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The Cerrado and didactic-pedagogical possibilities in School Geography[1]

Ivony Rosa de Oliveira Vilela [2]
Diego Tarley Ferreira Nascimento [3]

ABSTRACT

This study seeks to contribute to the process of teaching and learning about the Cerrado throughout elementary school, by proposing didactic sequences related to school geography. To this end, the research is based on a documentary review, including analysis of the National Common Curriculum Base (BNCC) and the Goiás State Curriculum Document (DC-GO), to identify possible skills related to the Cerrado biome. Teaching paths were then proposed to promote meaningful learning, the use of active methodologies and the development of spatial thinking. The results point to the presence of the Cerrado theme in school curricula, highlighting not only physical aspects, but also cultural and socio-economic ones. The proposed didactic sequences are expected to help train critical citizens who are aware of the importance of the Cerrado, reinforcing the role of schools in building knowledge that values the biome and promotes its sustainability.

KEYWORDS: Biome; Brazilian savannah; Environmental conservation; Teaching pathway.

[1] Englisn version by Ana Carolina de Sousa. *E-mail:* carolinasou26@gmail.com.

[2] Master's degree in Geography from the State University of Goiás (UEG). Teacher at the Goiás State Department of Education (SEDUC), Aragarças, Goiás, Brazil. Orcid: https://orcid.org/0009-0001-0624-4933. *E-mail:* ivonyrosaoliveira_phs@yahoo.com.br.

[3] PhD in Geography. Adjunct Professor at the Federal University of Goiás (UFG), Goiânia, Goiás, Brazil. Orcid: https://orcid.org/0000-0002-0420-3636. *E-mail*: diego_nascimento@ufg.br.

O Cerrado e as possibilidades didático-pedagógicas na Geografia Escolar

RESUMO

O estudo busca contribuir para processo de ensino e aprendizado a respeito do Cerrado ao longo do Ensino Fundamental, a partir da proposição de sequências didáticas relacionadas à Geografia Escolar. Para tanto, a pesquisa fundamenta-se em revisão documental, incluindo a análise da Base Nacional Comum Curricular (BNCC) e do Documento Curricular do Estado de Goiás (DC-GO), para identificação de possíveis habilidades relacionados ao bioma Cerrado. Em seguida, são propostos percursos didáticos que promovam a aprendizagem significativa, com o emprego de metodologias ativas e o desenvolvimento do pensamento espacial. Os resultados apontam a presença do tema do Cerrado nos currículos escolares, destacando não apenas aspectos físicos, mas também culturais e socioeconômicos. A partir das sequências didáticas propostas, espera-se oferecer subsídios para a formação de cidadãos críticos e conscientes da importância do Cerrado, reforçando o papel da escola na construção de um conhecimento que valorize o bioma e promova sua sustentabilidade.

PALAVRAS-CHAVE: Bioma; Savana Brasileira; Conservação ambiental; Percurso didático.

El cerrado y las posibilidades didáctico-pedagógicas de la Geografía Escolar

RESUMEN

El estudio pretende contribuir al proceso de enseñanza y aprendizaje sobre el Cerrado a lo largo de la enseñanza primaria, proponiendo secuencias didácticas relacionadas con la geografía escolar. Para ello, se basa en una revisión documental, que incluye un análisis de la Base Curricular Nacional Común y del Documento Curricular del Estado de Goiás, para identificar posibles competencias relacionadas con el Cerrado. A continuación, se propusieron programas de enseñanza para promover el aprendizaje significativo, el uso de metodologías activas y el desarrollo del pensamiento espacial. Los resultados apuntan a la presencia del tema del Cerrado en los currículos escolares, destacando no sólo los aspectos físicos, sino también los culturales y socioeconómicos. Se

espera que las secuencias didácticas propuestas contribuyan a formar ciudadanos críticos y conscientes de la importancia del Cerrado, reforzando el papel de la escuela en la construcción de un conocimiento que valore el bioma y promueva su sostenibilidad.

