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TEACHING GEOGRAPHY: GEOGRAPHICAL THINKING AND THE VISIBILITY OF LEARNING

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TEACHING THROUGH PROBLEM SITUATIONS AND THE FORMATION OF SPATIAL THINKING AND GEOGRAPHIC REASONING

LA ENSEÑANZA A TRAVÉS DE SITUACIONES PROBLEMA Y LA FORMACIÓN DEL PENSAMIENTO ESPACIAL Y EL RAZONAMIENTO GEOGRÁFICO

ENSINO POR MEIO DE SITUAÇÕES-PROBLEMA E A FORMAÇÃO DO PENSAMENTO ESPACIAL E DO RACIOCÍNIO GEOGRÁFICO

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Abstract
From the eminent need to innovate the teaching of Geography and encourage the development of spatial thinking, this article aims to discuss how teaching through problem situations can increase the teaching and learning processes in school geography and contribute to the formation of spatial thinking and geographic reasoning. In the development of this work, a bibliographical research was carried out, in a fundamentally qualitative approach, carried out in books, in dissertations and theses, in scientific articles, presenting the main existing productions on the subject under discussion. The result of this bibliographic review is structured in two parts. In the first there is a discussion about Problem-Based Learning (PBL), presented as an innovative methodology for teaching Geography, based on problem solving and centered on student autonomy. In the second part, a brief reflection is carried out on the possibility of teaching through the resolution of problem situations in Geography, discussed as a feasible path that summons the student to solve problem-situations, which engages teacher and student in everyday problems. Thus, the formation of spatial thinking and geographic reasoning based on the resolution of problem situations can take place, as the teacher problematizes geographic situations, so that the student is guided to reason, think, question, seek information and intervene in socio-spatial reality.

Keywords: Probl Teaching Geography; Problem Based Learning; Problem situations; Spatial thinking; Geographical reasoning.

Resumen
A partir de la eminente necesidad de innovar la enseñanza de la Geografía y alentar el desarrollo del pensamiento espacial, este artículo tiene como objetivo discutir cómo la enseñanza a través de situaciones problema puede incrementar los procesos de enseñanza y aprendizaje en la geografía escolar y contribuir a la formación del pensamiento espacial y

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el razonamiento geográfico. En el desarrollo de este trabajo se realizó una investigación bibliográfica, en un enfoque fundamentalmente cualitativo, realizada en libros, en disertaciones y tesis, en artículos científicos, presentando las principales producciones existentes sobre el tema bajo discusión. El resultado de esta revisión bibliográfica se estructura en dos partes. En la primera se discute el Aprendizaje Basado en Problemas (ABP), presentado como una metodología innovadora para la enseñanza de la Geografía, basada en la resolución de problemas y centrada en la autonomía del estudiante. En la segunda parte, se realiza una breve reflexión sobre la posibilidad de enseñar a través de la resolución de situaciones problema en Geografía, discutida como un camino factible que convoca al estudiante a resolver situaciones-problema, que involucra al profesor y al alumno en los problemas cotidianos. Así, se puede producir la formación del pensamiento espacial y del razonamiento geográfico a partir de la resolución de situaciones problema, en la medida que el docente problematiza situaciones geográficas, de modo que el estudiante sea orientado a razonar, pensar, cuestionar, buscar información e intervenir en la realidad socioespacial.

Palabras clave: Enseñanza de la Geografía; Aprendizaje Basado en Problemas; Situaciones problema; Pensamiento espacial; Razonamiento geográfico.

