

SCHOOL CLIMATE REPRESENTATIONS IN THE RIVER LANDSCAPE OF THE CLARIAN RIVER

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1. INTRODUCTION

The teaching of climate and landscape contains specific difficulties involved in other generals that are looming over school geographic education. These difficulties, which influence the construction of disciplinary knowledge, can be observed from the conceptions that students and teachers have. Analyzing their social representations are a way to understand the obstacles to learning about environmental transformations by students and the innovation of teaching models for teachers. To explain some of the obstacles that geographic knowledge faces, we are going to follow the metaphor of the Russian dolls, since one contains the following. The question is centered by studying a case about the representations that a student has and the teaching dynamics that are developed to explain the climate and its relationship with the river landscape of the Clariano river.

First, as J. Pagès (2000, citing Develay, 1997 and Porlan, 1998) says, the origin of specific didactics comes from concern about the problem of school failure and the search for solutions. In relation to the didactics of geography, it has been possible to verify how school traditions exert an influential weight on the failure of Social Sciences at school and, specifically, the teaching of school geography; A study carried out based on social representations reflects how these traditions predominantly influence teachers' decisions, content legislation or the structure of the subject (Campo, García

& Souto, 2019). Specific didactics are developed from the questions teachers ask about the practice and its problems, how the content is taught and learned in each area of knowledge, as we can recognize, for example, in the works that explain the difficulties, and possible alternatives of the study of the geographical space from the social facts (Souto, 2013) teach the landscape (García de la Vega, 2011) or the climate (Marrón Gaité, 2011).

Secondly, if we focus even more on the specific case of climate and landscape teaching, to these general obstacles posed by school routines and traditions, we must add some specific elements that make the problem particular. Regarding the contents of the weather and climate, some analyzes have confirmed the difficulties for learning in textbooks or in the curriculum. On the one hand, it is worth highlighting the complexity of understanding content and procedures (Tonda and Sebastiá, 2003), to which must be added a distribution of content in the school curriculum that does not adjust to the cognitive levels of students (Martínez and Olcina, 2019). On the other hand, the analyzes carried out by Martínez and López (2016) on weather and climate in primary school textbooks reveal the lack of criteria to teach the elements and factors of climate, an unequal classification of the climates of Spain, the absence of meteorological maps or that all the proper elements do not appear in the legends such as numerical or graphic scales. Regarding the textbooks of the ESO (Compulsory Secondary Education), verify the changes that appear, as in the explanations of the elements of the physical environment, when putting water before times and climates (Olcina, 2017, p. 123).

Third, at a local scale, a study by Martínez and Campo (2017, p. 144) carried out with a significant sample of the entire school and university population of Ontinyent (Valencia), concludes by corroborating the complexity of learning these concepts of climate and landscape. The idealization of the landscape, the confusion about the greenhouse effect or climate change, not differentiating between climate and weather, or the low geographic literacy in the explanations, are an example of how the facts presented above, together with the intervention of the media communication, have shaped a confusing learning about climate and landscape. Misconceptions, stereotypes and incomplete knowledge of the climate-landscape relationship at all stages-educational levels from childhood to university, reflect the validity of vulgar, non-scientific knowledge that remains anchored, persistent, and in which school education has intervened.

In these times of environmental transformations due to the evolution of the climate, climate change, it is necessary to ask educational research on the study of the relationship between climate and landscape. So it seems appropriate a study based on the knowledge of the social representations of students and teachers, studies to obtain diagnoses and build didactic innovation that benefits educational improvement.

2. CLIMATE AND LANDSCAPE: APPROACHES AND FOUNDATIONS FOR TEACHING RESEARCH

Learning about climate and landscape does not only occur in classrooms, there is social learning, by social transmission and school learning transmitted by the teacher. We often hear expressions referring to climate change, phrases such as «when we were little we were very cold in winter», «now it doesn't rain almost», «there is no one to clear up with this weather», although as Olcina and Martín (1999, p. 25).

Sometimes, when evoking meteorological events or phenomena, the memory is limited and the acquired representations are different from the events and data that occurred. The testimonial opinions of individuals become reasons for the meteorological history of a place, although when contrasting these impressions and personal perceptions with official data, the discrepancies are evident.

