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The Integration of Sustainability in Higher Education A Strategy for Shaping Globally Conscious Professionals

La integración de la sostenibilidad en la educación superior: una estrategia para la formación de profesionales con conciencia global

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Abstract

This research explores the integration of sustainability into higher education curricula as a key strategy for shaping globally oriented professionals. Based on a qualitative methodology and multi-case study design, interviews with academics, surveys with students, and document analysis of academic curricula were conducted. The results demonstrate institutional best practices and a positive attitude of the university community toward Education for Sustainable Development (ESD). Key sustainability competencies were identified, and the study emphasizes the need for curriculum redesign aligned with the Sustainable Development Goals (SDGs).

Keywords

- Sustainability
- Higher Education
- Competencies
- Global Awareness
- Sustainable Development

Resumen

Esta investigación explora la integración de la sostenibilidad en los currículos de educación superior como estrategia clave para la formación de profesionales con visión global. Con base en una metodología cualitativa y un diseño de estudio de casos múltiples, se realizaron entrevistas a académicos, encuestas a estudiantes y análisis documental de currículos académicos. Los resultados demuestran las buenas prácticas institucionales y una actitud positiva de la comunidad universitaria hacia la Educación para el Desarrollo Sostenible (EDS). Se identificaron competencias clave en sostenibilidad y se destacó la necesidad de un rediseño curricular alineado con los Objetivos de Desarrollo Sostenible (ODS).

Palabras clave

- Sostenibilidad
- Educación Superior
- Competencias
- Conciencia Global
- Desarrollo Sostenible

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Introduction

In the context of the 2030 Agenda and the Sustainable Development Goals (SDGs), higher education institutions are called to play a crucial role in the transformation towards a more sustainable world. Apart from their traditional missions of teaching and research, universities must contribute their part proactively today to the making of professionals who are not merely technically competent but also socially and environmentally aware. Making sustainability a part of higher education curricula is seen to be an important approach to enhancing the relevance of education and enabling students to address intricate global challenges, such as climate change, social injustice, and resource shortages.

Sustainability in higher education involves more than adding isolated courses; it requires a transversal, interdisciplinary approach that influences pedagogical practices, institutional values, and graduate profiles. According to (UNESCO, 2020), Education for Sustainable Development (ESD) promotes critical thinking, future-oriented planning, ethical reasoning, and active citizenship—competencies that are essential in a globalized society. Similarly, (Wiek et al., 2011) propose a sustainability competency framework comprising systems thinking, anticipatory skills, normative competence, and collaboration that must be adopted in university education.

Despite growing interest, most institutions still grapple with incorporating sustainable education, such as a shortage of training for faculty, curriculum resistance, and limited assessment measures. Therefore, it is essential to examine the way sustainability is being incorporated into academic programs now and to find effective strategies that enhance meaningful learning outcomes. This study aims to explore best practices, student and faculty perceptions, and the impact of sustainability-focused curricula on professional competencies. The findings contribute to the growing body of knowledge supporting the reorientation of higher education towards a more sustainable and equitable future.

Methodology

This study applies a qualitative approach with some mixed-method elements to investigate how embedding sustainability in higher education curricula is done and how this impacts the development of global competencies among university students. A multiple case study was employed, allowing for comparative deep analysis across three Latin American universities that are prominent in their focus on sustainability education. This methodological framework enables examination of sophisticated instructional phenomena within their real-life institutional contexts (Stake, 2006); (Yin, 2018).

The research was conducted over two semesters during the 2024–2025 academic year. Universities were selected on the basis of being members of local sustainability networks and publicly stating that they were committed to the United Nations Sustainable Development Goals (SDGs). Such purposeful sampling allowed us to investigate institutions which were proactively engaged in the pursuit of sustainability education.

