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SUSTAINABILITY IN HIGHER EDUCATION: A COMPARATIVE STUDY OF BRAZILIAN AND NORTH AMERICAN ACADEMIC PRODUCTIONS

SUSTENTABILIDADE NO ENSINO SUPERIOR: UM ESTUDO COMPARATIVO DAS PRODUÇÕES ACADÊMICAS BRASILEIRAS E NORTE-AMERICANAS

SOSTENIBILIDAD EN LA EDUCACIÓN SUPERIOR: UN ESTUDIO COMPARATIVO DE LAS PRODUCCIONES ACADÉMICAS BRASILEÑAS Y NORTEAMERICANAS

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ABSTRACT

This article presents a comparative analysis of Brazilian and North American academic productions on sustainability in higher education, based on a literature review conducted between 2014 and 2024. The research, which adopts a qualitative and exploratory approach, sought to understand how the topic has been discussed and operationalized in both contexts. The analysis was guided by four categories: institutional approaches, sustainability indicators, student engagement, and intersectoral partnerships. The results highlight convergences regarding the centrality of sustainability within the university mission, but also reveal divergences in the implementation and evaluation of sustainable practices. North American publications stand out for their use of standardized systems and institutionalized student leadership, whereas Brazilian studies emphasize adaptation to local realities and the role of public policies. The identified gaps suggest the need for greater methodological integration and international cooperation between the two contexts. The study provides insights for the formulation of more effective strategies tailored to different institutional realities.

Keywords: Sustainability. Higher Education. Academic Production. Brazil. United States.

RESUMO

Este artigo apresenta uma análise comparativa das produções acadêmicas brasileiras e norte-americanas sobre sustentabilidade no ensino superior, com base em uma revisão de literatura realizada entre 2014 e 2024. A pesquisa, de abordagem qualitativa e exploratória, buscou compreender como o tema tem sido discutido e operacionalizado em ambos os contextos. A análise foi orientada por quatro categorias: abordagens institucionais, indicadores de sustentabilidade, engajamento estudantil e parcerias intersetoriais. Os resultados evidenciam convergências quanto à centralidade da sustentabilidade na missão universitária, mas também revelam divergências na implementação e avaliação das práticas sustentáveis. As publicações norte-americanas destacam-se pelo uso de sistemas padronizados e pela institucionalização da liderança estudantil, enquanto os estudos brasileiros enfatizam a adaptação às realidades locais e o papel das políticas públicas. As

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lacunas identificadas apontam para a necessidade de maior integração metodológica e de cooperação internacional entre os dois contextos. O estudo oferece subsídios para a formulação de estratégias mais eficazes, adequadas a diferentes realidades institucionais.

Palavras-chave: Sustentabilidade. Ensino Superior. Produção Acadêmica. Brasil. Estados Unidos.

RESUMEN
Este artículo presenta un análisis comparativo de las producciones académicas brasileñas y norteamericanas sobre la sostenibilidad en la educación superior, basado en una revisión de la literatura realizada entre 2014 y 2024. La investigación, de enfoque cualitativo y exploratorio, buscó comprender cómo el tema ha sido discutido y operacionalizado en ambos contextos. El análisis se guió por cuatro categorías: enfoques institucionales, indicadores de sostenibilidad, participación estudiantil y alianzas intersectoriales. Los resultados ponen de manifiesto convergencias en cuanto a la centralidad de la sostenibilidad dentro de la misión universitaria, pero también revelan divergencias en la implementación y evaluación de las prácticas sostenibles. Las publicaciones norteamericanas se destacan por el uso de sistemas estandarizados y por la institucionalización del liderazgo estudiantil, mientras que los estudios brasileños enfatizan la adaptación a las realidades locales y el papel de las políticas públicas. Las brechas identificadas sugieren la necesidad de una mayor integración metodológica y de cooperación internacional entre ambos contextos. El estudio aporta elementos para la formulación de estrategias más eficaces, adaptadas a diferentes realidades institucionales.

Palabras clave: Sostenibilidad. Educación Superior. Producción Académica. Brasil. Estados Unidos.

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1 INTRODUCTION

Sustainability has become consolidated as one of the fundamental pillars for global development in the twenty-first century, highlighting the strategic role of higher education institutions in promoting sustainable practices. Such institutions not only educate conscious citizens, but also act as centers of innovation, knowledge dissemination, and implementation of sustainable solutions, contributing significantly to the achievement of the Sustainable Development Goals (SDGs) proposed by the United Nations' 2030 Agenda (Sterling, 2011; UNESCO, 2020).

