

# Ethnoknowledge Through Ethnogeomorphology and Geography Teaching: First Approaches

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## Abstract

This article addresses the issue of ethnoknowledge, focusing precisely on ethnogeomorphology in geographic science studies. Reserved a bibliographic review on the subject and methodologically leads us to analyze the national curriculum parameters of Brazilian education around the subject. We consider the existence of popular and cultural knowledge as primary sources to be addressed in teaching and, finally, for a better interpretation of relief.

**Keywords:** ethnogeomorphology, releco, geographic education

## 1. Introduction

The Geography taught in basic education has been the focus of many academic researchers as an object of study. The need for the appropriation of this knowledge arises from the understanding that the content of Geography taught in schools is not merely a direct transfer of academic content to basic education. In the school context, geographical knowledge primarily passes through the filters of pedagogy and didactics, respecting the intellectual growth and evolution of the students and the need for adaptation to their level of understanding. Delving into this theme, Yves Chevallier (1985) became the major international reference regarding the process of didactic transposition, which encompasses the ruptures that occur between scientific knowledge (savoir savant, some translate it as wise knowledge) consecrated in academia and dominant social institutions (including social practices of reference—Clerc, Minder, & Roduit, 2006), which together constitute the noosphere, and the knowledge effectively taught to students. These ruptures are mediated by curricula, textbooks, and teachers. Maryse Clary (2017/18) contributed to popularizing this process in the French-speaking Geography community, while Sérgio Claudino (2001) emphasizes the decisive role of didactic texts and warns that they also serve as a source of information influencing the noosphere itself. Eliane de Lima (2019) aligns with this valorization and argues that textbooks, as well as other didactic resources, incorporate both external didactic transposition (occurring outside the classroom) and internal transposition (carried out within the school). Although the didactic transposition model is, in itself, instructive in helping us understand the ruptures in the production of school knowledge, it must also be criticized: it implicitly places the student in a position of being a recipient, more or less passive, of school knowledge; it assumes academic knowledge as the almost exclusive source of school production, undervaluing the experiences of the community and the students. To a large extent, it upholds the model of a closed school knowledge based solely on academia, which Ethnoknowledge seeks to counteract.

Scientific content becomes a predominant focus of reflection, and community knowledge is gaining prominence as a research stage. This reflection aligns with the words of Freire (1989), who asserts that the school is the center for rescuing and fostering the appreciation of the knowledge within the community and its surroundings. Even the most peripheral communities generally have this institution for educating the community. It is in these

schools that the knowledge of the community is externalized by their sons and daughters when encouraged to do so, and the world as experienced through the students' perspective can be reclaimed, valued, and learned by teachers, always seeking to involve the family and the generations that perpetuate their origins and traditions in this process.

Cavalcanti (2019) provides an overview of suggested approaches for teaching Geography and lists several points: using the local context as a reference for addressing geographical content; adopting a multidisciplinary approach to geographical phenomena in education; developing geographical concepts that enhance geographical thinking; fostering the ability to read and map reality through graphical and cartographic language; developing the ability to deal with non-verbal language and geographical analysis; critically addressing critical-natural issues; discussing the concept of the environment and ethical considerations; addressing socially relevant topics, and contributing effectively to the understanding of citizenship. These references, to varying degrees, whether used individually or collectively, are applicable to all grade levels of basic education.

Claudino (2020) raises awareness about the undervaluation of local citizenship in Geography. It emphasizes that the term "citizenship" involves the student in the learning process as a participative and active individual, with their knowledge and perceptions of the place they inhabit. Therefore, it should consider ethno-knowledge.

Nascimento (2013) conceptualizes ethno-knowledge as the knowledge and traditions (cultural) passed down from generation to generation in traditional communities, learned through daily life and direct interaction with their environment and natural phenomena. In this sense, ethno-knowledge encompasses the symbols, oral traditions, and common expressions of a people influenced by locality and ancestry, as well as the relationship between humans and nature.

This perspective should be reflected in various aspects of Geography teaching. For example, the study of landforms can incorporate ethno-geomorphology, and these are the reflections presented in this article.

With regard to the relief physical-natural component and the question of the scale of approach, if we consider, as Cavalcanti does (2019), that it is up to school geography to form ways of thinking geographical factors that echo in the daily life of the subjects, the scale of approach to this component is understood in the sphere everyday life, experienced by oneself or by others. At the same time, if assuming, as Souza (2013) does, that Geography is a science of the present time, the time we will use in our

analyses will be the historical time in which we live (Nascimento, 2013, p. 12). In this context, new approaches emerge, among which we will address Ethnogeomorphology, which places the active subject at the center of having their perceptions and experiences reflected, that is, the knowledge of the student or citizen in relation to the landscape. It is only natural that the cultural involvement of this subject with the place they inhabit contributes to the evolution of the landscape. Therefore, Ethnogeomorphology will be the category to be explored and associated with the teaching of Geography. For this, the understanding of the cultural aspect will be of great importance in our reflections.

In school Geography, the need for appropriation of knowledge arises from the understanding that the content of Geography taught in schools is not merely a direct transfer of academic content to basic education. The geographical knowledge created by the community is crucial and contributes to the renewal of geographical knowledge by new generations, both teachers and students, enriched by discussions about Geography, citizenship, and the lived reality, thus leading to new approaches through scientific research.

This reflection aligns with the arguments of Freire (1989), who advocates that the school, as an institution of student formation, is characterized as a link for rescuing and fostering the knowledge of the community in its surroundings, as many communities have educational units for children and adolescents. It is from this perspective that the community's knowledge is externalized, resulting from the presence of family representation through children, who bring to school the world experienced as an empirical reality, potentiated by the contribution of teaching professionals through the involvement of families in this process; thus, the study of their origins, traditions, and customs for knowledge and appropriation is fundamental for the perpetuation of these elements.

Cavalcanti (2019), while taking stock of suggested approaches for teaching Geography, listed several points: using the local context as a reference for geographical content; adopting a multidisciplinary approach to studying geographical phenomena in education; developing geographical concepts instrumental to geographical thinking; developing the ability to read and map reality through graphical and cartographic language; developing the ability to deal with non-verbal language and geographical analysis; critically addressing physical-natural themes; addressing the concept of the environment and discussing environmental ethics; addressing socially relevant

topics; and effectively contributing to the understanding of citizenship. These references, to a greater or lesser extent, whether used individually or collectively, are applicable to all grade levels in basic education.

Furthermore, it is emphasized that the term “citizenship” involves students in the learning process as participative and active individuals, with their knowledge and perceptions of the place they inhabit; that is, in this context, scientific discussions about ethno-knowledge must be considered.

Nascimento (2013) conceptualizes ethno-knowledge as the knowledge and traditions (cultural) passed down from generation to generation in communities, learned through daily life and direct interaction with the environment and natural phenomena that surround them. In this sense, ethno-knowledge encompasses the symbols, oral traditions, and common expressions of a people influenced by locality and ancestry, as well as the relationship between society and nature.

## 2. Bibliographical Review

### 2.1 Cultural Geography: Sauer's Contribution to Understanding Ethnogeomorphology

Knowledge about space has always been inherent to human existence, as understanding and observing various spaces and their potentialities were crucial for survival. Although there was spatial knowledge, it was not systematically organized. As mentioned earlier, Geography as a science emerged in the 19th century, with German scholars Kant, Humboldt, Ritter, and Ratzel as its precursors. From the German school, the French and Anglo-Saxon schools of thought also emerged. The various discussions that Geography went through since its inception favored the emergence of different branches for further study.