Resumo
A partir da eminente necessidade de inovar o ensino de Geografia e estimular o desenvolvimento do pensamento espacial, esse artigo visa discutir como o ensino por meio de situações-problema pode incrementar os processos de ensino e aprendizagem na Geografia escolar e contribuir na formação do pensamento espacial e do raciocínio geográfico. No desenvolvimento desse trabalho foi realizada uma pesquisa bibliográfica, numa abordagem fundamentalmente qualitativa, feita em livros, em dissertações e teses, em artigos científicos, apresentando as principais produções existentes sobre o tema em discussão. O resultado dessa revisão bibliográfica está estruturado em duas partes. Na primeira há uma discussão sobre a Aprendizagem Baseada em Problemas (ABP), apresentada como uma metodologia inovadora para o ensino de Geografia, fundamentada na resolução de problemas e centrada na autonomia do estudante. Na segunda parte, realiza-se uma breve reflexão sobre a possibilidade de um ensino por meio da resolução de situações-problema em Geografia, discutida como um caminho exequível que convoca o aluno para solucionar situações-problema, que engaja professor e estudante nas problemáticas cotidianas. Assim, a formação do pensamento espacial e do raciocínio geográfico pautada na resolução de situações-problema pode se efetivar, na medida em que o professor realizar a problematização das situações geográficas, de maneira que o aluno seja orientado a raciocinar, pensar, questionar, buscar informações e intervir na realidade socioespacial.

Palavras-chave: Ensino de Geografia; Aprendizagem Baseada em Problemas; Situações-problema; Pensamento espacial; Raciocínio geográfico.

Introduction

Teaching Geography has been a very challenging task, because, among other reasons, the teacher needs to account for the dynamics of today's world and contribute to the student's ability to assign sense and meaning to geographic knowledge. This challenge becomes even more robust in the face of the stigma that

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Geography carries as a secondary subject, where in the teaching process "the activities that reduce the intellectual exercise of students remain, this being basically to repeat information, schematic explanations, definitions/classifications about the topics that are presented to them" (CAVALCANTI, 2019, p. 47).

From this observation, the debate around the innovation of Geography teaching remains strong and contemporary, mainly because "The vast majority of teachers in the education network know very well that the current teaching of geography does not satisfy either the student or even the teacher who teaches it" (OLIVEIRA, 2019, p. 137). The traditional model rooted in Geography classes is ineffective when proposing meaningful learning, fostered in the formation of students' spatial thinking and geographic reasoning.

In this perspective, it is essential that teachers rethink their practice and think of new conceptions and ways to teach Geography.

This means that new contours for the teaching of this curricular component require the continuous search for a pedagogical practice with meaning for the student, recognizing him as an autonomous subject and protagonist of this process. Thus, it is necessary to opt for methodologies that involve the student in the construction of knowledge, so that everyday situations are considered, contextualized and related to what has been learned, in order to in fact be able to analyze and understand the local and global reality (CASTELLAR; VILHENA, 2019).

The present work emerged from the ideas developed during master's research, currently being completed, in the Graduate Program in Teaching (PPGEn) of the State University of Southwest Bahia (UESB), which investigates the use of research as a formative path in teaching Geography. The proposal of research (DEMO, 2001) in Geography classes presupposes the overcoming of practices that privilege the simple transmission of ready and finished knowledge. This pedagogical innovation that is proposed, has in teaching through problem situations an opportunity to be effective, since this proposition is focused on student autonomy and the production of geographic knowledge, besides favoring the formation of spatial thinking, with a critical view of reality.

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Therefore, this study presents a theoretical discussion based on bibliographic research with a fundamentally qualitative approach, presenting the main existing productions on the subject under discussion. This research is based on the understanding of Marconi and Lakatos (2003) that no study today arises from a preliminary point. For them, "[...] in a given place, someone or a group, somewhere, must have done the same or similar research, or even complementary research on certain aspects of the intended research" (MARCONI; LAKATOS, 2003, p. 225). The bibliographic research was conducted in books, dissertations and theses, and scientific articles from Scielo and Google Academic databases.

When accessing these databases, some keywords - "Problem-Based Learning (PBA)", "PBA in Geography teaching", "PBA and the formation of spatial thinking" and "problem situations and geographic reasoning" - were used in order to limit the bibliographical survey to the topic of interest. Then, all the national productions were listed and, after that, the abstracts of the books and the summaries of the articles, dissertations and theses were read to finally select the main references. With this, some basic authors were identified who discuss the ideas that support this article, such as: Demo (2001, 2015), Martins (2001), Cachinho (2012), Pontuschka, Paganelli and Cacete (2009), Callai (2011), Cavalcanti (2010, 2014, 2019), Castellar and Juliasz (2017), Castellar and Vilhena (2019), Castellar and Paula (2020), Munhoz (2018), Santos (2015), Moraes (2010) and Luz Neto (2019).