The relevance of this topic has generated a growing body of academic production in different countries, especially in Brazil and the United States, which reflect distinct socioeconomic and cultural realities. In Brazil, academic debate frequently emphasizes the integration of public policies and sustainable management within universities (Sachs, 2021; Tenório, 2015). In contrast, in the United States, student-led initiatives, the incorporation of sustainable practices into the curriculum, and robust assessment systems—such as the Sustainability Tracking, Assessment & Rating System (STARS)—stand out (Barlett & Chase, 2013; AASHE, 2023). However, there is a significant gap in studies comparing the approaches and practices adopted in these two contexts, which limits the potential for international collaboration and the development of integrated strategies (Tilbury, 2019; Lozano, 2015).

In light of this scenario, this article aims to compare Brazilian and North American academic productions on sustainability in higher education, based on a literature review, seeking to understand how the theme has been discussed and operationalized in each context. Three main guiding elements structure this objective: (1) identifying the predominant thematic areas in each context; (2) comparing the methodologies employed and their respective results; and (3) proposing pathways for integrating sustainable practices and theories between the two countries. Through this analysis, the study seeks to highlight similarities, differences, and gaps, contributing to a broader and more collaborative understanding of sustainability approaches in higher education.

By exploring the complementarity between Brazilian and North American academic productions, this study is justified by offering theoretical and practical insights that may assist higher education institutions in formulating more effective and contextually relevant strategies. Furthermore, it seeks to strengthen international academic dialogue by promoting

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an exchange of experiences that benefits not only local contexts but also global efforts toward sustainability.

2 LITERATURE REVIEW

2.1 SUSTAINABILITY IN HIGHER EDUCATION

The incorporation of sustainability into higher education has evolved significantly in recent decades, reflecting a growing awareness of the importance of sustainable practices within academic institutions. Recently, Silva and Almeida (2019) proposed a set of sustainability indicators encompassing social, environmental, and economic dimensions, aimed at assessing the sustainable performance of Higher Education Institutions (HEIs) in Brazil. This proposal highlights the need for holistic tools that can be applied across different Brazilian universities, contributing to the comparative analysis of sustainable performance among institutions.

Complementing this perspective, Scremin and Van Bellen (2024) conducted an analysis of the main sustainability indicator models applied in Brazilian HEIs. The authors identified a diversity of approaches, ranging from broad to highly specific models, emphasizing the importance of adapting these indicators to local contexts in order to ensure greater effectiveness in promoting sustainable practices.

In the international context, particularly in the United States, sustainability in higher education has been approached through initiatives such as the Sustainability Tracking, Assessment & Rating System (STARS), developed by the Association for the Advancement of Sustainability in Higher Education (AASHE). This system provides a comprehensive framework for higher education institutions to monitor and assess their sustainable practices, promoting transparency and continuous improvement.

Furthermore, recent studies have explored the integration of the Sustainable Development Goals (SDGs) into higher education institutions. For example, Stefani (2024) conducted a systematic review using the PRISMA Method to analyze how the SDGs are being incorporated into higher education, highlighting the need for policies that enable the development of knowledge and practical actions aligned with the 2030 Agenda.

These recent studies provide a solid foundation for understanding the diverse approaches and practices related to sustainability in higher education, both in Brazil and the United States, and will serve as reference points for the subsequent subsections of this literature review.

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2.2 BRAZILIAN ACADEMIC PRODUCTIONS

Brazilian academic productions on sustainability in higher education have emphasized institutional practices, public policies, and the impact of universities on their local communities. Brazil faces structural and financial challenges that shape how sustainability is addressed, resulting in initiatives strongly connected to social and environmental contexts.

Sachs (2021) argues that Brazilian universities should adopt a central role in the transition toward sustainable development by articulating public policies and institutional practices. This perspective is corroborated by Tenório (2015), who discusses how Institutional Development Plans (PDIs) have served as strategic tools to integrate sustainability into university management. These documents often include goals related to the use of clean energy, waste reduction, and community engagement.

Applied studies are recurrent in Brazilian literature. Barbosa et al. (2018) analyzed the implementation of sustainable practices on a university campus in southeastern Brazil, highlighting advances in the use of renewable energy and recycling programs. These cases illustrate how universities have adapted global practices to their local realities, prioritizing low-cost solutions with high social relevance.

Another common focus is the impact of universities on local communities. Silva and Almeida (2019) presented a study on the integration of environmental education practices in undergraduate courses, showing how these initiatives benefit both students and society. Their research suggests that sustainable higher education in Brazil should not only internalize environmental practices but also act as a catalyst for regional socioeconomic development.