Data Collection Techniques

Three primary data collection approaches were utilized:

1. **Semi-structured interviews** of 12 university staff members—four from each institution—who were involved in teaching, curriculum development, or sustainability coordination. They addressed teaching practices, institutionally perceived support, methods of incorporating sustainability into the curriculum, and obstacles to sustainability integration.
2. **Structured questionnaires** were distributed to 180 students enrolled in undergraduate programs that had incorporated sustainability-related content. The questionnaire measured the awareness level, perceived relevance of sustainability education, and the extent to which they believed that they had acquired sustainability-related skills. The questionnaire employed a five-point Likert scale.

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3. **Document analysis** of institutional curricular materials, including syllabi, course guides, and strategic sustainability reports. This analysis aimed to identify both explicit and implicit inclusion of sustainability principles and competencies in academic offerings.

Methodology Overview

Component	Description
Approach	Qualitative with mixed-method elements
Design	Multiple case study in three Latin American universities
Techniques	Interviews, surveys, curriculum document analysis
Instruments	Semi-structured interview guide, structured questionnaire
Participants	12 faculty members, 180 students
Data Analysis	Open coding, thematic analysis, data triangulation

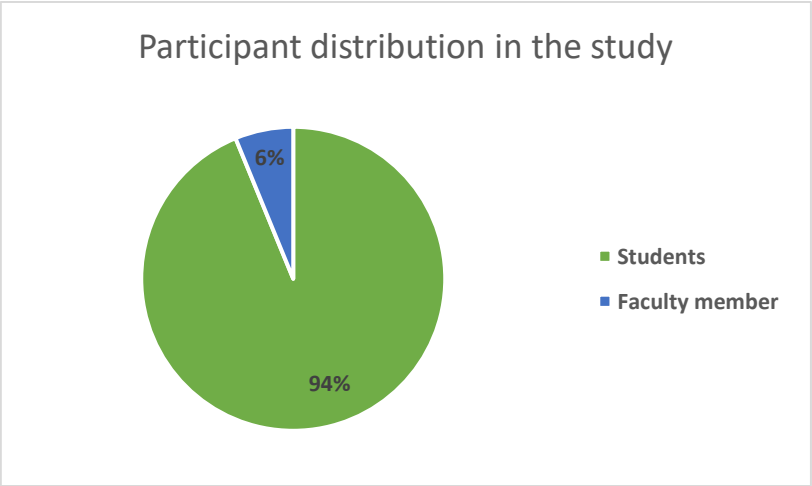
The table should present the components of the research design, i.e., approach, design, techniques, instruments, participant groups, and analysis methods (already prepared and presented above).

For ensuring the reliability and validity of the tools, the interview guide and questionnaire were tested by three academic experts with education and sustainability backgrounds. The language and structure of the instruments were further streamlined after piloting it on two professors and ten students. Minimal changes were made to ensure ambiguous items were clarified and logical flow improved.

Participants

Participants comprised 12 purposively sampled faculty members based on their direct involvement in teaching sustainability and curriculum development. Additionally, 180 students were randomly selected from various disciplines at the three universities. Care was taken to ensure a gender balance and social science and STEM student representation to incorporate different perspectives.

Participant Distribution in the Study



The pie chart allows for the visualization of the proportional faculty vs. student participant split.

Data Analysis

Survey answers and interview transcripts were open coded and analyzed with thematic analysis using (Braun & Clarke, 2006) six-step approach. Qualitative coding was conducted using the NVivo software suite, which allowed for easy structuring and comparison of data across cases. The four themes were "institutional

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commitment to sustainability," "pedagogical innovation," "interdisciplinary collaboration," and "student empowerment.".

Quantitative survey results were analyzed with descriptive statistics (frequencies, means, percentages) to offer the qualitative context. Triangulation of surveys, interviews, and document review increased the transferability and credibility of the findings (Flick, 2009). The process allowed for cross-validation of recurring themes and identification of outlier cases.