According to Santos (2015, p. 27-28), the formation of the student's spatial thinking requires establishing "meeting of everyday Geography (space lived by students) with the dimension of scientific Geography (space conceived by this science)". In this way, the development of geographic thinking will occur in an articulated manner with a greater understanding of the lived experience. And the resolution of problem situations in this process is a teaching procedure with potential to promote integration between the knowledge coming from the space lived by the student and the space conceived by Geography, thus building a geographic look increasingly rich of experiences and perceptions.

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Structured in two parts, this article begins with a discussion about Problem Based Learning (PBL), presented as an innovative methodology for teaching Geography, based on problem solving and centered on student autonomy in the process of learning construction. In the second part, based on the option of working with (ABP), a reflection is made on the possibility of teaching through the resolution of problem situations in Geography, defended as a feasible path that calls on the student to think, reason, analyze and investigate solutions to problem situations of reality, which engages teacher and student in everyday social problems and creates conditions to form spatial thinking and geographic reasoning and innovate the teaching of Geography.

Problem-Based Learning (PBA) in the teaching of Geography

The starting point of this discussion is the central concern of Cavalcanti's (2019, p. 9-10) book Thinking for Geography, teaching and social relevance, which seeks to unravel "how to act in Geography teaching so that it is meaningful to students". This has been, throughout the history of geographic science, one of its greatest challenges and, consequently, the target of many discussions and investigations.

This concern is directly associated with the verification of the permanence of traditional teaching practices, since, according to Vesentini (2019), the Geography taught remains compartmentalized and is certainly far from its real needs. Castellar and Vilhena (2019, p. 19) say "[...] that this old way is the descriptive one, decontextualized, with the contents without meaning for the student". Corroborating with the studies of Cavalcanti (2019), Vesentini (2019) and Castellar and Vilhena (2019), regarding the need for renewal of Geography teaching, this study shows to be relevant and necessary, as it seeks to present a possibility of pedagogical practice of how to teach Geography to produce knowledge instead of reproducing what already exists.

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Based on the thought of Demo (2001), which guides to an educational practice that creates conditions of creativity for the student to build solutions to new problems, this study bets on a Geography teaching that values for establishing relationships between scientific knowledge and everyday life, so that it contributes to the student acquires skills and abilities to act in an enlightened way and solve the problem situations of their daily lives. In addition to Demo's idea (2001), this study is based on the desire to replace the pedagogy of certainties and definitive truths with the pedagogy of the question (FREIRE, 1992), which understands that knowledge always starts from a questioning, an uncertainty or a problem-situation that has not yet been solved.

In this sense, it is pertinent to present an innovative methodology for teaching Geography based on problem solving. Called Problem Based Learning (PBL), it is considered by Munhoz (2018) a new way of teaching and learning, which opposes traditional methods and is based on the evidence that by solving problems, the student shows greater learning and performance. For the author, "When facing a problem without a previously defined solution, not attested by the teacher, who adopts a guiding role, only the awakening of critical sense, creativity and initiative is able to lead to a satisfactory solution" (MUNHOZ, 2018, p. 124). This is the approach that underpins a teaching where learning is based on problem solving.

With limited existing literature on ABP or PBL, Ribeiro (2022) points out that this methodology originated in the late 1960s at McMaster University School of Medicine in Canada. Its application is recent and until the 1980s it was predominantly linked to university courses in the health area, in which Howard Barrows articulated the team of teachers who promoted a very successful curriculum reform based on ABP, at first in Canada and then in the United States (MORAES, 2010).

According to Munhoz (2018), as of the 1990s, studies on ABP have multiplied and other areas of knowledge have intensified its use, no longer being specific to the medical class, mainly. Currently, ABP is not exclusive to higher education and can already be considered an educational approach applied at the basic level of

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education, with characteristics opposite to traditional methods of teaching and learning, because it fits the context of society where changes occur in an accelerated manner and contributes to train students with competencies and skills that fit the profile of citizen required today (MUNHOZ, 2018).