PALABRAS CLAVE: Bioma; Sabana brasileña; Conservación del medio ambiente; Vía didáctica.

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Introduction

The development model based on market expansion and encouraging unsustainable consumption has triggered and intensified a series of adverse environmental impacts (Heilbroner, 1988; Casseti, 2002; Batistela; Boneti, 2008). Given this scenario, it is essential to discuss the need for environmental conservation strategies that balance the use of natural resources with socioeconomic demands in order to ensure their preservation for future generations (Diegues, 2008).

The Cerrado is recognized as a global biodiversity hotspot (Mittermeier et al., 2004), but this biome has undergone intense degradation due to the conversion of its natural vegetation for human use. Currently, about 48% of its original area has already been deforested (Mapbiomas, 2025). In addition, unlike the Amazon and the Atlantic Forest, the Cerrado has few public policies for its conservation, and only 8.21% of its area is legally protected by Conservation Units (MMA, 2021).

Therefore, addressing the natural characteristics, biodiversity, and sociocultural potential of the Cerrado in a school environment, alongside its process of occupation and state of degradation, can promote awareness of the importance of conserving it. The perspective is that such learning can mobilize the evaluation and perception about the need to intervene, in a critical, reflective, and conscious manner, in favor of sustainability and the common good.

In this context, the school is a formal space for raising awareness about the Cerrado, providing students with a broader understanding of the biome's natural characteristics, biodiversity, and environmental and sociocultural importance. Thus, by relating the process of occupation of the Cerrado to its degradation in the school environment, it is possible to foster critical reflection and encourage the production and sharing of knowledge and changes in attitudes in favor of sustainability and the common good.

However, according to Borges and Ferreira (2018), the lack of reliable information about the Cerrado makes it difficult to create emotional ties with the biome. This gap is also evident in geography teaching, in which the Cerrado is often addressed in a superficial manner, without its ecological and cultural importance being properly contextualized.

In addition, geography teaching faces structural challenges, especially in public schools. Cardoso and Queiroz (2016) point out that the lack of teacher training, the scarcity of contextualized teaching materials, and poor working conditions limit qualified teaching about the Cerrado. To overcome these obstacles, Callai (2005) emphasizes the need to value students' experiences, promoting spatial thinking and geographical concepts relevant to their reality.

Thus, planning and contextualizing content according to students' daily lives, articulating physical, human, and social aspects, makes learning more meaningful and critical. This approach encourages teachers to rethink their pedagogical practices, strengthening the role of geography in constructing a reflective view of lived space.

Based on this perspective, this study seeks to critically examine the teaching of the Cerrado in school geography and contribute to it. The overall objective is to propose teaching sequences based on active methodologies and the development of spatial thinking in order to improve the approach to this biome throughout elementary school.

Methodology

The methodological procedures of this study were structured based on a qualitative approach, grounded in documentary research and the development of educational pathways. Initially, an analysis of the National Common Core Curriculum (BNCC) (Brazil, 2017) was conducted, and the Curriculum Guidelines of the State of Goiás – DC/GO (Goiás, 2019) were analyzed to identify learning expectations related to the Cerrado biome in the Geography curriculum, both in the early and final years of elementary school.

Based on this analysis, suggestions for teaching paths were made, structured as a set of actions, operations, and procedures necessary for students to build concepts and knowledge about the Cerrado. The development of these teaching sequences was based on theoretical references for teaching and learning, particularly in school geography, as well as active methodologies, geographical situation, and spatial thinking.

These proposals are based on the Historical-Cultural Theory, whose main exponents include Vygotsky (1991, 2005), Leontiev (2000, 2005), Luria (2005), and Davídov (1988). This theoretical framework highlights the central role of school and teaching in the psychological development of students, emphasizing that learning should promote the internalization of scientific concepts and stimulate critical-reflective thinking (Freitas, 2011). Thus, Developmental Theory, derived from the historical-cultural approach, guides the structuring of teaching sequences, ensuring that students can form meaningful cognitive representations about school knowledge.