Cultural Geography has its origins around 1890. Boudou (2011), intending to discuss the evolution of Cultural Geography, refers to the words of the French geographer Paul Claval, as cited by Corrêa (2007). According to Claval, the field of Cultural Geography was born during the very formation of Geography, when the identity of Geography was being shaped in Germany. Since then, it has been continuously refined, and it is now part of Critical Geography.

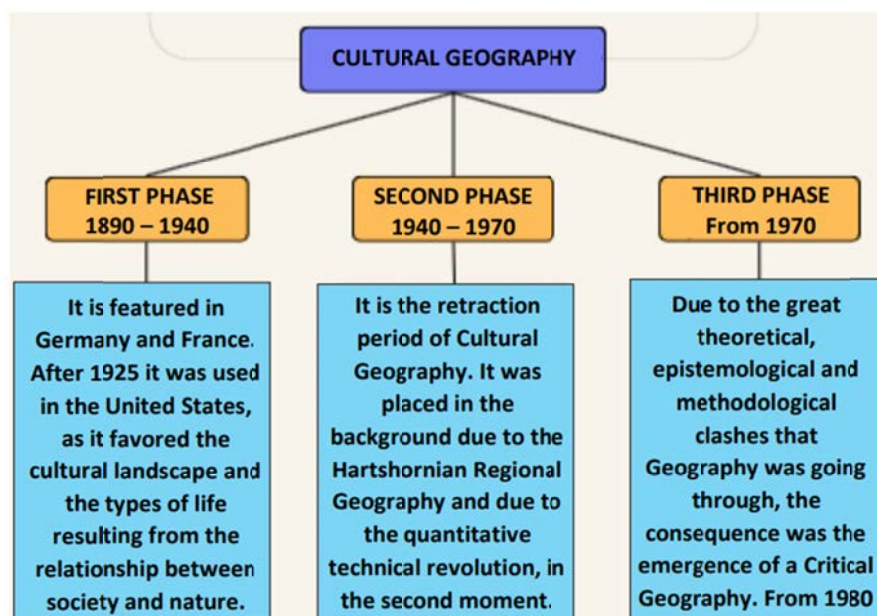


Figure 1. The three phases of cultural geography

Source: Boudou, 2011.

The path that Cultural Geography has taken has been filled with discussions raised by scientists from various backgrounds. According to Corrêa (2009), Hoefle (1998) presents a synthesized framework in which culture can be understood through three axes. In the first aspect, culture is seen from different perspectives: either comprehensive, limited, or restricted in meanings. In the second aspect, culture is viewed according to the role it plays in society, either determined by nature or economic base on one hand, or having a determinative role,

considered as a supra-organic entity on the other hand. The third aspect sees culture as a context, simultaneously reflecting, shaping, and being conditioned by it. Carl Sauer's Cultural Geography or the Berkeley School, belonging to the first axis, is based on a comprehensive view of culture, whereas the perspective of the so-called renewed Cultural Geography presents a more restricted view of culture.

According to Corrêa (2009), the production and reproduction of life, in its various forms, are measured in consciousness and sustained by symbolic production. This symbolism includes various languages spoken across the planet, gestures, community customs, rituals, arts, and a conception of the landscape. In this research, we will focus more on the conception that traditional communities have of the landscape. The symbolism created by the community to understand and explain the local relief guides our research in ethnogeomorphology

[...] Hall (1997) reafirma a perspectiva construcionista, na qual os símbolos são abertos a diferentes interpretações, calcadas cada uma na experiência, valores, crenças, mitos e utopias do grupo social que interpreta. Os significados são, assim, instáveis e essa instabilidade atravessa o tempo. Fala-se, então, em polivocalidade, isto é, diversas interpretações a respeito do mesmo símbolo. Esta polivocalidade é o antídoto a um significado imposto, único, que as elites, em sua hegemonia cultural, pretendem impor (Corrêa, 2009, p. 3).

The meanings given by populations to different spaces are the field of study of Cultural Geography. These meanings express values, beliefs, myths, and utopias created by societies. The study of the relationship format within a spatial context leads us to understand the close connection between Cultural Geography and Ethnogeomorphology. One of the fundamental elements is the individuality of places, hence the individuality in the perceptions of space by communities. Values and criteria are approached differently in various spaces, reinforcing the need to understand the geographical thinking of different communities.

Strengthening the understanding of the close link between Cultural Geography and Ethnogeomorphology, Corrêa (2009) states that culture, understood as meanings, directs the attention of geographers to the choice of their objects of investigation, just as Ethnogeomorphology seeks to understand the conception of the relief from the perspective of traditional communities. Both sciences agree that, being an approach, a way of looking at reality, an interpretation of what other groups think and practice, they are always individualized, although they may appear similar.

Nature and distance to places and cultural groups can be of interest to Cultural Geography. When considering the lived space, within which practices, perceptions, affections and distancing from what is strange are established, the geographer is faced with different meanings, according to each cultural group, in the face of nature and social space (Corrêa, 2009, p. 5).

A prominent American geographer made significant contributions to the study of Cultural Geography and laid the foundations of what we know as the Berkeley School, named after the University of California where Professor Carl Otwin Sauer taught. His theoretical and epistemological conception in the study of morphology is written in the book "Morfologia da paisagem" (1925). During his doctoral studies in Chicago, he was influenced by Rolin Salysbury and Ellen Semple, which introduced him to environmental determinism (Corrêa, 2014). According to Gomes (2011), Sauer was influenced by the German school, particularly by Passarge and Schürer, who asserted that the landscape should be based on the visible aspects of human activity. In Berkeley, Sauer interacted with cultural anthropologist Alfred Kroeber and, based on his fieldwork classes, refuted environmental determinism, replacing it with cultural determinism.

The need to find an object and method to establish a common basis for Geography led Sauer (1925, p. 12) to assert that "as long as geographers disagree about their object, it will be necessary, through repeated definitions, to seek a common basis on which a general position can be established." In the midst of discussions, Sauer considered the landscape as a combination of natural and cultural forms.

Sauer considers the landscape as the key concept of Geography. The landscape is the set of natural and cultural forms associated in an area. Materiality and extension are essential attributes of the Sauerian landscape, not admitting the use of the term as a metaphor, as a political or economic landscape. The forms that make up the landscape are integrated with each other, presenting functions that create a structure. The landscape thus constitutes an organic or almost organic unit (Corrêa, 2014, p. 5).

This quote makes it clear that Sauer's concept of landscape is the key concept in Geography, where the forms that constitute it are interconnected. According to Corrêa (2014), it is in this sense that Sauer was criticized for understanding culture as an abstract, supra-organic entity without concrete social agents, resulting in a harmonious picture, which is what we know as cultural landscape. In the perspective of Sauer's cultural

landscape, it can be a gentle hill with cultivated fields, houses arranged orderly in different patterns, roads, and forest reserves, etc.

Sauer chose the “Morphological” method because he believed it to be the most efficient method for a systematic analysis of landscapes, due to its capacity to contemplate the various forms of interactions.