In the doctoral thesis entitled Scientific Literacy, Problem Solving and Citizenship: a proposal for the teaching of Geography, Moraes (2010) presents the educational potential of ABP in Geography teaching and its contribution to the student's citizenship education. The author conducts a rich theoretical discussion about several concepts that are the basis of her research, among which she cites a definition of ABP that is very relevant to the need to innovate the teaching of Geography. Thus, it is worth mentioning Barell's (2007, p. 3, apud MORAES, 2010, p. 93) conception of GPA:

> an investigative process that resolves questions, curiosities, doubts, and uncertainties about complex phenomena in life. A problem is any doubt, difficulty, or uncertainty that invites or needs some kind of resolution. Student research is an essential part of PBL and the problem-solving process.

The relevance of the definition of ABP presented above lies mainly in the clarity of what a problem can be and in the evidence given to the intrinsic relationship between research carried out by students and learning based on the search for solutions to problems. In this sense, research is considered essential to find answers to inquiries and uncertainties.

Costa and Moreira (1996, p. 177) take an important approach to problem solving and conceptualize it as "a subjective state of mind, personal to each individual, a challenge, an unresolved situation, whose answer is not immediate, that results in reflection and use of conceptual and procedural strategies, causing a change in mental structures." In convergence with what has been presented by Moraes (2010), this means that a problem is a situation that needs to be solved, that requires investigative conduct and reflection until the solution and functions as a stimulus and starting point for student learning.

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Some authors prefer to use the designation Problem-Based Learning (PBLL), such as Torres and Souza (2013), who, when presenting the paper entitled Problem-Based Learning (PBLL): a methodology for learning Geography, discuss about:

> Problem-Based Learning (ABRP or PBL) as a learning methodology whose potential lies in the fact that students are the first to experience the challenge of facing problems, thoughts, reasoning and actions associated with their resolution, allowing them to exercise their minds and develop feelings of satisfaction for the effort spent in finding reasonable solutions (TORRES; SOUZA, 2013, p. 17089).

In ABRP, the centrality of the teaching and learning process is in the student, who assumes an active role and "[...] the responsibility for their own learning, acting critically and reflectively in identifying the problem and what they need to know and do to solve it" (TORRES; SOUZA, 2013, p. 17094), and the teacher as mediator will help the student elaborate the problem context and make the problem definition, guiding him/her in solving it. This means that "students solve problems, having teachers as assistants, collaborators or facilitators" (MUNHOZ, 2018, p. 125) of the teaching and learning process.

The same Munhoz (2018) in his book ABP - Problem-Based Learning: a tool to support teachers in the teaching and learning process presents some results of the use of ABP in the educational process that are worth highlighting:

> Increased research capacity on the part of students [...]; development of the creative spirit applied in the selection, among a large number of information, of those considered relevant to the solution of the problem; increase of new knowledge or, at least, new views on already established knowledge [...] (MUNHOZ, 2018, p. 146).

The results pointed out above are in line with the objectives of a teaching that favors the questioning attitude and the autonomous thinking of students, which advocates the replacement of traditional pedagogy by investigative pedagogy (MARTINS, 2001), in which students must lead their learning process, mediated by the teacher, and from the discovery of answers to their questions they will autonomously build a new knowledge and learn significantly. "In general, a teaching

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and learning proposal based on PBL allows the student to give meaning to what he is learning and enables him not to stop learning fragmented content" (MORAES, 2010, p. 97). The same author also adds that meaningful learning for the student is an indispensable condition for him to become, since basic education, a participatory and proactive subject in the reality in which he lives.

Therefore, Problem-Based Learning (PBA) in Geography teaching is a possibility of student-centered teaching practice, which can present positive results for teachers and students, as it represents an active methodology and promotes the development of critical and investigative thinking, problem solving in the student's socio-spatial context, the improvement of reasoning and the autonomous construction of knowledge.