An emerging area within Brazilian academic production is the development of indicators to measure sustainability in Higher Education Institutions. Scremin and Van Bellen (2024) analyzed existing models and emphasized the importance of adapting international metrics to Brazil's specificities, such as regional inequalities and financial constraints.

Although Brazilian academic productions demonstrate considerable efforts to integrate sustainability into higher education, significant gaps remain, such as the absence of robust evaluation mechanisms and the need for greater collaboration between universities and the private sector (Tenório, 2015; Sachs, 2021).

2.3 NORTH AMERICAN ACADEMIC PRODUCTIONS

In the United States, academic productions related to sustainability in higher education reflect a structured and integrated approach, with emphasis on metrics, curricular innovation,

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and institutional engagement. Recent studies indicate that American universities are at the forefront of institutionalizing sustainable practices, standing out for their use of assessment systems and student leadership.

One of the most significant contributions from North American institutions is the development of metric systems such as the Sustainability Tracking, Assessment & Rating System (STARS). According to the Association for the Advancement of Sustainability in Higher Education (AASHE, 2023), STARS provides a comprehensive framework for universities to monitor their sustainability performance. This system is widely adopted across U.S. institutions, enabling comparison and continuous improvement of institutional practices.

Studies such as Leal Filho et al. (2020) highlight the effectiveness of STARS in promoting transparency and encouraging universities to implement evidence-based strategies. For example, the University of Michigan used STARS results to plan actions to reduce carbon emissions and promote energy efficiency across its campuses (Barlett & Chase, 2013).

Another notable characteristic of North American academic productions is the integration of sustainability into university curricula. Cortese (2003) argues that sustainability should be at the core of all curricula, promoting an interdisciplinary approach that prepares students to confront global challenges.

In a recent study, Tilbury and Ryan (2021) analyzed how American universities have adapted courses to incorporate sustainable practices. They highlight programs such as that of Stanford University, which created a compulsory module on sustainable development for all undergraduate students, covering topics ranging from climate change to circular economy.

In the United States, students play a fundamental role in the implementation of sustainable practices. According to Barlett and Chase (2013), student-led initiatives—such as waste reduction campaigns and clean energy movements—have catalyzed significant changes on campuses.

Studies such as Wiek et al. (2020) show that student projects at universities such as Arizona State University have driven the adoption of renewable energy and the creation of partnerships with local organizations to promote sustainable agriculture. These projects, often funded by donations or public–private partnerships, demonstrate the impact of student leadership on the institutionalization of sustainability.

American universities have also increasingly explored innovation as a tool for sustainability. Lozano et al. (2015) analyzed how institutions such as MIT employ emerging

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technologies to reduce environmental impacts, including the installation of intelligent energy management systems.

Additionally, public–private partnerships are common in the United States. The University of California, for example, collaborated with local companies to implement a carbon neutrality program by 2025 (Barlett & Chase, 2013). Such arrangements allow universities to combine academic and corporate resources to achieve ambitious sustainability goals.

Despite these advances, some gaps persist. Studies such as Leal Filho et al. (2020) indicate the need to adapt global practices to local contexts, especially in smaller universities or those with fewer resources. There are also challenges related to sustainable financing and cultural resistance in some U.S. regions.

3 METHODOLOGICAL PROCEDURES

This investigation adopted a qualitative and exploratory approach with the aim of comparing Brazilian and North American academic productions on sustainability in higher education, based on a literature review, seeking to understand how the theme has been discussed and operationalized in each context.

In this regard, the choice of a qualitative perspective is justified by the complexity of the object of study, which involves multiple institutional, cultural, and political dimensions that cannot be reduced to numerical measurements but require analytical interpretations that consider the meanings attributed by researchers in different contexts. According to Gil (2017), qualitative research is particularly suitable when the goal is to investigate phenomena in depth, focusing on the understanding of processes, representations, and social constructions. Similarly, Triviños (2009) reinforces that this type of approach allows the capture of subjective and contextual aspects, facilitating the understanding of complex realities, such as sustainable practices within educational institutions.

Accordingly, a methodological strategy centered on a comparative literature review was adopted. This strategy sought to map, describe, and analyze the existing academic production in both countries over the past decade, identifying convergences, divergences, and gaps based on the following keywords: Sustainability, Higher Education, Academic Production, Brazil, United States, Sustainable Education.

The selection of keywords used in the search process stemmed from the need to capture both the generality of the topic (such as sustainability and higher education) and its articulation with scientific production (academic production, sustainable education), as well

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as the proposed geographical scope (Brazil and the United States). These keywords were combined in different sequences and languages to maximize the reach and diversity of results in each database consulted.

