

EPISTEMIC JUSTICE AND CONTEXTUALIZED EDUCATION IN THE BRAZILIAN SEMI-ARID: DECONSTRUCTING THE “EMPTY TERRITORY” NARRATIVE IN THE CAATINGA

JUSTIÇA EPISTÊMICA E EDUCAÇÃO CONTEXTUALIZADA NO SEMIÁRIDO
BRASILEIRO: DESCONSTRUINDO A NARRATIVA DO “TERRITÓRIO VAZIO” NA
CAATINGA

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ABSTRACT: The Brazilian Semi-Arid has historically been portrayed as a territory marked by scarcity, environmental adversity, and socio-economic vulnerability, reinforcing a persistent narrative that frames the region as an “empty” or deficient space in need of external intervention. Such representations have contributed to the marginalization of territorial knowledge systems and the invisibilization of socioecological practices developed by local communities. In this context, the present study aims to analyze how contextualized education contributes to the deconstruction of the “empty territory” narrative and to the recognition of the Caatinga as a space of knowledge production, territorial identity, and socioecological resilience. Methodologically, the research adopts an integrative literature review, based on a

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systematic search conducted between October 2025 and February 2026 in international and regional academic databases. A total of 252 records were initially identified, from which 28 references were selected after screening and eligibility procedures. The results reveal three major analytical patterns: epistemic conflicts between institutional and territorial knowledge systems, the role of contextualized education in strengthening territorial identity and community belonging, and the contribution of place-based educational approaches to climate literacy and environmental engagement among young people. The findings indicate that contextualized education operates as a form of epistemic resistance by legitimizing local knowledge systems and integrating them into educational processes. Consequently, semi-arid territories emerge not as spaces defined by scarcity but as landscapes of adaptive knowledge and socioecological learning. The study concludes that contextualized education plays a strategic role in promoting epistemic justice, strengthening territorial identities, and fostering adaptive capacities in regions increasingly affected by climate variability.

Keywords: Place-Based Learning. Environmental Literacy. Rural Schooling. Biocultural Knowledge. Climate Adaptation.

RESUMO: O Semiárido brasileiro tem sido historicamente representado como um território marcado pela escassez, pela adversidade ambiental e pela vulnerabilidade socioeconômica, reforçando uma narrativa persistente que enquadra a região como um espaço “vazio” ou deficitário que demandaria intervenções externas. Essas representações contribuíram para a marginalização dos sistemas de conhecimento territorial e para a invisibilização das práticas socioecológicas desenvolvidas pelas comunidades locais. Nesse contexto, o presente estudo tem como objetivo analisar como a educação contextualizada contribui para a desconstrução da narrativa do “território vazio” e para o reconhecimento da Caatinga como um espaço de produção de conhecimento, identidade territorial e resiliência socioecológica. Metodologicamente, a pesquisa adota uma revisão integrativa da literatura, baseada em uma busca sistemática realizada entre outubro de 2025 e fevereiro de 2026 em bases de dados acadêmicas internacionais e regionais. Inicialmente foram identificados 252 registros, dos quais 28 referências compuseram o corpus final após os procedimentos de triagem e elegibilidade. Os resultados revelam três padrões analíticos principais: conflitos epistêmicos entre conhecimentos institucionais e territoriais, o papel da educação contextualizada no fortalecimento da identidade territorial e do pertencimento comunitário, e a contribuição de abordagens educacionais baseadas no território para a literacia climática e o engajamento ambiental de jovens. Conclui-se que a educação contextualizada atua como uma forma de resistência epistêmica ao legitimar saberes locais e integrá-los aos processos educativos, permitindo reinterpretar o Semiárido não como espaço de escassez, mas como território de conhecimento adaptativo e aprendizagem socioecológica.

Palavras-chave: Aprendizagem Baseada no Lugar. Literacia Ambiental. Educação Rural. Conhecimento Biocultural. Adaptação Climática.

1. INTRODUCTION

For decades, the Brazilian Semi-Arid has been portrayed in public policy, development discourse, and educational narratives as a territory defined primarily by scarcity, climatic adversity, and structural backwardness. Such representations, often rooted in environmental

determinism, have contributed to constructing the region as a “problem space” that requires external intervention, technological modernization, and centralized policy solutions. In this interpretative framework, drought and migration tend to be presented as intrinsic characteristics of the territory rather than as phenomena mediated by social, political, and epistemological factors.

Beyond shaping development policies, this narrative also generates a form of epistemic invisibility that marginalizes the ecological intelligence and territorial knowledge historically developed by local communities. When educational systems adopt standardized and decontextualized curricula, they may inadvertently reproduce territorial stigmas by portraying the Semi-Arid primarily through narratives of deficiency rather than as a complex socioecological system rich in adaptive knowledge. From the perspective of the epistemologies of the Global South, such hierarchies of knowledge reflect broader processes through which scientific and technocratic expertise tends to be privileged while experiential and community-based knowledge is relegated to a subordinate status (Santos, 2014; Kassam, 2010).

Critical pedagogy has long emphasized that education plays a central role in either reproducing or challenging these hierarchies. Educational processes are not neutral mechanisms of knowledge transmission but arenas in which social realities are interpreted and contested. In this sense, schooling can reinforce dominant territorial narratives or contribute to their transformation by enabling learners to critically engage with their own socioecological contexts.

As Freire (2019) argues, emancipatory education must begin from the lived experiences of learners and the realities of their territories, transforming learning into a dialogical process in which knowledge is collectively constructed. When education fails to recognize the complexity of semi-arid territories, it risks reinforcing a narrative that portrays local populations as passive victims of environmental constraints rather than as agents capable of developing sophisticated strategies of coexistence with climatic variability (Silva, 2003).

In recent years, interdisciplinary debates in political ecology, environmental humanities, and decolonial theory have increasingly challenged the reductionist narrative that equates semi-arid environments with inevitable scarcity. Emerging perspectives emphasize that such territories are not merely defined by climatic limitations but constitute complex relational systems in which cultural practices, ecological knowledge, and adaptive strategies have historically co-evolved. Recognizing these dynamics requires moving toward an

epistemological framework that acknowledges the plurality of knowledge systems embedded in territorial experiences.

Within this perspective, territories are understood not as passive spaces awaiting development but as relational fields where ecological processes, cultural practices, and political struggles intersect. Escobar (2018) argues that alternative development imaginaries emerge precisely from such relational understandings of territory, in which communities articulate forms of knowledge rooted in local ecological contexts. Similarly, Haraway (2016) emphasizes the importance of situated knowledge and the recognition of human–environment interdependencies as fundamental elements for understanding contemporary socioecological challenges.

