi.org/10.14393/OBv6n3.a2022-65933

relationship, mediated by a pedagogical relationship. Engendering the meaning and sense of these contributions implies recognizing in them the particular, the singular, and the universal, as elements of method, constituents of a totality.

Thus, the enchainment of these cognitive actions occurs through conceptual links that close and open, stabilized and unstabilized, in continuous processes of concept construction, which are supported in the production of knowledge, amplifying the meanings that reach generalization, the final construct-object of an activity. Therefore, this dynamic of actions is an intellectual work of the students and the teacher, and it is upon this central concept, the work, that the Activity Theory is based (SOUZA, JULIASZ, 2020).

From this theoretical perspective, we established the construction of an investigation project, developed with debate, conceptual foundation, data treatment, spatialization and analysis of the categories/concepts that gathered explanatory capacity about a phenomenon, which is "crossed" by a central question. The proposition of the activity was consolidated through the presentation of a problem considering its ontological, epistemological, teleological, and methodological dimensions as nuclear to its investigation and exposition. This is the centrality of the teacher's work: the process of teaching-learning-development of the student is established not only in a dimension of conceptual content of the problem, but it also requires the proposition of procedural content in the resolution of a problem, since, on the concrete reality of the research, the attitudinal contents (dialogues) of the cognizing subjects (teachers and students) also emerge.

2 Overcoming the apriorism of the object by the proposition of a problem

The experience reported here took place during the course of Analysis of Socio-Spatial Information, developed in the Undergraduate Course in Geography at UNESP Rio Claro - SP, Brazil, which aims to consolidate critical reflections about the method of investigation and exposure. It is considered, by principle, that the role of the geographer is not to list isolated analytical categories (space,

DOI: http://doi.org/10.14393/OBv6n3.a2022-65933

region, territory and landscape), but to analyze the spatial and or territorial property that the phenomena present and promote the development of categorical and conceptual analytical foundations (SOUZA, 2018).

In this sense, we start from overcoming the positivist conception that Geography needs an "object" to support a criterion of scientificity. The positivist exigency of a science to have an object as a guarantee of a scientific status is not based on a critical perspective centered on the concrete materiality of the world. It is a dilettante way of explaining the object without explaining the central elements of reality and without evidencing the particularity of Geographical Science in the interpretation and transformation of this reality. Thus, it is critical to Geography to analyze the spatial and territorial dimension of the phenomena, the space, like time, is an immanence, and the territory a potency, since the processes of appropriation of space, the power relations, are constitutive of the territory (SOUZA, 2018). Conceiving space as immanent and explaining it in itself does not allow to scrutinize the spatial properties of a phenomenon-object-process. The spatial properties are determinations, constructs and mediations that the social being establishes on a given reality (fragmentation and urban segregation, for example), These are no other than spatial expressions of concrete mediations between human beings engendered in capitalism, for example, by the status of private property, from where its ontological meaning (of social relationship) emerges. Treating the spatiality and territoriality of private property means considering and understanding it as an expression of social power relations (RAFFESTIN, 1993).

As geographers we must analyze a phenomenon from a questioning that reveals the ontological meaning of space. We must develop analytical elements about spatio-temporal properties, i.e., establish categorical and conceptual assumptions that offer geographic explanatory capabilities about it. Thus, in the course, we do not start from a watertight conception of teaching mean, median, standard deviation, analytical models of concentration, among others. Nor is

DOI: http://doi.org/10.14393/OBv6n3.a2022-65933

there a diffusion of concepts about literature review, methodologies, or the definition of analytical modeling and its applicability.

These elements of structural theoretical and methodological character are reflected in the construction of the problem and the elaboration of action-objectives, building the totality of an investigation and exposition method. These processes also represent teaching, learning and development, since the literature review has the role of expanding the conceptual and methodological dimension of the proposed problem.

Specific objectives that will gradually conform and materialize the sign, meaning and sense of the central question are established through the analysis of multiple sources of data and the reconciliation between the concepts from a construction and deconstruction of the question. The potentiality of classification, systematization and analysis of data as methods and techniques for research in Geographic Science and, subsequently, the elaboration of reflections on the spatial and territorial unfoldings (determinations) that the work presents lead to the exposure and consolidation of the writing of the research.

Thus, in the year 2018, in the development of the discipline, the following question was defined with the students: What are the territorial determinations of the logic of monopolization and territorialization of capital in São Paulo's agriculture? It is assumed that territorial determinations are state and movement of socio-spatial practices of socioeconomic subjects and agents towards hegemony and that also allows, in dialectical movement, to erect counter hegemonies (SOUZA, BORGES, 2017), which requires conceiving the structuring elements of the forms of production of space under the capitalist mode of production in its two fundamental movements of centralization and concentration, also considering the phase of financialization of capital. (AMARAL, 2012).

The central question unfolded throughout the analysis of the agrarian and economic characteristics (categorical assumptions), having as spatial cutout selected microregions of the state of São Paulo, Brazil, regarding: land use (agricultural crops); tax collection (value added tax) and export/import, verifying

DOI: http://doi.org/10.14393/OBv6n3.a2022-65933

the importance of agriculture in the configuration of microregions and municipalities. From these questions, the specific objectives of the research project were consolidated.

In view of the presented problematic, a temporal cutout of analysis was defined (2010 to 2017) and facing the impossibility of covering an excessive volume of data, the geographic microregions of São Carlos, Araraquara, São José do Rio Preto, Adamantina, Jales and Bauru were defined, located in the Central and Western areas of the state of São Paulo, Brazil.