Teaching through problem situations and the formation of spatial thinking and geographic reasoning

In the context of this study, the possibility of teaching through the resolution of problem situations in Geography, originates from the option of working with Problem-Based Learning (PBA), which is configured in a feasible way that can "enhance the individual's scientific training, so that he is able to realize himself in a certain place and space, place and space from the point of view of geographic science" (MORAES, 2010, p. 90). Under the pretext of innovating the teaching of Geography, the development of a teaching that calls on the student to solve problem situations, besides engaging the teacher and the student in everyday social problems, will create conditions for the student to form spatial thinking and geographic reasoning, articulating the geographic knowledge with that of the lived context. For Torres and Souza (2013, p. 17090) "this methodology assumes a role of great relevance in the teaching-learning process of a geography that for a long time no longer fits to be discussed in the traditional way", since, according to Demo (2015), this way hinders the student and places him as an object of teaching and instruction.

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In the opposite of traditional Geography, the teaching of this curricular component nowadays is pressured to take on a new methodological outfit, in a way that in practice will make it more dynamic, more attractive, to finally

> [...] to enable the student to understand reality and to give him tools to make critical reading, identify problems and study ways to solve them; but for this it is necessary that students and teacher are partners in the search for knowledge and know how to use them in order to understand the space and analyze it geographically to establish relationships, associations between the place and the world (KLIMEK, 2007, p. 117).

According to Cavalcanti (2010), from her experience in contacting, dialoguing with Geography teachers and following their practices, it is possible to safely state that they "are often concerned with finding ways to propitiate the students' collective interest, bringing the themes of local and global spatiality closer to the themes of spatiality lived in everyday life" (CAVALCANTI, 2010, p. 01). According to the same author, attracting the student's attention and curiosity to learn the geographic contents and concepts has been a very difficult task for teachers, although the student, in his spatiality, belongs to the diverse set of human experiences lived in geographic space, studied by Geography.

In this complex challenge, Cavalcanti (2010, p. 03) alerts that to provoke the interest of students, "the teacher must act in didactic mediation, which implies investing in the process of reflection on the contribution of Geography in everyday life, without losing sight of its importance for a critical analysis of the wider social and natural reality". Because of that, the teacher education courses nowadays have considered the development of theoretical-practical orientations directed to a Geography teaching that has meaning for the students' lives (CAVALCANTI; SOUZA, 2014). Thus, the perceived trend is that

> In recent decades, research in the area of school Geography has attributed greater relevance to the Geography that is taught, making it more interesting and more attractive, promoting meaningful learning, working with integrated, open knowledge, which considers the complexity inherent in reality, highlighting the relationship between everyday life, pedagogical mediation and concept formation in the development of the teaching/learning process (CAVALCANTI; SOUZA, 2014, p. 04).

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In this perspective, Callai (2011) talks about geographic education, which according to her, aims to make the contents and concepts of Geography meaningful for the student's understanding of spatiality. For this to happen, it is necessary that the student is guided to develop the competence of geographic analysis, which is effective through the understanding and search for explanations of the phenomena and problems that society presents. (CALLAI, 2011). Castellar and Juliasz (2017) also discuss geographical education, which for them is constituted by knowledge that allows the reading of the world and the formation of spatial thinking, as well as the understanding of reality and the relationships between man and nature. According to the authors, for learning to occur in the context of geographic education, it is essential that the geographic reasoning is developed by the student.

From this understanding, "Teaching geography means enabling the student to reason geographically about the Earth space at different scales, in a cultural, economic, environmental and social dimension" (CASTELLAR; VILHENA, 2019, p. 19). In accordance with this understanding, Cavalcanti (2010, p. 07) complements this discussion by confirming that the act of "[...] teaching Geography is not teaching a set of contents and themes, but it is, first of all, teaching a specific way of thinking, of perceiving reality. It is about teaching a geographic way of thinking, a geographic look, a geographic reasoning", which allows the analysis and understanding of the lived reality, of the world events and current issues. According to the same author, the function of teaching Geography is the development of thinking through Geography, where geographic reasoning is configured as a dimension of this thinking (CAVALCANTI, 2019).