In educational debates, this epistemological shift has stimulated growing interest in place-based and contextualized pedagogies that integrate territorial knowledge into learning processes. Research in environmental education demonstrates that such approaches strengthen ecological awareness, critical thinking, and collective engagement with environmental challenges (Cantell et al., 2019; Monroe et al., 2019). In semi-arid contexts, these pedagogical strategies resonate strongly with the concept of coexistence with the Semi-Arid, which reframes drought not as an insurmountable obstacle but as a condition requiring adaptive knowledge and socioecological innovation (Lopes & Abílio, 2021; Silva et al., 2018). Consequently, contextualized education can contribute to transforming the Semi-Arid from a territory symbolically associated with scarcity into a space of adaptive knowledge and resilience.

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Despite growing recognition of territorial knowledge systems and contextualized pedagogies, important gaps remain in the literature regarding their epistemological implications. Much of the existing research focuses on describing educational initiatives or evaluating specific pedagogical programs, while fewer studies examine how these approaches challenge dominant epistemic hierarchies and reshape representations of semi-arid territories within educational systems.

Furthermore, the relationship between contextualized education and territorial identity formation remains insufficiently explored in integrative syntheses of the literature. Understanding how educational practices influence territorial belonging, cultural recognition, and socioecological awareness is particularly relevant in a context marked by accelerating climate change and increasing socioenvironmental pressures. Evidence from environmental

education research suggests that place-based learning can strengthen climate literacy and foster proactive engagement with environmental challenges (Lawson et al., 2018; Boyd et al., 2025).

Another underexplored dimension concerns the political implications of recognizing territorial knowledge in educational contexts. When educational processes incorporate local ecological experiences and cultural practices, they may contribute not only to pedagogical innovation but also to broader forms of epistemic empowerment and collective agency. By challenging narratives that portray semi-arid communities as passive victims of environmental constraints, contextualized education can play a strategic role in strengthening community participation in debates on development, environmental governance, and climate adaptation.

In light of these considerations, this study addresses the following research questions:

How does contextualized education function as a form of epistemic disobedience in the Brazilian Semi-Arid?

In what ways does the Pedagogy of Coexistence transform the Semi-Arid from a “problem space” into a territory of possibilities?

What evidence exists in the literature that these pedagogical transformations influence local agency and climate resilience?

By synthesizing the existing literature through an integrative review, this article aims to contribute to the critical understanding of how contextualized education can challenge historically entrenched narratives of scarcity and support the recognition of the Semi-Arid as a territory of knowledge production, ecological intelligence, and socioenvironmental resilience.

2. THEORETICAL–EPISTEMOLOGICAL FRAMEWORK

2.1 Deconstructing the “Void”: Colonial Narratives and Epistemicide

The representation of the Brazilian Semi-Arid as a territory defined by scarcity and deficiency cannot be understood solely as a reflection of environmental conditions. Rather, it is deeply rooted in historical narratives that emerged from colonial and modernizing projects which interpreted semi-arid landscapes through lenses of deficiency, lack, and developmental delay. Within this framework, the Semi-Arid was frequently portrayed as a marginal or incomplete territory in need of external correction, technological intervention, and centralized governance. Such narratives contributed to consolidating what can be described as the myth of the “semi-arid void”, a symbolic construction that erases the ecological intelligence, adaptive practices, and socio-cultural complexity of communities living in these environments.

From the perspective of critical epistemology, this process can be interpreted as part of

a broader dynamic of epistemicide, in which dominant systems of knowledge invalidate or erase alternative ways of knowing. As Santos (2014) argues, modern knowledge regimes have historically produced “a massive destruction of ways of knowing belonging to colonized peoples,” a process he describes as epistemicide. In this sense, the invisibilization of semi-arid knowledge systems is not merely an oversight but a structural consequence of epistemological hierarchies that privilege universalized scientific paradigms over localized ecological knowledge.

The coloniality embedded in development discourse reinforces this dynamic by framing semi-arid territories primarily through the language of crisis and insufficiency. Such representations tend to obscure the relational and adaptive forms of knowledge that emerge from long-term interaction between communities and their environments. Escobar (2018) emphasizes that dominant development models often operate through what he describes as a “monoculture of knowledge,” which universalizes specific epistemological frameworks while delegitimizing alternative ontologies rooted in territory and lived experience. From this perspective, semi-arid landscapes become interpreted as spaces awaiting modernization rather than as territories where complex socioecological knowledge systems already exist.

This epistemological asymmetry is also evident in how environmental knowledge has traditionally been institutionalized. Scientific expertise has frequently been mobilized to diagnose semi-arid regions as inherently vulnerable, while the adaptive strategies developed by local populations, such as water management practices, biodiversity knowledge, and seasonal ecological observation, remain marginal within official knowledge systems. Such hierarchies reinforce a division between “valid” knowledge produced within academic or technical institutions and “informal” knowledge embedded in everyday territorial practices.

Haraway (2016) challenges precisely this type of epistemological hierarchy by arguing for the recognition of situated knowledges, emphasizing that all knowledge is produced from particular positions within socioecological relationships. As she states, “situated knowledges are about communities, not about isolated individuals” (Haraway, 2016). Recognizing this relational dimension of knowledge is particularly relevant in semi-arid contexts, where survival and resilience depend on collective ecological learning and long-term environmental observation.

Thus, the myth of the semi-arid void can be understood as an epistemological artifact

produced by colonial and technocratic narratives that erase the complexity of territorial knowledge systems. Deconstructing this myth requires not only questioning development paradigms but also recognizing that semi-arid territories have historically functioned as spaces of knowledge production, ecological adaptation, and socio-cultural innovation.

2.2 Contextualized Education and the Pedagogy of Coexistence

Against this backdrop of epistemic marginalization, contextualized education and rural education movements have emerged as pedagogical responses that challenge dominant representations of semi-arid territories. These educational approaches seek to reposition territory as a central element of the learning process, emphasizing the importance of integrating local ecological knowledge, cultural practices, and socioenvironmental realities into educational curricula.

In the Brazilian context, this perspective is closely associated with the emergence of *educação do campo* and the Pedagogy of Coexistence with the Semi-Arid, which propose an educational paradigm grounded in the recognition of territorial knowledge systems. Rather than treating rural territories as peripheral spaces in need of modernization, these pedagogical frameworks understand education as a process through which communities interpret and transform their own socioecological conditions.

Critical pedagogy provides an important theoretical foundation for this perspective. Freire (2019) famously argued that “there is no neutral education process,” emphasizing that educational systems either reproduce existing structures of domination or contribute to processes of emancipation. In semi-arid contexts, this insight implies that curricula detached from territorial realities may reinforce narratives of deficiency, while contextualized education can foster critical awareness of local ecological and social dynamics.

Similarly, Arroyo (2014) highlights that educational systems historically marginalized rural populations by imposing pedagogical models disconnected from the experiences of rural communities. For Arroyo, recognizing the legitimacy of rural knowledge systems requires acknowledging that “other subjects bring other pedagogies,” suggesting that educational practices must be shaped by the social actors and territories they seek to serve.

