



Perspectives on Sustainability in Higher Education: Research Trends, Institutional Practices, and Implementation Challenges

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Abstract. This paper synthesizes perspectives on sustainability in higher education (HE), drawing on a comprehensive review of over fifty peer-reviewed studies published between 2000 and 2024. Higher education institutions (HEIs) are increasingly recognized as critical actors in advancing the United Nations Sustainable Development Goals (SDGs), yet their implementation strategies remain fragmented and uneven across regions. The review reveals a sharp rise in sustainability-focused scholarship after 2010, facilitated by the emergence of dedicated journals and global policy frameworks. Methodologically, most research is qualitative (interviews, focus groups, and document analysis), while quantitative studies rely on structured questionnaires. Conceptually, definitions of a “sustainable university” vary widely, with many institutions emphasizing campus greening and environmental measures, while neglecting social and economic dimensions. Key implementation drivers include signing sustainability declarations and establishing dedicated sustainability offices. Barriers include financial limitations, bureaucratic constraints, academic freedom concerns, and a lack of staff training. The discussion highlights the tension between fragmented and holistic approaches, the need to integrate equity and social justice into education for sustainable development (ESD), and the importance of leadership and governance for systemic change. The paper concludes that while progress has been made, future efforts must prioritize capacity building, cross-national collaboration, and mainstreaming sustainability into curricula, research, and governance.

Keywords: higher education sustainability, education for sustainable development, sustainable university, implementation barriers and drivers.

1 Introduction

Higher education institutions (HEIs) are increasingly recognized as pivotal actors in advancing the United Nations Sustainable Development Goals (SDGs) and in shaping societal responses to global sustainability challenges. The importance of HEIs is highlighted in major international declarations and frameworks, such as the Talloires Declaration, UNESCO's Global Action Programme on Education for Sustainable Development, and the 2030 Agenda for Sustainable Development (Sterling, 2011; Tilbury, 2011). Universities serve as centers of knowledge production, as well as role models for sustainable practices, positioning them as critical drivers of transformative change in society (McCowan, 2023). Despite growing attention, the pathways through which HEIs embed sustainability remain uneven and contested. Differences in governance structures, cultural contexts, and institutional priorities create fragmented approaches to Education for Sustainable Development (ESD), with some universities excelling in curriculum innovation while others emphasizing campus operations and symbolic commitments (Leal Filho et al., 2023; Lozano et al., 2015).

The field of higher education sustainability has expanded significantly since 2010, following the establishment of dedicated journals and global policy frameworks (Aikens et al., 2018; Popowska & Sady, 2024). Despite this growth, implementation strategies remain fragmented and inconsistent across regions (Leal Filho et al., 2019; Norton et al., 2022). This paper synthesizes research trends, institutional practices, and implementation challenges reported in sustainability scholarship between 2000 and 2024. The analysis contributes to ongoing debates on how universities can become more effective drivers of sustainable development and their involvement in supporting equity, social justice, and digital innovation.

2 Method

To conduct this review, we applied systematic search procedures across multiple databases, including Scopus, Web of Science, ERIC, and Google Scholar, focusing on the period 2000–2024. The keywords used included 'sustainability in higher education', 'education for sustainable development', 'sustainable university', and 'implementation barriers'. Inclusion criteria were peer-reviewed journal articles, book chapters, and conference proceedings that explicitly addressed sustainability in HEIs. Studies focusing exclusively on primary or secondary education were excluded. The members of the research team were all members of the seed project "Baseline Assessment of Sustainability related Educational practices and perceptions of academic and research staff across EU GREEN", funded by the EU Green Alliance. They all used the same search procedures.

To ensure comprehensive coverage, studies were selected if they explicitly addressed sustainability in HEIs, with a focus on education for sustainable development

(ESD), institutional practices, and/or implementation barriers. Fifty-six sources were identified, including conceptual analyses, empirical research, bibliometric studies, and case studies. Methodologies varied widely, from qualitative approaches (semi-structured interviews, focus groups, and document analysis) to quantitative surveys and bibliometric reviews.

Bibliometric trends revealed significant spikes in publication after 2010, coinciding with global policy developments and the establishment of specialized journals (Frizon & Eugénio, 2022; Lasino et al., 2023). A majority of studies originate from Europe, North America, and Australia, with comparatively limited contributions from Africa, Latin America, and Asia. Methodologically, qualitative studies are dominant, although survey-based quantitative research and bibliometric analyses are becoming increasingly common (Lozano et al., 2015). This review acknowledges limitations, including language bias (English-language dominance), underrepresentation of the Global South, and difficulties in comparing heterogeneous institutional and cultural contexts.