In turn, the centrality of the proposition, as previously pointed out, results in the objective of the discipline that was presented in the construction of a conceptual reference of analysis, data treatment, spatialization of a problem and, above all, the socio-spatial analysis that expresses the synthesis of the explanatory capacity of the categories about the studied reality. Activities that were consummated in a Report.[3]

3 The theoretical dimension: the categories and concepts of analysis

As previously pointed out, the categories of analysis, in dialectical historical materialism, represent the expression of social being, that is, they express a social relationship, from which derives another characteristic, their ontognoseological explanatory capacity of the problems to be investigated. Thus, the research proposal uses categories determined by the cognizing subject in light of reality, recognizing its socio-historical condition over the world.

In the Marxist conception, categories become empty when their meanings are not connected to reality or linked to movement. [...] The categories are ontological to the order of being, are forms of being, are historical and are transitory when deciphering it in its historicity. (OLIVEIRA; OLIVEIRA; SANTOS, 2013, p. 5-6).

[3] It is not the purpose of this article to discuss evaluation, but it is worth pointing out that the Activity Report ended up consolidating, as it was built, in an evaluation process-instrument: ex-ante (How can a report evaluate your development?); in-process (How do you conceive your development?), and ex-post (How does your development relate to the expectations and performance of the teacher and his/her interaction-performance in relation to the collective-group and classroom?).

DOI: http://doi.org/10.14393/OBv6n3.a2022-65933

The construction of categories and concepts of analysis is performed from a critical purification of the problem, in which questions are presented about the phenomena and one seeks to highlight those that present a direct relationship with this material concreteness and show, therefore, its central determinations. In this process, the sense of totality gains body, because in the reflection movement of the proposition, the analytical cutout expresses the complexes of the complex, in an inverse movement of what is presented in reality (complex of complexes), which become amalgamated in their interdeterminations.

Faced with the problem presented in the research project, the categories of analysis gain the conceptual form (complexes of the complex): land use (agricultural crops)/homogenization of the landscape; revenue (value added tax)/production and realization of value; export/import/trade balance and dependence, which together are revealed in territorial determinations (SOUZA, BORGES 2017; SOUZA 2016; BENEDITO, SOUZA 2010; SOUZA 2008, AMARAL, 2012; TRASPADINI, 2013, LAMOSO, 2020).

4 The empirical dimension: the composition and treatment of data

According to Gil (2007 and 2010), the methodological techniques of data collection in social research are: bibliographic research, documentary research, simple observation, sampling by accessibility, interviews and questionnaires, and secondary data collection. During the development of the course, the students learn the techniques of bibliographic research, constituting the literature review of the concepts mentioned above, and the technique of collecting, tabulating and systematizing secondary data.

The collection of secondary data and its analysis ratify the issues highlighted in the theory (investigation) and reveal the concreteness of the determinations in the explanatory construction of the problem (exposition). Thus, the secondary data were collected (in data bases/platforms), tabulated (for

DOI: http://doi.org/10.14393/OBv6n3.a2022-65933

calculation procedures), systematized and spatialized (in cartograms/maps, graphs and tables), constituting a geocartographic text [4].

In the secondary data collection stage, it was possible to present the students with different databases to be accessed:

a) IBGE (BRAZILIAN INSTITUTE OF GEOGRAPHY AND STATISTICS) - Municipal Agricultural Production (PAM), to analyze the main agricultural crops, in relation to the variable harvested area (in hectares), thus demonstrating the production matrix.

b) SEADE (STATE SYSTEM OF DATA ANALYSIS FOUNDATION) - São Paulo Municipalities Information (IMP), to analyze the collection, that is, the amount in products and by sectors of the economy, showing the importance of the activity in the added value.

c) ME (MINISTRY OF ECONOMY) - SISCOMEX Foreign Trade Systems Portal) to analyze the main export and import products consolidating information about the trade balance.

In the treatment and tabulation of data the following procedures were carried out:

(a) identification, characterization and analysis of the production matrix and the dynamics of competition and substitution of agricultural crops by area (hectares) and the pattern of diversification or monopolization/homogenization of the landscape by agricultural activities/cultures.

For this, the Scale Effect (SE) was calculated[5] e and Substitution Effect (ES)[6] and Theil's Index (H)[7], defined as the mathematical representation of the concept of

[4] It is fundamental to point out here that the map is a text. The title, the scale, the classes, the systematic cartographic implantations correspond to cognitive processes about the phenomenon and this spatiality becomes not only "visualized", but effectively analyzed.

[5] The scale effect allows the verification of the relative variation of the total area of the systems during the analyzed time period. (FILHO, COSTA, 2005).

[6] The substitution effect shows, within a given production system, if there are some activities (crops) that substituted others (positive substitution effect), or if such activities were substituted by others (negative substitution effect). (FILHO, COSTA, 2005).

[7] The higher the diversity index (H) the greater the diversity of crops, while the inverse situation represents the monopolization process of certain crops. Thus, the closer to zero, the degree of homogenization is greater and the lower the diversity of production. And the farther away from zero, the lower the homogenization and the higher the diversity. (BRUMATTI, BORGES, and SOUZA 2013).

DOI: http://doi.org/10.14393/OBv6n3.a2022-65933

Landscape Homogenization and that materializes spatially. The students handled the spreadsheet tools; made the calculations from mathematical formulas (simple sums, percentages, conditional formula, natural/neperial logarithm, absolute and relative growth rate) essential for the treatment of qualitative data, and spatialized this information in specific software.

b) Identification, characterization, and analysis of the value added.

The monetary values are constituted in nominal value, which is characterized as the value of goods and services on the date of their realization and the real value, which is characterized as the value of current goods and services, that is, a value corrected according to the inflationary behavior.