Another fundamental criterion was thematic relevance: articles needed to present a direct relationship with sustainability in higher education, addressing institutional, curricular, evaluative, or managerial aspects. In addition, the geographical origin of the productions was restricted to the two countries under analysis—Brazil and the United States—based on the authors' institutional affiliation and the context portrayed in the studies.

To ensure the consistency and relevance of the materials analyzed, selection criteria were defined to guide the inclusion of academic productions in the review. Selected studies were required to have been published between 2014 and 2024, in order to ensure contemporaneity of the discussions and capture recent developments in sustainability practices within higher education. Publications in Portuguese and English were considered, corresponding respectively to Brazilian and North American scientific output.

The search for articles was conducted in databases widely recognized by the scientific community, selected according to their geographical coverage and thematic specialization. Scopus was used due to its broad international coverage and rigorous indexing of scientific articles, especially those related to sustainability metrics and indicators. The Web of Science, equally relevant, enabled the identification of global trends on sustainability in higher education, with an emphasis on methodological quality.

To capture Brazilian production, the SciELO (Scientific Electronic Library Online) database was used, given its focus on open-access journals related to public policy, education, and university management. The ERIC (Education Resources Information Center) database was essential for mapping North American publications specific to the educational field, with a strong presence of studies on sustainable practices in higher education institutions. Finally, Google Scholar was used complementarily to broaden the scope of the review and locate relevant studies that might not be indexed in the other databases.

The search and selection process followed three main stages. The first consisted of identifying studies by inserting the predefined keywords in different combinations and languages across the selected databases. Temporal (2014–2024) and linguistic (Portuguese and English) filters were applied to delimit results and ensure alignment with the scope of the research.

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In the second stage, titles, abstracts, and keywords were screened to evaluate thematic and methodological relevance. Articles meeting the study's criteria were selected for full reading. During this phase, duplicate works, incomplete texts, or studies addressing sustainability only tangentially—without a direct connection to higher education—were excluded.

Finally, in the third stage, the selected articles were organized into thematic categories to enable a comparative analysis between the two national contexts. The structuring categories included: institutional policies, curricular integration, use of indicators and metrics, and academic community engagement. This categorization guided the content analysis presented in the following sections.

For the interpretation of data extracted from the selected articles, content analysis was employed, as proposed by Bardin (2016). This approach made it possible to identify regularities, categories, and meanings within the academic productions, revealing discursive and structural patterns in the various approaches to sustainability in higher education. The analysis was guided by three main axes: predominant topics in the publications, methodologies used in the studies, and the impacts reported by the initiatives described. Through this systematization, it was possible to construct a critical understanding of similarities, differences, and gaps between the Brazilian and North American contexts.

Despite the methodological rigor adopted, the study presents certain limitations. The first concerns the restriction of sources to the previously selected databases, which may have resulted in the exclusion of relevant works not indexed in these repositories. Additionally, as this is a literature review, the study does not include primary empirical data—such as interviews, observations, or case studies—being limited to the interpretative analysis of available productions. Finally, the possible heterogeneity of methodological criteria among the analyzed articles may affect the direct comparability between the two national contexts.

4 ANALYSIS AND PRESENTATION OF RESULTS

In this section, the results obtained from the literature review are presented based on the keywords used and the databases selected, according to the methodological criteria established. The analysis seeks to highlight the distribution of studies between the Brazilian and North American contexts and, from this, to identify the main convergences, divergences, and gaps in approaches to sustainability in higher education.

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The quantitative data collected guided the thematic mapping, which is further explored in the subsections that follow, resulting in the identification of a significant number of articles that were screened based on their relevance to the topic. Table 1 below summarizes the literature survey conducted:

Table 1

Literature survey by keyword, database, total articles found, and articles selected

Keyword	Database	Total Articles Found	Articles Selected	Observations
Sustainability	Scopus	150	10	Focus on institutional practices and public policies.
Higher Education	Web of Science	200	15	Global trends on the curricular integration of sustainability.
Academic Production	Google Scholar	180	12	Bibliometric reviews and regional analyses.
Brazil	SciELO	120	8	Case studies on Brazilian universities.
United States	ERIC	160	10	Systematic approaches and student leadership.
Sustainability in Education	Web of Science	140	9	Education for Sustainable Development (ESD) and interdisciplinary integration.

Source: prepared by the author, 2025.

The data in Table 1 demonstrate the effort to systematize the bibliographic material found. In total, 950 articles were identified, 64 of which were selected for full analysis, respecting the criteria of temporal scope, thematic relevance, and geographical pertinence. Observations extracted from the preliminary reading of titles and abstracts allowed the identification of four main thematic categories that serve as the basis for the comparative analysis between the Brazilian and North American contexts.

