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THE DEVELOPMENT OF GEOGRAPHICAL REASONING THROUGH A LUDO-DIDACTIC PROPOSAL IN THE CITY

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1. INTRODUCTION

The games and the geographical contents are the two crucial issues that articulate the ludo-didactic proposal. On the one hand, the games show a long journey in the didactics of Geography. On the other hand, the city turns out to be a reference and recurrent theme in the subjects of didactics. Thus, numerous authors have dealt with pedagogical games in relation to cartography and geography (Walford, 1969 and 1981, Bailey, 1981, Bandet, 1983, Butler, 1984, Bale, 1989, Brown Gaite, 1990, 1996, 2000, 2002 and 2005). The ways of classifying the matching game, based on the geography content, come from the contributions of Walford (1969 and 1981), Bailey (1981) and Brown Gaite (1990).

These contributions promote spatial thinking, from spatial perception, which precedes the understanding of spatial representation. The process of the ludo-didactic approach in geography has gone from being analog to digital with extreme speed. The scientific advance and the incorporation of technological resources in the classroom have overcome the capacity of assimilation and evaluation of classic playful proposals (Cf. Walford, 1969). In this last decade, the technological contributions related to cartography, such as Ahlqvist (2011), or those made on cities by Wilmott et al. (2016) and Coulton et al. (2017) provide a significant technological boost in learning.

However, the proposal of this work pursues the analogical elaboration of some materials next to generate workshops with the students and, as far as possible, to dispense with the technological means. Although, both the zenith images of the games

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and the Google Earth image used in the final activity are very useful for this proposal. The educational justification of the presented ludo-didactic proposal lies in two questions: on the one hand, schools do not always have optimal access to technological means and, on the other hand, the need to generate manipulable materials to provide cooperative learning situations through of the game, which would not be provided by computer screens. Geographical justification consists in manipulating concepts related to geographical thought (scale, proportion and frontal / zenith vision).

In the didactics of Geography, the city is a recurrent and valuable topic for its educational application in the classroom. Most of the social relations articulated in the lived space of the students, a space dominated by urban norms. The house, the school, the neighbourhood, the means of transport firmly anchored in an urban life. The study of the city requires establishing study links at a local scale and at a regional and global scale, considering the peculiarities of the spaces where these socio-spatial relationships built. Moreover, in particular, the reference to the city, as the space of social reference where opportunities and problems appear at different scales than in the towns.

The use of games constitutes a consolidated educational resource in the classroom. Besides the attractiveness of the challenge that the game keeps for the students and the dynamics that generated in the classroom, the rules of the game provide intra and interpersonal values. The game offered as an instrument of socialization, where the acquisition of autonomy and respect for the decisions of others are the most outstanding values.

2. AN APPROACH FRAMEWORK

Hannoun (1977), considering that phenomena occur in different places, highlights the importance of developing the spatial capacity of children so that they can understand the causes that generate these phenomena. To do this, distinguishes three levels of evolution of the perception of space by the child: space lived, space perceived and space conceived.

The first level corresponds to the 'lived space', which refers to the physical space experienced by the child through their movements and displacements. At that time, the child still does not conceive the notion of distances and his understanding of physical space through biological contact. This level represented by "here", understood as the next personal space. The expressions that allow understanding the development and acquisition of this evolutionary stage would be, according to Kastens and Liben (2010): in / on, on, within, within, in the middle of, near, between, near, around, next to.

The second level belongs to the so-called 'perceived space'. This stage means that the child has the capacity to recognize the spaces, although the observation replaces the experimentation of the previous stage. In this phase, begins to develop the mathematical

space and comes to expressed by "there". Kastens and Liben (2010) state the following terms most appropriate for spatial development and acquisition at this stage: front, back, right / left, right / left, side, straight, downhill, uphill.

The third level concerns the 'conceived space', which refers to an abstract space. In this final phase, the child establishes spatial relationships through cartographic and mathematical representations. According to Kastens and Liben (2010), in this stage the child manages to reason the phenomena represented through measurements, incorporating directions and angles to a coordinate system. Necessarily, these phenomena do not need to have been observed or experienced beforehand.

From the postulates of Piaget and Inhelder (1948), Catling (1978) advocates three spatial dimensions: spatial location, spatial distribution and spatial relationship. This author proposes a gradual understanding of the spatial concept throughout childhood. These three stages: topological, projective and Euclidean must be developed along with the two levels of maturation of childhood, perceptual and conceptual (García de la Vega, in press).