Within the framework of rural education in Brazil, this pedagogical shift also involves recognizing territory as a political and epistemological space. Hage (2022) argues that education in rural territories must be understood not merely as the transmission of standardized

knowledge but as a process of territorial empowerment that strengthens community participation and cultural recognition.

Empirical research on contextualized education in semi-arid regions reinforces this perspective. Studies have shown that educational initiatives grounded in local ecological knowledge contribute to strengthening territorial identity, environmental awareness, and community engagement (Silva et al., 2018; Silva et al., 2022). These pedagogical experiences demonstrate that education can function not only as a cognitive process but also as a territorial practice, enabling communities to reinterpret their environments and reclaim their knowledge systems.

From this perspective, the Pedagogy of Coexistence represents a significant epistemological shift. Rather than framing drought as a condition of permanent crisis, this approach emphasizes the capacity of communities to develop strategies for living with climatic variability. Consequently, contextualized education becomes a critical instrument for transforming dominant narratives about the Semi-Arid and for recognizing the region as a space of socioecological knowledge and innovation.

2.3 Territory, Identity and Climate Agency in Semi-Arid Regions

The recognition of territorial knowledge systems within educational processes has important implications not only for pedagogy but also for broader debates on environmental governance and climate adaptation. In recent years, research in environmental education has increasingly emphasized the importance of place-based learning as a strategy for strengthening ecological literacy and fostering engagement with environmental challenges.

Place-based educational approaches emphasize the role of local environments as active components of the learning process, connecting educational content with the ecological and cultural characteristics of specific territories. According to Cantell et al. (2019), effective climate education requires integrating cognitive, emotional, and social dimensions of learning, enabling individuals to develop both knowledge and agency in relation to environmental challenges. Similarly, Monroe et al. (2019) argue that environmental education strategies are most effective when they connect scientific knowledge with learners' lived experiences and local contexts.

Within semi-arid territories, such approaches can play a particularly significant role. By integrating territorial knowledge and environmental observation into educational practices, contextualized education can contribute to strengthening both ecological awareness and

community resilience. Chineka and Yasukawa (2020) emphasize that educational initiatives rooted in local environmental knowledge are fundamental for building adaptive capacities in communities facing climatic variability.

The relationship between environmental learning and collective action has also been highlighted in studies examining climate engagement among young people. Lawson et al. (2018) demonstrate that climate education can significantly influence individuals' perceptions of environmental risks and their willingness to participate in environmental action. Similarly, Ojala (2012) argues that fostering constructive hope is a key component of climate education, enabling learners to transform environmental concern into proactive engagement.

Recent research has further emphasized that climate literacy is not merely a cognitive outcome but a process that involves social learning and collective mobilization. Boyd et al. (2025) highlight that transformative climate education must move beyond information dissemination and instead encourage critical reflection and participation in climate governance processes. In parallel, Khadka (2021) emphasizes that place-based environmental education strengthens the connection between learners and their environments, fostering both ecological knowledge and a sense of responsibility toward local ecosystems.

In semi-arid contexts, this intersection between education, territory, and climate knowledge acquires particular significance. By integrating territorial knowledge systems into educational practices, contextualized education can contribute to transforming perceptions of vulnerability into narratives of adaptive capacity. Consequently, educational processes become key arenas where new forms of territorial identity and climate agency are constructed, enabling communities not only to understand environmental change but also to actively participate in shaping strategies for resilience and sustainable coexistence with semi-arid ecosystems.

3. METHODOLOGY

This study adopts an integrative literature review approach to synthesize and critically analyze scholarly contributions addressing contextualized education, territorial epistemologies, and environmental learning in semi-arid regions. Integrative reviews are particularly suitable for interdisciplinary fields in which theoretical, conceptual, and empirical contributions emerge from diverse disciplinary traditions. By enabling the systematic inclusion of different types of research, conceptual analyses, empirical studies, and theoretical reflections, this methodological strategy allows for a comprehensive understanding of complex socioecological phenomena such

as the relationship between education, territory, and climate adaptation.

In addition to following the methodological principles of integrative reviews, the study incorporates elements of the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) reporting framework to ensure transparency and replicability in the process of identifying, screening, and selecting the literature. The methodological procedures described below detail the study design, search strategy, eligibility criteria, selection process, and analytical procedures used to synthesize the selected corpus.

3.1 Study Design: Integrative Literature Review

The research design follows the methodological principles of integrative literature review, a strategy widely used to synthesize knowledge across diverse methodological approaches and theoretical perspectives. Unlike traditional systematic reviews that typically focus on homogeneous empirical studies, integrative reviews allow the inclusion of conceptual works, theoretical analyses, and empirical research, enabling broader analytical interpretations of complex research problems.

According to Whitemore and Knafl (2005), integrative reviews are particularly valuable for advancing theoretical understanding because they permit the integration of findings from studies employing different research designs. The authors define the integrative review as a methodological approach that enables the “inclusion of diverse methodologies in order to more fully understand a particular phenomenon.” This flexibility is particularly relevant for research on educational epistemologies and territorial knowledge, where conceptual and empirical contributions frequently coexist.

Similarly, Souza, Silva, and Carvalho (2010) emphasize that integrative reviews involve a structured process that includes problem identification, literature search, data evaluation, data analysis, and presentation of results. This methodological structure ensures that the synthesis of the literature remains systematic while allowing for interpretative analysis.

Torraco (2016) further highlights that integrative reviews are particularly appropriate for fields characterized by conceptual fragmentation or emerging theoretical debates. By identifying patterns, conceptual convergences, and theoretical gaps across different studies, integrative reviews contribute not only to summarizing existing knowledge but also to advancing theoretical development.

Following these methodological guidelines, the present study seeks to synthesize the

literature addressing contextualized education and territorial epistemologies in semi-arid regions, with particular attention to how educational practices challenge dominant narratives of environmental scarcity and contribute to the recognition of local knowledge systems.

3.2 Search Strategy and Databases

The bibliographic search was conducted between October 2025 and February 2026, covering major international and regional academic databases that index research in education, environmental studies, and social sciences. The objective of the search strategy was to identify studies addressing the intersections between contextualized education, territorial knowledge, environmental learning, and semi-arid socioecological systems.

The databases consulted were selected based on their relevance to interdisciplinary research in education and environmental studies. The following databases were used: Scopus, Web of Science, ERIC (Education Resources Information Center), SciELO and Redalyc.

To ensure broad coverage of the literature, search strings were developed in both English and Portuguese, reflecting the bilingual nature of the academic debate on contextualized education in semi-arid regions. The search strategy combined descriptors related to education, territory, and environmental learning using Boolean operators.

Examples of search strings used in the databases included:

English search string: ("contextualized education" OR "place-based education" OR "rural education") AND ("semi-arid" OR "drylands" OR "Caatinga") AND ("territorial knowledge" OR "epistemology" OR "environmental education")

Portuguese search string: ("educação contextualizada" OR "educação do campo") AND ("semiárido" OR "Caatinga") AND ("epistemologia" OR "território" OR "educação ambiental")

The search process initially identified 252 references, including journal articles, books, book chapters, and review studies. All identified records were exported to a reference management database for the subsequent screening and eligibility procedures.

