

Cartographical Knowledge and Training of Geography Teachers

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Abstract:

This article raises a few discussion topics concerning the cartographical learning for children and young adults as well as the training of Geography teachers in Brazil. It's necessary to clarify that one can't assign to teachers the full responsibility for the problems that the school and the cartography teaching are facing. We agree with Souza and Katuta (2001), who affirm there is a relevant and complex group of political, social and economic elements that can help explaining the educational situation Brazil is facing, especially in public schools. However, these elements end up being concealed along the education process. Therefore, we will present only the part of the scenario that includes the practices of Geography teachers, since they are responsible for forming the future generation of map-readers and producers. When dealing with the subject of teaching the teachers, we researched the literature that covers the teaching of Geography and Cartography at school and we applied it to national scope and to our own experience as teachers and researchers.

Keywords: training of Geography teachers, School Cartography, cartographical knowledge.

Introduction

Geography, the role played in the formation of citizens, must be seen in the main, the geographic space. It is an initiative that encourages student critique to understand their communication and presentation of spatial results. More than that, scientists must feel made geography at all times (CAVALCANTI, 1999).

To do so, Geography uses several images, which account, in addition to everyday life, of representing the different places that are part of the teaching of this discipline and that would not be possible to visualize without some graphic resource.

Being the allied Cartography of Geography in this process, the main concern of those who construct a map should be to make it capable of guiding the user through information and, thus, allow to build the learning about Geography. In other words, the map used for geographic education should communicate about the ways of organizing space, the world, the relationship between environment and man, and man with nature, in search of emancipatory education.

Cartographic learning is a complex task, due to its characteristic of social construct (ALMEIDA, 2010), endowed with a judgment of value, and requires a solid formation. It is art, method and technique of representation of geographic spaces, involves direct or indirect observations of the space to be mapped. The map is a language that is supported by the graphic / visual elements (colors, textures, saturation, symbols, tonality, size, etc.) and also textual elements (legend, scale, title, place names or objects, etc.). It is with this reasoning that Bertin (1967) states Cartography is the rational part of the world of images.

The map is situated between the world of symbols, as is abstract art, and figurative, as is photography. It is opposed to sequenced language as it is to a text. It is therefore close to the figures, which use an instantaneous language. Its function is to facilitate the spatial understanding of objects, processes, facts, conditions, concepts, anxieties of the human world and that will depend on the society in which this resource is inserted (HARLEY, 2005; 2009).

The increasing increase in the use of maps by society in general is possible thanks to the new technical

solutions for the collection and processing of the data, from the evolution of the computer science. However, if the availability of maps has become more comprehensive, the domain of language and production still occurs by specific groups (Martinez, 1998). It is not enough to have the map, you must know how to use it (LACOSTE, 1988).

The Geography teacher of basic school has great responsibility in the apprehension process of the map, since it is during his classes that the cartographic language is presented to the students. The way in which this contact is made can promote the approach or the distance from the maps. In this sense, the initial formation of the teacher is extremely important because he should, when working with maps, present security and view maps according to their real function: to communicate information that occurs in the territory.

Despite the considerable number of postgraduate researches in the area of Cartography in Brazil, there has been little discussion about the teaching of this subject within undergraduate courses, especially in Geography courses, in order for this professional to have intellectual autonomy in driving thematic in their daily practice. Therefore, we will present part of the Brazilian reality, in which we discuss the importance of School Cartography for the formation of new Geography teachers and, consequently, future users of the map.

The School Cartography courses and teacher training of Geography.

The role of presenting the cartographic knowledge in the school is in charge of the Geography classes, which aims to teach the student the understanding of logic in the territorial distribution of phenomena, so that he can act critically and recognize the relationships that involve his existence. The school cartography education should allow the student to understand why objects and phenomena are located in a particular area. It should stimulate a conscious reflection on the mapped space so that the student can demand or act on it. For this to occur in a satisfactory way, it is necessary to construct and develop a series of notions and processes that begin even in the first years of school.

In order for the Geography teacher to have a more significant training in the area of Cartography, authors like Mello (2007), Pezzato (2011) and Nogueira (2011) argue that the ideal would be to offer the discipline of School Cartography in the curriculum of Universities who hold a degree in Geography. According to Seeman (2011), School Cartography would be supported by Cartography, Education and Geography, enabling a better understanding of the world through cartographic products in the teaching environment. But for this, it is necessary that the formation of the teacher is solid, so that it has security and autonomy when using such resources in room.

