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Challenges and Measures for Embedding Sustainability in Higher Education Institutions

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Abstract

Purpose – Purpose: This study aims to explore the critical challenges in embedding sustainability in Nepalese HEIs and provides measures to address them.

Design/methodology/approach: Grounded in an interpretivist philosophy, this qualitative study employs an exploratory research design. Data were collected through semi-structured interviews with 15 HEI officials (including academics, deans, planning chiefs, and vice-chancellors) from two major Nepalese universities. A purposive sampling technique was used to ensure diverse perspectives. The data were analyzed to identify, rank, and thematically categorize the primary challenges.

Findings: The analysis reveals that the most severe challenges are structural and systemic. The top-ranked barriers include traditional organizational structures, disciplinary barriers, and insufficient institutional capacity; insufficient financial resources and a lack of administrative support; unscientific reward systems that do not incentivize sustainability efforts; and the ineffective integration of sustainability into teaching and operations. These are compounded by cultural, governance, and external relational challenges. Addressing these challenges and embedding sustainability in HEIs, they need to adopt a phased, systemic approach: establish sustainability offices, revise incentives, and enhance ICT (within 1 year); integrate SDGs into curricula, green campus operations, and modernize governance (1–2 years); and foster equity-focused policies, industry partnerships, and context-specific evaluation tools (2 + years) to embed sustainability institutionally and culturally.

Research limitations/implications: The study's main limitation is its exclusive focus on leadership perspectives, offering only a top-down view and omitting broader stakeholder experiences within the HEIs.

Practical implications: To overcome key challenges, Nepalese HEIs must adopt a holistic, "whole-institution" approach. Practical measures include revising governance models to establish sustainability-focused units, overhauling reward systems to recognize sustainability contributions, investing in capacity development for staff, integrating sustainability across curricula, and fostering stronger industry-academia partnerships.

Originality/value: This study provides a context-specific, prioritized ranking of the challenges to implementing sustainability in the under-researched setting of Nepalese HEIs. It moves beyond listing challenges to offering a structured framework for action, categorizing challenges into structural, cultural, relational, and knowledge-based themes to guide strategic intervention and resource allocation.

Keywords: *Challenges, Sustainability, Higher education institutions, Sustainable development goals, Officials.*

Introduction

Sustainability is one of the most significant issues in the modern world. Higher education institutions (HEIs) contribute to society and the environment by addressing climate issues, promoting nature-positive practices through research, and developing future sustainability implementers (Ankareddy et al., 2025). They are essential in tackling global sustainability issues and promoting the Sustainable Development Goals (SDGs), especially SDG 4 (Quality Education), SDG 11 (Sustainable Cities and Communities), and SDG 13 (Climate Action), by creating and disseminating knowledge to society (Basheer et al., 2025). In order to promote sustainability, HEIs are expected to be sustainable in all aspects of their operations, including research, education, operations on and off campus through community engagement, organizational structure, and evaluations conducted to report on their activities (Aleixo et al., 2018).

HEIs manage higher education and deliver knowledge-based services. They also ensure that faculty, researchers, and students share knowledge and encourage the development of knowledge (Tseng, 2016) that supports sustainability issues. They provide the necessary awareness and knowledge, support the development of skills in learning environments through instruction, aid in the promotion of innovative technologies, and disseminate the findings of research to the general public. Moreover, they prioritize fostering transformational literacy by increasing involvement in institutional, cultural, technical, and economic change. HEIs embed sustainability through co-creation, institutional autonomy, a comprehensive strategy, action learning, global classrooms, innovation hubs, individualized lifelong learning journeys, and inclusive and dynamic research opportunities (Schneidewind, 2013). Furthermore, they require the ability to understand and participate in social transformation, including e-learning, technological, economic, and institutional transformations. Despite these benefits of HEIs in promoting sustainability, HEIs also have a negative impact on the environment through their use of resources and the effects of that use, particularly with regard to natural resources, energy, and water; the daily commutes that the stakeholders take; and the significant infrastructure and products that they maintain (Jürgens et al., 2023). They also produce a lot of waste, which requires a lot of energy to handle and manage, and produces emissions (Filimonau et al., 2020).