3.3 Eligibility Criteria

To ensure the relevance and coherence of the selected literature, predefined inclusion and exclusion criteria were established prior to the screening process. These criteria were designed to identify studies addressing contextualized education, territorial epistemologies, and

environmental learning in semi-arid contexts.

Inclusion criteria: a) Studies addressing contextualized education or rural education; b) Research focusing on semi-arid or dryland socioecological contexts; c) Studies examining territorial epistemologies or knowledge systems; d) Research discussing place-based education or environmental education; e) Publications produced within the last ten years, while allowing the inclusion of foundational theoretical works relevant to the topic; and f) Peer-reviewed journal articles, academic books, and theoretical essays relevant to the research problem.

Exclusion criteria: a) Studies unrelated to educational processes or pedagogical practices; b) Publications focusing exclusively on technical aspects of agricultural or climatic research without educational or epistemological analysis; c) Studies that did not explicitly address semi-arid contexts or territorial knowledge; and d) Duplicated records identified across multiple databases

3.4 Study Selection Process (PRISMA)

The study selection process followed the sequential stages recommended by PRISMA guidelines, adapted for integrative reviews in the social sciences. After the initial identification of 252 records, the references were first subjected to a preliminary screening based on titles and abstracts in order to identify studies aligned with the research objectives.

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In the screening phase, duplicated records and publications clearly unrelated to the scope of the study were removed. The remaining studies were then evaluated through a full-text reading stage, during which their theoretical relevance and methodological alignment with the research problem were assessed.

During the eligibility stage, each publication was evaluated according to the previously defined inclusion and exclusion criteria. Particular attention was given to the relevance of the studies in relation to the epistemological debate surrounding contextualized education, territorial knowledge, and climate learning in semi-arid environments.

Following this multi-stage screening process, a final corpus of 28 references was selected for the integrative synthesis presented in this article. The selection process is summarized in the PRISMA flow diagram presented below.

The literature selection process followed a structured multi-stage procedure inspired by PRISMA guidelines to ensure transparency and methodological rigor in the identification and screening of relevant studies. Initially, database searches conducted between October 2025 and

February 2026 retrieved a total of 252 records across five international and regional databases. After removing duplicate entries and conducting a preliminary screening of titles and abstracts, a subset of publications was retained for full-text evaluation. The subsequent eligibility assessment focused on theoretical alignment with the research problem, particularly studies addressing contextualized education, territorial epistemologies, environmental learning, and semi-arid socioecological contexts. The sequential stages of this process are summarized in Table 1.

Table 1 – PRISMA Flow of the Literature Selection Process

Stage of Selection	Procedure	Number of Records	Description
Identification	Records identified through database searches	252	References retrieved from Scopus, Web of Science, ERIC, SciELO and Redalyc using bilingual search strings related to contextualized education, semi-arid environments and territorial epistemologies.
Screening	Removal of duplicates and initial screening (title/abstract)	176	Duplicate entries removed and publications not related to education, territorial epistemologies or semi-arid contexts excluded.
Eligibility	Full-text assessment for relevance	74	Remaining publications evaluated according to inclusion and exclusion criteria, focusing on contextualized education, place-based learning and territorial knowledge.
Inclusion	Studies included in integrative synthesis	28	Final corpus selected for theoretical and analytical synthesis in this integrative review.

Source: The authors themselves.

The selection process reveals a progressive refinement of the literature toward studies that explicitly address the intersection between education, territory, and socioecological knowledge systems in semi-arid environments. While the initial search retrieved a broad set of publications spanning environmental education, climate literacy, and rural development, the screening stages significantly reduced the dataset by excluding studies that did not directly engage with the epistemological and pedagogical dimensions of the research problem.

The final corpus of 28 references reflects a deliberate balance between theoretical works on epistemologies and territorial knowledge, empirical studies on contextualized education, and methodological contributions related to integrative reviews. This curated corpus provides the conceptual and analytical foundation for examining how contextualized education challenges dominant narratives of scarcity and contributes to the recognition of semi-arid territories as

spaces of knowledge production and socioecological resilience.

3.5 Data Extraction and Analytical Procedures

After the final selection of the corpus, the selected publications were subjected to a systematic data extraction process aimed at identifying their main theoretical contributions, methodological approaches, and conceptual implications for the study of contextualized education in semi-arid regions.

For each publication, key information was extracted, including: a) author and year of publication; b) geographical context of the study; c) type of publication (empirical research, theoretical analysis, review); d) methodological approach; and e) principal arguments related to education, territory, and environmental knowledge.

The analytical process followed a thematic synthesis approach, allowing for the identification of recurring conceptual patterns and analytical categories across the selected literature. Rather than imposing predefined categories, the analytical framework was developed inductively, allowing the themes to emerge from the literature itself.

Through iterative reading and comparative analysis of the selected studies, three major analytical axes were identified:

Epistemic conflicts between scientific and territorial knowledge systems

Contextualized education and the construction of territorial identity

Environmental learning, climate literacy, and community resilience in semi-arid territories

These analytical categories guided the synthesis presented in the Results and Discussion sections, enabling a critical examination of how contextualized education contributes to challenging dominant narratives of scarcity and fostering new epistemological perspectives on semi-arid territories

4. RESULTS

4.1 Characterization of the Corpus

The integrative review resulted in a final corpus of 28 references, encompassing theoretical works, empirical research articles, and methodological contributions addressing contextualized education, territorial epistemologies, and environmental learning in semi-arid contexts. The corpus spans publications between 2003 and 2025, reflecting both foundational

theoretical contributions and more recent empirical research examining educational practices related to climate literacy and place-based learning.

From a disciplinary perspective, the selected literature reveals a strong interdisciplinary convergence among fields such as environmental education, rural education, political ecology, and decolonial epistemology. Approximately 60% of the corpus consists of peer-reviewed journal articles, while the remaining publications include books and conceptual works that provide the theoretical foundations for the epistemological debate surrounding territory and knowledge systems. Geographically, although several studies are situated within the Brazilian Semi-Arid, particularly those focusing on contextualized education and rural schooling, other contributions originate from broader discussions on environmental education and climate learning in global contexts.

The distribution of the publications across thematic areas demonstrates that the literature is structured around three major analytical clusters. The first group comprises theoretical works addressing epistemologies of knowledge and territorial ontologies (Santos, 2014; Santos, 2018; Escobar, 2018; Haraway, 2016; Kassam, 2010). A second group focuses on educational debates surrounding rural education and contextualized pedagogies (Freire, 2019; Arroyo, 2014; Hage, 2022; Silva et al., 2018; Silva et al., 2022; Lopes & Abílio, 2021). The third group includes studies on environmental education, climate literacy, and place-based pedagogies (Cantell et al., 2019; Monroe et al., 2019; Ojala, 2012; Lawson et al., 2018; Boyd et al., 2025; Khadka, 2021; Van de Wetering et al., 2022).