2.1. Social representations: the ideas of students and teachers in a study based on didactics

In order to develop this topic of social representations in student learning, we rely on the theoretical approaches of Bourdieu and Domingos (2000). To understand the social representations in the learning of school geography and in the line of knowing the intentionality of human events related to behavior change, Souto and García (2019) offer us an explanation from the geography of the perception and social representations. In this way we are on the path of seeing what is the incidence of school knowledge on social behavior.

In different studies carried out on what the students of Early Childhood, Primary, ESO or University Degree understand about the landscape or climate change, results appear that show the stereotypes and idealization that they have regarding these concepts (Arto Blanco, 2010; Barraza, 2000; García-Monteagudo, 2019; Morote, Campo and Colomer, 2019). But why these erroneous and stereotypical explanations, what is happening?

But also, when dealing with educational problems from school practice, teachers also have a leading role. The teacher establishes his teaching model from the training he has, the difficulties of praxis and the decisions that allow him to carry out this practice according to educational values that are consistent with his ethics. This compendium is concretized in teaching and merges with the contents that it develops in its classroom, its platform of thought and the objectives it has as a teacher. The teaching staff teaches from a model (García Pérez, 2000) that transfers to their teachings and that intervenes in the learning of the climate and the landscape that affects the learning of the students.

2.2. The landscape and its didactics: from perception to social representation

The landscape is a polysemic and diverse use concept that has had a strong scientific development in geography, although it has not only been the object of study of this discipline (Nogué, 1985). The didactic approach of the landscape to the Ontinent students follows the strategies of observation, identification and interpretation (Liceras, 2003) from socioconstructivist assumptions (Vigotsky, 2010). On this matter, it is interesting to know how students explain the local landscape, since other investigations have highlighted the subjective assessment of this concept among students (Cavalcanti, 2010; García de la Vega, 2014). Assessment is a stage of perception or physiological process that has been used in studies of the geography of perception and behavior (Capel, 1973).

Anthropic action is usually expressed in a minority despite the fact that from the Free Institution of Education (ILE) it was defended that the human being is an integral part of nature (Ortega, 2000). The curricular changes on the landscape contents have been thoroughly analyzed by Casas, Puig and Ermeta (2017). These authors have identified that the LOMCE allows the teaching of landscape in the subject of Plastic and Visual Education, an aspect that has been considered in the preparation of the didactic unit that the students of this research have worked on (Campo, Castellà, Martínez, and García-Monteagudo, 2019), since this concept has a pictorial and aesthetic origin (Maderuelo, 1996). With these budgets, didactic proposals on didactics of landscape and art have been developed (Fernández, 2016; García-Morís, 2015) that follow the curricular guidelines that enable their didactic treatment as a model of the holistic landscape and as a humanized landscape resulting from economic activity (Casas, Puig and Ermeta, 2017). This understanding can be analyzed from the social representations from the methodological features that are synthesized in the following section.

3. THE CLIMATE-LANDSCAPE RELATIONSHIP: STUDY METHODOLOGY

The problem is how this construction of everyday knowledge about a scientific object, about a concept such as climate and landscape is produced. This study as part of a larger investigation contemplates the objective of discovering stereotypes and conceptual errors in the representation of the climate-landscape relationship. We do it with a population of 1st of ESO since the study participants will respond according to the knowledge and mental representation built in Primary.

In an explanation for a Primary Education student, it could be said that, apart from another more substantiated explanation, the landscape is what we observe on the surface of the earth and in the atmosphere. At the end of the day, when we define the landscape we indicate that it is made up of the climate, relief, vegetation, fauna and human action. However, our initial conjecture is that the majority of the students who

complete Primary Education and start 1st of ESO do not represent the landscape in three dimensions and therefore do not consider the atmosphere or climatic elements that intervene in the landscape.