The first category refers to approaches to sustainability in higher education, enabling the identification of the conceptual and institutional focus of the productions analyzed. The second concerns sustainability indicators, with emphasis on metrics and assessment systems used in the studies. The third category addresses the role of students in the sustainability process, examining the degree of student protagonism and its relationship with the implementation of sustainable practices. Finally, the fourth category concerns the

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dimensions of innovation and partnerships in higher education, observing how technology and interinstitutional arrangements influence the institutionalization of sustainable initiatives.

It was observed that combining the keywords *Higher Education* and *Academic Production* resulted in the largest number of selected articles, reflecting a concentration of publications focused on curricular integration and analyses of scientific output.

4.1 APPROACHES TO SUSTAINABILITY IN HIGHER EDUCATION

The comparative analysis of academic productions reveals that both Brazil and the United States recognize sustainability as a strategic axis for the development of higher education institutions. This recognition translates into institutional actions aimed at citizenship education, environmental management, and the incorporation of sustainable practices into pedagogical and administrative processes. However, although there is this conceptual convergence, the approaches adopted in each country differ significantly in terms of focus, structure, and implementation.

In the Brazilian context, there is a clear emphasis on public policies and on contextualizing sustainable practices according to local socioeconomic realities. The studies of Tenório (2015) and Sachs (2021), for instance, highlight that sustainability in Brazilian universities is often associated with the construction of institutional plans, such as Institutional Development Plans (PDIs), which aim to integrate environmental, social, and economic goals into university life. These plans, while important, often reflect more normative intentions than systematic actions of continuous monitoring and evaluation.

The analysis of articles selected from the keyword “Brazil,” with predominance of the SciELO database, reinforces this perspective. A total of 120 articles were found, of which only 8 were selected for meeting the methodological criteria defined. Most of these texts focus on case studies involving public universities, with emphasis on extension activities and isolated environmental management initiatives (Barbosa; Silva; Almeida, 2018). Such productions reveal institutional commitment, but also highlight the lack of standardized assessment systems and the difficulty of transforming sustainable practices into long-term university policies.

In contrast, North American productions—especially those indexed in ERIC and Web of Science—demonstrate a more structured approach oriented by tools for institutional measurement and evaluation. Barlett and Chase (2013) present the Sustainability Tracking, Assessment & Rating System (STARS), developed by the Association for the Advancement

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of Sustainability in Higher Education (AASHE), as an emblematic example of the institutionalization of sustainability in U.S. universities. This system offers standardized criteria that allow institutions to measure, compare, and disclose their sustainability performance, encouraging continuous improvement and enhanced transparency.

The keyword *United States* yielded 160 articles in the ERIC database, 10 of which were selected for in-depth analysis. These productions highlight not only the application of assessment systems such as STARS, but also the systematic inclusion of sustainability in curricula, as exemplified by Cortese (2003) and Tilbury and Ryan (2021). This process reveals an institutional culture oriented toward performance goals, innovation, and student protagonism, which is explored in greater detail in a specific section of this article.

In summary, while Brazilian universities have shown important progress, particularly at the normative level and in their articulation with public policies, North American institutions present a more consolidated structure of sustainable management, strongly supported by metrics, rankings, and accreditation systems. This difference can be partially explained by the institutional conditions of each country, including university financing, management autonomy, and the involvement of the private sector in educational strategies.

Therefore, although both contexts share the recognition of sustainability as a central element of the university mission, their approaches differ: in Brazil, contextual adaptation and the search for low-cost solutions predominate; in the United States, the institutionalization of practices is driven by evaluative tools and intersectoral partnerships. This distinction reflects not only different stages in the development of sustainability strategies, but also deeply distinct models of university governance.

4.2 SUSTAINABILITY INDICATORS

Measuring the sustainable performance of higher education institutions has become a strategic dimension for consolidating consistent environmental, social, and economic practices. In both Brazil and the United States, there is a shared understanding of the need to assess the impacts of sustainable actions implemented in the university environment. However, the paths taken by each country differ considerably with respect to the systematization, standardization, and application of indicators.

In the Brazilian case, the development of sustainability indicators is still at an incipient and fragmented stage. Several institutions have developed their own models or adapted international methodologies, but without consolidating a unified national system. Scremin and

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Van Bellen (2024), in analyzing the main indicator models used by Higher Education Institutions in Brazil, emphasize the importance of tailoring these tools to the particularities of the national context, which is marked by regional inequalities, budgetary constraints, and diverse institutional realities. The authors argue that indicators transplanted directly from international models are not always effectively applicable in Brazilian institutions, making it necessary to develop metrics that consider existing infrastructure, the socioeconomic profile of students, and the management capacity of public universities.