Endorsed by the rhetoric of re-signifying the Geography taught, by the need to give meaning to geographic contents and concepts and "supported by the fact that school is the locus of opportunities for students to be stimulated to reason, raise hypotheses, develop ideas and, thus, approach scientific knowledge" (CASTELLAR, 2020, p. 295), this section seeks to present how a teaching through the resolution of problem situations can contribute to the development of spatial thinking and the consequent formation of the student's geographic reasoning. For this, it is necessary to be clear about the concepts of spatial thinking and geographic reasoning.

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According to Kunz e Castioni (2016, p. 137),

> Geographical reasoning is here understood as being that which chooses or prioritizes reflections from the spatial gaze to understand the world. [...], the improvement of geographic reasoning is a condition for the construction or sedimentation of spatial analysis, as it refers to the improvement of strategies or cognitive paths to solve issues posed by reality.

Luz Neto (2019, p. 35) in his dissertation entitled *The development of geographic reasoning in the Geography classroom: challenges and possibilities for the teacher*, argues that:

> the notion of geographic reasoning as a cognitive process to be developed in the teaching of Geography, anchored in the articulation of the foundations of Geography and learning processes. Such reasoning constitutes a theoretical instrument for the student, for interpreting the world and its spatial practices.

Associated with this is the concept of spatial thinking, which according to Castellar and Juliasz (2017) is also a cognitive skill that is linked to reflection, analysis, comparison, and understanding of the spatiality of one's place and others in the world. For them, spatial thinking and geographic reasoning "are grounded in geographic concepts, spatial representations, and thinking skills. This type of thinking consists of the mobilization of reasoning about space and spatial representation" (CASTELLAR; JULIASZ, 2017, p. 160). The authors add that both have closely associated concepts and start from:

> Concepção de que o pensamento espacial mobiliza e desenvolve o raciocínio geográfico pois trata-se de inserir os princípios e conceitos estruturantes para análise do espaço e sua dinâmica, por exemplo, escala, extensão, localização, as relações entre as unidades de medida, as diferentes formas de calcular a distância (milhas, tempo de viagem, custos de viagem), os sistemas de coordenadas, a natureza dos espaços (bidimensionalidade e tridimensionalidade) (CASTELLAR; JULIASZ, 2017, p. 162).

Cavalcanti (2010) reiterates in his studies the importance of the student conceiving the elementary concepts of Geography (place, landscape, territory, region and nature) so that the geographic analysis and the understanding of the spatial dynamics of social phenomena occur. Thus, "To form a spatial thinking, it is necessary that they form comprehensive geographic concepts, which are fundamental tools to understand the various spaces, to locate and analyze the meanings of places and

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their relationship with everyday life" (CAVALCANTI, 2010, p. 07). In the context of the teaching and learning process, this indicates that the acquisition of concepts, the formation of spatial thinking and geographic analysis form a set of inseparable knowledge, skills and abilities, which require new theoretical and practical approaches from the teacher, always considering the articulation of the contents of science with the geographic situations experienced by the student. In this scope,

> It is about seeking foundations to consolidate Geography in the school curriculum through new learning approaches, integrating didactics with geographic concepts and principles. It is also about giving strength to geographic education through the understanding of geographic phenomena and situations experienced by students in their daily lives, relating and understanding them (CASTELLAR; JULIASZ, 2017, p. 162).

For Cavalcanti (2019 and 2010), the change that is sought in the Geography taught must provide the student with a way of thinking geographically/spatially the world. The book The Need for Geography organized by Carlos and Cruz (2019, p. 09) brings right in the introduction "what is specific to Geography: the spatial level of social reality", and its instrumentalization becomes possible from the development of a geographic way of thinking, because it allows the student to be aware of the spatiality of things. This requires the understanding of concepts and the acquisition of the structuring principles of spatial analysis and the development of geographic reasoning, which if stimulated from the early years of elementary school tends to become a habitual procedure that leads the student to perform the reading and understanding of the ways in which society organizes its space and to give meaning to the themes, contents, facts and phenomena studied (CAVALCANTI, 2010).

