

Translating Sustainability Strategies into Pedagogical Practice in Higher Education

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Abstract

Higher education institutions are increasingly expected to play an active role in advancing sustainable development through education, research, and institutional governance. This study examines how sustainability-oriented strategies are translated into pedagogical practice and how they are experienced by students and educators within a university setting, drawing on perspectives from education for sustainable development and student engagement theory. Using a mixed-methods approach, the research combines survey data from 175 students with semi-structured interviews conducted with educators, student representatives, and members of the university administration. In addition, institutional strategy documents were systematically analyzed to explore the relationship between strategic intentions and everyday teaching practices. The findings indicate that although sustainability is clearly articulated at the strategic level, its integration into teaching and learning remains uneven. Student awareness and engagement vary considerably, while educators describe structural constraints, limited pedagogical support, and challenges related to interdisciplinary teaching. These results suggest that sustainability education risks remaining fragmented unless it is supported by coherent pedagogical frameworks, clearer communication, and curriculum-level integration. The study contributes to education theory by offering empirical insight into how institutional strategies, pedagogical conditions, and student engagement intersect in practice, and by highlighting factors that influence the educational effectiveness of sustainability initiatives in higher education.

Keywords: sustainability education, education for sustainable development, student engagement, pedagogical practice, higher education.

1. Introduction

Higher education institutions are increasingly expected to play a central role in addressing global sustainability challenges through education, research, and institutional governance [1], [2]. In recent decades, sustainability has become a strategic priority for universities worldwide, reflected in institutional policies, mission statements, and international frameworks such as the United Nations Sustainable Development Goals [1], [5]. Universities are not only seen as sites for knowledge production but also as key actors in shaping future generations' competencies, values, and behaviors related to sustainable development [3], [6]. As a result, the integration of sustainability into higher education has moved beyond symbolic commitment toward expectations of meaningful educational impact [2], [4].

Despite this growing emphasis at the strategic level, a persistent challenge remains in translating sustainability ambitions into pedagogical practice [4], [7]. While universities often articulate strong sustainability goals in institutional strategies and policy documents, the extent to which these commitments are reflected in teaching and learning processes is less clear [2]. Previous research has highlighted that sustainability initiatives in higher education frequently remain fragmented, with limited integration into curricula and inconsistent engagement among students and educators [7], [1], [8]. This gap between institutional intention and educational practice raises important questions about how sustainability is enacted within the everyday realities of teaching and learning [10], [7].

Education for Sustainable Development (ESD) provides a useful framework for understanding these challenges [1], [6]. ESD emphasizes the development of competencies that enable learners to critically engage with complex sustainability issues and to contribute to societal transformation [6]. However, achieving these outcomes requires more than the inclusion of sustainability content; it demands pedagogical approaches that actively engage students and foster interdisciplinary learning, critical thinking, and real-world application [6], [10]. At the same time, student engagement theory suggests that meaningful learning is closely linked to students' active participation, perceived relevance of content, and interaction with educators and peers [9]. From this perspective, the effectiveness of sustainability education depends not only on institutional strategies but also on how these strategies are experienced

and enacted within the learning environment [6], [9].

Existing literature has explored sustainability in higher education from various perspectives, including policy development, curriculum design, and institutional transformation [2], [4]. However, less attention has been given to the process through which sustainability strategies are translated into pedagogical practice and how this process is shaped by the interaction between institutional structures, educators, and students [4], [10]. In particular, there is a need for empirical research that examines both the strategic intentions of universities and the lived experiences of those involved in teaching and learning [10]. Understanding this translation process is essential for identifying why sustainability initiatives often fail to achieve their intended educational impact [7], [10].

This study addresses this gap by examining how sustainability-oriented strategies are translated into pedagogical practice within a higher education context. Focusing on the University of Stavanger as a case study, the research adopts a mixed-methods approach combining survey data from students, semi-structured interviews with educators, student representatives, and administrative staff, and an analysis of institutional strategic documents. By integrating multiple sources of data, the study provides a comprehensive view of how sustainability is positioned at the strategic level and how it is experienced in practice.