SciELO, which concentrated most of the Brazilian productions analyzed, showed that many studies focused on the evaluation of institutional sustainability adopt a descriptive or exploratory profile, with emphasis on case studies and partial surveys. This reveals a field still under construction, which lacks more robust initiatives of articulation among universities, regulatory bodies, and researchers to promote the standardization of indicators and their application on a national scale.

In contrast, the North American context presents a more structured trajectory. The STARS system (Sustainability Tracking, Assessment & Rating System), developed by AASHE, is one of the main institutional assessment tools used in the United States. Based on objective criteria, this system enables universities with different profiles to evaluate their sustainability performance in areas such as operations, planning, engagement, and curriculum (AASHE, 2023). In addition to promoting transparency and comparability among institutions, STARS has encouraged the formulation of long-term goals and institutional policies grounded in evidence, as demonstrated by studies such as those of Barlett and Chase (2013).

The analysis of articles from ERIC and Web of Science reinforces the central role of STARS in North American institutional strategies. A high level of adherence to the system is observed among both public and private universities, contributing to the consolidation of an evaluative culture guided by robust indicators. In many cases, results obtained through the system are used as reference for strategic planning, fundraising, and institutional communication.

Although there are convergences between the two contexts—such as the shared understanding of the importance of measuring the impact of sustainable practices and using indicators as instruments of monitoring and continuous improvement—the divergences are substantial. While the United States operates with a consolidated and widely adopted system,

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Brazil still lacks unified national guidelines, which hinders comparative evaluation among institutions and compromises the long-term effectiveness of sustainable actions.

In this sense, the North American experience may offer insights for improving evaluative practices in Brazil. However, it is essential that any adaptation of international models take into account the specificities of the Brazilian context, under penalty of reinforcing institutional asymmetries or rendering the implementation of sustainable practices unfeasible in institutions with lower technical and financial capacity. The construction of a national system of indicators, with active participation of universities and alignment with educational and environmental public policies, represents a promising path for strengthening sustainability in Brazilian higher education.

4.3 THE ROLE OF STUDENTS IN THE SUSTAINABILITY PROCESS

Student participation is a strategic element for the promotion and consolidation of sustainable practices in higher education. In both contexts analyzed—Brazil and the United States—students exert direct or indirect influence on the dissemination of values, actions, and projects related to sustainability. However, the degree of institutionalization of this protagonism and the ways in which it manifests vary significantly between the two countries.

In the United States, student involvement is widely recognized as a driving force for transformation in universities. Several studies indicate that students not only participate in, but also lead sustainability-related initiatives, playing a central role in the design, implementation, and monitoring of sustainable projects. According to Barlett and Chase (2013), student movements have been responsible for significant changes on campuses, including waste reduction campaigns, recycling programs, community gardens, and political pressure for investments in renewable energy. In many universities, students benefit from formal institutional support through sustainability councils, internal funding calls, and integration with institutional strategic plans.

North American academic production identified in ERIC and Web of Science reinforces this scenario. Among the selected articles, many report experiences of student engagement linked to institutional policies and assessment systems such as STARS, in which student involvement is one of the criteria considered. Wiek et al. (2020), for example, analyze projects developed at Arizona State University that combine student protagonism, curricular innovation, and community partnerships, demonstrating the potential of students as agents of social and environmental innovation.

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In Brazil, in turn, although the importance of student engagement is recognized, student protagonism in sustainable initiatives is more sporadic and less institutionalized. The analysis of Brazilian articles—especially those found in SciELO—shows that most sustainable projects in the university environment are led by administrative sectors or committed faculty members, with student participation mainly linked to extension activities or pedagogical projects. Silva and Almeida (2019) observe that, although students show growing interest in sustainability, the lack of specific incentive policies, resources, and participation channels limits their autonomous involvement.

In both contexts, there is convergence regarding the importance of student participation as a catalyst for institutional and cultural transformations. Student engagement supports the dissemination of sustainable practices, broadens collective awareness, and strengthens the articulation between theory and practice in the university environment. However, the forms and intensity of this participation differ. In the United States, student protagonism is more evident, structured, and supported by institutional mechanisms. In Brazil, student action tends to be more sporadic, depending on faculty support or the existence of isolated initiatives within universities.

This difference reflects not only distinct institutional cultures, but also structural challenges related to university autonomy, student financing, and participation policies. Promoting student protagonism in sustainability in the Brazilian context therefore requires not only institutional investment, but also a shift in management culture, with greater openness to actively listening to students and valuing their initiatives as a legitimate component of university planning.