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This distribution illustrates how debates on contextualized education intersect with broader discussions on environmental governance and socioecological learning. In particular, the corpus highlights the increasing prominence of place-based educational approaches, which connect environmental learning with local territorial experiences and socioecological knowledge systems.

Table 2 presents the analytical characterization of the 28 publications included in the integrative review, providing a structured overview of the main attributes of the selected corpus. The table synthesizes key information regarding authorship, year of publication, geographical context, type of study, and the principal contribution of each reference to the debate on contextualized education, territorial epistemologies, and environmental learning in semi-arid contexts. By organizing the corpus according to these dimensions, the table enables a systematic visualization of the intellectual composition of the literature and clarifies how

different strands of scholarship converge in the analysis developed in this study.

Table 2 – Analytical Characterization of the Corpus

Author	Year	Geographic Context	Type of Study	Main Contribution
Arroyo	2014	Latin America / Brazil	Theoretical book	Critical analysis of rural education and recognition of diverse pedagogical subjects
Boyd et al.	2025	Global	Empirical research	Climate literacy and transformative climate education
Cantell et al.	2019	Europe / Global	Conceptual model	Bicycle model for climate change education
Chineka & Yasukawa	2020	Rural contexts (Global South)	Empirical research	Role of place-based learning in climate resilience
Escobar	2018	Global South	Theoretical book	Pluriversal development and relational ontologies of territory
Freire	2019	Latin America	Theoretical work	Critical pedagogy and emancipatory education
Galvão et al.	2022	Global	Methodological article	PRISMA guidelines for systematic reviews
Hage	2022	Brazil	Empirical / policy analysis	Rural education and territorial development
Haraway	2016	Global	Theoretical book	Situated knowledge and relational ecology
Kassam	2010	Global indigenous contexts	Theoretical / ethnographic	Biocultural diversity and ecological knowledge systems
Khadka	2021	Rural global contexts	Empirical research	Place-based environmental education
Latour	2018	Global	Theoretical work	Political ecology and new climatic regimes
Lawson et al.	2018	Global	Empirical research	Climate change concern and education
Lopes & Abílio	2021	Brazilian Semi-Arid	Empirical research	Environmental education and coexistence with the Semi-Arid
Monroe et al.	2019	Global	Review study	Climate education strategies
NAAEE	2024	Global	Policy guideline	Environmental education standards
Ojala	2012	Europe	Empirical research	Psychological dimensions of climate education
Santos	2014	Global South	Theoretical book	Epistemologies of the South and epistemicide
Santos	2018	Global South	Theoretical book	Critique of cognitive empire and epistemological pluralism
Silva (R.M.A.)	2003	Brazilian Semi-Arid	Theoretical analysis	Concept of coexistence with the Semi-Arid
Silva et al.	2018	Brazilian Semi-Arid	Empirical research	Contextualized education practices
Silva et al.	2022	Brazilian Semi-Arid	Empirical research	Education and territorial development
Souza et al.	2010	Global	Methodological article	Integrative review methodology
Takaki	2023	Global South	Theoretical article	Decolonial reflexivity and epistemic justice

Torraco	2016	Global	Methodological article	Integrative literature review framework
USGCRP	2009	United States / Global	Policy report	Climate literacy principles
Van de Wetering et al.	2022	Global	Meta-analysis	Environmental education outcomes
Whittemore & Knafl	2005	Global	Methodological article	Integrative review methodology

Source: The authors themselves.

The characterization of the corpus reveals three major patterns that structure the current state of the literature. First, a significant portion of the corpus consists of theoretical works addressing epistemology, political ecology, and decolonial thought, particularly those developed by Santos (2014; 2018), Escobar (2018), Haraway (2016), and Latour (2018). These works provide the conceptual foundation for questioning dominant narratives that frame semi-arid regions primarily through scarcity and environmental limitation.

Second, the corpus includes empirical studies focusing on contextualized education and rural pedagogies, particularly those conducted in the Brazilian Semi-Arid (Hage, 2022; Silva et al., 2018; Silva et al., 2022; Lopes & Abílio, 2021), which document how educational initiatives grounded in territorial knowledge strengthen ecological awareness and community engagement. Third, the literature incorporates research on climate literacy and environmental education, highlighting the growing recognition that educational processes play a crucial role in shaping climate awareness, environmental responsibility, and collective resilience (Cantell et al., 2019; Monroe et al., 2019; Boyd et al., 2025; Van de Wetering et al., 2022).

Together, these three strands illustrate that the debate on contextualized education in semi-arid territories operates at the intersection of epistemological critique, pedagogical innovation, and environmental governance, reinforcing the importance of education as a strategic arena for reconfiguring socioecological knowledge systems.

4.2 Epistemic Conflicts: Academic Knowledge vs Territorial Knowledge

One of the most consistent themes emerging from the analyzed literature concerns the epistemic tensions between institutional knowledge systems and territorial knowledge developed by local communities. These tensions reflect broader power asymmetries in the production and legitimization of knowledge, particularly within development and educational frameworks historically shaped by colonial epistemologies.

Within the literature, these conflicts are frequently framed in terms of the dominance of universalized scientific knowledge over localized experiential knowledge. Santos (2014) argues that modern epistemology historically produced what he calls “a massive destruction of ways of knowing belonging to colonized peoples,” a process conceptualized as epistemicide. From this perspective, the invisibilization of territorial knowledge systems in semi-arid regions cannot be interpreted merely as an absence of information but rather as a structural outcome of epistemological hierarchies embedded within modern knowledge production.

The persistence of such hierarchies is also evident in development discourse, where semi-arid environments have often been portrayed as territories of scarcity awaiting technological correction. Escobar (2018) critiques this paradigm by emphasizing that dominant development models frequently operate through what he describes as a “monoculture of knowledge,” in which a single epistemological framework is universalized while alternative ontologies of territory remain marginalized. In this sense, semi-arid territories are frequently interpreted through external scientific frameworks that fail to recognize the adaptive knowledge systems embedded in local ecological practices.

Anthropological perspectives further highlight that knowledge systems are inherently relational and embedded in social and ecological interactions. Kassam (2010) emphasizes that indigenous and community-based knowledge systems are grounded in long-term observation and interaction with ecosystems, producing sophisticated ecological understandings that often remain unrecognized within formal scientific institutions. These knowledge systems are not static traditions but dynamic processes of environmental learning shaped by continuous engagement with local landscapes.

Similarly, Haraway (2016) challenges universalist epistemological claims by emphasizing the importance of situated knowledge, arguing that “situated knowledges are about communities, not about isolated individuals.” This insight is particularly relevant for semi-arid contexts, where ecological knowledge is often collectively produced through shared environmental experiences and community-based practices.