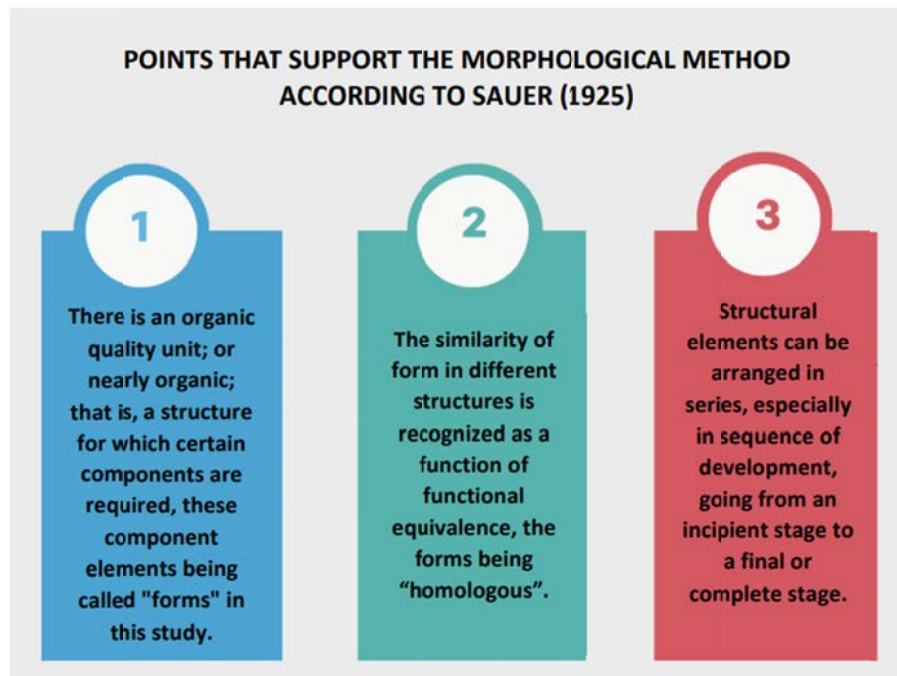


Figure 2. Points that support the morphological method

Source: Sauer, 1925.

Regarding the aforementioned method, Gomes (2011, p. 235) states that “the morphological method proposed by Sauer should suppress these two problems, that is, it would be able to establish an objective, systematic, and general knowledge without resorting to a cause-and-effect model.”

According to Sauer (1925), the origin of the relief did not influence or establish a functional relationship. Instead, functionality was established through the interaction of the elements that formed the landscapes. This includes human beings as the last and most important geomorphological element, serving as the physical basis for the support and development of human societies. Therefore, the relief was just one of these elements and not the most important one, considering that the morphology of relief forms was extremely complex, and it was often necessary to search for original forms from previous forms, which were sometimes impossible to determine.

Cultural Geography, from the perspective of Sauer’s landscape, has much to contribute to this research, especially considering the focus on relief. Understanding Sauer’s morphology, which encompasses not only the physical forms of the relief but also human actions, considering human modification of it, both composing the landscape, we can see that Sauer’s landscape offers valuable tools for dialogue with Ethnogeomorphology.

### 2.2 Geomorphology: Paths

It is essential to discuss Geomorphology before delving into the discussions of Ethnogeomorphology, as we start from the premise when the study of relief did not include the interaction of humans with the terrain. Today, studies show the need for a broader perspective on relief, recognizing humans as modifiers of the terrain in various types of interactions within the process of geographic space production.

Just like the knowledge that would later be called Geography, geomorphological thinking also dates back to Classical Antiquity. Osco, Oliveira, and Boin (2014) argue that the origins of geomorphological thinking can be traced back to ancient Greece and Rome. During these periods, Philosophy and Religion, prevailing in those historical periods, shaped the explanation of natural phenomena observed by human beings (Marques, 2001).

During the transition from the 18th to the 19th century, different schools of thought emerged seeking

explanations for the origin and evolution of the Earth. On one side were those based on the principles of catastrophism, and on the other extreme, those using the principle of Uniformitarianism or Actualism. In the 19th century, there was an expansion of geomorphological knowledge. Europe and the United States stood out, with prominent works and the recognition of authors who made significant contributions to the development of Geomorphology (Marques, 2001).

According to Florezano (2008), Geomorphology contemplates the genesis, composition (materials), and the processes that act on it. In the initial studies of Geomorphology, which started around the 18th century, Geomorphology mainly focused on the relief, considering two main aspects: internal processes, known as tectonism, and external agents, including weathering and erosion. Both internal and external processes acted with varying intensities.

William Morris Davis, an American professor at Harvard University during the 19th and 20th centuries, is known as the father of Geomorphology. His studies culminated in the erosional cycle of relief or Davisian cycle, described in "The Geographical Cycle." When discussing the development of Geomorphology, Davis outlined what he called the "Phylogeny of Geomorphological Thought," dividing it into two main schools: the Anglo-American School and the German School (Abreu, 1983).

In essence, Davis (1889) was the first to present a coherent theory explaining the genesis and evolution of relief, earning him the title of "Father of Geomorphology" for his role in systematizing it as a science (Marques, 2001). However, no science is static. The evolution of thought, the development of new theories, and the observation of other factors have led (and continue to lead) to a progressive critique of Davis's explanatory model (Marques, 2001).

In the German School, the main name in Geomorphology was Richthofen (1883), who had a Humboldtian conception of totality. Walther Penck (1924) was the main opponent of the Davisian Theory. He considered the relief as a product of three elements: endogenous and exogenous processes, which, together, resulted in the formation of geomorphological features (Cassetti, 2001).

The French School also made significant contributions to geomorphological thinking, reproducing the scientific knowledge from North America and being of extreme importance for the development of Geography and Geomorphology in Brazil. Emmanuel de Martonne (1964) and Tricart (1977) are notable figures. Emmanuel de Martonne (1964) was influenced by Davis, thus adopting a structural perspective. Tricart (1977) introduced the concept of Ecodynamics, based on the balance between morphogenesis and pedogenesis, grounded in Troll's (1932) concept of Ecological Landscape (Florezano, 2010).

As previously mentioned, Brazilian Geomorphology is strongly influenced by the French school. Vitte (2010), in his article "Brief considerations on the history of geographic geomorphology in Brazil", presents a survey and analysis of the entire process through which thought on geomorphology passed. With the intention of making greater use of the aforementioned author's study, we will present here, in table form, the survey made by the author in his article, firstly considering the chronological sequence of the facts, taking into account the year or decade; then, we will mention the event of the year or decade mentioned and we will finish the last column with the consequences of each event.

According to Vitte (2010), in the late 1960s, Brazilian Geomorphology witnessed two major revolutions with Aziz Ab'Saber. The first revolution was the result of extensive reflection and field experience, which had already begun during the preparation of his doctoral thesis in 1951. The second revolution is the concept of morphoclimatic domains (Ab'Saber, 1979) and Forest Refuges, which not only revolutionized climatic Geomorphology worldwide but also Biogeography.

Currently, in Brazil, Geomorphology is traversing various paths, as mentioned by Suertegaray (2018). These paths include Cartographic Geomorphology, which works with the articulation of different scales of morphostructures and morphosculpture concepts (Ross, 1990), and the consideration of relief as a form/environment appropriated by society. Furthermore, the present geomorphological research presents numerous possibilities. Suertegaray (2018) cites Marques (1994) and states that current Geomorphology expresses various other tendencies, such as Anthropogenic Geomorphology, Urban Geomorphology, Submarine Geomorphology, Ecological Geomorphology, and Planetary Geomorphology. The latter involves studies beyond the Earth's surface, encompassing the Moon and other planets.