Thus, because it is a matter of value and the use of past years (the years 2011 to 2015 were selected), for inflation correction (year by year, in thousand current reais), in the Citizen's Calculator platform (Central Bank of Brazil Portal)[8], from the IGP - DI Index (Getúlio Vargas Foundation) [9], allowing the effective analysis of value and or price variation when it came to the land market.

c) Identification, classification and analysis of the main products for export and imported. The reflections pointed to the input bias of the main products consumed and destination of production, identifying a pattern of dependence, (re)primarization of the local economy or not (AMARAL, 2012; TRASPADINI, 2013).

Regarding the preparation of the maps, the students used the Quantum GIS (QGIS) and ArcGIS software from the University's Climatology Laboratory, and collected the shapefiles on the IBGE platform - Bases Cartográficas[10] for plotting in the Geographic Information System - GIS. The following cartographic materials of the selected micro-regions of the state of São Paulo were elaborated: map of the area in sugarcane production (2010 and 2016) and map of the value added per sector (of the economy).

[8]https://www3.bcb.gov.br/CALCIDADAO/publico/exibirFormCorrecaoValores.do?method=exibirFormCorrecaoValores.
[9] General Price Index - Domestic Availability. It is an arithmetic average, calculated monthly by FGV - Fundação Getúlio Vargas, established in 1994, with the purpose of measuring the behavior of prices in general of the Brazilian economy. (PORTAL BRASIL, 2018).
[10] https://mapas.ibge.gov.br/bases-e-referenciais/bases-cartograficas/malhas-digitais.

DOI: http://doi.org/10.14393/OBv6n3.a2022-65933

Thus, a didactic sequence was used in the discipline classes, aiming to analyze the proposed geographic phenomenon and develop practical-cognitive and critical actions-objectives, contemplating the elements of analysis (theoretical and methodological) that involve the studied theme.

Table 1 - Didactic sequence (action-objectives) of the analysis of the logic of monopolization and territorialization of capital in agriculture in São Paulo

TOPIC	DESCRIPTION
Introductory Sections	*Exposition of a Research Project template.* *Explanation of the sections: Introduction, Objectives (general and specific), and Literature Review.*
Study Area	*Choice of the geographical micro-regions of the state of São Paulo to be studied by the groups of students.*
Collection and treatment of secondary data	*Presentation of the IBGE database (PAM).* *Exposure and practice of the Scale Effect (SE) and Substitution Effect (ES)*
Intermediate sections	*Exposure of the sections: Material and Method, Schedule and Bibliography.*
Secondary data collection	*Systematization and collection in IBGE database (PAM), about sugarcane harvested area in 2010 and 2017.*
Treatment of secondary data	*Practice of elaboration of cartographic material in ArcGIS software, from IBGE data (PAM).*
Secondary data collection	*Presentation of the São Paulo Municipal Information database* *Presentation of the calculation of the base 100.* *Presentation of the Monetary Correction calculation in the platform Citizen's Calculator (Central Bank of Brazil).*
Treatment of secondary data and cartographic production	*Practice of the Monetary Correction calculation year by year, from data collected in São Paulo Municipal Information (SEADE).* *Practice calculating the percentage participation year by year, from data collected in São Paulo Municipal Information (SEADE).*
Treatment of secondary data and cartographic production	*Practice developing cartographic material in QGIS software, from data collected in São Paulo Municipal Information (SEADE).*
Secondary data collection	*Presentation of the ME- SISCOMEX database about export and import.*
Treatment of secondary data and cartographic production	*Practice of currency conversion (exchange) calculation year by year, of the data collected in ME- SISCOMEX* *Practice calculating the percentage participation year by year, from the data collected in ME- SISCOMEX*
Resumption of initial sections	*Exposition (resumption) of the Literature Review section.* *Explanation of the concept of "Landscape Homogenization".*
Treatment of secondary data and cartographic production	*Presentation and practice of the Theil Index calculation*
Exposure	*Analysis, Presentation and Discussion of the Research Report constructed by the student groups. Formative Equalization*

Source: FAGUNDES, SOUZA, 2018.

DOI: http://doi.org/10.14393/OBv6n3.a2022-65933

5 The explanatory capacity of reality

Through the survey and treatment of secondary data, the students interpreted the geographical characteristics of the researched localities, regarding the categories and concepts immanent to the phenomenon.

The concept of territorial determinations was ratified in the research and simultaneously enabled the construction of cognitive activities of interpretation and generalization of reality. It is also highlighted that, empirically, they constitute the geographical manifestation of processes of concentration and centralization of capital, having its geographics expressed as the territorialization of monopoly and the monopolization of territory in the case studies carried out (OLIVEIRA, 1999; SOUZA, 2014).

The validation of the hegemony of the sugarcane agricultural culture and the centrality of primary products for export were pointed out in the group analyses. The identification of the supremacy of sugarcane cultivation and the industrialization of its derived products (sugars from sugarcane, alcohol, energy, and straw), in relation to food crops or other export crops, was being consolidated, the latter mediated by a strong process of cartelization (BELLINGIERI, BORGES, SOUZA, 2012), revealing the new socio-spatial configurations established by the logic of value production in the state of São Paulo.

The elucidation of the concrete is a teleological purpose of the exercise of the activity, which grounds the theory. However, it is important to recognize that the students faced methodological limitations in their research (limitations can be found in different phases). For example, the option for agricultural data (and not for livestock and agroforestry) was established due to the availability of a free database, free of charge, with historical series and common to the research area. They also found that not using data from ranching (pasture) and planted forests (eucalyptus), masks the reality, since there are locations where these productions are relevant.

In the construction of the Final Research Report, the students confirmed the dimension of the categorical/conceptual assumptions, their

DOI: http://doi.org/10.14393/OBv6n3.a2022-65933

explanatory capacities of the real, and their limits. They understood the meaning and the sense of their theoretical development (via bibliographic review) not as a scholastic abstraction, but as the result of a movement of apprehension of the real mode of production that spatializes itself, producing particularities to the "geography" of microregions in São Paulo. They have perceived which are the main territorial determinations manifested by the process of monopolization and territorialization of capital in agriculture, mainly in the relation between agriculture and economy, allowing the ratification of hypotheses concerning the phenomenon.