Ethical Considerations

The study complied with international ethical standards for educational research. A letter of informed consent explaining research purposes, voluntary participation, and confidentiality guarantees was provided to all participants. Participants were given pseudonyms to protect their identities in published accounts. Ethical clearance was provided by the ethics committee of the main research institution.

Limitations

Despite its contextual richness, the study has generalizability constraints due to the qualitative, case-study nature of the investigation. The findings may not be transferable to universities in different geographic or political settings. Furthermore, self-reported data—particularly student surveys—are subject to social desirability bias. Nevertheless, the research provides valuable, transferable insights and practical implications for educational leaders aiming to embed sustainability into their institutions' academic models.

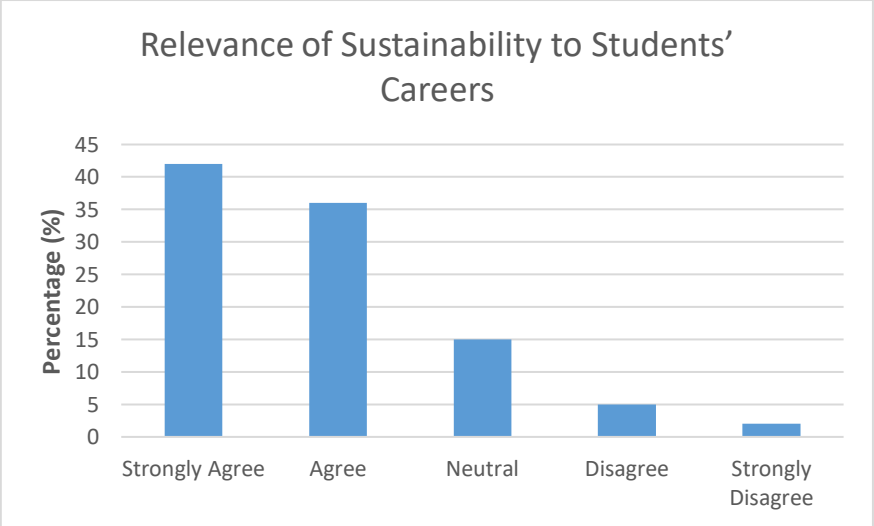
Results

The findings of this study reveal significant insights into how sustainability is integrated into higher education curricula and the effects it has on student awareness, competencies, and institutional practices. The data presented below are based on the analysis of 180 student surveys, 12 faculty interviews, and institutional curriculum documentation from three Latin American universities.

Student Perceptions and Learning Outcomes

The results of the student survey provide a clear indication that sustainability is viewed as a relevant and valuable component of higher education. In particular, 78% of the students agreed or strongly agreed that sustainability is relevant to their academic and working lives. This high level of affirmation validates previous studies by (Lozano et al., 2013) and (Barth et al., 2007), which emphasize growing student demand for education that equips them to act on environmental and societal issues.

Relevance of Sustainability to Students' Careers



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This bar graph shows that over 75% of the students consider sustainability as a significant factor in shaping their careers.

The graph shows the distribution of responses to the question in the survey "Sustainability is relevant to my career". While 42% strongly agreed and 36% agreed, 7% disagreed. This indicates an overwhelmingly positive acceptance of sustainability by the students. Thus.

aside from relevance, students were asked if they believed they had gained important sustainability competencies, such as systems thinking, ethical decision-making, and interdisciplinary collaboration. 68% of students recorded agreement or strong agreement, which is a pointer that the universities are making moderate progress on this indicator. However, 22% responded with neutrality, and 10% disagreed, which is a pointer that there is still some room for depth and consistency of implementation to be enhanced.

Student Survey Results

Survey Question	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
Sustainability is relevant to my career	**42**	**36**	**15**	**5**	**2**
I feel my university provides enough sustainability education	**35**	**33**	**20**	**9**	**3**
I have acquired key sustainability competencies	**38**	**30**	**22**	**7**	**3**
I am likely to apply sustainability principles in my future job	**40**	**34**	**18**	**6**	**2**
I participate in sustainability-related projects	**30**	**32**	**25**	**9**	**4**

This table summarizes responses to key questions regarding sustainability education across all three universities.