In terms of conceptual evolution, Suertegaray (2018) considers that Geomorphology now recognizes humans as geomorphological agents. This change in perspective is a result of a new understanding of geomorphological time. The geological time scale, as a systematic temporal representation of the planet's evolution, becomes

fundamental for temporal studies in Geomorphology, prompting a reevaluation. This line of thinking brings back concepts like Quinary and Technogenic, which aim to identify the period/epoch of human activities as transformative processes of the planet as a whole (Pavlov, 1922).

The concept of Quinary necessarily leads us to another concept. This is what is called Technogenic. According to Oliveira and Queiroz Neto (1993) “technogenic deposits are deposits resulting from human activity (Chemekov, 1992). The concept covers both constructed deposits, such as landfills of various kinds, and induced deposits, such as alluvial bodies resulting from erosion processes, triggered by land use (Suertegaray, 2018, p. 56).

The aforementioned citation shows that today we are living in a geological period dominated by the Quinary, which is a period where human technical activity appears as an important force of intervention in nature. Anthropogenic action in Geomorphology can be seen in relation to its impacts on the soil and alterations in the relief, studied by anthropogeomorphology. According to Silva, Dias and Mathias (2014), technological development has allowed humans to have an increasingly greater intervention in nature, producing changes in the physiognomy and physiology of the landscape, resulting, for example, in technogenic deposits, where humans are considered geomorphological agents, as well as geological agents, giving rise to “Technogenesis.”

Given the presentation of the paths followed by Geomorphology and the recent understanding of anthropogenic action as a participating element in the construction of the relief, the study of Ethnogeomorphology is considered indispensable.

In this vein, human marks are circumscribed in various landscapes. We now ask, how do human beings perceive these marks in the landscape? And is this perception used in the management of these landscapes? The answers to these questions are within the scope of Ethnogeomorphology. Therefore, in brief, it is evident that the inclusion of human perception in the interpretation of the terrestrial relief, delineated in the landscapes, represents a valuable theoretical and methodological guideline for Geomorphology—in addition to the advancements that have been drawn over time in Geomorphology. In this regard, we have discussed a little about the history of Geomorphology, understanding its origins and the importance of integrating human beings into this field of study.

### *2.3 Ethnogeomorphology: A Geographical Perspective*

History shows us that ancient peoples, such as the Incas, developed a vast empire in the Andean region. These people created an efficient agricultural system with irrigation works in the mountainous Andes. We can observe that the coexistence and interaction of humans with nature provide them with knowledge derived from experience. Thus, peoples in different times and places constructed their worlds in distinct ways, shaped by the diverse worldviews of each culture (Tuan, 1980).

As the themes of Geography accompany and are part of people’s daily lives, we refer back to history and the Incas once again. Despite being settled in a mountainous region, this people managed to develop an irrigation system that supported the cultivation of corn. Such facts demonstrate that we do not need to attend school to engage with Geography. We perceive and learn it through the force of our own daily lives in its various aspects (Moreira, 2007)

Geography is a knowledge lived and apprehended by the experience itself. A knowledge that puts us in direct contact with our outside world, with its whole and with each of its elements at the same time. If in this lies its peculiarity, from which its natural popularity derives, in this also lies its broad political significance (Moreira, 2007, p. 58).

Empirical knowledge about space and its way of acting upon it leads to the consideration of experience when studying landscapes, as landscapes unfold as individuals interact with their reality, with the place presenting its cultural and economic aspects and its nature as a physical and biological element (Falcão Sobrinho, 2020).

Relief and landscape are clearly linked through integrated and dynamic relationships, and these relationships are visibly perceived by these communities. They can coherently and integrally describe a series of geomorphological processes, connected to other environmental elements of the landscape, thus demonstrating a holistic environmental conception (Lopes & Ribeiro, 2016).

The deepening study of relief highlights the increasing need for a holistic view, not excluding anthropic action. “Relief will also become important as the stage for human activities, whatever they may be, from the construction of dwellings or use to land exploitation. Relief is an indispensable element in shaping activities” (Falcão Sobrinho, 2020, pp. 37–38).

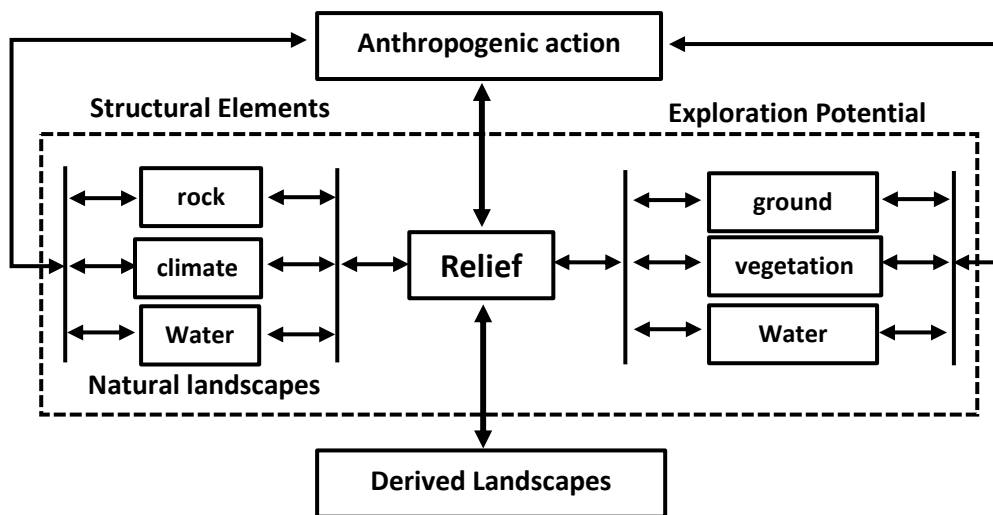


Figure 3. Relief as an element and anchor in the dynamics of the landscape

Source: Falcão Sobrinho, 2020.

Fluxograma 03 illustrates the relationship between society and nature materialized in the landscape, with relief as a guiding element of this dynamic. It is in this understanding that Ethnogeomorphology emerges.

According to Ribeiro (2012), Ethnogeomorphology arises in the context of a new direction in the field of Geomorphology, being considered a branch of Ethnoecology, co-sister to Ethnopedology, which seeks to unveil the intrinsic human knowledge about relief and the morphocultural processes of these, for the better organization of landscapes by human groups.

In the long and endless process of organizing space, humans have established a set of practices through which spatial forms and interactions are created, maintained, undone, and remade. These spatial practices, a set of spatially located actions that directly impact space, either by altering it in whole or in part or by preserving its forms and spatial interactions (Corrêa in Castro, Gomes, & Corrêa, 2011, p. 35).

The above citation emphasizes the importance of humans as agents who interact with spaces through various practices. These spatial practices transcend the intensity of spatial intervention, and human presence should be taken into account in spatial studies, particularly in the case of this research focused on relief.

Etnogeomorphology is a relatively recent and evolving field that emerged around the 2010s, gaining momentum due to increased interest from researchers in understanding, appreciating, and systematizing traditional knowledge (ethnoknowledge) as a means to comprehend reality (Ribeiro, 2012). The earliest work on this topic, to the best of available records, was presented at the VI National Geomorphology Symposium (SINAGEO) in 2006, Goiânia/GO, authored by Nunes Júnior et al. (2006), entitled “Etnogeomorfologia: aplicações e perspectivas” (Ethnogeomorphology: applications and perspectives). This work highlighted the significance of Etnogeomorphology for environmental management and ethnopreservation practices.