3 Results

3.1 Research Trends

The literature demonstrates a marked increase in sustainability-focused research after 2010, with substantial representation from Europe, North America, and Australia. Quantitative studies often used structured questionnaires with up to 100 items (Christie et al., 2015; Lee et al., 2023), whereas qualitative work relied on interviews, focus groups, and document analysis (Norton et al., 2022; Reid & Petocz, 2006). Cross-national comparisons remain rare due to internal policies, translation issues, and limited institutional support (Dabija et al., 2017; Jones et al., 2013). Table 1 summarizes the main methodological approaches in sustainability research in HEIs.

Table 1. Main methodological approaches in sustainability research in HEIs.

Method	Typical data sources	Representative Studies
Qualitative (Interviews, Focus Groups, Document Analysis)	Faculty, staff, websites, institutional policies	Reid & Petocz (2006); Norton et al. (2022)
Quantitative (Structured Questionnaires)	Students, faculty, staff	Christie et al. (2015); Lee et al. (2023)
Bibliometric and Systematic Reviews	Published literature	Frizon & Eugénio (2022); Leal Filho et al. (2023)

3.2 Institutional Practices

Definitions of a sustainable university vary considerably, often emphasizing environmental measures such as campus greening, energy reduction, and waste management

(Lozano, 2018; Sammalisto et al., 2015). Other approaches stress competence development for students, teacher training, and curriculum integration (Cebrián & Junyent, 2015; Huang et al., 2024). Signing sustainability declarations and establishing dedicated sustainability offices are reported as effective drivers of implementation (Lozano et al., 2015; Ávila et al., 2017). Nevertheless, implementation remains fragmented across departments, with uneven engagement from faculty (Shephard & Furnari, 2013; Yarritu et al., 2024). Table 2 presents key drivers and barriers to sustainability implementation in HEIs.

Table 2. Key drivers and barriers to sustainability implementation in HEIs.

Drivers	Barriers
Signing sustainability declarations (Lozano et al., 2015)	Financial limitations (Nejati et al., 2011; Wright, 2010)
Dedicated sustainability offices/committees (Ávila et al., 2017)	Administrative and bureaucratic constraints (Farinha et al., 2020)
Integration of ESD into curricula and staff training (Duarte et al., 2023)	Lack of training and capacity building (Mulà et al., 2017; Daniels et al., 2023)

3.3 Regional Perspectives on Sustainability in Higher Education

Sustainability research in higher education shows significant regional imbalances. Europe, North America, and Australia dominate scholarly production, while Africa, Latin America, and parts of Asia remain underrepresented. Latin American studies emphasize community engagement and local contexts (Norton et al., 2022), whereas Asian contributions highlight cultural traditions and pedagogical adaptations (Huang et al., 2024; Winter et al., 2022). These regional perspectives (see Table 3) illustrate the need for cross-national collaborations and context-sensitive approaches to sustainability in HEIs.

Table 3. Regional distribution of sustainability studies in higher education (2000–2024).

Region	Research Focus	Representative Studies
Europe & North America	Curriculum integration, institutional governance	Lozano et al. (2015); Christie et al. (2015)
Latin America	Community engagement, local sustainability practices	Norton et al. (2022)
Asia	Cultural adaptations, pedagogical innovation	Winter et al. (2022); Huang et al. (2024)
Africa	Institutional barriers, policy challenges	Daniels et al. (2023); Feinstein et al. (2013)

3.4 Equity, Inclusion, and Social Justice in ESD

Despite sustainability's holistic intent, the social and equity dimensions of education for sustainable development (ESD) are frequently neglected. Most institutional practices prioritize environmental measures, leaving issues of equity, diversity, and global justice underexplored (Damiani, 2020; Misiaszek & Rodrigues, 2023). However, critical global citizenship education research emphasizes the integration of justice, democracy, and cultural diversity into sustainability curricula (O'Flaherty et al., 2024). By incorporating these dimensions, universities can move beyond technical fixes to promote transformative change that addresses structural inequalities.

3.5 Governance and Leadership for Systemic Change

Institutional leadership and governance play a decisive role in advancing sustainability in HEIs. Strong governance structures, such as dedicated sustainability offices, facilitate the mainstreaming of ESD across teaching, research, and operations (Lozano et al., 2015; Tilbury, 2011). Conversely, weak leadership, bureaucratic inertia, and competing institutional priorities hinder implementation (Daniels et al., 2023; Wright, 2010). Commitment from top-level administrators is therefore essential to overcome resistance and foster systemic change.

3.6 A Short Story of Success

The University of Gävle in Sweden provides a concrete example of how sustainability can be embedded across institutional functions. According to Sammalisto et al. (2015), sustainability at Gävle was facilitated by the involvement of staff from multiple departments, spanning education, research, and campus operations. The university emphasized energy conservation, waste reduction, and holistic thinking while fostering dialogue about long-term sustainability goals. A key driver was strong management support, which enabled staff initiatives to translate into institutional change. Nevertheless, challenges persisted, such as balancing ecological priorities with limited resources and ensuring broad engagement across all academic units. This case demonstrates both the potential and the difficulties of translating sustainability commitments into systemic institutional practice.