The geography teaching proposal adopted in this study seeks to connect the local to the global, passing through the regional, promoting critical geographical thinking by using multiple languages and technologies. To this end, this study considered theoretical contributions of Castellar (2017), Callai (2010, 2011), and Cavalcanti (2002, 2010, 2012, 2019), who defend the need to overcome fragmented approaches and highlight the

sociocultural and environmental dimension of geographical space. These authors emphasize the importance of providing students with tools that enable them to interpret reality and face contemporary challenges from an integrated geographical perspective.

The structure of the teaching suggestions followed the teaching mediation approach proposed by Cavalcanti (2012), prioritizing an approach that combines contextualization, problematization, and systematization, in addition to defining strategies for assessing learning. The proposals presented are not intended to exhaustively meet all learning expectations, but seek to establish correlations between content and enable greater integration between topics.

Finally, it is important to note that the teaching sequences proposed here should be understood as flexible suggestions, open to adaptation according to the pedagogical objectives and specific context of each school. The purpose of this study is not to exhaust all didactic-pedagogical possibilities, but rather to effectivelly contribute to improving Geography teaching practices, encouraging more contextualized and meaningful approaches to the Cerrado biome.

Results and Discussions

An analysis of the National Common Core Curriculum (BNCC) (Brazil, 2017) and the Goiás State Curriculum Document (DC-GO) (Goiás, 2019) identified how the Cerrado biome is addressed in the school geography curriculum. As a national regulatory document, the BNCC establishes a set of essential knowledge for Basic Education, while the DC-GO contextualizes and applies these guidelines to the state's reality.

In the case of BNCC, Geography in Elementary School explores different dimensions of geographical space, seeking to develop critical thinking and socio-environmental analysis skills. However, the Cerrado appears only sporadically and it is directly mentioned only in the 7th grade,

in skills that deal with the territoriality of traditional peoples (EF07GE03) and the physical-natural components and biodiversity of Brazil's biomes (EF07GE11). Oliveira (2013) points out that the BNCC approach does not address the specificities and environmental challenges of the Cerrado in depth, while Morais (2022) argues that the topic is addressed indirectly through the analysis of landscapes, watersheds, and economic processes.

On the other hand, the DC-GO presents eight skills distributed between the early and final years of elementary school that address the Cerrado from different perspectives, including physical, socioeconomic, and cultural aspects (Table 1).

Table 1 – DC-GO skills (S) that address the Cerrado

3rd year	(EF03GE03-A) Recognize the different traditional peoples and communities (indigenous, quilombolas, cerradeiros, riverine, and migrants), their ways of life in different places, with an emphasis on the territory of Goiás.
4rd year	(EF04GE11-D) Identify the natural resources of the state of Goiás (Cerrado Biome) and the importance of their preservation and conservation.
5rd year	(EF05GE03-B) Understanding the relationship between urban growth and the socio-environmental and economic changes involved, highlighting the occupation of the Cerrado.
6rd year	(EF06GE05-A) Identify global natural phenomena and relate the interdependencies of climate, soil, relief, hydrography, and vegetation formations, with an emphasis on the Cerrado.
	(EF06GE05-B) Identify the main characteristics of Brazilian biomes and learn about the importance of environmental preservation areas, with an emphasis on those in Goiás.
	(EF06GE06-B) Identify the main activities in the Goiás savanna and their impact on water resources.
7rd year	(EF07GE03-B) Critically analyze the legal territorial rights of indigenous peoples, quilombolas, forest peoples, savanna dwellers, riverine communities, coastal communities, and urban and rural social movements.
	(EF07GE11-A) Characterize and relate the dynamics of physical and natural components in the national territory to the distribution of Brazilian biodiversity, focusing on morphoclimatic domains.

Source: DC-GO (GOIÁS, 2018), adapted by the authors.

The Goiás curriculum values the Cerrado as environmental and social heritage, highlighting the importance of traditional communities, the impacts of human occupation, and the need to conserve the biome (Marques; Misnerovicz, 2020).