The aim of this paper is therefore to explore the relationship between institutional sustainability strategies and pedagogical practice, with particular attention to student engagement and educator perspectives. More specifically, the study seeks to understand (1) how sustainability is articulated in institutional strategies, (2) how these strategies are reflected in teaching and learning practices, and (3) how students and educators experience and interpret these processes. By doing so, the paper contributes to research on education for sustainable development by offering empirical insight into the conditions that shape the effectiveness of sustainability education in higher education. To better understand how sustainability strategies are translated into pedagogical practice, the following section presents the theoretical perspectives that guide the analysis, with particular attention to Education for Sustainable Development and student engagement.

2. Theoretical Framework

The integration of sustainability into higher education is commonly framed within Education for Sustainable Development (ESD), which emphasizes the role of universities in preparing students to address complex global challenges [1], [6]. ESD focuses on the development of competencies such as critical thinking, systems thinking, and the ability to engage with real-world problems, requiring pedagogical approaches that are participatory, interdisciplinary, and practice-oriented [6].

Despite this emphasis, sustainability integration in higher education often remains uneven [7]. While many institutions have adopted sustainability as a strategic priority, its implementation in teaching and learning is strongly influenced by individual educators and disciplinary contexts. This highlights a gap between institutional sustainability commitments and educational practice, suggesting that strategic commitment alone is insufficient to ensure meaningful sustainability education [7], [10]. Student engagement theory provides a complementary lens for understanding this gap. Engagement is closely linked to active participation, cognitive involvement, and perceived value and relevance of learning [9]. In sustainability education, this is particularly important, as students must connect theoretical knowledge with practical and societal applications [6]. Active and experiential learning approaches are therefore associated with higher levels of engagement and deeper understanding [12], [9].

These perspectives highlight the importance of pedagogical design in shaping how sustainability is experienced by students. Educators play a central role as mediators between institutional strategies and classroom practice, but their ability to integrate sustainability is influenced by institutional conditions such as pedagogical support and opportunities for interdisciplinary collaboration [10], [7]. In the absence of coordinated support, sustainability integration often remains fragmented [7], [4].

The relationship between institutional strategies and pedagogical practice can therefore be understood as a process of translation rather than direct implementation. Institutional policies articulate sustainability intentions, but these must be interpreted and enacted within teaching contexts [10]. This process is shaped by the interaction between institutional conditions, pedagogical practices, and student engagement, resulting in varying degrees of alignment between sustainability goals and learning outcomes [10], [6], [9].

Building on these perspectives, this study examines how sustainability strategies are translated into pedagogical practice in higher education, with a focus on the conditions that influence this process and its implications for student engagement and learning.

3. Methodology

This study adopts a mixed-methods approach to examine how sustainability-oriented institutional strategies are translated into pedagogical practice within a higher education context. The study combines three sources of data: a student survey, semi-structured interviews, and institutional document analysis (see Figure 1). Data were collected during Spring 2024 at the University of Stavanger. The mixed-methods design was selected to provide both breadth in understanding student perspectives and depth in exploring institutional and pedagogical experiences. Semi-structured interview guides and a survey instrument were developed in alignment with the study's research questions and theoretical framework, with interview prompts adapted to different participant groups.

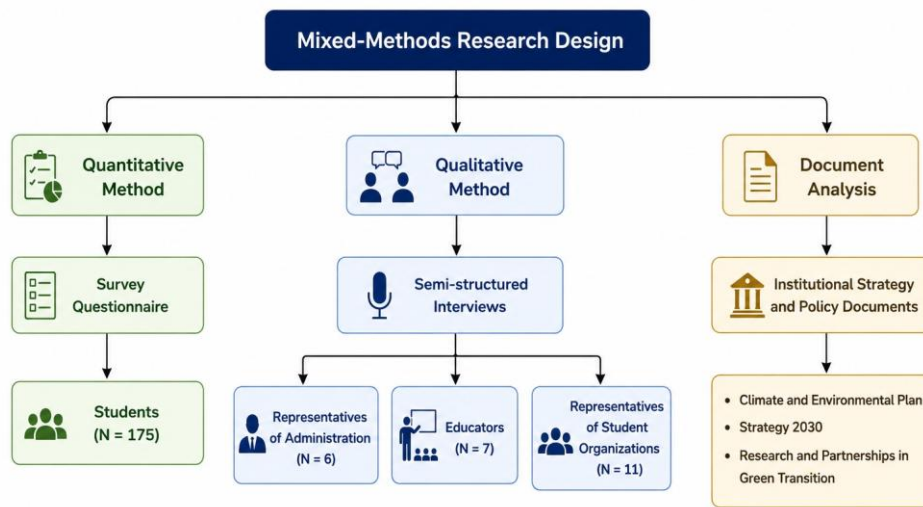


Fig. 1. Overview of the mixed-methods research design

An overview of the study's data sources, participants, and analytical approaches is presented in Table 1.