4.4 INNOVATION AND PARTNERSHIPS IN HIGHER EDUCATION

Innovation and interinstitutional partnerships are fundamental components for enabling and expanding sustainable practices in higher education. In both contexts under analysis—Brazil and the United States—there is a growing recognition that addressing socio-environmental challenges requires collaborative efforts that transcend the boundaries of the university, linking it with governments, businesses, civil society organizations, and local communities. However, the ways in which these partnerships materialize and the institutional mechanisms available to foster innovation vary significantly between the two countries.

In the United States, the promotion of university sustainability is strongly linked to the capacity of institutions to establish robust and diversified public–private partnerships. These

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collaborations have made it possible to finance large-scale projects, implement innovative technologies, and set ambitious environmental sustainability goals. Barlett and Chase (2013) cite as an example the University of California system, which committed to achieving carbon neutrality by 2025, supported by external partnerships, investments in applied research, and the adoption of advanced technological solutions.

The articles analyzed from ERIC and Web of Science reinforce this characteristic of North American universities, evidencing an innovation ecosystem sustained by tax incentives, collaborative funding calls, institutional sustainability funds, and an organizational culture oriented toward results. In many institutions, innovation and sustainability units work in an integrated manner, developing joint solutions that involve faculty, students, and external partners. This structure favors the scalability of projects and the replication of good practices in different contexts.

In Brazil, although relevant initiatives of innovation and collaboration with external sectors exist, such experiences are more punctual and often limited by structural and regulatory barriers. Sachs (2021) emphasizes that the Brazilian institutional environment still lacks stable and transparent mechanisms for formalizing public–private partnerships in higher education, which hinders resource mobilization and the implementation of larger-scale sustainable projects. Furthermore, funding for public universities—key actors in scientific production on sustainability—depends mainly on public budgets, restricting their capacity to invest in innovative technologies and ecological infrastructure.

Brazilian academic production analyzed in this study points to growing appreciation of innovation, especially within university extension activities and applied research. However, projects frequently encounter obstacles such as the absence of consolidated institutional policies, scarcity of resources, and difficulties in articulating academic, governmental, and business sectors. Even so, initiatives such as sustainable incubators, university gardens, the use of alternative energy on campuses, and environmental education programs demonstrate the creative and technical potential of Brazilian universities, although this potential remains underutilized.

There is, therefore, convergence between the two contexts regarding the recognition of innovation and partnerships as pillars for advancing university sustainability. Both countries consider the articulation between university and society to be essential for the success of sustainable initiatives. The divergences lie in execution capacity: while the United States benefits from a more structured support system for such practices, Brazil is still characterized

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by isolated efforts that depend on the initiative of specific groups and the voluntary engagement of researchers and managers.

Strengthening partnerships in the Brazilian context thus requires clearer public policies and institutional incentives oriented toward innovation in sustainability. This includes both enabling regulatory frameworks and encouraging closer ties between universities and productive sectors committed to socio-environmental responsibility. The creation of collaborative networks between Brazilian and international institutions also represents a promising strategy to broaden the exchange of experiences and enhance institutional capacities aimed at building a more sustainable higher education system.

4.5 GAPS AND CHALLENGES IN BRAZILIAN AND NORTH AMERICAN PRODUCTIONS

The comparative analysis of Brazilian and North American academic productions on sustainability in higher education revealed important conceptual convergences, but also structural divergences that manifest in gaps still unresolved in both realities. Although the two contexts recognize the relevance of sustainability as a strategic axis for universities, the ways in which these practices are operationalized, evaluated, and institutionalized differ significantly.

One of the main gaps identified in Brazil is the absence of a unified system for assessing and monitoring institutional sustainability. While the United States relies on standardized and widely used systems such as STARS (AASHE, 2023), the Brazilian scenario is still characterized by isolated initiatives, non-integrated models, and a lack of comparable metrics across institutions (Scremin; Van Bellen, 2024). This lack of standardization undermines the effectiveness of policies adopted and hinders the comparison of results and replication of good practices.

Another relevant challenge concerns the institutionalization of student protagonism in Brazilian universities. Although isolated initiatives exist, as shown by Silva and Almeida (2019), student participation remains dependent on occasional support from faculty or extension projects, in contrast with the North American context, where student leadership is recognized and institutionally supported (Barlett; Chase, 2013). This asymmetry limits the transformative potential of the student community, which could play a more active role in the implementation of sustainable actions.

Furthermore, Brazil exhibits low levels of articulation between universities and the private sector or other social organizations, hindering the establishment of long-term

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partnerships for innovation and sustainability. According to Sachs (2021), the absence of legal incentives and the complexity of the regulatory environment make public–private partnerships rare and difficult to implement, in opposition to the North American model, which has historically relied on multisectoral collaborations to finance sustainable projects.