3.1. Case study

This research is a case study (Stake, 1999) carried out with 105 students, 53 boys and 52 girls, who are studying 1st year of ESO in two schools, which we call Center A and Center B, during the 2018-19 school year from Ontinyent (Valencia); 14 teachers from the same town, 7 teachers and 7 teachers who belong to five educational centers other than basic training have also participated. These teachers carry out their work in public (6), subsidized (7) or privately managed public centers (1). They belong to different educational levels and teach subjects such as Social Sciences (2), Biology (4), Physics and Chemistry (2), Mathematics (1), Language and Literature (1), Social Integration (1), Administration (1) and Infant (1). The training they have is consistent with the subjects they teach. Regarding age, they are in the following ranges, over 56 years there are 3 teachers, between 46 and 55 years there are 2 teachers, 6 teachers between 36 and 45 years and 3 teachers between 25 and 35 years.

Objective 1- To verify how they explain the climate in the landscape, how they understand the climate-landscape relationship, to know if among their central ideas the climate is represented as a modeler or architect of the landscape, if the climate appears in a residual way or if it does not appear at all. To analyze these premises we have to know the main concepts that it considers when representing a specific river landscape.

Objective 2- To understand the ideas of the teaching dynamics in the explanations of the climate and landscape. Identify social representations linked to practicing teachers, analyze their conceptions and pedagogical knowledge of disciplinary content, on methodologies and focused approaches, in this case of climate.

The information gathering instruments have been the productions of the students in their class assignments and a semi-structured interview for the teachers.

As for the students' productions, they are taken from the same teaching material. The students of the study's secondary schools, Center A and Center B, work the same didactic unit and know its elaboration ex profeso with an experimental and research nature (Campo, Castellà, Martínez and García-Montegudo, 2019, p. 8- 9). The class activity, object of study, is carried out between 20 and 30 minutes maximum and is framed within the knowledge of the students' previous ideas, so they have not had previous references to the subject of landscape, although it is a known landscape. Research techniques are applied to the answers of the students in the tasks to analyze the pictorial representations and their interpretation through the keywords that the students

attribute to a delimited landscape, the landscape between the Pou Clar and the Pont Nou de Ontinyent. This space is part of the Clariano River, it is analyzed from a holistic perspective in a subsequent field trip in which the students investigate aspects related to atmospheric weather, soil, vegetation, waters and cultural heritage and will be able to contrast with the initial perceptions and guesses he had of that landscape.

The activity analyzed is integrated into the exercises of the didactic unit: first, each student makes a drawing of the aforementioned space, to which he attributes five words (second exercise) that later orders according to their importance on a numerical scale of increasing importance of 1 to 5, finally each student explains what they have drawn using the words mentioned in the previous exercise. The analysis of the representation that these students have about the climate and landscape of that locality and their relationships with the environment is carried out by interpreting the content of their drawings and the words associated with them. This is an essential method in the didactics of the social sciences, since it favors the understanding of the behavior of the participating subjects (Yin, 1989). Although the interpretation of the key words associated with this landscape and the pictorial representations of the students are joint, it is necessary to establish some considerations. Exercises 2.2.B and 2.2.C in which students choose and order five words that they attribute to the aforementioned landscape correspond to the word association test model (Agüero and Chama, 2009; Navia and Estrada, 2012). The ordered data of those words have been analyzed using the Evocation 2005 software, which has been used in other investigations (Lopes, 2010; Silva and Viveiros, 2017) and follows the guidelines of the Midi Group (Flament, 2001), in which a methodological application of the theory of social representations to the field of didactics has been found (Domingos, 2000; Saraiva, 2007). For its part, the interpretation of the pictorial representations of questions 2.2.D and 2.2.E has been carried out in order to know how the students express this landscape, following the approach of Duborgel (1981). They are pictorial representations that take on the function of mental schemes (Kosslyn, 1981; Vara, 2010) and help to understand the meaning that students give to that landscape as a subjective space, as has been done in the geography of perception and behavior with mind maps (Caneto, 2000). In this study the representations of the landscape are more in line with the less elaborate sketches of maps, sketches or drawings (Escobar, 1992), which are made spontaneously by the students at the beginning of the didactic unit.

Regarding the semi-structured interview, it follows the script that has been reviewed by a group of teachers belonging to Ibero-American universities who have previously known the objectives of this research. The interview is composed of three parts, a first part referring to the statistical data, age, gender, type of center, subject taught, academic training, level and course. A second part that is composed of eleven questions on training, instruction and practice as teachers in explaining the local climate and landscape.