Table 1. Overview of data sources and analytical approaches

Data source	Participants / Material	Purpose	Analysis method
Student survey	175 UiS students	Explore sustainability awareness, educational exposure, and engagement	Descriptive and exploratory statistical analysis
Semi-structured interviews	24 informants	Explore pedagogical and institutional experiences	Thematic analysis
Institutional documents	Strategy and policy documents	Examine sustainability discourse and institutional priorities	Qualitative document analysis

A total of 182 responses were initially collected, of which 175 valid responses from University of Stavanger students were retained for analysis. Quantitative data were collected through a survey distributed to students across different study programs at the University of Stavanger. The demographic characteristics of the survey participants are presented in Table 2.

Table 2. Demographic characteristics of survey participants (N = 175)

Variable	Category	n (%)
Gender	Women	111 (63.4)
	Men	64 (36.6)
Age	19–21	59 (33.7)
	22–25	82 (46.9)
	26–29	22 (12.6)
	30+	12 (6.9)
Study level	Bachelor programs	95 (54.3)
	Master programs	76 (43.4)
	Other	4 (2.3)
Largest field representation	Economics and Law	62 (35.4)
	Health Sciences	39 (22.3)
	Teacher Education	23 (13.1)

The structure of the survey instrument is presented in Table 3.

Table 3. Structure of the survey instrument and question categories

SECTION	EXPLANATION
A	Demographic information and control questions were measured using five single-choice format questions.
B	General knowledge about sustainability, survey questions included one closed yes/no question, three single-choice questions, and one question using a five-point Likert scale (1 = "I completely disagree" to 5 = "I completely agree").
C	The five competencies were measured as follows: <ul style="list-style-type: none"> • Systems Thinking was measured with four items using one closed question each. • Anticipatory Competence was measured with four items using a five-point Likert scale ranging from 1 = "I completely disagree" to 5 = "I completely agree". • Normative Competence was measured with four items using a five-point Likert scale ranging from 1 = "I completely disagree" to 5 = "I completely agree". • Strategic Competence was measured with four items using a five-point Likert scale ranging from 1 = "I completely disagree" to 5 = "I completely agree". • Interpersonal Competence was measured with four items using a five-point Likert scale ranging from 1 = "I completely disagree" to 5 = "I completely agree".
D	Customized questions were measured with six items using a five-point Likert scale (1 = "I completely disagree" to 5 = "I completely agree").

The survey explored students' awareness of sustainability, their exposure to sustainability-related education, perceptions of institutional sustainability efforts, and engagement with sustainability initiatives. The survey data were analyzed using descriptive and exploratory statistical methods to identify patterns and variations in students' sustainability awareness and engagement across educational contexts.

Qualitative data were obtained through semi-structured interviews with 24 informants: six representatives from administration/top management, seven educators, and eleven student organization representatives. The interviews were conducted between 23 April and 8 May 2024, either face-to-face on campus or digitally via Microsoft Teams, depending on participant availability. Different semi-structured interview guides were developed for each participant group in alignment with the study's research questions and theoretical framework.

The interviews focused on participants' experiences with sustainability in teaching, institutional priorities, and perceived challenges in integrating sustainability into pedagogical practice. The interview data were transcribed and analyzed using thematic analysis to identify recurring patterns and key themes.

In addition, institutional strategy documents were examined through qualitative document analysis to explore how sustainability is articulated at the policy level and how these strategic intentions relate to educational practices. The combination of survey data, interview insights, and document analysis enables a comprehensive understanding of the relationship between institutional strategies and pedagogical implementation.

4. Results

The findings are structured around three key dimensions: (1) the relationship between institutional sustainability strategies and pedagogical practice, (2) student awareness and engagement, and (3) educators' experiences and perceived constraints.