6 Other caveats in the processes of analysis

The discipline's proposal intended to ground the students in the practice of academic research, stimulating them throughout the classes (theoretical and practical), in extra-class activities, in the construction and individual and collective elaboration of the Research Reports, under a thematic focus of the subareas of Agricultural Geography and Economic Geography.

From a pedagogical point of view, it is worth pointing out the importance of tools such as: electronic spreadsheets (for the execution of logical-mathematical exercises and the elaboration of graphs); GIS software (for the execution of maps), which denotes the importance of disciplines that appropriate the use of these techniques to treat and spatialize geographic phenomena. The dimension of technique is a historical dimension and denying this objectivity does not contribute to the formative process of the students, it is fundamental to establish two important points: the first is that technique is a means/tool of the teacher's work that is a mediating element, on which the teacher and the students must also establish mediations; the second refers to the fact that its simplification as dead work does not replace the pedagogical relationship, as a dimension of humanization and consolidation of the autonomous social being.

When the students (organized in groups) built their research reports, they were encouraged in a similar way in the activity proposal, to

DOI: http://doi.org/10.14393/OBv6n3.a2022-65933

develop analytical-scientific capacities (arising from the methodological and procedural structuring of the problem understanding) and geographic reasoning (arising from the theoretical and empirical organization and chaining of categories and concepts and their social-spatial interrelations). However, when analyzing the reports, it is essential to highlight that the theoretical writing, the organization of secondary data and the structuring as a whole presented differentiations among the groups, despite the exposure of the steps that make up a research process. (Introduction, Objectives, Literature Review, Material and Method, Results, Timeline and Bibliography).

There were groups that developed in a more elaborate and robust way the theoretical section with reflections on a wider conceptual range (deindustrialization, monopolization of land and territory and international division of labor, productive matrix, territorial determinations, landscape homogenization, added value, trade balance) and general elucidations about the phenomenon of analysis (in the current in which the explanatory centrality lies in power relations).

Other groups organized with greater excellence the results from the collection of secondary data, presenting a graphic and cartographic composition of high quality. These behaviors evidentiate the characteristics of the group of researchers and their appreciation for the qualitative or quantitative approach in research. The fact is that the work presentations provided reflective mediations, both from the point of view of the analysis of the results and of their production, and made evident the development needs of one group or the other, equalizing work and learning.

7 Spatialization, representation, and considerations about the learning processes

To demonstrate the pedagogical advances of the students, some analyses present in the Research Reports are presented. It was decided to name the Groups as A, B, C, with Group A responsible for the geographical locations of Araraquara and São Carlos, Group B for São José do Rio Preto and Adamantina, and Group C for Jales and Bauru, state of São Paulo, Brazil.

DOI: http://doi.org/10.14393/OBv6n3.a2022-65933

The groups tabulated the data, elaborated maps, organized graphs and demonstrated the main territorial determinations: agricultural land use; revenue collection and import/export. Some productions were kept in the form presented by the students, in Portuguese, but it is possible to "translate/identify" the spatialized information.

A summary table is presented with the subject propositions, highlighting the themes, objectives, categories, concepts, platforms, calculations, tools, and forms of spatialization and representation of the phenomena analyzed by the students.