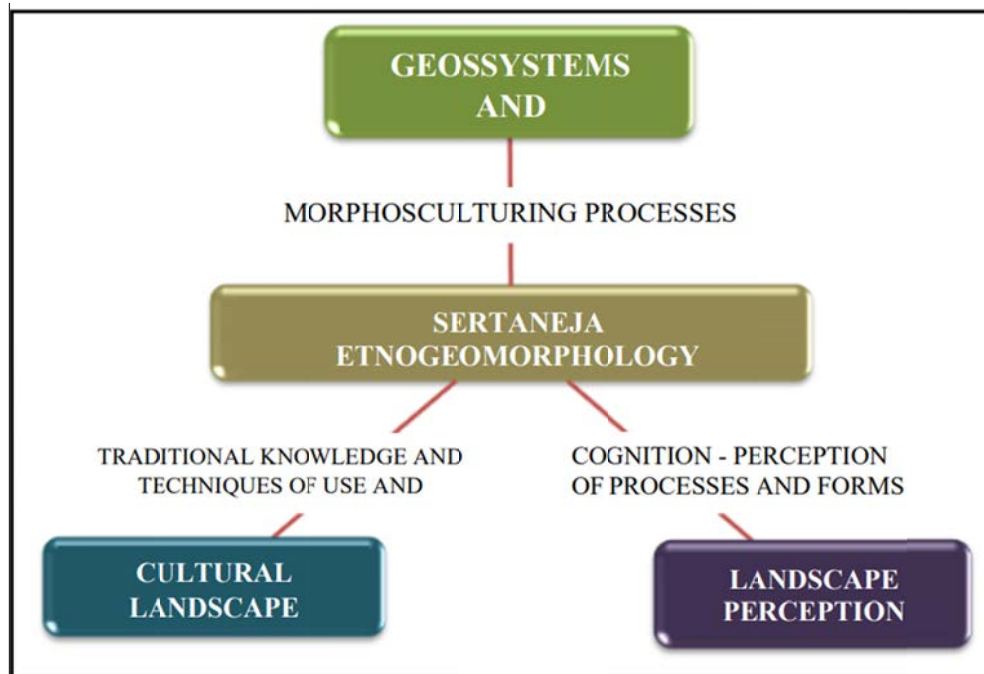


Figure 4. Conceptual triad for understanding Geomorphology

Source: Ribeiro, 2012.

The landmark of Ethnogeomorphology's consolidation in Brazil can be attributed to the publication of Ribeiro's doctoral thesis (2012) titled "Etnogeomorfologia Sertaneja: proposta metodológica para a classificação das paisagens da sub-bacia do rio Salgado/CE" (Sertaneja Ethnogeomorphology: methodological proposal for the classification of landscapes in the Salgado river sub-basin, Ceará). The aforementioned author developed a theoretical and methodological framework that serves as a foundation for research in this field. In her thesis, she identified the ethnoknowledge of traditional farmers from four areas in the Cariri region of Ceará (Crato, Barbalha, Mauriti, and Aurora) and demonstrated that these individuals possess a repertoire of knowledge about landforms and erosive processes. Regarding the concept of Ethnogeomorphology, Ribeiro (2012) states:

"The technological stage and the empirical and 'heritage' knowledge about the nearby environment are essential factors in the modifications implemented by anthropogenic actions on the inputs, pathways, and outputs of matter and/or energy in the environmental system that supports their subsistence. The way in which rural producers manage soil, water, and vegetation resources in their production areas directly and indirectly alters the dynamics of the constituent elements of the local geosystem. The states of this geosystem will change at different times and in different ways than they would without anthropogenic action, and this speed and form are directly related to changes in the morphological dynamics of the landforms" (p. 94).

According to Ribeiro (2012), Ethnogeomorphology is defined as a hybrid science that lies at the interface between natural and social sciences. It studies the knowledge that a community holds about geomorphological processes, taking into account their understanding of nature, cultural values, and local traditions. Ribeiro's work (2012) focused on the Sertanejo region of Cariri, in the state of Ceará. This research, however, will focus on the coastal landscape, also in the same state. Ethnogeomorphology, as a new field of investigation, presents a challenging proposal in contrast to traditional approaches in geomorphology by seeking traditional knowledge about local geomorphological aspects (Ribeiro, 2012).

Environmental perception has strong cultural roots, and cultural and individual filters are decisive in perceptual attitudes. They define perception, which, in turn, determines how humans see, interpret, and interact with their environment (Oliveira, 2009). Different traditional communities in various locations have different perceptions, which is why ethnogeomorphological studies do not yield uniform results. In different parts of the Earth, there are societies with distinct cultural patterns that govern their social structure, so each group perceives and acts upon the natural environment uniquely, based on their own worldview. Thus, when discussing how humans perceive and interpret the environment, there are as many worlds as there are perceptions, as each individual sees

their surroundings based on the references, information, and knowledge acquired throughout life (Lopes, 2017)

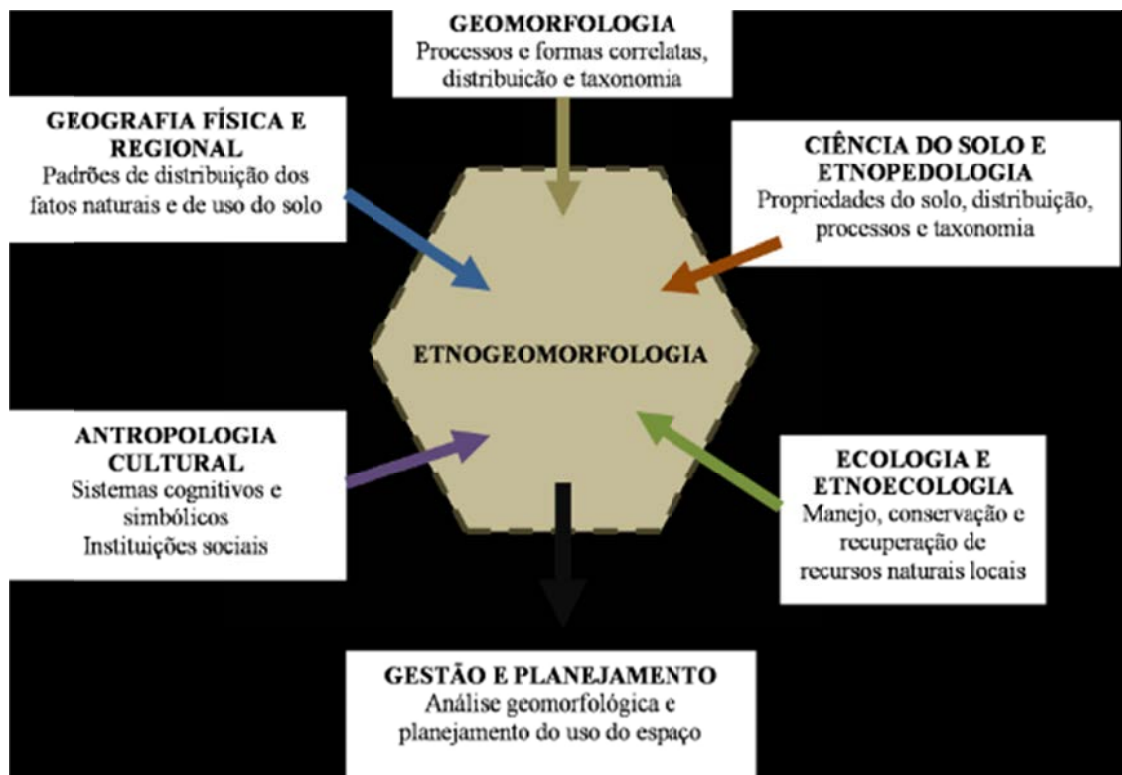


Figure 5. Ethnogeomorphology and its epistemological basis

Source: Ribeiro, 2012.

