

BRIDGING THE GAP: EMPLOYER AND STUDENT PERSPECTIVES ON GREEN SKILLS DEVELOPMENT FOR INDUSTRY PREPAREDNESS AND CURRICULUM ENHANCEMENT IN HIGHER EDUCATION TOWARDS A SUSTAINABLE FUTURE

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Abstract

The transition to a sustainable economy necessitates equipping future professionals with green skills; however, disparities persist between industry expectations and higher education curricula. This mixed-methods study, conducted during Academic Year 2024–2025, explores employer and student perspectives on green skills development to enhance industry preparedness and align academic training with labor market needs. Surveys completed by 30 employers and 100 students, alongside 10 expert interviews, uncovered critical gaps in sustainability competencies, particularly in practical and interdisciplinary skills. Employers emphasized technical expertise and systems thinking, while students advocated for experiential and integrated learning opportunities. Institutional barriers including siloed curricula and resource constraints were identified. The study highlights the importance of collaborative curriculum redesign involving academia, industry, and policymakers. Recommendations focus on embedding sustainability across disciplines, fostering partnerships, and adopting innovative pedagogies to better equip graduates for sustainable careers. These findings contribute to advancing higher education's role in sustainable development.

Keywords: Green skills, higher education, curriculum development, sustainability, employability, industry-academia collaboration, sustainable development

1. Introduction

Global sustainability challenges are reshaping labor market demands, creating an urgent need for green skills—competencies critical for environmentally sustainable practices. Higher education institutions (HEIs) have a pivotal role in preparing graduates to meet these demands. Nonetheless, a significant gap remains between green skills imparted academically and those required by employers (European Commission, 2017; OECD, 2022), adversely affecting graduate employability and workforce readiness in sustainability-focused sectors.

Employers report difficulty sourcing candidates with both practical technical skills (e.g., renewable energy technologies and circular economy practices) and transversal competencies such as systems thinking and sustainability leadership (SOLAS, 2022). At the same time, students

perceive sustainability education as overly theoretical, lacking hands-on experience and interdisciplinary integration (UNESCO, 2021).

While prior research often addresses either employer or student perspectives independently, seldom are these views considered jointly to inform curriculum design holistically (Brundiers et al., 2020). This study addresses this gap by integrating employer, student, and expert perspectives to assess curricular alignment, identify barriers to green skills acquisition, and propose actionable strategies for curricular enhancement oriented toward sustainable futures.

This study is guided by the following research questions:

1. How do employer expectations differ from current education offerings regarding green skills?
2. What barriers hinder student green skill development?
3. How can curricula better prepare graduates for sustainable careers?

Theoretical grounding is provided by Becker's Human Capital Theory (1964), framing education as an investment that enhances economic value through skills development, and Vygotsky's Constructivist Learning Theory (1978), emphasizing experiential, context-sensitive knowledge construction.

2. Methods

2.1 Research Design

A mixed-methods approach was employed to garner comprehensive insights from multiple stakeholders (Creswell, 2014). Quantitative surveys were complemented with qualitative interviews and document analysis to triangulate findings and deepen understanding.

2.2 Participants and Sampling

- **Employers:** Thirty sustainability-committed companies in renewable energy, manufacturing, and construction sectors were purposively sampled to ensure relevance to green skills demands.
- **Students:** One hundred higher education students enrolled in the College of Business and Public Administration (CBPA) programs during Academic Year 2024–2025 were selected via stratified random sampling to ensure programmatic diversity across BSBA, business, and social sciences disciplines.
- **Experts:** Ten academic administrators and sustainability education leaders were purposively recruited to provide expert insights.

2.3 Data Collection Instruments

- **Employer Survey:** An online structured questionnaire with Likert-scale and open-ended questions assessed perceptions of current green skill gaps and workforce needs.
- **Student Survey:** A structured questionnaire evaluated student interest, preparedness, and barriers regarding green skill development.
- **Semi-Structured Interviews:** Conducted with HR managers, sustainability officers, university deans, and policymakers to capture in-depth perspectives on curricular alignment and challenges.

- **Document Review:** Analysis of curricula, syllabi, and assessment materials examined the extent and nature of sustainability content integration.

2.4 Procedures

Ethical approval was obtained prior to data collection. Electronic surveys were distributed with reminders to maximize response rates. Interviews were conducted with participant consent, audio-recorded, and transcribed verbatim. Curriculum documents were accessed through institutional repositories.

2.5 Data Analysis

Quantitative data were analyzed using descriptive statistics including means, frequency distributions, and trend analyses via SPSS. Qualitative interview and document data were thematically analyze, following Braun and Clarke's (2006) six-phase approach to identify recurring themes related to skill gaps, curricular barriers, and stakeholder recommendations.