DOI: http://doi.org/10.14393/OBv6n3.a2022-65933

Table 2 - Summary of activity development

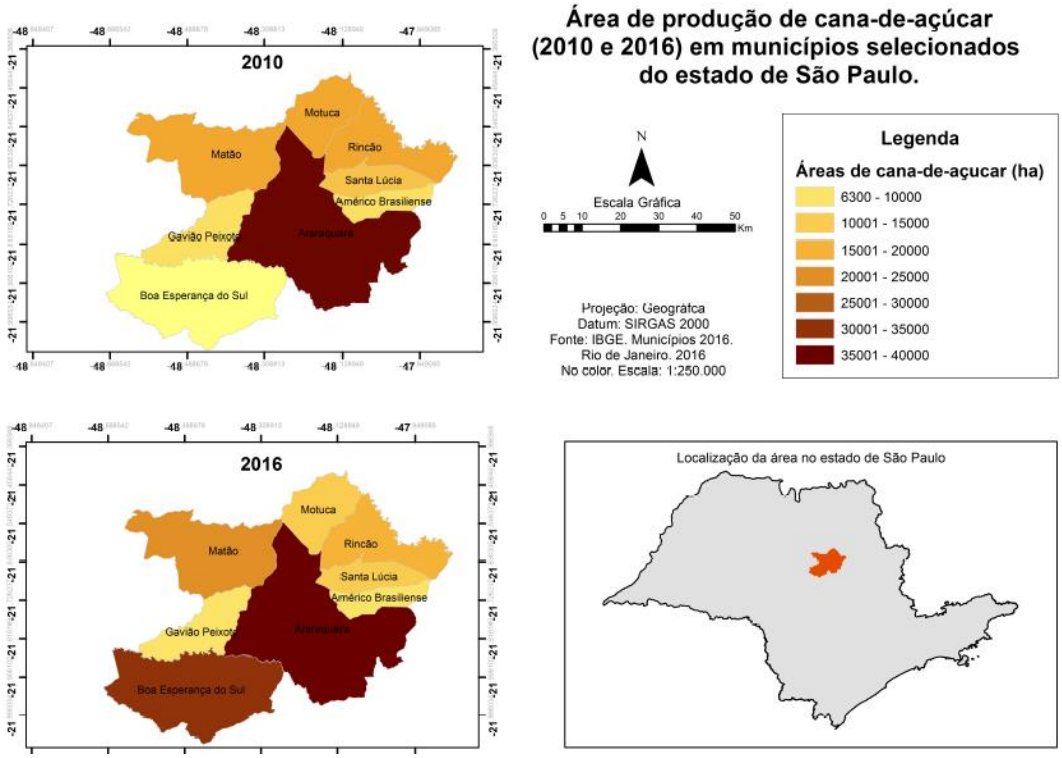
Themes	Objectives	Territorial determinations	Platforms	Calculations	Tools	Products/results
Agricultural land use	*Identify and analyze the main agricultural crop in harvested areas.*	*Productive Matrix*	*IBGE database (PAM) Cartographic Databases (IBGE)*	*Participation, Absolute Variation, Base 100, Growth Rate.*	*ArcGIS*	*Tables, Graphs, Maps, growth and occupation classes*
	Identify and analyze the agricultural crops in area and whether or not they replace another crop's arable area.	*Scale and crop substitution (commoditization of agriculture)*	*IBGE database (PAM)*	*Scale Effect (SE) and Substitution Effect (ES)*	*Excel*	*Tables, Graphs, Maps, growth and occupation classes*
	Identify and analyze whether there was an increase or decrease in agricultural production diversity.	*Landscape homogenization*	*IBGE database (PAM)*	*Theil Index calculation (H)*	*Excel*	*Tables, Graphs, Maps, growth and occupation classes*
Tax Revenue	*Identification and characterization of the main products in value*	*Value added*	*São Paulo Municipal Information Monetary Citizen's Calculator (Central Bank of Brazil).* *ME SISCOMEX*	*Calculation of base 100, Monetary correction, Percentage share year by year, Absolute variation, Growth rate,*	*Excel, QGIS*	*Tables, Graphs, Maps, growth and occupation classes*
Import/Export	*Identify and classify the export and import profile and whether there is a reprimarization process of the economy*	*Trade balance*		*Participation, Absolute Variation, Base 100, Growth Rate, Monetary Correction.*	*Excel, QGIS*	*Tables, Graphs, Maps, growth and occupation classes, integrated regional analysis, position of municipalities, variation, growth and occupation classes*

Source: FAGUNDES, SOUZA, 2018.

DOI: http://doi.org/10.14393/OBv6n3.a2022-65933

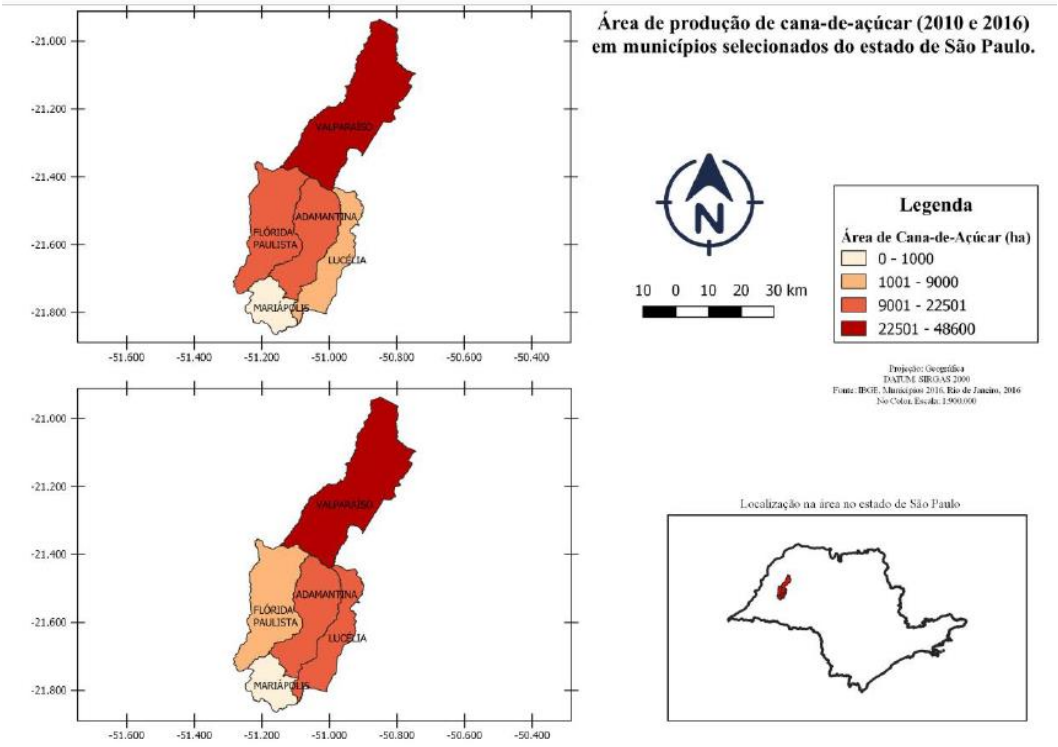
Theme: Agricultural land use

Map 1. Area (in production) of sugarcane in the micro-region of Araraquara-SP 2010 and 2016.



Source: FAGUNDES, SOUZA, 2018.

Map 1. Area (in production) of sugarcane in the Adamantina micro-region 2010 and 2016.



Source: FAGUNDES, SOUZA, 2018.

DOI: http://doi.org/10.14393/OBv6n3.a2022-65933

Theme: Agricultural land use

Table 1. Scale Effect (EE) and Substitution Effect (ES), municipality of São José do Rio Preto - SP, in 2010 and 2016.

Area/Data	Sugarcane	Temporary crops (except sugarcane)	Permanent crops	Total
2010	6.700	283	1,190	8,173
%	82	3	15	100
2016	6.000	318	1,666	7,984
%	75	4	21	100
EE 2010/2016	-154,94	-7	-28	-189
ES 2010/2016	-545,06	42	504	-

Source: FAGUNDES, SOUZA, 2018.