Cultural diversity is as vast as human history itself, reflecting in the culture of each society. These cultural manifestations are a historical product constructed through social interaction with nature. According to Santos (2006), culture is not a closed or static system; on the contrary, it is constantly shaped and reshaped. Time is an essential element in this construction.

Culture is the primary tool used in human-environment relationships and becomes particularly evident in the practices of traditional community peoples. These groups have adapted to highly complex ecological environments through the accumulated knowledge about the territory and the various ways in which work is carried out. The diversity of often complex practices ensures the group's reproduction, enabling a culture that is integrated with nature and appropriate forms of management (Castro, 2000).

Cultures are born and consolidated in the nearby space, that is, in a specific place. Carlos (2007) emphasizes that the place is the basis of life production and can be analyzed in the triad of "inhabitant-identity-place." The place is the close space where experience is established. According to Corrêa, in Castro, Gomes and Corrêa (2011), citing Tuan (1979), the place has a "spirit," a "personality," and there is a "sense of place" that is manifested through visual or aesthetic appreciation and through the senses based on long-lived experiences. For Heidegger (2005), a place is the dwelling of man, without exception. It contains and preserves the advent to which man belongs in his essence.

The construction of a place is done collectively in any space. According to Lopes (2017), a place is a product of human relationships between man and nature, woven by social relationships that occur in the realm of lived experience, guaranteeing the construction of a network of meanings and senses woven by history and civilizing culture, producing identity because it is where man recognizes himself—it is the place of life. According to Nogueira (2013), it is in lived experiences that the rootedness of man with the place is constructed. In these experiences, knowledge is born and passed down orally over the years, making memory an extremely important resource.

Ethnoscience is based on the connection between the natural and the social, using as a methodology the

investigation of the nomenclature designated by traditional populations for natural elements and phenomena, as well as the cultural values inherent in these groups. Ethnoscience investigations provide the collection of knowledge about nature accumulated over long generations, often not recorded in written form, yet surpassing at times the knowledge acquired through sophisticated methodologies of Western science (Pereira & Diegues, 2010).

This socially constructed knowledge within a traditional community does not lose its importance simply because it did not originate in academia, despite later being appropriated by academia. According to Castro (2000) and Diegues (1995), the knowledge of fishermen regarding seas, rivers, and other aquatic environments, derived from their navigation and fishing activities, forms the foundation of current scientific knowledge.

Supporting the discourse on the importance of traditional knowledge, Toledo and Marrera-Baasols (2009) state that traditional wisdom, as cultural systems, is based on experiences of the world, its accomplishments and meanings, and its valuation according to the natural and cultural context in which they unfold. Environmental knowledge is just one essential part or fraction of local wisdom.

Technical-scientific knowledge often seeks to disqualify and devalue other forms of knowledge and practices. However, as mentioned earlier, we know that environmental knowledge, in general, served as the foundation for the development of modern science. In this case, Diegues (2007) highlights that a significant portion of traditional populations live by rivers, lakes, streams, and the seashore, which explains the values attributed to water, as these environments play a fundamental role in the social and symbolic production and reproduction of their way of life. For this research, three traditional communities were selected, two located by the seaside, along the Coreaú River and Guriú River, and another near the lake, where the community also relies on the land for subsistence agriculture.

To varying degrees, all three communities selected for the research engage in artisanal fishing. Pedrosa, Lira, and Maia (2013) state that artisanal fishing has played a historically significant role in human development, both as a provider of food and a means of subsistence, as well as a socioeconomic activity for coastal communities. Often, the economic aspects are not so rewarding; however, according to Tuan (1980), they endure this way of life for the satisfaction derived from this ancestral and traditional lifestyle.

Braz and Falcão Sobrinho (2022) report that the perception of the landscape and the processes that reflect the culture of these peoples is effective in establishing a dialogue between technical/scientific/academic knowledge and traditional knowledge, enabling the establishment of models for the organization and management of local spaces. They further state that the study of the landscape from the perspective of ethno-geomorphology is already evident in the steep slopes of the Andes, where, even without the scientific knowledge available today, the Inca people, through simple techniques, were able to mitigate the problems posed by the environment, preventing erosive processes such as landslides and consequent loss of agricultural production

### **3. Methodology**

The first step towards achieving the objectives consisted of scientific reflections on approaches related to the study of relief, including academic and educational studies, leading to an understanding of Etnogeomorphology in the context of education. Each participant is characterized as an active link in the process based on their perception and experiences. The second point to be considered is the individual's perception in the process of understanding relief from a cultural aspect and its relationship with the place they inhabit, contributing to the evolution of the landscape.

In pursuing this path, the study aims to answer the question: What does Etnogeomorphology mean, and how does it relate to Geography teaching? To do so, it is necessary to refer to official documents that establish and guide the teaching of Geography and other sciences. Here, I mention the National Education Guidelines and Framework Law—LDB, which reinforced the need for the creation of the National Common Curricular Base—BNCC, establishing some connections between Geography knowledge, ethnoknowledge, and Etnogeomorphology as fundamental for Geography teaching in schools.

Based on these documents, illustrative tables will be created, describing the principles of geographical reasoning, specific competencies in Human and Social Sciences for High School education, and the skills related to specific Competencies 1 and 2 in the Area of Human and Social Sciences.

### **4. Results and Discussions**

In 1996, the Law of Guidelines and Bases of National Education—LDB reinforced the need for the creation of the National Common Curricular Base—BNCC. The BNCC is part of the National Education Plan—PNE, provided for in the Federal Constitution of 1988. According to Pizzato (2001), the new Law of Guidelines and

Bases of National Education, Law 9.394/96, brings about significant innovations compared to the previous one. These innovations are first and foremost the extension of basic education, which includes Early Childhood Education, Elementary Education, and Secondary Education. Throughout the law, the fundamental axis that guides education is the connection between education and the world of work and social practice. After the creation of Law 9.394/96, the next step would be the creation of the National Common Curricular Base.

High School—HS is the final stage of basic education. The new BNCC, approved at the end of 2017, renewing HS, affirms to ensure a vision of social inclusion that embraces diversity, requiring a curricular organization that aligns with the student's work and social relationships, allowing young people to see themselves as active individuals in such a dynamic society.

To shape these young individuals as critical, creative, autonomous, and responsible subjects, it is up to high schools to provide experiences and processes that guarantee the necessary learning to understand reality, confront new challenges of contemporaneity (social, economic, and environmental), and make ethical and well-founded decisions (Brazil, 2018, p. 10).