HEIs offer a platform for co-creation and collaboration between individuals and organizations from various societal or scientific backgrounds to solve the growing complexity of real-world problems (Giesenbauer & Müller-Christ, 2020). In fact, they need to incorporate sustainability concepts into their operations, academic programs, and campus culture by implementing a variety of actions that show their commitment to sustainability.

Moving on to Nepal, the nation has ratified the Sustainable Development Agenda. There are various government policy documents including, National Science, Technology and Innovation Policy (MoEST, 2019a), Sustainable Development Goal 4: Education 2030 Nepal: National Framework (MoEST, 2019b), Sustainable Development Goals Status and Roadmap: 2016–2030 (NPC, 2017), and 15th plan 2019/2020-2023/2024 (NPC, 2020), available to promote sustainability in Nepal. These documents promote the application of innovations, the development of scientific culture, and the growth of science and technology in order to increase production and productivity and guarantee

everyone's quality of life. However, the situation in Nepal is different from the global situation. Nepalese HEIs must work hard to integrate their policies and aims and act holistically in order to meet the objectives of sustainability initiatives if the nation is to achieve sustainable development. They also plan to integrate innovation, technology, and science. According to some anecdotal evidence (e.g., Adhikari, 2010; Gaulee, 2014; Rijal, 2020), Nepalese HEIs have a less systematic approach to learning and innovation, are less organized, and have fewer opportunities to share past knowledge. They also face a number of challenges, such as inadequate teaching and research quality, out-of-date curricula, inadequate physical facilities, administrative inefficiencies, political instability, mismanagement of resources, a shortage of qualified human resources, a failure to meet minimum academic standards, and governance shortcomings. To improve the quality of education that can support sustainability activities, Nepalese HEIs are struggling to develop new programs and research projects due to a shortage of funds (Adhikari & Shrestha, 2023; 2024; Shrestha, 2025).

Nepalese HEIs have many opportunities to apply sustainability to support their mission and achieve their vision. They must consider these sustainability initiatives to increase their performance outcomes. For this, they need to be able to adapt to, foresee, and encourage change. However, significant challenges remain in implementing sustainability in higher education. While global literature offers frameworks for embedding sustainability in HEIs, there is a lack of context-specific empirical studies examining the systemic, institutional, and operational barriers in low-resource, politically unstable settings like Nepal. Existing anecdotal evidence (Adhikari & Shrestha, 2023; 2024; Shrestha, 2025; Shrestha & Chhetri, 2024; Shrestha et al., 2025) highlights challenges in Nepalese HEIs—such as outdated curricula, weak governance, and funding shortages—but fails to systematically analyze how these intersect with sustainability integration or propose evidence-based, locally adapted strategies. This study addresses that gap by critically investigating the unique challenges and actionable measures for embedding sustainability within Nepal's higher education landscape. In light of these discourses and caveats, this paper explores the critical challenges in embedding sustainability in Nepalese HEIs and provides measures to address them.

Literature review

Conceptualization of sustainability

Sustainability has emerged as a major worldwide concern, tackling issues including economic instability, social injustice, and environmental degradation (Basheer et al., 2025). As it gains prominence in global policy, HEIs are anticipated to be essential in advancing the SDGs (Lee, 2025). The core concept of sustainable development was put forth in the Brundtland Report (1987) and is described as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Santillo, 2007). This idea serves as the foundation for international initiatives, such as the United Nations' 2015 adoption of the 17 SDGs, which seek to address resource depletion, poverty, inequality, and climate change by 2030 (Gupta & Singh, 2020; Szabo et al., 2016).