Theme: Agricultural land use

Table 2 Productive Diversity in selected municipalities of the Jales-SP micro-region, in 2010 and 2016.

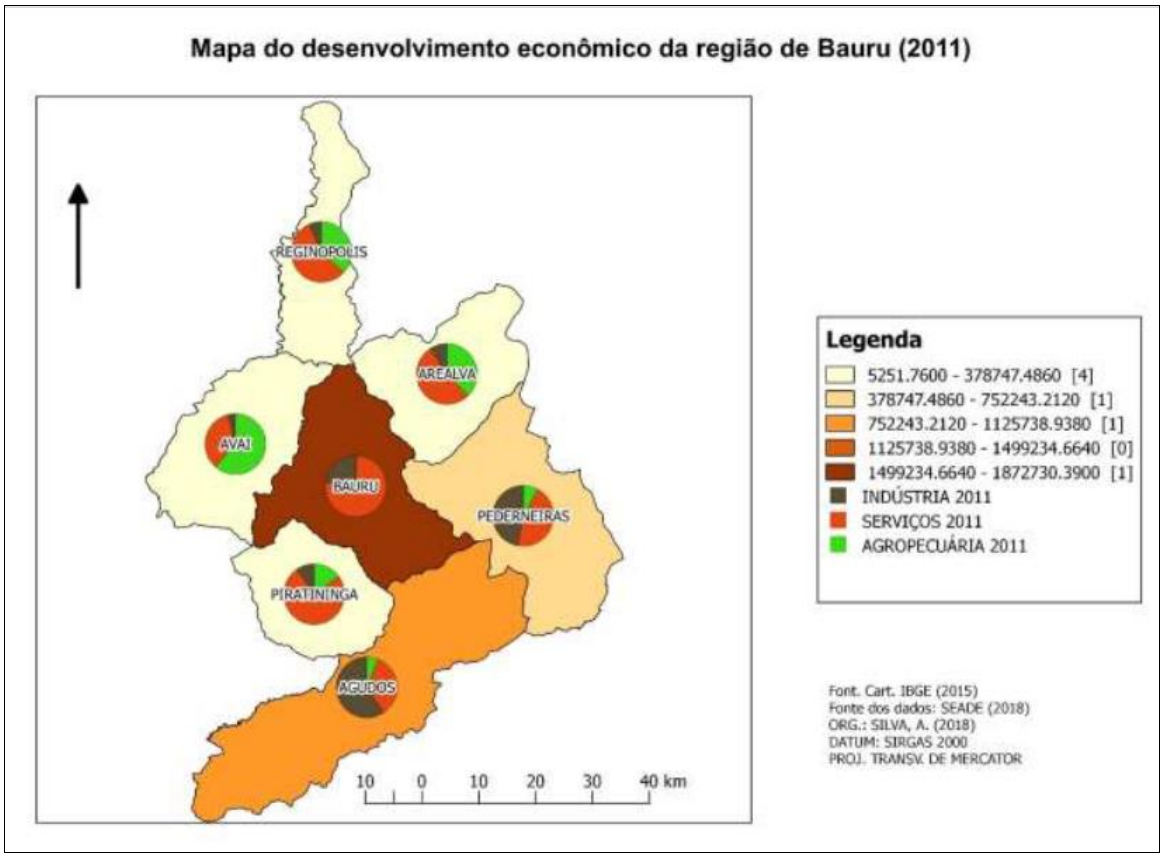
Municipality	Year		Productive Diversity Index Behavior
	2010	2016	
Jales	1,587	1,099	Reduction of Productive Diversity
Dolcinópolis	0,514	0,526	Expansion of Productive Diversity
São Francisco	1,533	1,418	Reduction of Productive Diversity
Urânia	1,499	1,278	Reduction of Productive Diversity
Pontalinda	1,466	0,804	Reduction of Productive Diversity
Vitória Brasil	1,500	1,000	Reduction of Productive Diversity
Dirce Reis	1,487	1,861	Expansion of Productive Diversity
Paranapuã	1,159	0,787	Reduction of Productive Diversity

Source: FAGUNDES, SOUZA, 2018.

DOI: http://doi.org/10.14393/OBv6n3.a2022-65933

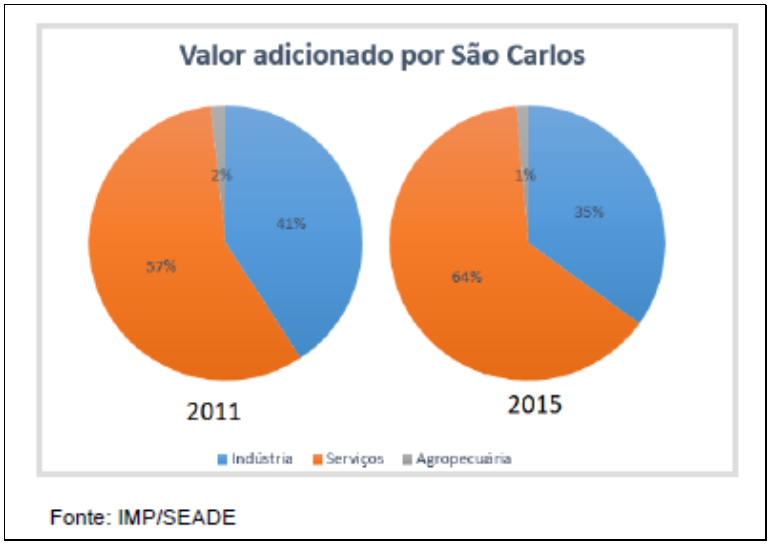
Theme: Tax revenue

Map 3 Value added (by sector of the economy), in the microregion of Bauru- SP - (Industry, Services and Agriculture) – 2011 (R$)



Source: FAGUNDES, SOUZA, 2018.