Finally, an assessment survey on the use and importance of concepts related to climate and landscape. The content of the semi-structured interviews was used to understand the experimental results of the didactic unit, that is, with the intention of knowing the classroom experiences and situations by the teachers (Taylor and Bodgan, 2000; Travé, 2019). This allowed us to approach the elements that intervene in the teaching practice and to know the obstacles that intervene in the didactic proposal, following the assumptions of the action research in which it is framed because it corresponds to the Nós Propomos project (Claudino et al., 2019). The semi-structured nature of this type of interview has allowed the introduction of some new questions during their development, although the fundamental purpose has not been altered. The transcription follows a complex system in which prosodic aspects and the changes of ideas of the participants have been considered (Onwuegbuzie et al., 2009) to analyze their answers, following the work scheme of other investigations that have used this technique (García Calvente and Mateo Rodríguez, 2000; García-Ruiz and Lena-Acebo, 2019).

The semi-structured interviews are a technique that fits into the procedural aspect of the methodological approach of Banchs (2000) and will be complemented by the structural aspect that encompasses the drawings and the representational structure that the students manifest. With all this, the use of a mixed sequential exploratory method (Creswell, 2014) will give access to a global understanding of the school representation of the landscape from a non-probabilistic or intentional sample (Otzen and Manterola, 2017).

3.2. The geographical setting. Clariano river landscape: Pou Clar to Pont Nou

When we need to analyze the social representations of students, geographical settings are places that provide unique conditions to analyze and interpret since the landscapes and the territory to which they belong show well-defined natural, cultural and socioeconomic realities (García de la Vega, 2014, p.103).

Ontinyent is a municipality in the province of Valencia with a municipal territory of 12,543 ha. In which is the protected natural area of Pou Clar i Serra de l'Ombria that has 2,871 ha. The site is located south of the municipal term and It stands out for its high environmental value. One of the sources of the Clariano River, the true backbone of the municipality, is located in Pou Clar. The water springs called “brolladors” make up together with the pools, “pous”, excavated in the calcareous stone and the “tolls”, rafts, a natural recreation area where the locals come regularly to walk or bathe in summer as the The area is only 3.5 kilometers from the town. From Pou Clar to Pont Salt (see Figure 1), the river runs between pools, river terraces, meander, rocks, slopes, ravines, riverside and Mediterranean vegetation, forest tracks, rural roads. These sections of what we consider natural environment are interspersed with other river sections with a greater presence of

human action with tables, posters, recreation areas, abandoned country houses, agricultural crops, orchards, old electrical constructions, huts, agricultural farms or asphalt roads, areas of dispersed urbanization, we call it an *anthropized natural environment*.

Along the river Clariano from Pon del Salt to the Pont Nou in the urban area of Ontinyent, elements of the natural and urban environment, water, geomorphological, structural, related to human activities, and infrastructures can be found around its banks. In this *urban environment* crossed by a boxed river, you can see the remains of old houses and factories, hydraulic mills, bridges that connect the neighborhoods of Ontinyent that split through the river bed and allow citizens to move from one part to another from Ontinyent and the CV-81 road.

In a generic way, consider that three media appear, differentiated by the elements that describe their sections. Although there is no section that we can consider as pure, we understand there is a section that we call *natural environment* where natural elements prevail, a second section where natural and anthropic elements coexist that we will call *anthropized natural environment* and a third section that we call urban environment, since the river completely crosses the population of Ontinyent through its urban area.

4. ANALYSIS AND DISCUSSION OF DATA

4.1. The representational structure: a world view of the Clariano river landscape

The first data correspond to the words analyzed by the Evocation 2005 software and provide information on the structure of the representational content of the landscape concept in the corresponding section of the Clariano river in which the didactic intervention was carried out after carrying out this exercise.

The results reveal a hard nucleus in which natural elements (water, vegetation, river and plants) appear with a subjective assessment of that space. The peripheral elements detail these natural elements and delve into the valuation of the landscape, in which the bridge concept does not appear integrated in that river space.