Education is seen as essential to the advancement of the SDGs in the United Nations' 2030 Agenda, which promotes institutional participation and local adaptation (Ruiz-Mallén & Heras, 2020). This

agenda offers a path toward "peace and prosperity for people and the planet, now and into the future" (UN General Assembly, 2015). The SDGs are the foundation of this agenda since they provide a widely accepted framework for gauging sustainability advancements in social, economic, and environmental spheres. The SDGs serve as a standard for corporations, institutions, and organizations to align their operations with sustainable development, in addition to directing global sustainability initiatives and governmental regulations (Basheer et al., 2025).

In furthering the sustainability goal, HEIs have become essential contributors. By giving future generations the values, information, and abilities needed to tackle sustainability issues, these institutions are in a unique position to promote revolutionary change. HEIs influence not just students and faculty but also the larger community by acting as hubs for innovation and thought leadership. Beyond only teaching theory, education for sustainability involves raising awareness of the negative effects of unsustainable behavior and encouraging moral and responsible conduct. As today's students, future leaders will influence the course of sustainability in the ensuing decades by their choices as citizens, professionals, and legislators (Frizon & Eugénio, 2022; Pizzutilo & Venezia, 2021). Therefore, it is not only desirable but also essential to incorporate sustainability into the educational system.

Forms of sustainability in HEIs

Higher education's approach to sustainability has changed over time, moving from concentrating on individual environmental initiatives to a comprehensive, multifaceted endeavor. A "whole-institution" approach is made up of a number of interrelated pillars that are frequently used to conceptualize this comprehensive integration (Sterling et al., 2013). The primary forms of sustainability in HEIs are:

a. Curriculum and Teaching (Education for Sustainable Development): This form focuses on the university's primary academic goal, which is to educate students. It entails incorporating sustainable teaching and learning practices into all subject areas. Giving students the information, abilities, qualities, and attitudes, they need to tackle difficult global sustainability issues is the aim (UNESCO, 2017). This integration may appear as independent courses and programs that involve environmental science, sustainability studies, or similar areas; curriculum infusion by integrating sustainability ideas into current courses in a variety of fields, such as business, engineering, the humanities, and health sciences (Lozano et al., 2013); and pedagogical innovation by using immersive, transformative learning techniques like problem-based learning, interdisciplinary projects, and the "Campus as a Living Lab" model—in which the university's operations serve as a place for applied student research (Beringer & Adomßent, 2008).

b. Research (The Knowledge Creation Pillar): Research is essential for generating fresh perspectives and innovative solutions to environmental issues in HEIs. Academic endeavors that advance knowledge of social, economic, and environmental issues fall under this area. Discipline-specific, multidisciplinary, and transdisciplinary research are all possible. Some studies have their roots in a single discipline and focus on sustainability-related issues unique to that field, like developments in renewable energy technologies. Others may take an interdisciplinary approach, combining techniques and viewpoints from several academic fields—for example, ecology, economics, and political science—to offer more

thorough evaluations of topics like conservation policy. Transdisciplinary research is even more expansive; it actively involves non-academic stakeholders, such as members of the community, business representatives, and legislators, in the study process, thus transcending academic borders. Lang et al. (2012) argue that this collaborative paradigm encourages the co-creation of knowledge, increasing its practical relevance and real-world impact. HEIs' role in tackling sustainability issues is strengthened when these research methodologies are combined.

c. Operations and Campus Management: This is the most evident form, where the HEIs manage their resources, physical infrastructure, and real estate sustainably. They demonstrate their commitment by aligning their operations with their principles (Leal Filho et al., 2019). Key operational areas include: (a) energy and climate: to reach carbon neutrality, cut back on energy use, make investments in renewable energy, and create climate action plans; (b) waste management: putting in place extensive procedures for composting, recycling, and waste reduction to produce zero waste; (c) sustainable buildings: creating, erecting, and maintaining structures in accordance with strict environmental guidelines; (d) water and grounds: conserving water, improving campus biodiversity, and implementing sustainable landscaping; and (e) food services and procurement: implementing sustainable purchasing practices and offering fair-trade, organic, and locally produced food.

d. Outreach, Engagement, and Governance (The Institutional Framework). This form ensures the sustainability of HEIs' institutional structures and culture while connecting their internal activities to the larger community. Outreach and engagement entail exchanging information and working together with communities, businesses, and the government via partnerships, public education, and practical projects that tackle regional sustainability issues (Trencher et al., 2014). Governance and administration ensure sustainability is formally integrated into institutional strategy through policies, planning, advisory structures, and budgeting, including aligning endowment investments with sustainability values via Socially Responsible Investment (SRI) (AASHE, 2023). Together, these initiatives promote an inclusive, accountable, and long-lasting institutional resilience.