Unlike Hannoun, Comes (2007) also distinguishes three types of spatial abilities, but through the curricular perspective and school spatial contents in the Social Sciences. In the first place, this author points out the spatial conception, which refers to the mental capacity to operate, think and process geographic information, and then remember. Secondly, the orientation and measurement of the space appear which implies the capacity of orientation and notion of the dimension of space. For this, the domain of Cartesian localization, with forms and objective measurements, is necessary. Finally, there is the graphic representation of space and the cartographic language, related to cartographic skills. From the development of spatial conception, orientation and measurement of space, the student acquires the skills of representing known and unknown space through cartographic language

Although there are conceptual nuances among these authors, a relationship establish between the typologies of acquisition of spatial abilities. This relationship would be the human need to acquire spatial domain through cartographic representation. This means that students need to read and understand the cartographic language to represent space. In this same sense, the acquisition of geospatial capacities for lifelong learning is necessary and it is necessary to move around in space to face the real situations that arise in the world (García de la Vega, in press).

The National Research Council (2006: 12) defines spatial thinking as a constructive combination of cognitive abilities composed of the concepts of space, the use of representation tools and the application of reasoning processes. There are numerous spatial concepts, such as sense, direction, location, proximity, dimension, scale, continuity, pattern and network that make up the set of geospatial abilities (Gersmehl and Gersmehl 2007).

The different cartographic projections require the acquisition of laterality by the students. This laterality refers to that which has the character of a mirror, since the margins represented in a given country will not coincide with the right and left of the students. This fact refers to the spatial domain of the topological phase, according to Catling (1978). In addition, the cartographic representation has a zenith projection, which requires the acquisition of the projective phase, mentioned by Catling (1978). Thus, from a vantage point, urban elements can be seen in three dimensions and will be represented in two dimensions. The application of the coordinate system will allow the student to establish the orientation and proportion to structure the urban elements in the ordered pairs (vertical line and horizontal line). In this activity the Euclidean phase, mentioned by Catling (1978), is reached to understand and read cartography.

Consequently, students need to develop the notions of topological, projective and Euclidean spatial relationships throughout compulsory education. The topological spatial relationships are the first that the child establishes with his environment, being key to the future development of spatial perception. Projective and Euclidean spatial relationships do not necessarily occur as one stage after another in all children and usually occur simultaneously (Table 2).

These spatial notions are essential for the child to read a map, and thus understand the relationships that occur in their city. But not only this, Uttal (2000) affirms that the daily use of cartography with children leads to the acquisition of abstract spatial concepts and the ability to think about spatial relationships that have not been experientially and directly experienced.

The Spanish curriculum hardly gives any importance to the acquisition of spatial thought through cartography. In primary school, the cartography appears, substantially, during the third year, considering the identification and location of places as key (Breda, García de la Vega and Straforini, 2015). While in secondary education it appears associated with history, although it seems that the European trend will offer a different curricular framework for the future. (De Miguel, 2018). In any case, in both stages, the curriculum registers a little formative interest for the cartography. The formative character of geography as a means to represent and interpret geographical facts. In addition, where knowledge and acquired geographical skills are applied (García de la Vega, 2018). For all this, this work advocates the geographic game, whose cartographic basis, for the development and acquisition of geographic skills.

3. CONCLUSIONS

The game in learning geography attracts the attention of students, especially when the images are part of the place they inhabit. To this, we add the challenge that lies in

the game, which promotes the development of a strategy, not only cognitive, but also social. The student learns to control their emotions, form teams to achieve the same goal, respect the rules of the game, make decisions and respect the opinions of others. The final objective of these games directed towards the acquisition of spatial relationships and cartographic notions. For this, the materials of the games with images of the city used, where the concepts referring to the perceived and represented space interfere.

The city, as a learning space, offers an opportunity for experiential didactics. The curriculum of the discipline of Geography points out issues that addressed from the study of the city. Throughout the city, students can develop strategies to analyse, interpret and suggest real solutions from the application of cartography. It is not just about locating the most relevant places, although it is the first step to carry out a deeper analysis on the dynamics of the city.

The cartographic representations allow reaching an interpretation of urban diversity and its totality. It is about developing simple and playful cartographic skills to obtain an integrated reading of the city. A city where students can carry out analyses and interpretations of real situations in order to provide possible solutions to their city. The ludo-didactic proposal pursues an innovation of the way of treating the city, where the spatial skills in those games contemplated to get to know the city.