Graph 1. Value added (by sector of the economy) in the municipality of São Carlos - SP, (Industry, Services and Agriculture) - 2011 and 2015



Source: FAGUNDES, SOUZA, 2018.

DOI: http://doi.org/10.14393/OBv6n3.a2022-65933

Theme: Import/Export

Graph 2 Import and export of selected municipalities of the Bauru - SP microregion in 2011 (US$/thousand)

Source: FAGUNDES, SOUZA, 2018.

Theme: Import/Export

Table 3 Values of the main primary and secondary products exported by the municipality of Araraquara - SP in 2010 and 2017 (R$)

Primary products	Value	Secondary products	Value
		2010	
Fruit juices (including grape must) and vegetable juices	651.930.413,00	Electric motors and generators, except generating sets	14.172.667,00
Cane or beet sugar and chemically pure sucrose	73.649.815,00	Stockings: socks of all kinds	1.848.107,00
Vegetable materials and vegetable waste	52.141.947,00	Presses, crushers, machines and similar appliances	1.796.585,00
		2017	
Fruit juices (including grape must) and vegetable juices	585.387.021,00	Hydraulic turbines, water wheels and their regulators	4.274.223,00
Essential oils (deterpenated or not)	144.827.989,00	Electrically heated apparatus and devices for the treatment of materials by a process involving a change of temperature	1.631.841,00
Cane and beet sugars	42.683.381,00	Pajamas	1.557.365,00

Source: FAGUNDES, SOUZA, 2018.

DOI: http://doi.org/10.14393/OBv6n3.a2022-65933

In this sense, besides the spatialization and representation, the groups made considerations about the analyzed processes. The following are fragments of the Research Reports that allow us to visualize the students' understanding of the proposed analyses, ratifying previously presented concepts and showing the elaboration of new concepts.

> GROUP A:
> [...] it is evident the presence of a homogenization trend of the rural landscape, since agricultural crops with greater market potential, as in the case of sugar cane, expand in large proportions, reducing cultivation areas previously turned to other types of crops, that is, generating the decay of diversification.[...] There is thus the integration of agricultural activities with industrial activities, disarticulating the rural complex and increasing complexity in terms of intersectoral exchanges, division of labor, and specialization [...]
> GROUP B:
> [...] during the analyzed period the determinations present themselves in different ways, but following a characteristic of land monopolization and homogenization around monoculture. However, this homogenization is presented in a masked way in the economy [...]. However, we see that territory, as a space of power relations, is determined by the hegemonic power of capital, which is one of the main people responsible for the monopolization of territory.
> GROUP C:
> [...] engrossed in land grabbing and land concentration, factors that still persist in the territorialization of capital and the exploitation by the capitalist optics of the regions worked. The alteration of the culture produced facilitates the change in the productive matrix, causing a decrease in the Diversity Index, which accelerates the landscape homogenization process. The territorial determinations are reflected in the transformations in both microregions, which are agricultural frontiers, which facilitates the process. (FAGUNDES, SOUZA, 2018)

Thus, regarding geographical issues the groups revealed indications about agrarian issues, development and dependency (TRASPADINI, 2011).

8 Final considerations

Involved in a dynamic of actions-objectives, the discipline of "Analysis of Socio-Spatial Information" intended a didactic training teaching practice at a

DOI: http://doi.org/10.14393/OBv6n3.a2022-65933

higher level in the Geography course, having as centrality the Activity Theory. The construction and consolidation of this theory in the discipline sought to break with watertight practices of operationalization of technical tools and research procedures, starting to offer activities (work) that would allow students to understand the material dimension of categories and concepts, to understand their direct relationship with the empirical, eliminating a dualistic perspective with theory.

The established course (the didactic sequence) could be positively understood and evaluated from the students' reports, which recognized the importance of a research discipline. The students pointed out the need to review the curricular structure, considering that its methodological character should precede the decisions of the research projects of the Final Term Paper (TCC), which results in an extremely relevant critical view by the students, demonstrating an understanding of the formative process as a whole.

As the course is offered in the final terms of the course, it was useful for the students to resume their previous knowledge regarding: Human Geography (Rural, Economic), Geotechnologies (Geoprocessing) and Research Methodology, building interrelationships of these contents in an original way, opportunizing their development.

Finally, we highlight that the proposal aimed to provide meaning and sense to geographic analysis and, above all, to the teaching-learning process and development. The integration of theory and practice and the correlation of conceptual, procedural and attitudinal contents were established during the work. Thus, the expansion of cognitive, intellectual and operational capacities was promoted in a concrete, participatory, reflective, and questioning way, as is intended to be built today in a democratic and autonomous training environment.

References

AMARAL, M. S. *Teorias do imperialismo e da dependência: a atualização necessária ante a financeirização do capitalismo*. São Paulo:USP. 2012 (Tese de Doutorado). DOI: http://dx.doi.org/10.11606/T.12.2012.tde-09102012-174024.

BELLINGIERI, J. C. ; BORGES, A. C. G. ; SOUZA, J.G. Interpretações sobre fatores de exclusão de pequenos agricultores no setor citrícola. *Estudos Geográficos (UNESP)*, v. 10, p. 27-42, 2012.

BENEDITO, C. SOUZA, J.G. Análise do uso, da tributação e da concentração da terra em Piracicaba- SP: o setor sucroalcooleiro e a homogeneização da paisagem. *Agrária (USP),* São Paulo, no. 13, pp. 62-79, 2010. DOI: https://doi.org/10.11606/issn.1808-1150.v0i13p62-79.