In the perception of the new BNCC, the school has a fundamental role in awakening the student's interest in investigating and intervening in the various nuances of the world, including its social, environmental, and cultural aspects, among others. According to the BNCC, the past of previous generations reflects on the current generation and, therefore, cannot be neglected. We understand that there is a need for young people to see themselves as cultural beings, knowing that their ancestors have contributed to the current reality, especially through their common-sense knowledge. It becomes urgent to recognize their cultural identity.

[...] the school that embraces youth should be a space that allows students to... understand that society is formed by people who belong to different ethnic and racial groups, who have their own culture and history; equally valuable, and together they build their history in the Brazilian nation (Brazil, 2018).

According to Lima (2020), the Base Nacional Comum Curricular (BNCC) for high school not only aimed at preparing students for higher education but also emphasized vocational training and orientation towards the world of work. In this regard, it maintained vocational education through the Programa Ensino Médio Inovador - Pro EMI. The creation of this program aimed to address the issue of limited university vacancies by offering a solution through vocational training.

Geography, as a curricular component of basic education presented in the Base Nacional Comum Curricular (BNCC), provides students with an understanding of the world around them, from their immediate surroundings to distant regions. It is through studying their own place that students first grasp the concept of Geography, as they observe the tangible natural elements in the landscape and the social relationships within their immediate community, which serve as a basis for expanding their understanding of society and their role within it. By understanding themselves as subjects of history, students begin to see themselves as cultural beings, forming their cultural identity and repertoire of customs and memories. While this conception of Geography, centered around the concept of place, is present throughout basic education, it is particularly emphasized in the elementary school level.

According to Lima (2020), the integration of Geography as a curricular component within the humanities field in the BNCC can be seen as a regression for the discipline in high school. This integration minimizes the in-depth exploration of geographical concepts. The government's objective was to prioritize interdisciplinary dialogue among all disciplines in the humanities field. However, we agree with Couto (2016) when he asserts that the delineation of the major areas within the scientific fields is arbitrary, as they do not constitute distinct sciences. He argues that the BNCC lacks scientific consistency in defining the humanities or justifying Geography as a component within this field. One of the issues he raises is that there is no epistemology specific to the humanities or natural sciences, but rather to individual disciplines and scientific fields, each following its own path of systematization with its specific object of study and key concepts. Lima (2020) believes that this emphasis on interdisciplinary approaches ultimately results in a loss of disciplinary identity, allowing any teacher, regardless of their academic background, to teach subjects within the humanities field, even if it is not their primary area of expertise.

The understanding of space forms the foundation of the teaching process in Geography. However, in order to achieve effective learning in this subject, it is necessary to engage in a specific form of spatial thinking by comprehending the fundamental aspects of reality, such as the location and distribution of terrestrial phenomena and human actions. This is what we refer to as geographical reasoning.

Geographical reasoning is a pedagogical strategy that utilizes a set of principles developed over the years, which

serve the purpose of enhancing understanding in the field of Geography. These principles are rooted in the theoretical and methodological foundations of geographic science. The principles include analogy, connection, differentiation, distribution, extension, location, and order.

Table 1. Description of the principles of geographical reasoning

DESCRIPTION OF THE PRINCIPLES OF GEOGRAPHICAL REASONING	
PRINCIPLE	DESCRIPTION
Analogy	A geographic phenomenon is always comparable to others. The identification of similarities between geographic phenomena is the beginning of understanding the terrestrial unit.
Connection	A geographic phenomenon never happens in isolation, but always in interaction with other phenomena near or far.
Differentiation	It is the variation of the phenomena of interest of Geography by the terrestrial surface (for example, the climate), resulting in the difference between areas.
Distribution	It expresses how objects are distributed in space.
Extension	Finite and continuous space delimited by the occurrence of the geographic phenomenon.
Location	Particular position of an object on the Earth's surface. Location can be absolute (defined by a geographic coordinate system) or relative (expressed through topological spatial relationships or spatial interactions).
Order	Order or spatial arrangement is the most complex geographic principle. It refers to the way in which space is structured according to the rules of the society that produced it.

Source: National Common Curriculum Base, 2018.

The teaching of school Geography is based on the application of geographical reasoning through the understanding and use of geographical principles, according to the National Common Curricular Base (BNCC, from its initials in Portuguese). The object of study in Geography, which is the geographical space, is addressed in the BNCC through various categories of analysis: territory, place, region, nature, and landscape.

On December 14, 2018, the BNCC document was homologated, along with the new high school curriculum. The documental change reflects an increase in the teaching workload, the distribution of subjects that are now called Formative Pathways—IF, divided by study areas, and the development of textbooks. While elementary education is based on the understanding of school Geography starting from the self towards the understanding of others and the collective, high school proposes more complex reasoning with dialogues, mastery of methodologies, hypotheses, arguments, systematic questioning, in short, what is necessary to promote youth empowerment.

Therefore, in high school, the BNCC for the area of Human and Applied Social Sciences proposes that students develop the ability to establish dialogues—among individuals, social groups, and citizens from different nationalities, knowledge, and distinct cultures—which is essential for accepting otherness and adopting an ethical behavior in society. To achieve this, it defines skills related to the mastery of concepts and methodologies specific to this area (Brazil, 2018, p. 10).

In order to promote personal and social development through the construction and consolidation of knowledge, the BNCC is divided into the following formative pathways: Language and its technologies, Mathematics and its technologies, Natural Sciences and its technologies, and Human and Applied Social Sciences. The Human and Applied Social Sciences pathway encompasses the following curriculum components: Geography, History, Sociology, and Philosophy. The categories of analysis that guide this area, according to the BNCC, are: time and space; territories and boundaries; individual; nature; society; culture and ethics; and politics and work.

The Human and Applied Social Sciences area, both in elementary and high school, defines learning centered on the development of skills in identifying, analyzing, comparing, and interpreting ideas, thoughts, historical, geographical, social, economic, political, and cultural phenomena and processes (Brazil, 2018, p. 10).

As a fundamental part of this research, the student is one of the characters to be observed. The BNCC emphasizes the importance of youth empowerment as a element associated with learning and individual development. The objective of the BNCC is to promote youth empowerment by stimulating the student's ability to mobilize different languages, value fieldwork (widely used in Geography classes), resort to different forms of recording, and engage in cooperative practices for the formulation and resolution of the problems that surround them, as well as healthy interaction with society and nature.

In the construction of their life in society, the individual establishes relations and social interactions with others, constructs their perception of the world, assigns meanings to the world around them, interferes with

and transforms nature, produces knowledge and wisdom, based on cognitive procedures specific to their traditions, both physical-material and symbolic-cultural... The relationship that a society has with nature is also influenced by the importance attributed to it in its culture, by social values as a whole, and by the information and awareness of the importance of nature for the sustainability of the planet (Brazil, 2018, p. 10).

The Specific Competencies of the Formative Pathway in Human and Applied Social Sciences, composed of curriculum components (Geography, History, Philosophy, and Sociology), are conceptual foundations of knowledge and procedures. Of the six specific competencies in this area, only two competencies are aligned with the theoretical basis that will be used in our research. Only Specific Competency 1 and Specific Competency 3 address topics related to Cultural Geography and Geomorphology.