In the paper by Melo (2007), justifications for the insertion of School Cartography in the higher education curriculum are presented, however, the recent research done for the elaboration of this text shows that very few universities offer this discipline in the Brazilian territory:

We understand that the courses of Geography in Bachelor and Licenciatura, although they present points in common, are specific formations each one must have a curricular grid of its own. In the case of the Licenciatura, it is important to include in this grid, curricular components that work with school knowledge, such as School Cartography, offering, in the teacher's initial training, relevant knowledge in relation to the exercise of their profession. With reference specifically to the curricular components of Cartography, we could verify, in the great majority, the lack of relation with the Elementary and Middle School of Geography. (MELLO, op cit-p.38)

The author also affirms that academic knowledge, developed in higher education, must be in tune with the research carried out in geographic science without losing sight of scholarly knowledge. This connection between the different spheres of knowledge feeds the discipline with new reflections and approaches, avoiding the deterioration of academic and scholastic geography, because who maintains the existing discipline is the teacher.

Nogueira (2011) also defends the incorporation of the discipline of School Cartography in the curriculum:

With regard to the transposition of scientific knowledge learned in the university to the one to be taught in basic education, the program of the discipline of School Cartography can solve some of the difficulties that the future teacher will encounter when he is in his classroom. The knowledge learned will need contributions from other knowledge to teach the map and teach Geography with maps; this is not a simple or easy task in the beginning, but it is urgent and possible to become pleasurable and permanent in the basic education classrooms. (NOGUEIRA, op. Cit, 2011)

In the initial formation of the professor of Geography it is expected that there will be a sufficient Cartography approach so that he can work on the theme in his practice in basic education.

Some public universities in Brazil have been introducing the discipline of School Cartography in the initial formation of teachers, among them the Federal University of Juiz de Fora, in Minas Gerais, with the discipline "Practical Teaching in Cartography"; the State University of Amazonas with the subject "Cartography applied to teaching", the Federal University of Santa Catarina with the discipline "Cartografia Escolar", all geography and the University of São Paulo, in the Campus of Ribeirão Preto that offers the discipline "School Cartography" as optional for the course of Pedagogy.

At the Federal University of Santa Catarina (UFSC), the discipline of School Cartography has been a reality in the Geography course since 2006. Created in the curricular reform as compulsory for undergraduate students, the subject has been taught in the fifth period of the course.

In the course of Degree in Geography of the Campus of Ourinhos of UNESP the discipline of School Cartography was introduced in the grid as optional in 2012, with a 60-hour workload. In the adequacy of the Political Pedagogical Project of the course and in compliance with the determinations of the State Board of Education, the discipline became mandatory and has a theoretical and practical timetable as a curricular component.

When conducting a survey of the curricular matrices of 85 undergraduate courses in Geography offered at public higher education institutions (federal and state) throughout the country, it is possible to note that, in general, two disciplines of Cartography are offered, divided between the introduction of Cartography or Systematic Cartography and Thematic Mapping, more frequent in the courses.

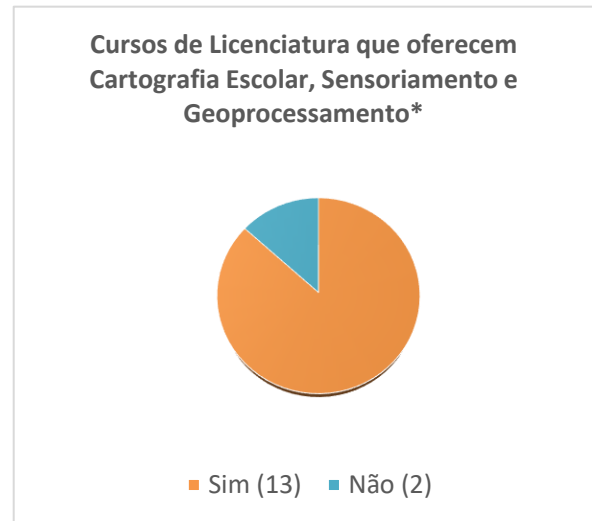
Not all courses offer undergraduate courses in remote sensing and geoprocessing, which already indicates a lag in relation to the use of remote sensing products in the classroom, which has been increasingly frequent in the basic education Geography curricula.