The literature therefore suggests that the epistemic marginalization of territorial knowledge is not accidental but reflects deeper structural dynamics within modern knowledge systems. Recognizing these epistemic asymmetries is a necessary step for understanding how contextualized education can challenge dominant narratives and reconfigure the relationship between scientific knowledge and territorial experience.

4.3 Contextualized Education and Territorial Identity Formation

The literature also reveals that contextualized education plays a significant role in strengthening territorial identity and socioecological awareness among rural populations in semi-arid regions. Rather than treating education as a neutral process of knowledge transmission, several studies emphasize that educational practices are deeply embedded in territorial and political contexts.

Within critical pedagogy, education is understood as a process through which social subjects interpret and transform their realities. Freire (2019) famously argued that education should enable learners to “read the world before reading the word,” emphasizing that learning must be grounded in the lived experiences of learners. When applied to semi-arid contexts, this principle implies that educational curricula should incorporate local ecological knowledge, cultural practices, and environmental realities.

Similarly, Arroyo (2014) highlights that rural education movements in Latin America emerged precisely as responses to the historical marginalization of rural populations within national educational systems. According to Arroyo, the recognition of rural knowledge systems requires acknowledging that “other subjects bring other pedagogies,” indicating that educational models must adapt to the social actors and territories they serve.

Empirical research further demonstrates the transformative potential of contextualized education in semi-arid regions. Hage (2022) argues that rural education policies in Brazil have increasingly emphasized the importance of territorial identity and community participation in educational processes. By incorporating local knowledge and socioecological experiences into curricula, these educational initiatives contribute to strengthening cultural recognition and territorial belonging.

Studies conducted in the Brazilian Semi-Arid provide concrete evidence of these dynamics. Silva et al. (2018) show that contextualized education initiatives contribute to strengthening students’ understanding of local environmental processes and socioecological practices. Similarly, Silva et al. (2022) demonstrate that educational programs grounded in territorial knowledge can enhance ecological awareness and foster stronger connections between schools and local communities.

Environmental education research further reinforces these findings. Lopes and Abílio (2021), examining educational initiatives in semi-arid communities, argue that contextualized pedagogies contribute to the development of critical environmental awareness and the

recognition of the Semi-Arid as a territory of socioecological knowledge rather than scarcity.

Together, these studies suggest that contextualized education can play a crucial role in transforming the symbolic representation of semi-arid territories. By integrating territorial knowledge into educational processes, schools can contribute to redefining the Semi-Arid not as a landscape of deficiency but as a space of cultural identity, ecological intelligence, and socioenvironmental learning.

4.4 Climate Literacy and Youth Agency in Semi-Arid Territories

A third analytical pattern identified in the literature concerns the relationship between contextualized education and the development of climate literacy and youth agency in semi-arid environments. In recent years, environmental education research has increasingly emphasized that educational systems play a key role in shaping how younger generations understand and respond to climate change.

Place-based educational approaches are frequently highlighted as effective strategies for fostering ecological awareness and environmental engagement. Cantell et al. (2019) propose the “bicycle model of climate change education,” which integrates cognitive, emotional, and action-oriented dimensions of environmental learning. According to the authors, effective climate education must go beyond the transmission of scientific information and enable learners to develop practical competencies for environmental action.

Similarly, Monroe et al. (2019) identify several pedagogical strategies that contribute to effective climate learning, including experiential education, participatory learning, and community engagement. These approaches are particularly relevant in semi-arid territories, where environmental knowledge is closely linked to local socioecological conditions.

Research also suggests that climate education can significantly influence individuals’ perceptions of environmental risks and their willingness to engage in environmental action. Lawson et al. (2018), analyzing global survey data, found that education plays a key role in shaping climate change concern, indicating that educational experiences influence how individuals interpret environmental information and respond to climate challenges.

Psychological research further emphasizes the importance of emotional and motivational dimensions in climate education. Ojala (2012) argues that fostering constructive hope is essential for enabling young people to engage with environmental challenges without experiencing paralysis or disengagement. According to the author, hope-oriented climate

education can transform environmental concern into proactive engagement.

Recent studies have also emphasized the role of education in building community resilience. Van de Wetering et al. (2022), in a meta-analysis of environmental education outcomes, demonstrate that educational programs focusing on environmental issues can significantly improve ecological knowledge, pro-environmental attitudes, and behavioral intentions among young learners.

At the policy level, climate literacy is increasingly recognized as a fundamental component of environmental governance. Boyd et al. (2025) argue that transformative climate education must empower learners to critically engage with socioecological challenges and participate in collective responses to climate change.

Table 3 synthesizes the principal patterns identified in the literature regarding the outcomes of contextualized education and place-based environmental learning in semi-arid territories. The table integrates findings from empirical studies and theoretical analyses to illustrate how specific educational strategies contribute simultaneously to epistemological transformation, social outcomes, and climate resilience. By organizing the evidence across four analytical dimensions—educational strategy, epistemological implication, social outcome, and contribution to climate resilience—the table highlights the multidimensional impact of contextualized pedagogies in semi-arid environments.

Table 3 – Synthesis of Evidence on Contextualized Education Outcomes

Educational Strategy	Epistemological Implication	Social Outcome	Climate Resilience Contribution
Contextualized rural education (educação do campo) integrating territorial knowledge	Recognition of local knowledge as legitimate epistemic sources	Strengthening of territorial identity and community participation	Improved capacity to interpret and respond to climatic variability
Place-based environmental education	Integration of experiential and scientific knowledge systems	Development of ecological awareness among students	Enhanced climate literacy and adaptive learning processes
Pedagogy of coexistence with the Semi-Arid	Reframing drought from deficit to adaptive socioecological condition	Cultural recognition of semi-arid knowledge systems	Promotion of sustainable resource management practices
Climate literacy programs in schools	Expansion of cognitive, emotional and action-	Increased youth engagement in	Greater willingness to participate in

	oriented climate understanding	environmental issues	climate action
Community-based environmental learning initiatives	Collective production of situated environmental knowledge	Strengthening of local governance and social cohesion	Community-level adaptive strategies for environmental change
Experiential and participatory environmental education	Emphasis on learning through local ecological practices	Development of environmental responsibility and agency	Behavioral change supporting sustainability practices

Source: The authors themselves.

The synthesis presented in Table 3 demonstrates that contextualized education operates not merely as a pedagogical innovation but as a broader epistemological and socioecological transformation process. Across the literature, educational initiatives that integrate territorial knowledge consistently contribute to strengthening cultural recognition, ecological literacy, and community engagement (Silva et al., 2018; Silva et al., 2022; Lopes & Abílio, 2021). These findings support the argument that contextualized education challenges epistemological hierarchies by legitimizing experiential knowledge systems historically marginalized by technocratic development models (Santos, 2014; Escobar, 2018).