Even so, Antunes and Nascimento (2022) warn that, despite of Cerrado's ecological importance and biodiversity, its treatment in textbooks tends to be superficial, often limited to viewing the biome as "Brazil's breadbasket." Oliveira and Morais (2021) add that there is a lack of contextualized teaching materials, which makes it difficult to achieve a deeper understanding of the subject.

In this context, one of the main challenges faced by teachers is the scarcity of teaching materials that link curriculum content to the local reality, hindering pedagogical mediation aimed at valuing the Cerrado. Combined with this is the limited infrastructure in many public schools, which prevents, for example, the use of technological resources or technical visits—fundamental strategies in the proposals presented here. In addition, initial and continuing teacher training does not always include interdisciplinary practices and active methodologies focused on the Cerrado biome, which requires additional planning and adaptation efforts by teachers.

Given these limitations, suggestions were made for educational pathways that could contribute to teaching about the Cerrado in school geography classes, respecting the progression of content complexity throughout the years of elementary school. In addition, each proposal was structured to promote the evolution of spatial relationships, moving between lived, perceived, and conceived space, and stimulating the students' spatial thinking based on spatial concepts, reasoning processes, and spatial representations.

The teaching sequences were organized according to Cavalcanti's (2012) methodological principles, following the three essential stages of teaching geography: problematization, systematization, and synthesis. These proposals consider students as active participants in the learning process, with teachers acting as mediators in knowledge construction. In addition, it aims to integrate elements of students' daily lives, relating

school content to local reality, and to use active methodologies and technological resources, making learning more dynamic and meaningful.

The first educational proposal is aimed at 3rd grade elementary school students and deals with Cerrado's traditional peoples and communities (EF03GE03-A). This approach enables students to understand the cultural diversity of the biome and the relationship between these populations and the environment. Initially, the approaches explores the topic through a discussion circle, in which students share their prior knowledge about indigenous peoples, quilombolas, riverine communities, and other groups. Then they are organized into groups to research and create an illustrated mural representing the ways of life of these communities. As a complementary activity, a visit to a traditional community can be organized, allowing students to have closer contact with this reality. Assessment takes place throughout the process, considering participation in discussions, the production of the mural, and reflections on the visit.

The second teaching proposal addresses the conservation and preservation of the Cerrado's natural resources (EF04GE11-D), focusing on environmental impacts and the importance of water. The sequence is aimed at 4th grade elementary school students and begins with a group discussion on the topic, in which students identify and record the main environmental problems on an interactive poster – like a cloud of words and ideas.

Next, Steve Cutts' documentary "Men" (Figure 1) is shown, lasting just over three minutes. The teaching proposal continues with a debate, which will deepen understanding of how human actions, expressed through deforestation and pollution, affect water bodies and other natural resources in the Cerrado. To summarize what they have learned, students are invited to write a "Letter to the Future of the Cerrado," in which they express their perceptions and commitments to preserving the biome. The assessment considers participation in the discussions and the reflection presented in the letter.

FIGURE 1 – Print-screen extracted from the documentary "Men"

Available at: https://www.youtube.com/watch?v=zkQu0QNcWjA.

The third teaching sequence is intended for the 6th grade of elementary school and it broadens the analysis to the national context, exploring Brazil's biomes and the environmental preservation areas of the Cerrado (EF06GE05-B). The course begins with an analysis of maps of Brazil's biomes, allowing students to understand the distribution and boundaries of the Cerrado. To this end, we suggest using the maps in the IBGE school atlas, for example, the one on Brazilian biomes (Figure 2), highlighting the location, extent, and boundaries of the Cerrado.

Next, the documentary "A Park to Live In" is shown – Figure 3 –, lasting almost an hour and a half, which addresses Conservation Units in the state of Goiás. As the main activity, students use the StoryMaps platform (available at https://storymap.knightlab.com/) to create an interactive digital map, highlighting and describing some protected areas of the biome through text, images, and/or video, as shown in Figure 4.