The most important data for this work is that only 15 of the 85 courses surveyed offer some discipline focused on the discussion of School Cartography. The same appears with other names, but with the same approach, for example, at the University of Rio Grande (FURG) that presents the discipline of Applied Cartography to the teaching of Geography, or the Federal University of Mato Grosso (UFMT) Campus Cuiabá with the discipline Educational Projects in Cartography.



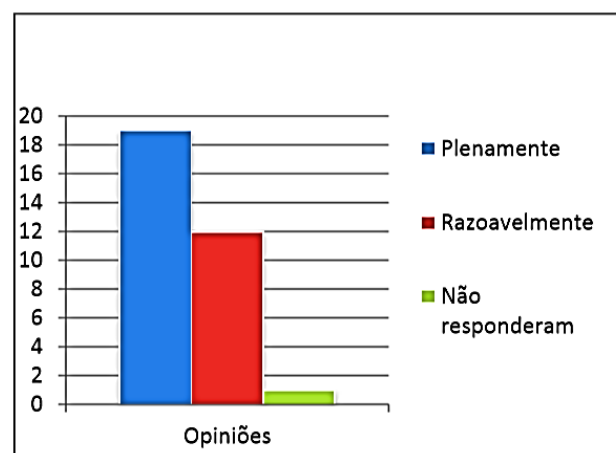
Graph 1: Disciplines offered in the degree courses in Geography, 2016.

Another data considered in the survey was that of the 15 courses that offer subjects related to School Cartography, 13 also have remote sensing and / or geoprocessing disciplines which can demonstrate a concern in the teacher's more complete training in the new information technologies.



Graph 2: Undergraduate Courses Offering School Cartography, Remote Sensing and Geoprocessing, 2016

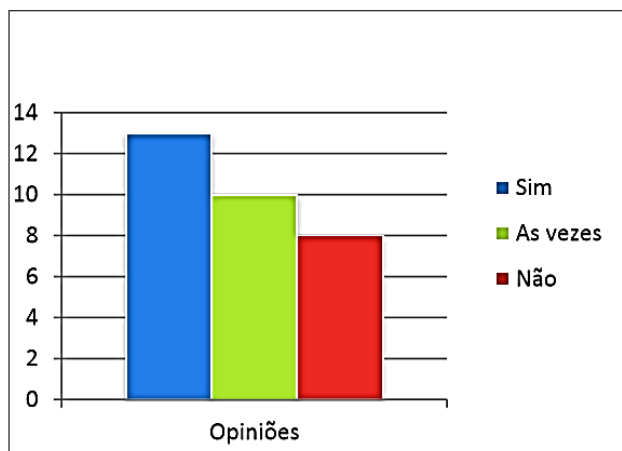
The result of this can be observed when 32 teachers of Geography of the State of São Paulo, in full action, were interviewed. The questions were presented on an online platform, with open and closed questions. We will emphasize the first question (graph 3) which proposed the reflection of the learning by the map.



Graph 3: Answers to the question "Do you think the activities that have cartographic resources can help in the teaching of Geography? ". Source: JORDAN, 2015.

It is possible to note that there are a large number of teachers (12) who answered reasonably regarding the use of cartographic resources in Geography classes. The difficulty of perceiving the map as a resource for teaching during geography classes may be tied to teacher training.

However, although to a greater or lesser extent all, except those who did not respond, we considered the use of these resources for learning. Another question was about teacher safety in working with Cartography (figure 4).



Graph 4: Answers to the question "Do you feel comfortable, safe, to work with these diverse cartographic resources in the classroom? ". Source: JORDAN, 2015

Eight of the 32 teachers still do not feel safe to work with maps, even though they have been teaching for some time. Therefore, although they consider the importance of the cartographic resources for the classes, even arguing that these products stimulate the student's curiosity and make the class more dynamic, on the other hand there is great difficulty in working with the maps in the classroom, by the own unfamiliarity with Cartography as language. This result may be related to teacher training and insecurity when using a classroom map, possibly due to the absence of subjects related to cartography and teaching during graduation.