Challenges in embedding sustainability in HEIs

Sustainability is essential to HEIs' reputation and status globally. HEIs are regarded as the "changing agents" that will advance sustainability (Žalėnienė & Pereira, 2021). They play a key role in training conscious citizens and promoting sustainable practices. They have many opportunities to apply sustainability approach to support their mission and achieve their vision. However, there are many challenges to implementing sustainability in HEIs.

Leal Filho et al. (2022) reveal that lack of funding, lack of interest of the students, lack of resources, and lack of support from the university administration are the main challenges for conceiving and implementing sustainable initiatives. Research indicates that the absence of well-structured databases and information systems, efforts to apply acquired knowledge, inappropriate institutional culture, and faculty members' non-knowledge-based activities are the main obstacles (Adhikari & Shrestha, 2024; Shrestha & Chhetri, 2024; Shrestha et al., 2025). Aleixo et al. (2018) identify a number of important obstacles to putting sustainability programs into action, including ambiguity and complexity, financial

resources, resistance to change, intricate organizational structures, stakeholder loyalty to HEIs, and knowledge and skills linked to sustainability. Additionally, cultural and socioeconomic disparities, policy sources, implementation tactics, and unsustainable development methods pose difficulties for HEIs (Hallinger & Chatpinyakoop, 2019).

Other factors that make it difficult for HEIs to implement sustainability initiatives include inadequate staff development procedures, disciplinary boundaries, traditional organizational structure, strategy, and system, lack of coordination and collaboration among universities, conventional structure, inadequate institutional capacity, and inability to effectively use ICT strengths (Heiss, 2022; Adhikari & Shah, 2021). According to some researchers (Verhulst & Lambrechts, 2015; Vogt & Weber, 2020), weaker industry-academia ties, unscientific reward structures, and reward schemes (Veer Ramjeawon & Rowley, 2017) are also making it difficult to implement sustainability initiatives in HEIs. Other issues include a lack of commitment, awareness, interest, and involvement on the part of academic staff, students, employees, management, and policymakers. Additional barriers to implementing sustainability in HEIs include the lack of official and informal governance to address sustainability (Hossain & Mohammad, 2015), traditional governance, and economic and cultural systems (Parvez & Agrawal, 2019). Additionally, there are no contextual evaluation systems for sustainable development (Albareda-Tiana et al., 2018; Jain et al., 2013). Furthermore, HEI growth is constrained by unscientific reward systems and regulations as well as weak industry-academia ties (Shrestha, 2025). Some other challenges faced in implementing sustainable management are highlighted, such as integrating environmental, social, and economic practices into operations and teaching, as well as issues such as limited resources and resistance to change (Machado & Davim, 2025).

Research Methods

Research Philosophy: This study is grounded in an interpretivist philosophy. This paradigm is based on the knowledge that social reality is complicated, subjective, and shaped by the interpretations people give to their experiences (Saunders et al., 2019). This concept is directly in line with the research goal, which is to investigate the viewpoints of HEI authorities. It recognizes that the "challenges" have many complex realities that are influenced by the roles of the individuals, institutional circumstances, and individual perceptions rather than a single, objective truth.