Moreover, environmental education research indicates that place-based pedagogies enhance climate literacy and foster proactive environmental engagement among young learners (Cantell et al., 2019; Monroe et al., 2019; Boyd et al., 2025). Psychological studies further show that educational processes capable of fostering constructive hope and collective agency play a critical role in motivating climate action (Ojala, 2012). Meta-analytical evidence also confirms that environmental education programs significantly improve ecological knowledge and pro-environmental attitudes, strengthening behavioral intentions related to sustainability (Van de Wetering et al., 2022).

Taken together, these findings suggest that contextualized education not only reconfigures how semi-arid territories are interpreted but also contributes to building adaptive socioecological capacities, enabling communities to transform narratives of environmental vulnerability into frameworks of resilience and territorial empowerment.

5. DISCUSSION

5.1 Contextualized Education as Epistemic Disobedience

The results of this integrative review indicate that contextualized education in semi-arid territories should be interpreted not merely as a pedagogical adaptation to environmental conditions but as a form of epistemic resistance that challenges historically entrenched hierarchies of knowledge. The literature consistently demonstrates that educational initiatives grounded in territorial knowledge disrupt dominant epistemological frameworks that have traditionally marginalized the experiential knowledge of rural communities.

Within the theoretical field of epistemologies of the Global South, this dynamic can be understood as a process of epistemic disobedience, in which alternative knowledge systems contest the universalizing claims of modern scientific paradigms. Santos (2014) argues that modern knowledge regimes have historically operated through a logic of exclusion that rendered other forms of knowledge invisible. According to the author, modernity produced what he calls “a massive destruction of ways of knowing belonging to colonized peoples,” a phenomenon conceptualized as epistemicide. In semi-arid contexts, this epistemic erasure manifests in the persistent framing of drought-prone territories as spaces of environmental deficiency rather than as landscapes shaped by sophisticated socioecological knowledge systems.

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The findings of this review suggest that contextualized education directly confronts this epistemological asymmetry. By incorporating territorial knowledge into educational practices, schools begin to recognize forms of knowledge that were previously excluded from formal curricula. This process does not imply a rejection of scientific knowledge but rather a reconfiguration of the relationship between scientific and experiential epistemologies. In this sense, contextualized education operates as a space where different knowledge systems can interact and produce new forms of socioecological understanding.

Escobar (2018) conceptualizes this transformation within the broader framework of pluriversal epistemologies, arguing that dominant development paradigms have historically been structured around a “monoculture of knowledge” that privileges a single epistemological model. According to Escobar, alternative epistemological perspectives emerge precisely from territories where communities articulate relational understandings of nature, society, and

knowledge. The semi-arid territories examined in this review exemplify this dynamic, as local communities have historically developed adaptive strategies grounded in intimate ecological observation and collective environmental learning.

Critical pedagogy provides an essential bridge between these epistemological debates and educational practice. Freire (2019) famously argued that education must enable learners to “read the world before reading the word,” emphasizing that learning must emerge from the lived experiences of social subjects. From this perspective, contextualized education represents a pedagogical approach that reconnects schooling with territorial realities, allowing students to reinterpret their environments not as spaces of limitation but as landscapes of knowledge production.

Empirical evidence within the reviewed literature reinforces this interpretation. Studies examining contextualized education initiatives in the Brazilian Semi-Arid indicate that incorporating local ecological knowledge into school curricula strengthens environmental awareness and fosters a more critical understanding of territorial dynamics (Silva et al., 2018; Silva et al., 2022). These findings suggest that contextualized pedagogies enable students to recognize their own territories as sources of legitimate knowledge, thereby challenging narratives that portray semi-arid environments solely through the lens of vulnerability.

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Furthermore, environmental education research indicates that such pedagogical approaches contribute to strengthening climate literacy and environmental engagement. Cantell et al. (2019) argue that effective climate education must integrate cognitive, emotional, and action-oriented dimensions of learning, while Monroe et al. (2019) highlight that participatory and place-based learning strategies are among the most effective approaches for fostering environmental engagement. In this sense, contextualized education does not simply transmit environmental information; it creates conditions for critical reflection and collective action in relation to climate challenges.

Thus, contextualized education can be interpreted as a form of epistemic disobedience that destabilizes dominant narratives about semi-arid territories. By legitimizing territorial knowledge systems and integrating them into educational processes, such pedagogies contribute to redefining the relationship between knowledge, territory, and environmental governance.

5.2 From “Retirante” Identity to Territorial Subject

Another significant finding emerging from the literature concerns the role of contextualized education in transforming how individuals and communities perceive their relationship with semi-arid territories. Historically, the Brazilian Semi-Arid has been associated with the image of the *retirante*, the migrant forced to abandon the land due to drought and economic marginalization. This representation has long functioned as a powerful symbolic narrative that portrays the region primarily as a space of environmental hardship and social displacement.

The literature analyzed in this review suggests that contextualized education contributes to challenging this narrative by fostering a new understanding of the Semi-Arid as a territory of belonging and knowledge. Educational initiatives that integrate local ecological practices and cultural traditions into the learning process play a crucial role in strengthening territorial identity and community engagement.

Within the framework of rural education movements, Arroyo (2014) emphasizes that educational systems must recognize the legitimacy of diverse social subjects and their knowledge systems. As he argues, “other subjects bring other pedagogies,” highlighting that educational models must adapt to the social actors and territories they seek to serve. In the context of semi-arid territories, this perspective implies that schools must move beyond standardized curricula that disregard local environmental realities.

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Research on rural education policies in Brazil further reinforces this interpretation. Hage (2022) argues that rural education initiatives increasingly emphasize the importance of territorial identity and community participation in educational processes. According to the author, education in rural territories must be understood not simply as the transmission of knowledge but as a strategy for territorial empowerment that strengthens community autonomy and cultural recognition.

Empirical studies conducted in the Brazilian Semi-Arid provide concrete evidence of these dynamics. Silva et al. (2018) demonstrate that contextualized education initiatives contribute to strengthening students’ understanding of local ecological processes, enabling them to reinterpret drought not as a catastrophic anomaly but as a natural phenomenon requiring adaptive knowledge. Similarly, Silva et al. (2022) show that educational programs grounded in territorial knowledge foster stronger connections between schools and local communities, encouraging collaborative environmental learning.

Environmental education research further supports these findings. Lopes and Abílio

(2021), analyzing educational initiatives in semi-arid schools, observe that contextualized pedagogies encourage students to recognize the ecological value of their territories and develop critical awareness of socioenvironmental challenges. Such educational experiences contribute to transforming the symbolic representation of the Semi-Arid from a territory of deprivation into a landscape of socioecological learning.

This transformation also has important implications for youth engagement in environmental governance. Studies examining climate education indicate that educational experiences grounded in local environmental contexts significantly influence how young people perceive climate risks and their own capacity for environmental action (Lawson et al., 2018; Ojala, 2012). By fostering a sense of territorial belonging and ecological responsibility, contextualized education enables students to move from passive observers of environmental change to active participants in the construction of adaptive strategies.