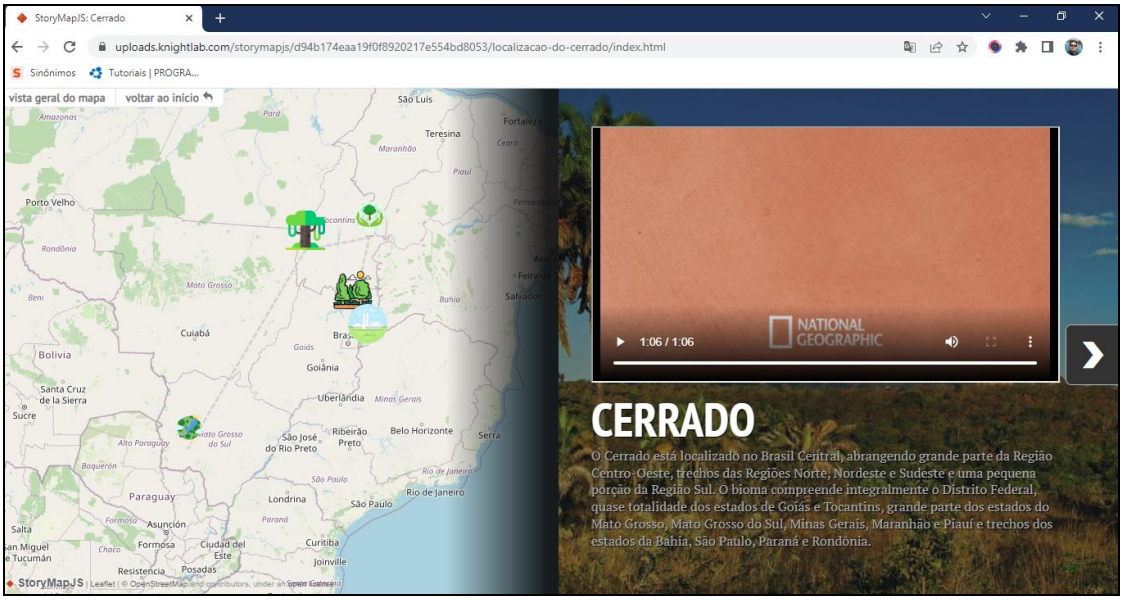
FIGURE 2 - Map of Brazil's biomes

Source: IBGE, available at: https://atlasescolar.ibge.gov.br/brasil/3043-diversidade-ambiental/biomas.html.

FIGURE 3 – Documentary "A park to live in," produced by the Government of Goiás

Source: Governo de Goiás, available at: https://www.youtube.com/watch?v=wxbYp_Iklxc.

FIGURE 4 - Using StoryMaps to visualize preserved areas of the Cerrado



Source: Antunes e Nascimento (2022).

Learning is summarized through the production of creative texts (poems, short stories, or chronicles), in which students express their reflections on the occupation, impacts, and relevance of Cerrado preservation areas. The assessment covers the analysis of the StoryMap construction and the quality of the reflections in the texts produced.