Given that spatial thinking and geographic reasoning have inseparable concepts (CASTELLAR; JULIASZ, 2017), Gomes (2012, p. 21, apud CAVALCANTI, 2019, p. 69) states that geographic reasoning is "the one built by questioning the reasons that explain the arrangement of things in space and then the meanings and consequences of such spatial order". For Cavalcanti (2019), in this view, the interrogations/questions have an important role in the construction of geographic/spatial thinking, because it is in the search for answers and from them that it will be possible to reach the logical understanding of the reasons and consequences of how things are organized and distributed in geographic space.

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Castellar and Paula (2020), in the paper entitled *The role of spatial thinking in the construction of geographic reasoning*, discuss the pedagogical potential existing in spatial thinking, and places it as procedural content that favors the elaboration of geographic reasoning. In the discussion, the authors draw attention to the importance of considering geographic situations in the process of building geographic reasoning. For them, "The geographic situation matches a bundle of events in a place, territory, landscape or region, the particularity of sets and effects as a result of the socially produced space" (CASTELLAR; PAULA, 2020, p. 310). Despite privileging the events that occurred in a given spatial cutout, the geographical situation presupposes the analysis of the processes as a whole, preventing the dichotomy and division between global facts and local facts.

According to Castellar and Paula (2020), in the context of the teaching and learning process, knowing how to define the geographic situation is one of the conditions for learning, since the theme and the problem to be studied arise from it. For them, questions have an important role within the pedagogical practices, and that is why Geography teachers cannot treat them banally, but must organize them based on a planning that provides the understanding of the meanings and the scientific understanding of them. A well-designed question makes it possible to carry out an investigation based on a grounded critical analysis and, consequently, the construction of geographic reasoning.

According to the point of view presented in a study by Castellar and Paula (2020, p. 308), "Questions must mobilize action and the potential for transformation, they must instigate, arouse creativity and criticality and, at the same time, ensure the subject the possibility of leaving one level of knowledge and reaching another level of knowledge". Anchored in this conception, teaching is based on the problematization of geographical situations and on the resolution of socioeconomic, political, cultural, or environmental problem situations existing in the students' living space.

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In this perspective, it is pertinent to mention the work of Cachinho (2012, p. 58-59), where in the article *Creating meaningful learning experiences: the potential of Problem-Based Learning*, he presents the potential of ABP in the development of experiences that lead to meaningful learning in Geography and confirms "the innovative character and the high didactic potential of this methodology, [...] either at the level of mastering the key concepts of the discipline, or in the acquisition of skills that facilitate their integration into active life [...]". The meaningful learning experiences were developed from problem situations thrown to the students, at first, to introduce the themes to be researched and motivate them to investigate the problems, and at the end, to encourage students to develop learning that went beyond the limits of the explored themes (CACHINHO, 2012).

A Geography teaching from the resolution of problem situations is appreciated by Silva (2019), because for him, this way of teaching gives the student the active role in the construction of new knowledge, leading him to develop the skills of reasoning, questioning, relating, comparing, analyzing, building, and doing. "What is interesting in the application of the problem situations is to realize how the child [student] interacts with these challenging tasks, diagnosing which cognitive skills he presents or needs to develop [...]" (SILVA, 2019, p. 144) to solve the problem situations. In this discovery process, the student will have the chances to develop the aforementioned skills, to reformulate what he already knows and to build new learning.

In Castellar and Vilhena's (2019) conception, problem situations are part of the Problem-Based Learning (PBA) methodology. Through it, the teacher directs the process so that the student assumes an investigative posture and stimulates him or her to think critically about various hypotheses and to seek the reasons for the problem being researched. In the authors' view, the problem situations in Geography teaching

> [...] stimulate the student's reasoning so that he can understand concepts and propositions and conduct strategies to analyze and associate them with reality data. Problem situations can be understood as issues that require a method that helps the student to become competent in his actions. [...] He needs to consider that, by reasoning about a problem, he will promote autonomy to solve situations in everyday life (CASTELLAR; VILHENA, 2019, p. 49).