Research Approach: This study adopted a qualitative case study research design to conduct an in-depth investigation of the challenges in embedding sustainability within the specific context of Nepalese HEIs. This approach works effectively for examining intricate, little-studied phenomena where the factors are still unclear (Creswell & Poth, 2018). A phenomenon that involves complex relationships between strategy, culture, finance, and pedagogy is the difficulty of integrating sustainability into HEIs. This approach gives the freedom to discover these complex issues from the perspective of those who are facing them. In order to better understand the perspectives of stakeholders, Kaufman et al. (2018) held focus groups with parents (n = 12) and professionals (n = 19). Additionally, McInnes et al. (2012) used data from 27 individuals in their study, while Fridlund and Hildingh (2000) included data from 1 to 30 participants in their qualitative research. All of these studies provide credence to the exploratory research method used in this work.

Research Strategy: The study uses a qualitative inquiry strategy to investigate HEI officials' viewpoints. It enables a more comprehensive analysis of experiences across many HEI situations, diverse roles, and institutional settings of participants.
Data Collection Method: A semi-structured interview guide covering topics like institutional priorities, barriers to sustainability integration, and strategies used was developed based on a review of relevant literature. The interviews were conducted in-person and lasted approximately 30 to 60 minutes. With the participants' consent, the interviews were audio-recorded for later transcription and analysis.

Sampling Technique: A purposive sampling technique was employed to select participants who possessed specific characteristics relevant to the study's focus on sustainability in higher education institutions (HEIs). The selection criteria included: (1) holding a leadership, academic, or administrative role with direct involvement in institutional planning, curriculum development, or sustainability initiatives; (2) affiliation with either Tribhuvan University or Pokhara University—Nepal's two largest and most diverse public universities; and (3) demonstrated engagement in or responsibility for sustainability-related activities, policies, or decision-making within their institutions.

Participants included academics, deans, planning chiefs, and vice-chancellors, ensuring a range of perspectives grounded in both strategic oversight and operational experience. Through professional networks and direct outreach, 15 participants (8 from Tribhuvan University and 7 from Pokhara University) were selected. This sample size was deemed sufficient to achieve thematic saturation while balancing analytical depth with practical constraints inherent in qualitative research.

Data Analysis: The analysis involved a two-step process. First, descriptive statistics (percentages and mean ranks) were used to determine the perceived severity and final ranking of each challenge, as presented in Table 1. Second, the qualitative descriptions of the challenges underwent thematic analysis. This involved familiarizing ourselves with the data, generating initial codes, and searching for themes to categorize the challenges into broader, meaningful groups. This process resulted in the four key themes, such as Structural/Systemic, Cultural/Behavioral, External/Relational, and Knowledge & Capacity, that are presented in Table 2.

Ethical Considerations: Throughout the entire research process, ethical guidelines were closely followed. All participants provided their informed consent after being fully informed about the study's goals, methods, and their rights, including the ability to discontinue participation at any moment. In all reports, individuals and their institutions were given pseudonyms to maintain anonymity.

Results and Analysis

The findings from the study reveal a multi-layered landscape of challenges impeding the effective embedding of sustainability in Nepalese HEIs (Table 1). These challenges are ranked according to the percentage of respondents who identified them as significant, offering a clear hierarchy of institutional, cultural, financial, and systemic barriers.

Table 1: Challenges in embedding sustainability in higher education institutions

S.N.	Challenges	%	Rank
1.	Insufficient financial resources, low student motivation, a lack of resources, and a lack of administration support	93.33	2
2.	Inappropriate institutional culture, faculty members' non-knowledge-based activities, low attempts to apply learned knowledge, and the lack of well-structured databases and information systems	73.33	5
3.	Low levels of stakeholder loyalty to HEIs, financial resources, ambiguity and complexity, organizational complexity, and sustainability-related knowledge and abilities.	60	7
4.	Unsustainable development practices, policy origins, implementation strategies, and cultural and socioeconomic inequalities	86.67	3
5.	Traditional organizational structure, strategy, and system; insufficient staff development processes; disciplinary barriers; insufficient institutional capacity; and an incapacity to utilize ICT strengths effectively	100	1
6.	Unscientific reward systems and reward plans	93.33	2
7.	Absence of dedication, consciousness, enthusiasm, and participation from academic personnel, students, workers, administrators, and policymakers	60	7
8.	Insufficient formal and informal governance to tackle sustainability	73.33	5
9.	Traditional systems of governance	80	4
10.	Absence of contextual assessment tools for sustainable development	60	10
11.	Poor industry-academia connections	66.67	6
12.	Ineffective incorporation of social, economic, and environmental practices into operations and teaching	93.33	2