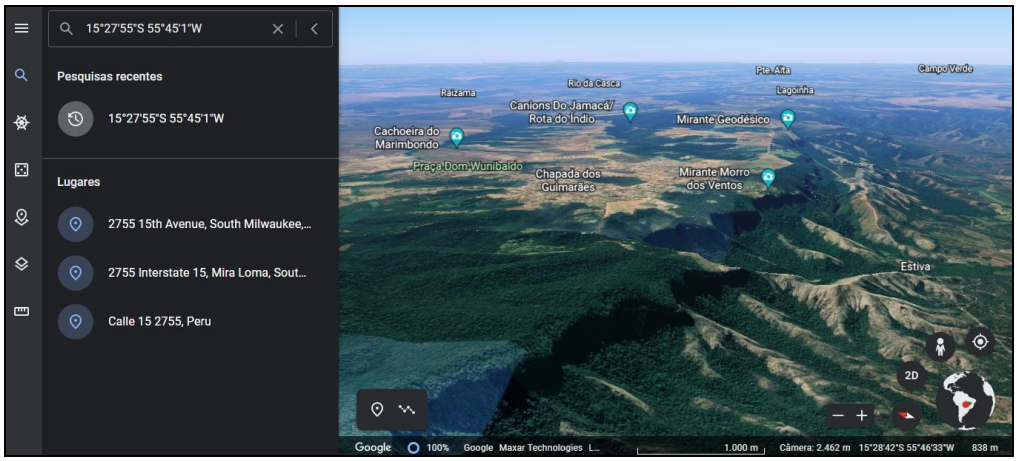
Also in the 6th grade, the fourth teaching proposal explores human activities and their impact on water resources in the Cerrado (EF06GE06--B). The course begins with the screening of the video "The Story of Stuff" (Figure 5), which lasts about 20 minutes and allows students to reflect on the impact of natural resource exploitation. The proposal continues with a field trip to a body of water near the school, where students can observe natural aspects and possible environmental impacts (pollution, erosion, deforestation, etc.). After this, students will be divided into groups to discuss the causes and effects of the environmental impacts observed.

FIGURE 5: Documentary "The Story of Stuff"

Available at: https://www.youtube.com/watch?v=DfG6MFLZ-VQ.

Whether as a substitute due to the impossibility of conducting a technical visit or as a supplement, students can use Google Earth (available at https://earth.google.com/web/) to observe different forms of occupation of the Cerrado and their environmental impacts. Just as an example, students can explore different locations, such as: mechanized agriculture in western Bahia (11°46'1"S 45°39'19"W), Bananal Island (10°56'25"S 50°11'22"W), mining activity in Paracatu-MG (17° 10'56"S 46°53'9"W), the agricultural frontier between the Cerrado and the Amazon (13°10'56"S 52°42'25"W), and Chapada dos Guimarães (15º27'55" S 55º45'1" W) – shown in Figure 6.

FIGURE 6 - Using Google Earth to view Chapada dos Guimarães



Source: https://earth.google.com/web/.

The course results in a simulated community assembly, in which students take on roles as environmentalists, farmers, and government officials, debating solutions to the water crisis in the biome. The activity will stimulate debate, empathy, and the search for collaborative solutions. Assessment is based on students' argumentative skills and engagement during the assembly.

Finally, in the 7th grade of elementary school, the last educational course proposes a more complex analysis of biodiversity and occupation of the Cerrado, considering the historical and environmental processes that shaped the biome, as well as the diversity of fauna and flora (EF07GE11-A). For students to recognize the environmental characteristics, history of occupation, and main environmental impacts of the biome, the teaching path will involve a more in-depth contextualization of the Cerrado, based on the screening of a documentary entitled "Sertão Velho Cerrado" (Figure 7), which lasts just over an hour and a half. Then, guided by the teacher, students will discuss the impacts of human transformations and the challenges faced by the Cerrado.

FIGURE 7 - Documentary "Sertão Velho Cerrado"

Available at: https://www.youtube.com/watch?v=5BZoEyBvXpc.

To complement the description of the biome's biodiversity, a better contextualization of the Cerrado's fauna can be achieved through an educational game entitled "Cerrado em Jogo" (Cerrado at Play), developed by Motta (2021) and available at https://repositorio.ifgoiano.edu.br/handle/prefix/1902. It is illustrated in Figure 8. The game consists of 40 illustrated cards with information about Cerrado animals, including species such as macaws, capybaras, and alligators.

FIGURE 8 - Letters from "The Cerrado at stake"

Source: Motta (2021).

The landscape diversity and flora of the biome can also be explored using a Cerrado Memory Game, developed by Rocha and Nascimento (2021), which features representations and descriptions of the biome's phytophysiognomies – Figure 9.

FIGURE 9 - Cards from the memory game "Cerrado"

Source: Rocha e Nascimento (2020).