If we look at the results according to the participating institutes, Centers A and B, it is observed that the tendency to value the landscape as beautiful does not offer great differences. However, it can be seen that in one of the ESO institutes in the sample (Center A) the representation of this landscape is more global and is supported by generic elements of an abiotic nature. This student attaches great importance to water and its value in the midst of a natural setting in which they name the river. For its part, in the other institute (Center B), vegetation, plants and trees are part of the hard core of its worldview of the landscape, in which water is an important element, although not as much as in the previous case.

In relation to *Objective 1*, the students do not contemplate any concept, a direct element related to the climate, such as sun, clouds, sky, heat, cold, etc. The relationship is established through other elements that represent the action of the climate on the landscape such as water, vegetation, river, plants, nature.

Through the partial results of each Center, A and B, the importance of the concept of water is observed in both. However, it is governed by the following order: Center A establishes its priority for the concept of nature, while Center B does it for vegetation.

4.2. Pictorial representations of the geographical setting

To complete the development of *Objective 1*, the drawings made on the proposed river landscape are analyzed. For this, the elements they paint in the drawings are classified first according to belong to the landscape component. These components of the river landscape of the Clariano river and their respective elements are concepts and relationships that comprise a student who has completed Primary Education.

Anthropic action in the landscape is divided into two components, structural and social. Once the elements of each component of the landscape are classified, the frequency with which they appear in each drawing is established (see Figure 2), in this way we obtain what we call Predominance, that is, the component that contains the most elements in the drawing that is represents the landscape. In both Center B and Center A, the drawn landscape has a *predominance of structural and water components*.

Once the components that appear in the river landscape of each drawing are established, we relate it to the types of medium that describe the route. Understanding as *Natural Environment* if the social and structural components do not appear in the drawings, *Anthropized Natural Environment* if physical and human components appear, and *Urban Environment* when structural and social components appear, and possibly some other physical one.

Based on the total number of drawings obtained, the percentage relationship has been made, reflecting to what extent the students have represented one medium more than another. That is, what percentage of drawings corresponds to a natural environment, what percentage to an urban one, or what proportion to an anthropized natural environment. This indicates the idea of medium that predominates in the students of each center and, in the group formed by the total sample.

Note the degree of representation that the different media have among the students: it should be noted that, although in center A the natural environment is the one with the highest degree of representation (36%), a certain degree of equality can be seen in the representations. On the other hand, we see how in Center B it is the anthropized natural environment that has the most representation, corresponding to 58% of the drawings.

In relation to *Objective 1*, according to the analyzes carried out in section 4.1, the words that the students choose to define the landscape reveal that in the representational structure terms associated with the concept of climate are not considered. The relationship with climate appears in a residual or hint. Regarding the analysis of the drawings in section 4.2, only two participants have the “climate” component as predominant, there are eleven students who represent climate in their drawings, but as a non-predominant component. Therefore, only 10.5% of the students in the sample contemplate the three dimensions of Euclidean space, draw on a three-dimensional plane and appear in addition to other elements of the landscape, the horizon, the sky, the clouds or the sun.

4.3. The representations of the teachers before the explanation of the climate and landscape

At this point, the analysis that belongs to *Objective 2* of the study is developed. For this, 14 interviews with teachers have been carried out. The most defined feature of this group is its variety and interdisciplinarity.

Among the questions asked in the interview, we analyzed those that refer to which concepts they understood were most important in explaining the climate and landscape and how they valued the knowledge of those concepts.

The range of use of a concept is over 14 and corresponds to the number of teachers participating, while the assessment they make about the lesser or greater importance of a concept for their explanations of the climate or local climate, corresponds to a scale from 1 to 4, being 1 if they value this concept very little and 4 if they value it a lot.

The questionnaire considered other questions that were related to these uses and evaluations. For example, if they used examples or data from Ontinyent to explain the climate or the local climate, or what type of resources they used for their explanations. Most respond that the most frequent is the textbook and sometimes news or facts on the subject, but not preferably from the locality. Analyzing the results, it is inferred that most use the concepts of atmospheric weather, climate, climate change, greenhouse effect, landscape and Dana (in Ontinyent regularly in recent years with heavy flooding). It is valued of little importance and the insolation, the night irradiation or the average temperature are not explained. With these premises it is inferred that:

- Teachers are mainly guided by textbooks, this coincides with the concepts that are included in the books, those that they use and seem important to them. This is clearly observed when using and valuing the greenhouse effect more than the minimum average temperature, nighttime irradiation or insolation, these latter being the fundamental bases for an explanation of what happens with the climate today.