At that moment we find exactly what Castellar (1996), Simielli (1999) and Carmo (2009), had denounced in their research, that Cartography is distant from Brazilian schools because most of the reading, writing and visualization skills through graphic means are unknown or little used by teachers.

We also add that the distance from the real space of the student to the mapped space, which in most of the representations present in the books and other didactic materials do not reflect the students' daily life, makes it difficult to establish the relation and approximation with the maps.

An initiative that has been giving interesting results both for students of basic education and for students of the Geography course (future teachers) is the participation of the schools in the Cartography competition for children "Professor Livia de Oliveira" award, of national scope, that takes place annually and selects designs for the Barbara Petchenik Children's Map Award

from the International Cartographic Association, which takes place every two years.

This contest aims to promote the creative representation of the world, in drawing or any form of artistic work, from maps by children and adolescents. It is proposed that teachers discuss the theme of the contest call with their students and that later they draw their impressions, analyzes and reflections on the subject, but always basing their design on a map.

Mapping within geography should stimulate the student's autonomy, recognition of his environment and his own recognition, should also prevail over the potential use of cartographic representations in the discovery process. (GIRARDI, 2007). The idea is to base the teaching of cartography and, for this, we propose the initial and continued formation of the geographers and the expansion of the debate on the insertion of the discipline of School Cartography in higher education, restricted not only to Geography courses, in the initial series that many of the basics for map reading are introduced and developed. All the reflections presented have a strong political bias and the contributions we intend to give are related to the defense of the permanence of Geography and Cartography in Brazilian Basic Education.

Final considerations

It's indisputable that we need to give more attention to Geography and Cartography in the school environment, besides the proposals of activities in the classroom, but as regards the autonomy of the teacher to approach this subject and to train the possible new cartographers. This concern became inflamed when the assessments of several public spheres and the private network in Brazil stood out the difficulties in using and reading the maps.

We highlight the concern presented in the training courses for teachers of Geography. It is noteworthy that, as Souza and Katuta (2001) agree, there is a set of relevant political, social and economic factors to explain the current situation of education, especially in public schools in Brazil. However, it is possible to highlight three scenarios that contribute to this lag in mapping learning through Geography classes.

Regarding the cartographic literacy that occurs even in the initial years of schooling, we also observe that the teachers responsible have, in their curriculum of graduation in Pedagogy, a maximum of one semester of Geography, causing a deficit that will be detrimental to learning in later years.

Another aspect of the Brazilian school scene concerns the excessive preoccupation of specialist teachers with the contents of didactic materials in which the subjects are quantified, chapters or tasks are enumerated,

and they control the time for the presentation of all the material. It creates a situation in which the management of the topics covered within a reduced workload, force the neglect of the difficulties presented by the students and make difficult the search for new methods by the professionals.

In addition to the issues surrounding teacher education, we emphasize that the Brazilian educational scenario is determinant for the recurrence and permanence of the problems presented, since it generates work overload. Due to the devaluation of the profession in the country and the consequent low remuneration, a large part of the teachers work in more than one school, which results in lack of time to prepare diversified classroom materials and strategies, as well as dedicate themselves to continuing professional training.

These issues are not exclusive to Brazil. Vesentini (2009) points out, in his book "Rethinking School Geography for the 21st Century", like the United States and France, after changing their respective school curricula - in the first country reducing the burden of Geography and in the second, discipline - presented difficulties in reading the maps.

Duarte (2016) also presents the case of Spain and England, where Geographic Education has steadily and steadily moved away from the maps over the years, or in the case of Spain based on a traditional Geography based on copies and paintings of maps. In both cases, they distanced the possibility of making school maps an instrument for building knowledge.

This worrying scenario stimulated the development of academic research and new approaches by teachers of Geography in the academy, extending significantly the field of School Cartography.

This resumption of the importance of geographic and cartographic reasoning has also stimulated the introduction of the discipline of School Cartography in undergraduate courses in Geography. In general, the programs in this area are intended for the teaching-learning process by maps, taking into account the theories of student's cognitive development, with a conceptual theoretical basis of general cartography that allows the development of teaching materials and methodologies.

The domain of the techniques of construction and use of cartographic documents is considered a means of expression of the geographic scientificity and, therefore, has great power of transformation of the daily reality and the construction of citizenship (CAVALCANTI, 2005) through the formation of students more critical to the your space.

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