The synthesis of learning takes place through a final seminar, in which students present and discuss the diversity and conservation strategies of the Cerrado. The assessment considers performance in the games and the quality of the reflections presented in the seminar.

These approaches demonstrate a commitment to pedagogical practice by linking theoretical knowledge of school geography with concrete experiences, valuing both scientific knowledge and local and popular knowledge. The inclusion of games, videos, interactive maps, and field activities allows teachers to move between theory and practice in a meaningful way, promoting teaching that is not restricted to content reproduction, but rather proposes a critical and situated understanding of the Cerrado.

In addition, the proposals stand out for their originality in proposing interactive and contextualized sequences, which are rarely used in traditional teaching. For example, using the StoryMaps platform in the 6th grade to map conservation units in the Cerrado, or simulating a community assembly in the same year, with debates on the water crisis, highlight innovative strategies that promote active learning and student engagement in topics of socio-environmental relevance.

Another relevant example is the "Cerrado em Jogo" (Cerrado at Play) resource in the 7rd year, which combines playfulness and scientific knowledge, promoting appreciation of the biome's fauna through accessible language. The "Letter to the Future of the Cerrado" proposal, in the 4rd year, also stands out by encouraging written and reflective expression, contributing to critical ecological awareness from the early years of schooling.

Even with such potential, it is necessary to question the feasibility of these proposals in school contexts marked by inequality: how can we ensure that schools with limited technological resources are able to implement activities using StoryMaps or Google Earth? How can we ensure adequate time and teacher training for planning and mediating these sequences? Such questions require public policies that value teachers, as well as investment in school infrastructure, and continuing education focused on critical environmental education.

These educational approaches demonstrate that teaching the Cerrado in school geography classes can be significantly improved when it is structured based on the progression of content complexity, the development of spatial thinking, and on valuing student experiences. This way, the aim is not only to transmit knowledge, but also to educate citizens who are critical and aware of the importance of preserving the Cerrado.

Conclusion

This study sought to broaden understanding and contribute to the teaching of the Cerrado biome in Basic Education. Systematic analysis of curriculum documents, teaching materials, pedagogical practices, and perceptions of teachers and students revealed both challenges and potentialities in addressing this topic in the Geography curriculum component.

Initially, despite its significant environmental and sociocultural relevance, the Cerrado is rarely addressed in the National Common Core Curriculum, especially in terms of two skills suggested for the 7th grade of elementary school. In turn, the Curriculum Document of the State of Goiás covers the biome more comprehensively, proposing skills related to traditional peoples, natural components, human activities, and impacts.

In order to contribute to the teaching and learning process in Geography, educational pathways were proposed to promote greater student engagement and broaden their critical perception of the Cerrado. These teaching strategies incorporated active and contextualized methodologies that value student leadership, with the potential to develop skills such as spatial thinking and understanding of the interrelationships between society and nature. However, it is important to note that challenges remain, especially regarding interdisciplinary integration and the continuing education of teachers, who must be prepared to use innovative approaches in teaching.

This study also highlights that conservation of the Cerrado should be viewed as a responsibility shared between schools, communities, and public policy.

Nevertheless, it is essential to emphasize the role of environmental legislation as a regulatory instrument to curb deforestation practices and the misuse of natural resources. This is because without a properly enforced regulatory framework, any educational or awareness-raising action are unlikely to be enough in the face of the severity of socio-environmental problems. In this context, it is important to remember that agribusiness activities are currently one of the main sources of impact on this biome, whether through the disorderly expansion of agricultural frontiers, intensive use of pesticides, or pressure on preservation areas. This aspect needs to be addressed systematically and critically throughout studies and research processes in order to highlight the contradictions between economic development and environmental conservation.

For this reason, this study argues that investing in environmental education for students is essential to shape critical citizens committed to protecting natural resources. Thus, the Cerrado should be recognized not only as an integral part of Brazil's natural heritage, but also as a rich ground for innovation in Geography teaching and other areas of knowledge.

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