Faculty Perspectives and Pedagogical Strategies

Interviews with faculty members revealed a diverse set of strategies being used to integrate sustainability into teaching. Among the most effective approaches were:

- Embedding sustainability content into existing core courses.
- Developing interdisciplinary projects addressing real-world community issues.
- Promoting service learning and community-based research.
- Integrating sustainability in final-year thesis and capstone projects.

83% of interviewed faculty stated they intentionally included sustainability concepts in their course design. Many mentioned aligning their teaching strategies with the SDGs and actively encouraging students to connect course content with societal challenges.

However, several challenges were also identified:

- **Lack of training** in Education for Sustainable Development (ESD) methodologies.

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- Limited **institutional incentives** for curriculum innovation.
- Difficulties in **evaluating soft skills** and competencies like ethical reasoning or systems thinking.

These findings align with previous literature, including (Rieckmann, 2012) and (Sterling, 2013), who argue that professional development and systemic change are necessary for full sustainability integration.

Institutional Curriculum Analysis

An analysis of curriculum documents and strategic reports revealed that all three universities had at least some form of sustainability embedded in their mission or vision statements. However, the extent of curriculum integration varied considerably:

University	Sustainability in Core Courses	Elective Offerings	Service Learning Integration	Institutional Policy
A	High	Moderate	Yes	Sustainability Office
B	Moderate	High	No	Green Campus Program
C	Low	Moderate	Partial	General Commitment

This variability suggests a lack of standardization in sustainability education, even among institutions committed to sustainable development. While University A demonstrated a more systemic and policy-aligned approach, University C relied heavily on isolated faculty initiatives.

Competency Development and Future Application

Students were also asked about the likelihood of applying sustainability principles in their future jobs. 74% had indicated a high or very high likelihood, reinforcing the observed transferability of sustainability skills to work. Further, 62% indicated they had participated in some activities that had to do with sustainability, i.e., workshops, seminars, and community work programs.

Faculty interview evidence supported this viewpoint. Students participating in sustainability projects were reported to have greater motivation, teamwork, and problem-solving skills by the professors. As one faculty member noted:

"When students see the real-world impact of their actions—like improving waste management in a local school—they internalize the importance of sustainable thinking in any profession."

Such anecdotal evidence suggests a strong link between experiential learning and the internalization of sustainability values, echoing the findings of (Brundiers et al., 2010).

Emerging Themes and Patterns

Through qualitative coding of interviews and documents, the following themes emerged:

1. **Institutional Commitment**: The presence of dedicated offices or sustainability coordinators significantly influenced the depth of curriculum integration.
2. **Pedagogical Innovation**: Faculty-led initiatives and interdisciplinary teaching fostered greater student engagement.
3. **Student Agency**: When students were given opportunities to lead sustainability projects, their interest and skill development improved substantially.
4. **Evaluation Gaps**: Most universities lacked formal assessment mechanisms to measure sustainability competencies effectively.

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Discussion

This part translates the findings of major significance using existing scholarly literature as the framework, pinpointing trends in emergence, institutional relationships, teaching methodologies, and competency formation. It also includes visual data depicting the occurrence of obstacles experienced by teachers that assists the discourse of hindrances in sustainability integration.

Student Engagement and Perception

The majority of the respondents (78%) valued sustainability as something that could be applied to their working lives. This is consistent with (Lozano et al., 2013), who believe that increasingly, students view higher education not just as an institution where competences are attained but also as an institution where social change occurs. The high level of consensus regarding the significance of sustainability is indicative of increased global awareness among young people.