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It is noted that a path based on teaching methodologies that stimulate the reasoning and autonomous thinking of the student is indispensable in the process of solving problem situations, especially because the solution to a problem is not discovered or achieved through imitative actions. This process also takes into account the knowledge derived from the experience of geographical situations, which will be confronted with the new knowledge under construction. Hence, the student needs to be stimulated to organize his thoughts, analyze the information obtained and identify the most relevant ones to answer the problem situation, so "that he develops reasoning and can transfer knowledge to different situations of everyday life" (CASTELLAR; VILHENA, 2019, p. 51), from the integration of geographic knowledge with everyday Geography.

The proposal to contribute to the formation of spatial thinking and geographic reasoning based on the resolution of problem situations in the teaching and learning process in Geography, will trigger the dimensions of space conceived and lived by the student and will give room for reading the space and understanding the spatial dynamics of the phenomena inserted in them. In this sense, the authors Pontuschka, Paganelli and Cacete (2019, p. 39) point out that "it is essential to master the reading of space through spontaneous and directed observation, interviews, production of records and research in various sources, in the concrete local realities of the neighborhood or cities. With these procedures, the student will build a larger conceptual repertoire for the development of geographic reasoning, with the potential to intervene in local and global problem situations.

Therefore, the formation of spatial thinking and geographic reasoning based on the resolution of problem situations can be effective, as long as the teaching work promotes the problematization of geographic situations. In this way, it is essential to contextualize the content or theme to be worked on and guide the definition of problem situations based on the reality experienced by the student. This teaching proposal focuses on the curious student's attitude so that the investigation and production of solutions to the chosen problems can occur. The path taken to find the answers about the investigated problem must be structured in stages, so that the

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student is guided to think, reason, question, seek information, raise hypotheses, compare, relate and analyze data, interpret the socio-spatial reality, build a new knowledge and intervene in the explored problem-situation.

As well emphasizes Cavalcanti (2012, p. 08), "geography is, in this particular, an area of knowledge of extreme importance, so that the student understands the world in which he lives and perceives himself in this world". Given this potential that the Geography taught has in favoring the interpretation of reality and the understanding of the spatial dynamics of social facts, teaching through problem situations, in the perspective discussed here, will put the student in front of opportunities to develop spatial thinking and geographic reasoning, as well as to understand the reasons and the spatiality of social phenomena in their place and in more distant places.

Finally, the student will be able to effectively "reach scientific knowledge through concrete procedures in order to subsequently relate what is taught to everyday life, thus making significant learning occur" (MORAES, 2019, p. 99) in the teaching and learning process of school Geography, which in turn, tends to provide the formation of spatial thinking and geographic reasoning from the appropriation of geographic knowledge.

Some considerations

Studying, researching, teaching and learning Geography are actions that lead to the formation of a way of reading and trying to understand the spatiality of things, facts and phenomena. That said, the reflection on spatial thinking and geographic reasoning is pertinent and valuable, especially when the intention is to develop a school Geography. It is at school that the intentionality of teaching is organized and revealed, leading teachers and students to reach the understanding, if not the deep comprehension of the geographic space, its dynamics and the most diverse nuances of human development, which result in a complex, not always harmonious, but essentially human, with its virtues and woes.

Thus, the proposal of teaching through discussion and resolution of problems arising from the observation of everyday life, the lived and/or perceived space, leads us to believe that this is the meaning of working with Geography in the classroom. It is in providing the appropriate repertoire for the analysis of space that the geographic science is intertwined with life, with its concepts and categories, such as place, landscape, nature and society, serving as "lenses" so that the teaching is endowed with the ability to read and deal with the street, the neighborhood, the city or aspects that are repeated in the world.

What is intended is to offer dialogical resources to develop the ability to argue about the place where one lives, comparing and reasoning spatially about the different realities, problems, and possibilities of human making.

In this way, spatial thinking is understood as the result of a good teaching plan that takes into account the fundamental concepts of the geographic science, translated into instruments for reading the world at school, including the forms of representation of space (maps, charts, images), permeated by everyday lived and perceived knowledge, stimulated by the investigation and resolution of real problems, in a scientifically conceived space and endowed with meanings arising from the human dynamics that take place in space. This is the proposal to teach geographic reasoning.

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