- In the explanations of the climate and local climate they consider the use of the landscape concept important, but they do not use examples of data, facts or situations typical of the locality, except for the Dana they suffer each year.

4.4. The fundamentals of teachers

The teacher at center A is a teacher and graduate in geography and history, he teaches 1st ESO in Social Sciences at a public institute. The teacher at center B has a degree in biology and teaches biology and mathematics in a concerted center. These teachers become acclimatized to the problems of daily practice and obstacles. Let's see an example of the answers of each teacher to the same question. *When you have to try to explain the climate, climate change and landscape in Ontinyent, what problems do you encounter in developing explanations for your students?*

Teacher Center A: *Before experiencing the Didactic Unit, I had no information and the one I had was not looking for it. This must be done within a team and I was prevented. In 2011 I had a student, daughter of the head of cycle studies, my partner thought that in my class's students did not learn. I did not follow the book nor am I very traditional. In February the ESO director and head of studies called me to inquire that there were complaints from some parents. This was an understatement. I replied that from the next day the book would follow and that they apologized.*

Teacher Center B: *In the first place, the students have many idealized concepts, erroneously constructed by the amount of little filtered information that they have. Previous knowledge must be rebuilt and reinforced.*

The methodological changes that these teachers intend to develop meet with two types of rejections: in center A, the rejection of the educational community to constructivist and innovative approaches and, in center B, the one that confronts students to work with another methodology, in both cases it involves the confirmation of school immobility, the refusal to leave the comfort zone.

5. CONCLUSIONS

In the social representations that the students have of the landscape of the Clariano river, the concept of climate is not a remarkable component. The elements of the climate appear in a percentage not greater than 10.5% of all the drawings made. In the representational structure, the climate is residual. A similar result occurs when the drawings are analyzed two participants have the "climate" component as predominant in their drawings, there are only eleven students who represent the weather in their drawings. only 12% of the students in the sample contemplate the three dimensions of Euclidean space, drawing their representations on a three-dimensional plane. The horizon, the sky, the clouds or the sun, the space of the atmosphere appears residually along with other components.

In general, the concept of water, the hydric component and the structural (anthropic) component predominate, differences between the Centers are appreciated. One more frequently contains the idea of a landscape related to nature and the other one related to vegetation. This is related to the dynamics of the teachers in each center and which are consistent with the educational thinking they have, the training, the didactic model or the methodology they use.

The explanations of the teachers on how they use and value the concepts in the explanation of the climate indicates the need to break with the routines and traditions that prevent permanent training adapted to current environmental problems. In this way, teachers would be prepared for more complex explanations about the climate and its evolution today, they could also be trained in the daily, local space, as an explanatory source of environmental events.

Final thoughts:

- The data obtained through the combination of instruments such as Evocation, drawings and the semi-structured interview, reaffirm us in the usefulness of these tools to know the social representations of a specific school population, since they offer an opportunity to calibrate the conceptualization and mental description that they have the students of that landscape and the way of thinking of the teacher who governs their actions in praxis.
- The ideas expressed by teachers about their vision of teaching and training action in the face of environmental problems suggest the possibility of involving teachers in an experience based on action research, since, although it was not a central element of the study, it has been able to verify in some cases, teachers introduce changes in teaching methodology from their experience, which coincides with the approaches of Lewin and Stenhouse (Elliot, 2000).
- From the results, it is inferred that the analysis of the information collected by different techniques, serves to obtain approximations of the reality that we want to transform, such as:
 - o recognize the conceptions with which students from Primary to Secondary Education arrive, obtain clues about the knowledge of the disciplinary content they have of climate and geography.
 - o verify the difficulties of teachers to break school traditions and routines
 - o The idealization of the landscape and the scarce presence of the climate in the representations of the students, together with the difficulties of the teachers in their disciplinary knowledge and practice, urges us to break the traditions and school routines to better face the explanations of the environmental transformations.