4.1 Strategic Commitment and Pedagogical Practice

The analysis of institutional documents shows that sustainability is clearly positioned as a strategic priority. The university emphasizes its role in contributing to sustainable development through education, research, and societal engagement, with explicit alignment to the United Nations Sustainable Development Goals. The document analysis was based on three institutional sources: the Climate and Environmental Plan, Strategy 2030, and UiS material on research and partnerships in green transition, all of which repeatedly connected sustainability to educational development, research activity, institutional operations, and societal transformation.

However, this strategic commitment is not consistently reflected in pedagogical practice. While sustainability is present in some courses and programs, its integration appears uneven and largely dependent on individual initiatives. Interview findings suggested that sustainability integration often depended on individual educator initiative rather than systematic curriculum design. As one educator explained, "Yes, It's quite free, in that sense, to organize the teaching. In that sense, the organization doesn't interfere much with the content of the teaching".

These findings indicate inconsistencies between institutional sustainability strategies and their implementation in teaching practices. Although sustainability is well articulated at the policy level, its translation into pedagogical practice lacks coherence, resulting in fragmented implementation across disciplines.

4.2 Student Awareness and Engagement

Survey findings indicate variation in students' awareness and engagement with sustainability. This variation was particularly visible in students' reported exposure to sustainability-related content across different study programs. While many students recognize the importance of sustainability, a substantial proportion report limited exposure to sustainability within their formal education. Perceptions of the visibility and consistency of the university's sustainability efforts also varied among respondents.

Students reported differing experiences regarding how sustainability was integrated into teaching and learning. While some participants experienced sustainability as visible within courses and educational activities, others perceived sustainability integration as limited or inconsistently addressed across programs. As one student representative stated, "I would have appreciated more sustainability in all study programs".

Perceptions of the visibility and consistency of the university's sustainability efforts also varied among respondents. Some participants considered current sustainability efforts sufficient, while others perceived sustainability integration as limited across educational contexts. As one participant noted, "I think the university could have even more focus on integrating sustainability into teaching and research". This variation indicates that student engagement is shaped not only by institutional strategies but also by how sustainability is integrated into learning experiences.

4.3 Educator Perspectives and Constraints

Interviews with educators and administrative staff reveal several challenges in integrating sustainability into teaching. While sustainability is widely recognized as important, its implementation is constrained

by structural and pedagogical factors.

A key issue identified is the lack of structured pedagogical support. Although sustainability is emphasized at the strategic level, many educators described limited pedagogical guidance and insufficient institutional support for integrating sustainability into course design. As one educator explained, “Yes, it’s quite free, in that sense, to organize the teaching. In that sense, the organization doesn’t interfere much with the content of the teaching”. The analysis further revealed that “educators usually have great freedom to determine the curriculum content themselves”, resulting in sustainability integration often depending on individual initiative rather than coordinated institutional practice.

Interdisciplinary collaboration was also highlighted as both necessary and difficult. One educator described this challenge by stating, “We do try, but it’s difficult in an organization like this to make it happen... There are quickly tensions because there are silos here that are working towards their own interests, which means they don’t want to let go of any of their resources. So there is a desire for it, but I think it’s quite difficult to achieve”.

The thesis additionally notes that “the lack of clear guidelines and sufficient resources, combined with the expectation gap between students and educators, contributes to difficulties in encouraging student involvement in sustainability beyond the classroom”. Interdisciplinary collaboration was also highlighted as both necessary and difficult. Educators acknowledged the importance of cross-disciplinary approaches but noted that institutional structures and disciplinary boundaries often limit collaboration. In addition, tensions between academic autonomy and institutional direction contribute to variability in implementation. While educators have considerable flexibility in course design, the absence of coordinated institutional support contributes to uneven integration of sustainability across teaching practices and programs.

4.4 Summary of Findings

Overall, the findings reveal inconsistencies between institutional sustainability strategies and their implementation in teaching and learning practices. While sustainability is strongly represented within institutional policies and strategic priorities, students and educators described uneven integration across courses and programs. Variations in student engagement, limited pedagogical support, and challenges related to interdisciplinary collaboration emerged as key factors influencing how sustainability was experienced within the educational environment.