Table 2. Specific competences of applied human and social sciences for the high school

SPECIFIC SKILLS OF HUMAN AND SOCIAL SCIENCES APPLIED TO HIGH SCHOOL EDUCATION	
number of Competence	Specific Competence
1	Analyze political, economic, social, environmental and cultural processes at the local, regional, national and global levels at different times, based on the plurality of epistemological, scientific and technological procedures, in order to understand and take a critical position in relation to them, considering different points of view and making decisions based on arguments and sources of a scientific nature.
3	Critically analyze and evaluate the relationships of different groups, peoples and societies with nature (production, distribution and consumption) and their economic and socio-environmental impacts, with a view to proposing alternatives that respect and promote awareness, socio-environmental ethics and responsible consumption at local, regional, national and global levels.

Source: National Common Curriculum Base, 2018.

A Specific Competency 1 aims to understand and utilize specific methodological procedures to critically discuss the historical circumstances that favor the emergence of dichotomous conceptual frameworks, contextualizing them in order to identify their reductionist nature in relation to the actual complexity of reality. It also involves operationalizing concepts such as ethnicity, temporality, memory, identity, society, territoriality, spatiality, and different languages and narratives that express cultures, knowledge, beliefs, values, and practices.

Specific Competency 3, among other objectives, aims to analyze paradigms that reflect the thoughts and knowledge of different groups, peoples, and societies (including indigenous, quilombola, and other traditional peoples and populations), taking into consideration their ways of appropriating nature, extracting, transforming, and commercializing natural resources, their forms of social and political organization, labor relations, the meanings behind the production of their material and immaterial culture, and their languages.

The Skills of the Formative Pathways described in the BNCC represent the necessary knowledge for the development of the Specific Competencies, and they are materialized through action, through doing. They are composed of an alphanumeric code that represents a set of information about the skills to be developed.

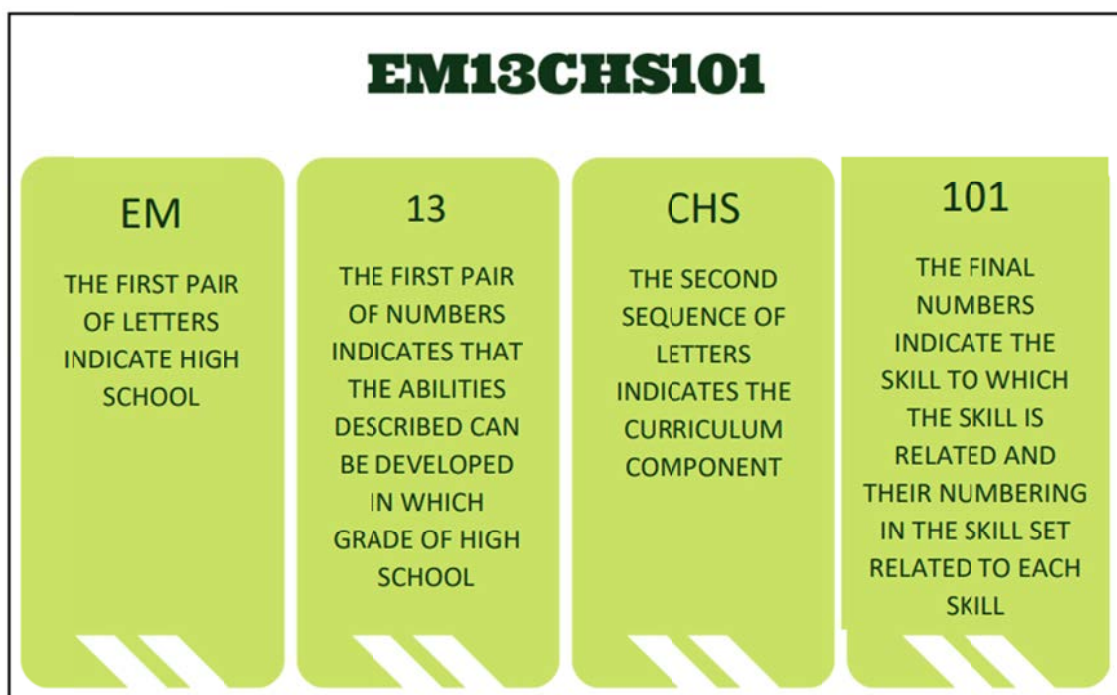


Figure 6. Description of the Alphanumeric Code of BNCC Skills

Source: National Common Curriculum Base, 2018.

Table 3 presents the Skills of specific Competencies 1 and 3. These selected Skills are in line with the Ethnogeomorphology theme.

Table 3. Skills of specific skills 1 and 2 in the area of applied human and social sciences

SKILLS	
alphanumeric code	Description
(EM13CHS101)	Identify, analyze and compare different sources and narratives expressed in different languages, with a view to understanding philosophical ideas and historical, geographic, political, economic, social, environmental and cultural processes and events.
(EM13CHS102)	Identify, analyze and discuss the historical, geographic, political, economic, social, environmental and cultural circumstances of conceptual matrices (ethnocentrism, racism, evolution, modernity, cooperativism/development, etc.), critically evaluating their historical significance and comparing them to narratives that contemplate other agents and speeches.
(EM13CHS103)	Elaborate hypotheses, select evidence and compose arguments related to political, economic, social, environmental, cultural and epistemological processes, based on the systematization of data and information of different natures (artistic expressions, philosophical and sociological texts, historical and geographic documents, graphics, maps, tables, oral traditions, among others).
(EM13CHS104)	Analyze objects and vestiges of material and immaterial culture in order to identify knowledge, values, beliefs and practices that characterize the identity and cultural diversity of different societies inserted in time and space.
(EM13CHS105)	Identify, contextualize and criticize evolutionary typologies (nomadic and sedentary populations, among others) and dichotomous oppositions (city/countryside, culture/nature, civilized/barbarian, reason/emotion, material/virtual, etc.), making their ambiguities explicit.
(EM13CHS106)	Use cartographic, graphic and iconographic languages, different textual genres and digital information and communication technologies in a critical, meaningful, reflective and ethical way in different social practices, including school ones, to communicate, access and disseminate information, produce knowledge, resolve problems and exercise protagonism and authorship in personal and collective life.
(EM13CHS304)	Analyze the socio-environmental impacts resulting from practices by government institutions, companies and individuals, discussing the origins of these practices, selecting, incorporating and promoting those that favor socio-environmental awareness and ethics and responsible consumption.

Source: National Common Curriculum Base, 2018.

## 5. Conclusion

The teaching of Geography is a fundamental discipline that aims to understand the relationships between human beings and the environment in which they live. An interesting approach within Geography education is ethno-geomorphology. Ethno-geomorphology is an interdisciplinary field that combines elements from Geography and Anthropology to analyze the relationships between human societies and landforms. It seeks to understand how different ethnic and cultural groups shape, perceive, and interact with the geographical environment around them.

When studying ethno-geomorphology, students are encouraged to examine how human communities interpret and modify the geographic space according to their beliefs, practices, and traditional knowledge. This approach promotes the appreciation of cultural diversity and the recognition of the importance of traditional knowledge for understanding the environment. Furthermore, ethno-geomorphology stimulates students to reflect on the interactions between society and nature and the importance of sustainability and the preservation of natural resources.

To implement the teaching of ethno-geomorphology, it is important to use different teaching resources and encourage students' critical reflection, motivating them to question and analyze the relationships between cultural and geographical aspects.

Thus, teaching Geography with a focus on ethno-geomorphology contributes to a broader and integrated education by addressing not only the physical and environmental aspects but also the social, cultural, and historical aspects present in the construction of the geographical space

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