Thus, the literature suggests that contextualized education plays a crucial role in reshaping territorial imaginaries. By reconnecting education with local ecological knowledge and community practices, schools contribute to transforming the symbolic identity of semi-arid populations from that of the displaced retiree to that of the territorial subject capable of producing knowledge and shaping environmental futures.

5.3 Semi-Arid Regions as Spaces of Adaptive Knowledge

The reinterpretation of semi-arid territories as spaces of knowledge production represents one of the most significant epistemological shifts identified in the literature. Rather than framing semi-arid environments exclusively through narratives of scarcity, several authors emphasize that such territories embody sophisticated systems of ecological learning and adaptive knowledge.

Anthropological research on biocultural diversity highlights that communities inhabiting environmentally variable regions often develop highly complex ecological knowledge systems. Kassam (2010) emphasizes that indigenous and local knowledge emerges from long-term interactions between communities and ecosystems, producing adaptive strategies that cannot be easily replicated through purely technical interventions. These knowledge systems are characterized by continuous environmental observation, seasonal ecological knowledge, and collective learning processes that enable communities to respond to environmental variability.

Similarly, Haraway (2016) argues that understanding contemporary socioecological challenges requires recognizing the relational nature of knowledge production. As she notes, “situated knowledges are about communities, not about isolated individuals,” emphasizing that environmental understanding emerges from collective interactions with ecosystems. In semi-arid territories, such relational knowledge systems are evident in community-based practices of water management, biodiversity conservation, and agricultural adaptation.

Political ecology perspectives further reinforce this interpretation. Latour (2018) argues that contemporary environmental crises require rethinking the relationship between society and nature, moving beyond the modernist separation between human and ecological systems. According to Latour, the emergence of the “new climatic regime” demands forms of knowledge that integrate ecological processes with social and political dynamics.

Environmental education research provides empirical evidence supporting this epistemological shift. Studies indicate that educational initiatives incorporating territorial knowledge significantly enhance ecological literacy and environmental engagement among students. Meta-analytical evidence shows that environmental education programs can improve ecological knowledge and pro-environmental attitudes by up to 20–30% in educational assessments, demonstrating the effectiveness of experiential learning strategies (Van de Wetering et al., 2022).

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At the policy level, the importance of climate literacy has also been increasingly recognized. The Climate Literacy Framework developed by the U.S. Global Change Research Program emphasizes that understanding climate systems requires integrating scientific knowledge with local environmental observation and community-based learning (USGCRP, 2009). Similarly, international environmental education guidelines highlight the importance of experiential and place-based learning for strengthening environmental responsibility and sustainability practices (NAAEE, 2024).

Recent research on climate education further emphasizes the transformative potential of such pedagogical approaches. Boyd et al. (2025) argue that effective climate education must move beyond information dissemination and instead encourage critical engagement with socioecological challenges. In parallel, Khadka (2021) demonstrates that place-based environmental education strengthens the connection between learners and their environments, fostering both ecological knowledge and a sense of environmental responsibility.

Taken together, these findings suggest that semi-arid territories should not be

interpreted solely through narratives of environmental vulnerability. Instead, they must be recognized as spaces of adaptive knowledge, where communities have historically developed complex socioecological strategies for living with climatic variability. By integrating these knowledge systems into educational processes, contextualized education contributes to redefining semi-arid regions as landscapes of ecological intelligence and socioenvironmental resilience rather than as territories of scarcity.

6. CONCLUSION

This integrative review examined how contextualized education has been conceptualized and implemented in semi-arid territories, with particular attention to its epistemological implications and its role in shaping territorial identity and climate learning. The analysis of the selected corpus reveals that the dominant narrative portraying the Semi-Arid primarily as a space of scarcity and environmental limitation is increasingly being challenged by educational approaches that recognize the socioecological complexity of these territories.

Across the literature, contextualized educational practices consistently emerge as mechanisms that reconnect schooling with territorial knowledge systems. By integrating ecological observation, cultural practices, and local environmental experiences into the educational process, these pedagogical approaches contribute to strengthening ecological literacy, territorial belonging, and community engagement. The findings also indicate that place-based educational strategies can play a significant role in fostering climate awareness and encouraging young people to engage more actively with environmental challenges.

Taken together, the results suggest that contextualized education does not merely adapt educational content to local realities; rather, it redefines how semi-arid territories are understood within educational systems. Through this process, the Semi-Arid begins to be recognized not as a landscape defined by deficit but as a space of knowledge production, socioecological learning, and adaptive capacity.

Beyond its pedagogical significance, contextualized education carries important epistemological implications. By legitimizing territorial knowledge systems historically marginalized by dominant epistemic frameworks, these educational practices contribute to processes that can be interpreted as forms of epistemic justice. In this sense, contextualized education functions as a counter-hegemonic approach that challenges the hierarchical

separation between scientific and experiential knowledge.

At the same time, these pedagogical experiences highlight the potential of education to operate as a territorial pedagogy, in which learning processes are grounded in the ecological and cultural realities of specific places. This territorial orientation allows education to become a space where socioecological knowledge is collectively constructed, strengthening community autonomy and cultural recognition.

Furthermore, the literature reviewed in this study indicates that contextualized education can also function as a strategy for climate resilience. By fostering environmental awareness, ecological literacy, and community engagement, place-based educational initiatives contribute to building adaptive capacities that are essential in regions increasingly affected by climatic variability.

Despite its contributions, this study is subject to certain limitations inherent to integrative literature reviews. The analytical synthesis presented here is based exclusively on previously published studies, which may reflect particular disciplinary perspectives or geographical focuses within the broader field of environmental and rural education. Additionally, although the integrative review methodology allows for the inclusion of diverse types of research, the heterogeneity of the selected studies may limit the comparability of specific empirical findings.

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Another limitation concerns the availability of empirical studies focusing specifically on contextualized education in semi-arid environments. While the literature on environmental education and climate literacy has expanded significantly in recent years, research addressing the intersection between territorial epistemologies and educational practices in dryland contexts remains relatively limited.

Future research should continue to explore the relationship between education, territory, and socioecological knowledge in semi-arid regions through interdisciplinary approaches. Comparative studies examining contextualized education across different global drylands could provide valuable insights into how diverse communities develop adaptive educational strategies in response to environmental variability.

Another important research avenue concerns the role of climate literacy in semi-arid educational systems, particularly in relation to youth engagement and environmental governance. Investigating how educational practices influence climate awareness and environmental participation among young people could contribute to strengthening

educational responses to climate change.

Finally, further investigation is needed into the role of territorial epistemologies in rural schooling, particularly regarding how schools can function as spaces where local knowledge systems and scientific perspectives interact productively. Expanding research in this area may help illuminate how educational institutions can contribute to the recognition of socioecological knowledge and the construction of more resilient and equitable territorial futures.

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