4 Discussion

A critical issue identified across the reviewed literature is the persistent fragmentation of sustainability efforts within HEIs. While campus greening projects and environmental initiatives are visible, they often fail to connect with broader pedagogical or research dimensions (Sammalisto et al., 2015; Wright & Horst, 2013). This compartmentalization risks reducing sustainability to a technical or symbolic exercise rather than embedding it as a core institutional value (Shephard & Furnari, 2013). Furthermore, the pre-

dominance of environmental measures (such as greening the campus, providing sustainable solar or geo-thermal sources of energy) tends to overshadow the social dimension, leaving gaps in addressing issues of inequality, governance, and community engagement (Kagawa, 2007; Sylvestre et al., 2014).

The literature also highlighted tension between transformative visions of ESD and the practical constraints faced by faculties, who often perceive sustainability as an additional burden in an already overcrowded curriculum (Cebrián et al., 2015; Christie et al., 2015). Staff capacity-building remains limited, with few institutions systematically integrating professional development opportunities (Mulà et al., 2017). Looking forward, universities must embrace holistic strategies that link teaching, research, governance, and community engagement, supported by strong leadership and cross-national collaboration (Tilbury, 2011; McCowan, 2023). Digitalization and innovative pedagogies, including design thinking and blended learning, represent promising pathways to scale up ESD and engage diverse student populations (Huang et al., 2024; Winter et al., 2022).

Academic freedom concerns, coupled with a lack of institutional support, further constrain implementation (Cebrián et al., 2015). Leadership and governance emerge as crucial for fostering systemic change, but cross-national collaboration remains limited (Feinstein et al., 2013; McCowan, 2023). Future work should integrate equity and social justice into ESD, prioritize professional development, and explore comparative research across diverse contexts.

5 Conclusion

There is an urgent need for systemic change in HEIs in order for them to realize their full potential as sustainability leaders. Universities should go beyond symbolic commitments to integrate sustainability into their governance structures, curricula, research agendas, and community partnerships. Policymakers and international organizations such as UNESCO and the UN should support this process by creating enabling environments through funding, policies, and monitoring frameworks. Faculty and staff should be equipped with professional development opportunities to address the multi-dimensional challenges of sustainability (Mulà et al., 2017). Students, as future agents of change, should be actively engaged in shaping curricula and institutional practices. The future of sustainability in higher education depends on collaborative, cross-national approaches that integrate environmental, social, and economic dimensions while embracing digital innovations and interdisciplinary pedagogies. Strengthening these efforts will allow universities to move from fragmented practices to holistic, transformative approaches aligned with the UN Sustainable Development Goals.

This review demonstrates that while higher education institutions have made notable progress in advancing sustainability, challenges remain pervasive. Drivers such as sustainability declarations and institutional offices promote change, but barriers including financial, bureaucratic, and cultural resistance persist. To accelerate progress, future strategies should prioritize capacity building, cross-national collaboration, and embedding sustainability into curricula, governance, and institutional culture. Only through

holistic integration can universities fulfill their potential as catalysts of sustainable development.

5.1 Future Research Directions

Future research should expand cross-national comparative studies to capture diverse institutional and cultural contexts (Feinstein et al., 2013; McCowan, 2023). Greater attention is also needed to the integration of climate change, equity, and interdisciplinary approaches within curricula (Mulà et al., 2017; Popowska & Sady, 2024). Digitalization and innovative pedagogies offer promising avenues for embedding sustainability into higher education (Lasino et al., 2023; Winter et al., 2022). Such research will strengthen the capacity of HEIs to act as global leaders in addressing sustainability challenges.

5.2 Strengths and Limitations

First, the focus on English-language publications creates a language bias, which likely excluded relevant scholarship produced in other languages, and perhaps emphasizing that ESD is actually a concern worldwide. Second, the underrepresentation of studies from the Global South limits the generalizability of findings, particularly in regions where higher education institutions face distinct sustainability challenges. Third, much of the empirical research relies on self-reported surveys, which may reflect aspirations rather than actual practices. Finally, comparisons across countries and universities are constrained by heterogeneous policies, cultural contexts, and institutional priorities.

Despite these limitations, this review also has significant strengths. Covering over two decades of scholarship (2000-2024), it integrates conceptual analyses, empirical studies, and bibliometric reviews, providing a comprehensive overview of trends, practices, and barriers. The synthesis highlights common challenges while identifying pathways for institutional and systemic transformation.

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