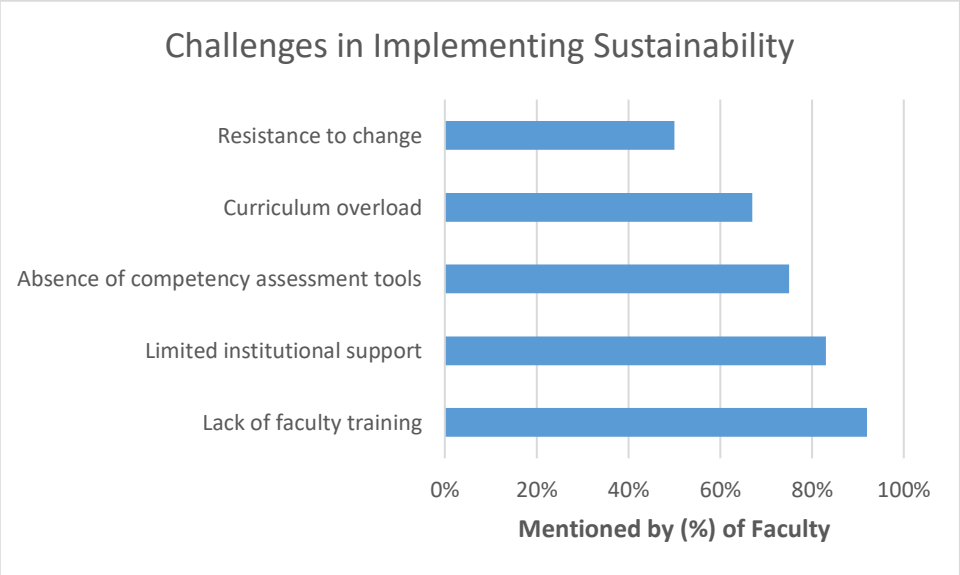
However, only 68% of the students reported acquiring sustainability competencies, with 22% in between. This gap reflects the persistence of the difficulty in converting curriculum presence to learning outcomes. As (Wiek et al., 2011) emphasize, competencies like systems thinking or anticipatory skills require active, interdisciplinary pedagogies—not just theoretical exposure. Thus, sustainability integration must be coupled with experiential learning methods to produce meaningful competencies.

Faculty Strategies and Innovation

Faculty interviews revealed diverse pedagogical approaches to teaching sustainability, including real-world projects, community-based research, and interdisciplinary collaboration. These are congruent with (Brundiers et al., 2010) efforts towards "real-world learning opportunities" as essential in successful sustainability education.

Despite innovation efforts, scholars documented various constraints too. These were coded and measured against the interview analysis.

Challenges Reported by Faculty in Implementing Sustainability Education



As visualized in the graph, **92% of faculty** mentioned **lack of training**, followed by **83% citing limited institutional support**, and **75% noting the absence of tools for assessing competencies**.

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Faculty Challenges in Sustainability Integration

Challenges in Implementing Sustainability	Mentioned by (%) of Faculty
Lack of faculty training	92%
Limited institutional support	83%
Absence of competency assessment tools	75%
Curriculum overload	67%
Resistance to change	50%

This data shows that even when faculty are committed to sustainability, **systemic and institutional factors** can limit their impact. (Sterling, 2013) argues that for sustainability to take root, institutions must undergo a **paradigm shift**—not just include new topics, but adopt new values, reward structures, and teaching philosophies.

Institutional Commitment and Policy Gaps

Curriculum document analysis demonstrated widespread difference among institutions in the degree of integration of sustainability. While a few universities utilized cross-curricular approaches with formal offices of sustainability, others relied upon scattered individual faculty efforts.

This inconsistency suggests the need for stronger institutional governance arrangements. (Tilbury, 2011) contends that institutions that incorporate sustainability into strategic planning, create dedicated positions, and track impact through performance indicators are more successful at long-term integration. The discussion of variability is further supported by the earlier Table 2 in Results, which showed that only one university had a fully embedded approach. These findings call for a university-wide framework supported by leadership and sustained across departments.