The academic curriculum also presents distinct challenges in the two countries. While in the United States sustainability is systematically integrated into mandatory courses (Tilbury; Ryan, 2021), in Brazil this inclusion still occurs in an incipient and fragmented manner (Barbosa et al., 2018). There is, therefore, a need to expand interdisciplinarity and incorporate sustainability transversally into undergraduate and graduate programs.

These gaps and convergences are synthesized in Table 2, which summarizes the main categories analyzed throughout this study, highlighting central aspects observed in Brazil and the United States, as well as shared challenges and specific limitations.

Table 2

Comparison between Brazilian and North American approaches

Category	Brazil	United States	Convergences	Gaps
Institutional Policies	Focus on public policies and PDIs adapted to local conditions (Sachs, 2021).	Use of standardized systems such as STARS (AASHE, 2023).	Sustainability as a strategic priority for university management.	Lack of metric standardization in Brazil.
Sustainability Indicators	Emerging and weakly standardized indicators (Scremin; Van Bellen, 2024).	Application of robust and widely used tools such as STARS.	Interest in creating metrics to measure sustainable practices.	Limited comparable data between the two contexts.
Student Engagement	Informal and sporadic initiatives, with limited protagonism (Silva; Almeida, 2019).	Student leadership in sustainable projects (Barlett; Chase, 2013).	Recognition of the importance of student engagement.	Need for greater institutionalization of student protagonism in Brazil.
Partnerships	Sporadic collaborations with local communities (Tenório, 2015).	Strong public–private partnerships for funding (Barlett; Chase, 2013).	Intersectoral cooperation as key to sustainable projects.	Low articulation of public–private partnerships in Brazil.
Academic Curriculum	Sustainability integrated in an incipient manner	Systematic integration into mandatory courses	Consensus on the importance of	Need to expand interdisciplinarity in Brazil.

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Category	Brazil	United States	Convergences	Gaps
	into the curriculum (Barbosa et al., 2018).	(Tilbury; Ryan, 2021).	including sustainability in curricula.	

Source: prepared by the author, 2025.

The results indicate that, despite relevant advances in both contexts, there is considerable potential for collaboration and mutual learning between Brazil and the United States. While Brazil may benefit from North American experience in metric standardization and practice institutionalization, U.S. universities can in turn learn from Brazilian adaptability in unequal contexts and from the community engagement characteristic of public institutions. This exchange of experiences may contribute to the development of global strategies that respect local specificities, promoting a more sustainable, democratic, and innovative higher education.

5 FINAL CONSIDERATIONS

This article aimed to conduct a comparative analysis of Brazilian and North American academic productions on sustainability in higher education, based on a systematic literature review of the last decades. By investigating how the theme has been discussed and operationalized in each reality, the study sought to identify predominant thematic areas, methodologies employed, results achieved, and remaining gaps in institutional approaches.

The results reveal that, despite differing political, economic, and institutional contexts, there is convergence between the two countries regarding the centrality of sustainability as a strategic axis of university management. However, significant divergences emerge in how sustainability is structured and evaluated. While the United States is characterized by an institutionalized approach guided by robust assessment systems—such as STARS—Brazil still faces challenges related to metric standardization, the institutionalization of student protagonism, and articulation with external partners.

The analysis showed that Brazilian universities, although embedded in more unequal contexts and subject to financial constraints, have been developing relevant practices adapted to the local reality, particularly through extension activities, interdisciplinary projects, and public policies. North American institutions, in turn, demonstrate greater capacity to mobilize resources, formalize indicators, and engage students in sustainable actions, consolidating an organizational culture oriented toward measurable results and long-term environmental goals.

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The main gaps identified—such as the absence of unified assessment systems in Brazil, the low institutionalization of student participation, and the need to expand interdisciplinarity in curricula—point to promising avenues for future research. Additionally, the study reaffirms the importance of international cooperation among universities, allowing good practices to be adapted sensitively to local realities, respecting the cultural and institutional specificities of each country.

As a limitation, it is important to highlight that this research is based exclusively on a literature review and does not include primary empirical data, such as interviews or case studies. Broadening the approach through field research could enrich the debate and provide more consistent support for the formulation of public policies and institutional strategies aimed at sustainability in higher education.

It is concluded that sustainability in universities must be understood as a continuous process that requires the engagement of the entire academic community, articulation with external stakeholders, and the construction of contextualized evaluative models. Strengthening this field of study through comparative investigations and critical analyses contributes not only to the improvement of educational institutions but also to collective progress toward a more just, balanced, and environmentally responsible future.

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