5. Discussion

From an education for sustainable development (ESD) perspective, the results suggest that the presence of sustainability at the strategic level does not automatically lead to effective pedagogical integration [11], [7]. While the university demonstrates a clear commitment to sustainability in its policies and strategic documents, this commitment is not consistently reflected in teaching and learning practices. This supports existing research indicating that sustainability initiatives in higher education often remain fragmented when not supported by structured pedagogical frameworks [7], [10]. The findings therefore reinforce the view that sustainability education requires more than institutional endorsement; it depends on the conditions under which teaching is designed and delivered [6], [11].

A key contribution of this study lies in highlighting the role of pedagogy as a mediating factor between institutional strategy and educational outcomes. The variation observed in student engagement suggests that learning experiences are shaped by how sustainability is integrated into the curriculum rather than by the existence of institutional strategies alone. In particular, the results indicate that students are more engaged when sustainability is approached through applied and practice-oriented methods, such as project-based learning and real-world problem solving. This aligns with student engagement theory, which emphasizes the importance of active participation and perceived relevance in promoting meaningful learning [12], [9].

At the same time, the findings draw attention to the structural and institutional constraints that shape pedagogical practice. Educators’ experiences reveal that, despite recognizing the importance of sustainability, they often lack the necessary support to integrate it effectively into their teaching. The absence of clear guidelines, limited access to pedagogical resources, and challenges related to interdisciplinary collaboration contribute to inconsistencies in implementation. These findings suggest that the translation of sustainability strategies into practice is not solely an individual responsibility but is influenced by broader institutional conditions [10], [13].

The tension between academic autonomy and institutional coordination in sustainability implementation further complicates this process. While flexibility in course design allows educators to adapt content to their disciplines, it also results in variability in how sustainability is addressed. Without coordinated efforts to support integration at the curriculum level, sustainability remains dependent on individual initiative rather than being embedded systematically across programs. This reinforces the need for institutional mechanisms that facilitate collaboration, provide pedagogical support, and ensure coherence in sustainability education [10], [13].

Taken together, the findings indicate that sustainability education in higher education is shaped by the interaction between institutional strategies, pedagogical practices, and student engagement. This interaction highlights the importance of viewing sustainability not only as a strategic priority but as an educational process that requires alignment across multiple levels of the institution. The results therefore contribute to education theory by demonstrating how institutional intentions are mediated by pedagogical and structural factors, influencing the extent to which sustainability becomes meaningful in students' learning experiences [14], [12].

6. Conclusion

This study examined how sustainability-oriented institutional strategies are translated into pedagogical practice within a higher education context. The findings indicate inconsistencies between institutional sustainability ambitions and their implementation in teaching and learning practices. Although sustainability is clearly emphasized within institutional strategies and policy documents, its integration into pedagogical practice remains uneven across courses and programs. Variations in student engagement, limited pedagogical support, and structural constraints experienced by educators were identified as important factors influencing this process.

The findings further suggest that institutional commitment alone is insufficient to ensure meaningful sustainability education [7]. Instead, the educational impact of sustainability initiatives depends on how sustainability is integrated into teaching and learning environments. Students reported different experiences regarding sustainability integration, while educators highlighted challenges related to limited guidance, insufficient resources, and difficulties associated with interdisciplinary collaboration. The study also indicates that students experience sustainability as more meaningful when it is visible and connected to their educational experiences.

From a theoretical perspective, the study contributes to research on education for sustainable development by illustrating how institutional strategies, pedagogical practices, and student experiences interact in shaping sustainability education within higher education. The findings support previous research suggesting that sustainability implementation is influenced not only by strategic priorities, but also by the institutional and pedagogical conditions through which these priorities are translated into practice [12].

The findings additionally have implications for policy and practice in higher education institutions. Strengthening sustainability education requires clearer pedagogical support, stronger curriculum-level integration, and improved opportunities for interdisciplinary collaboration. Greater coordination and communication across institutional levels may further contribute to more coherent sustainability implementation and more consistent student experiences.

Future research could further explore how sustainability integration differs across disciplinary contexts and educational levels, as well as how different pedagogical approaches influence students' sustainability engagement and competencies over time.

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