Competency Development and Real-World Application

One of the main goals of ESD is the development of actionable competencies. However, our data suggests that competency development is uneven and often unstructured. While students report moderate development, this is not always linked to an articulated framework.

(Wiek et al., 2011) identify five key competencies that universities should promote:

- Systems thinking
- Anticipatory thinking
- Normative thinking
- Strategic thinking
- Interpersonal skills

Most faculty did not reference these competencies explicitly in their course planning. This reflects a disconnect between international frameworks and local implementation. The use of standardized tools such as sustainability rubrics, portfolios, or digital badges could improve tracking and motivation.

Moreover, 74% of students stated they intend to apply sustainability principles in their professional lives. While this intention is promising, intent does not guarantee preparedness. Institutions must ensure that learning is transferable, emphasizing practice, reflection, and formative assessment.

Emerging Themes

From triangulating all data sources, the following themes emerged:

1. **Student Motivation and Autonomy**: Students are more engaged when they perceive direct relevance between their education and societal needs. This aligns with (Deci y Ryan, 1985) self-determination theory, suggesting that autonomy and relevance increase internal motivation.

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2. **Hidden Curriculum Influence**: Sustainability is taught not only through courses but through institutional behavior. Campus practices (e.g., recycling, energy policies) form part of what called the **hidden curriculum**.
3. **Experiential and Project-Based Learning**: These approaches had the highest reported impact on competency development, reinforcing the work of (Kolb, 1984)and the need to embed learning in real-world contexts.
4. **Equity Considerations**: Some students indicated that access to sustainability events and extracurriculars was limited due to scheduling or cost. Future research should investigate how to **democratize participation** in sustainability learning.

Conclusion

The integration of sustainability into higher education is no longer an option but a necessity. As the global community continues to confront complex and interrelated challenges—climate change, poverty, resource depletion, and social injustice—educational institutions must respond with strategic reforms that prepare graduates not only to thrive professionally, but to contribute meaningfully to sustainable societies. This study examined the current state of sustainability integration in three Latin American universities, analyzing its impact on students, faculty, and institutional structures. The conclusions provide useful critique of how higher education can more effectively achieve its transformative potential.

Initially, the results demonstrate unambiguously that students perceive sustainability as an important and fundamental element of their learning. The large percentage of students (78%) identifying sustainability as something crucial to their future professional practice evidences an increasingly conscious generational perception of global challenges. However, the lower proportion of students (68%) who stated having acquired certain sustainability competencies evidences the discrepancy between curriculum existence and pedagogic impact. This would mean that mere inclusion is not sufficient; instructional material must be supported by effective learning strategies to build deep, transferable abilities.

Second, educators are central figures in sustainability education, often being themselves institutional innovation leaders. Their efforts to mainstream sustainability in terms of project-based learning, interdisciplinarity, and pedagogy of reflection are best practices aligned with international guidelines like those outlined by (UNESCO, 2020) and (Wiek et al., 2011). Nevertheless, faculty are too often confronted by structural obstacles—inadequate institutional incentives, insufficient training, and too few assessment toolkits—which hamper more extensive or effective implementation.

Third, the organizational context has a major role to play in terms of sustainability integration depth and scope. Those universities that possess formal sustainability offices, cross-disciplinary mandates, and clear performance indicators exhibit more systematic infusion of ESD principles. However, in institutions with sustainability dependent upon individual initiatives, the initiatives are disjointed and less impactful. Strategic governance and top-down policy structures are therefore required to inculcate sustainability into the instructional fabric.

Furthermore, the study analysis revealed that not only do students desire to but also are willing to apply sustainability principles in professional life. Intention must be accompanied by planned experience opportunities, reflection, and competency building. Integrating sustainability into capstone projects, service learning, and applied research can bridge this gap and foster a sense of agency and responsibility among students.

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