BRUMATTI, L. M. BORGES, A. C.G. SOUZA, J. G. Análise do processo de monopolização do território no município de Pongaí – SP. *Anais.* VI Simpósio Internacional de geografia agrária - VII simpósio nacional de geografia agrária 1a. Jornada de geografia das águas (ISBN 978-85-237- 0718-7). 2013.

DUARTE, N. *Vigotski e o "aprender a aprender": crítica às apropriações neoliberais e pós-modernas da teoria vigotskiana*. — 2. ed. rev. e ampl. — Campinas, SP: Autores Associados, 2001. DOI: https://doi.org/10.1590/S1981-77462003000100015.

DUARTE, N. *A teoria da atividade como uma abordagem para a pesquisa em educação*. Perspectiva, Florianópolis, v. 20, n. 02, p.279-301, jul./dez. 2002.

FAGUNDES, F. N., SOUZA, J. G. *Relatório de Final de Estágio Docência - Disciplina Análise da Informação Socioespacial*. Rio Claro: UNESP. 2018 (Inédito) (n.p.).

FREIRE, P. *Pedagogia da esperança: um reencontro com a pedagogia do oprimido*. São Paulo: Paz e Terra, 2011.

LUKÁCS, Georg. *Prolegômenos para a ontologia do ser social: obras de Georg Lukács*. Volume 13 / Georg Lukács; [traduzido por Sérgio Lessa e revisado por Mariana Andrade]. – Maceió: Coletivo Veredas, 2018. 1391 p.

LIBÂNEO. José Carlos. A didática e a aprendizagem do pensar e do aprender: a Teoria Histórico-cultural da Atividade e a contribuição de Vasili Davydov. *Revista Brasileira de Educação*. Set /Out /Nov /Dez 2004 N° 27. DOI: https://doi.org/10.1590/S1413-24782004000300002.

DOI: http://doi.org/10.14393/OBv6n3.a2022-65933

LIBÂNEO. José Carlos. Teoria histórico-cultural e metodologia de ensino: para aprender a pensar geograficamente. In: *Anais* XII Encuentro De Geógrafos De América Latina (EGAL), Universidad de la República, Montevideo, Uruguay, abril, 2009.

MÁRKUS, G. *Marxismo y Antropologia.* Barcelona: Editorial Griyalbo, 1974.

MOREIRA, R. Marxismo e Geografia (A Geograficidade e o diálogo das Ontologias). *GEOgraphia*, ano 6, n. 11, p. 21-37, 2004. DOI: https://doi.org/10.22409/GEOgraphia2004.v6i11.a13466.

MÜLLER, M.L. Exposição e Método Dialético em "O Capital". *Boletim Seaf*, nº 2, Belo Horizonte, 1982.

OLIVEIRA, A. U. *Território e Migração: discussão conceitual na Geografia*. São Paulo: USP (mimeo), 1999

OLIVEIRA, N.C.; OLIVEIRA, L.A.; SANTOS, J.M.V. O Materialismo Histórico e suas categorias de análise: Algumas Considerações. In: *Anais* VII Seminário de Pedagogia - SEPED, 2013, Cornélio Procópio. Anais VII SEPED, 2013. v. 01. p. 1-17.

SAVIANI, D. *A nova Lei da Educação: trajetória, limites e perspectivas*. Campinas: Autores Associados, 1997.

SMITH, N. *Desenvolvimento Desigual*. Rio de Janeiro: Bertrand Brasil, 1988.

SOUZA, J. G. *Questão de Método: a homogeneização do território rural paulista.* Jaboticabal-SP: Universidade Estadual Paulista, Jaboticabal, 2008. (Tese de Livre Docência). DOI: https://doi.org/10.13140/RG.2.2.36402.63688.

SOUZA, J.G. Os limites do território. *Agrária (USP),* São Paulo, n. 10/11, 2009. DOI: https://doi.org/10.11606/issn.1808-1150.v0i10-11p99-130.

SOUZA, J.G. A Questão Indígena: Acumulação por Espoliação e Monopolização do Território (A economia política do agronegócio). *Prim@ Facie*, v. 12, p. 01-42, 2014.

SOUZA, J.G. Local-global: território, finanças e acumulação na agricultura. in: LAMOSO, L. P. *Temas do desenvolvimento econômico brasileiro e suas articulações com o Mato Grosso do Sul*. Curitiba: Ithala, 2016. p. 55- 95.

SOUZA, J.G.; BORGES, A. C.G. As determinações territoriais da lógica do valor e do autovalor – análise da produção de soja no Mato Grosso – Brasil. In: JACINTO, R. *Outras fronteiras, novas geografias: intercâmbios e diálogos territoriais*. Lisboa: Âncora Editora, 2017. p. 247-270.

SOUZA, J.G.; FULINO, R. A questão do método. *Caminhos de Geografia*, Uberlândia - MG Edição especial: I CIGEO-DR Dez/2020 p. 1–15. DOI: https://doi.org/10.14393/RCG0058464

SOUZA, J.G., JULIASZ, P.C.S. *Geografia: ensino e formação de professores*. Marília: Ed. Lutas Anticapital, 2020, 200p.

TRASPADINI, R. Reprimarização e dependência. *Brasil de Fato*, São Paulo, 14-20 de abril de 2011. Opinião, p.3. DOI: https://doi.org/10.4000/espacoeconomia.15957.

TRASPADINI, R. Ruy Mauro Marini e a Teoria Marxista da Dependência, *Pensata*, V.3 N.1 novembro. 2013.

VIGOTSKI, L. S. Pensamento e palavra. In L. S. Vigotski. *A construção do Pensamento e da Linguagem*. São Paulo: Martins Fontes. 2001.

Received in November 2022.
Approved in January 2022.