3. Results

Table 1
Key Findings on Green Skills Development from Employers, Students, Experts, and Curriculum Analysis

Stakeholder	Theme	Finding	Statistics / Representative Quote
Employers	Skill Gaps	Significant gaps in technical green skills, particularly renewable energy and circular economy competencies.	78% identified skill gaps “We often see graduates lacking hands-on experience with solar and wind technologies, which is critical.” – HR Manager
	Transversal Skills	Strong emphasis on need for systems thinking, sustainability leadership, and problem-solving skills.	85% emphasized these skills “Sustainability leadership and problem solving are as important as technical know-how.” – Sustainability Officer
	Challenges	Insufficient practical exposure among graduates complicates recruitment.	—
Students	Interest vs Preparedness	High interest in green skills but low confidence in their preparedness for sustainability careers.	82% interested; 38% felt prepared “I want to learn real sustainability skills but most courses are theory-heavy.” – BSBA Student

Stakeholder	Theme	Finding	Statistics / Representative Quote
	Barriers	Lack of experiential learning, insufficient interdisciplinary content, exam-focused assessments limit learning.	67% cited lack of hands-on learning; 59% reported poor interdisciplinarity —“Most sustainability content feels disconnected from my main studies.” – Social Sciences Student
Experts	Institutional Barriers	Curriculum siloing, resource constraints, and slow revision processes inhibit green skills integration.	—“Curriculum updates take years; meanwhile industry demands evolve rapidly.” – University Dean
	Collaborative Needs	Calls for increased academia-industry-government partnerships to ensure curricula remain responsive.	—“Joint curriculum review panels could bridge gaps.” – Policy Expert
Curriculum	Sustainability Content	Sustainability is mostly taught in electives, rarely integrated into core courses.	—“Sustainability is optional in many programs, missing the chance to build foundational skills.” – Faculty
	Experiential Learning	Internships and project-based sustainability learning are inconsistently incorporated.	—“Internships that focus on sustainability are rare and not well-structured.” – Curriculum Designer

3.1 Employer Perspectives on Green Skills

- **Skill Gaps:** 78% of employers reported significant deficiencies in graduates' technical green skills, particularly in renewable energy technologies and circular economy competencies.
- **Transversal Skills:** 85% emphasized the importance of systems thinking, sustainability leadership, and practical problem-solving abilities.
- **Challenges:** Employers identified insufficient practical exposure among graduates as a major obstacle to workforce readiness in sustainability roles.

3.2 Student Perspectives

- **Interest vs Preparedness:** While 82% of students showed strong interest in green skills, only 38% felt adequately prepared for sustainability-focused careers.

- **Barriers:** The main barriers included lack of experiential learning opportunities (67%), insufficient interdisciplinary curriculum content (59%), and exam-centered assessments that limit practical understanding.

3.3 Expert Insights

- **Institutional Barriers:** Experts highlighted siloed curricula, resource limitations, and slow bureaucratic processes as key factors limiting green skill integration.
- **Collaborative Needs:** A strong consensus emerged on the need for enhanced collaboration between academia, industry, and policymakers to maintain curricular relevance.

3.4 Curriculum Analysis

- Sustainability content was largely confined to elective courses, with inconsistent inclusion of practical and experiential components.
- Internships and project-based learning opportunities related to sustainability were sporadic and not systematically embedded within core curricula.

4. Discussion

4.1 Aligning Education with Industry Needs

The findings reflect a persistent mismatch between industry's demand for applied technical and systems-based green skills and the limited practical and interdisciplinary education currently available to students, mirroring trends documented in European Commission (2021) and SOLAS (2022) studies.

4.2 Theoretical Implications

Confirming Becker's Human Capital Theory, the study underscores the economic imperative of equipping graduates with relevant green competencies. Simultaneously, Vygotsky's Constructivist Learning Theory is supported by students' call for experiential and context-rich learning modalities.

4.3 Curriculum Redesign Recommendations

To close existing gaps, sustainability competencies should be embedded as core, cross-disciplinary elements in curricula, supported by internships, project-based learning, and integrated interdisciplinary modules emphasizing both practical and conceptual knowledge.

4.4 Enhancing Partnerships

The study confirms the necessity of sustained, formalized partnerships among industry, academia, and policymakers to co-create and maintain responsive curricula, as recommended by international frameworks (OECD, 2022; Brundiers et al., 2020).

4.5 Addressing Institutional Challenges

To overcome institutional inertia and faculty limitations, policy reforms should incentivize curriculum innovation, fund experiential learning infrastructure, and strengthen educator capacity through targeted professional development in sustainability education.

5. Conclusion

This study uncovers a critical disconnect between employer requirements and student readiness for green skills in higher education. Integrating diverse stakeholder perspectives, it proposes multidisciplinary curriculum redesign and strengthened partnerships as pathways toward

enhancing workforce preparedness for sustainable development. Future research should evaluate outcomes of curricular reforms over time and expand analysis globally.

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Ethical Considerations

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