Most Critical Challenge (Rank 1)

All participants (100%) identified insufficient staff development, disciplinary barriers, low institutional capability, traditional organizational structure, strategy, and system, as well as inefficient ICT use, as the most critical challenges. They highlight significant structural and systemic flaws. Rigid organizational structures, inadequate staff training, academic disciplines that are not integrated, institutional capacity constraints, and underutilization of information and communication technology (ICT) are some examples of these issues. The fact that this challenge is placed highest suggests that the biggest obstacles are structural and systemic problems. Interdisciplinary cooperation, which is essential for sustainability, is hindered by disciplinary silos and traditional systems' resistance to change. Innovation and efficiency are hampered by inadequate ICT use and limited capacity.

High-Priority Challenges (Rank 2)

Three distinct but interrelated challenges were each cited by majority of the respondents (93.33%). They perceive that insufficient financial resources, low student motivation, lack of resources, and lack of administration support are also perceived as one of the key challenges for embedding sustainability

in HEIs. Being ranked second indicates that these challenges are very important issues. Investments in sustainability projects (such as training programs and green infrastructure) are constrained by budgetary constraints. While administrative assistance is essential for promoting policy and cultural change, low student motivation may result from a lack of knowledge or incentives. Because sustainability initiatives need institutional support as well as money, the combination of these elements results in a major barrier.

The participants also perceive that unscientific reward schemes and methods are also the main problems embedding sustainability in HEIs. The results indicate that sustainability initiatives are not encouraged by reward systems like cash or promotions. Furthermore, when incentives aren't aligned, faculties and staff might place more value on traditional indicators (such as publications and teaching hours) than on sustainability. It implies that redesigning reward systems to value sustainability contributions (e.g., research on SDGs, green initiatives) could drive engagement.

The participants also perceive that the three pillars of sustainability—social, economic, and environmental—are not incorporated into HEI operations and courses. In order to generate graduates or practices that are in line with the SDGs, HEIs must integrate sustainability into their operations and teaching. Thus, sustainability ideas should be incorporated into courses, and sustainable practices should be modeled in campus operations (such as trash management and energy utilization). Along with operations modeling sustainable methods, education should train students for sustainable development.

Significant Structural and Equity-Related Barriers (Rank 3)

With a ranking of 3, this is a serious problem. Weak policies and unsustainable practices (such as reliance on non-renewable resources) impede advancement. Access to sustainability resources and knowledge may be restricted by cultural and socioeconomic disparities, especially in disadvantaged or diverse communities. In such a case, HEIs need to revise policies to align with SDGs, adopt inclusive strategies, and address socioeconomic disparities in their programs.

Governance Constraints (Rank 4)

The participants perceive that traditional systems of governance that involve challenges, which point to outdated governance systems, also oppose sustainability. Traditional governance may place more emphasis on immediate objectives than long-term sustainability. Progress in such a situation depends on updating the administration that prioritizes sustainability.

Institutional Culture and Infrastructure Gaps (Rank 5)

Two challenges are tied to this level: The participants also perceive that a misalignment between the institution's culture and sustainability objectives, as well as faculty members' activities that lack a foundation in sustainability knowledge, their restricted implementation of sustainability principles, and their inadequate data infrastructure, also create a problem in embedding sustainability in HEIs. In actuality, a change-resistant institutional culture may make it more difficult to implement sustainability. There may be a lack of incentives or training for faculty to include sustainability in their research or teaching. Strong databases are necessary for evidence-based decision-making. Thus, HEIs should prioritize sustainability in faculty jobs, invest in data tools to monitor success, and train staff to cultivate a sustainability-oriented culture.

In addition, insufficient formal and informal governance to tackle sustainability involves inadequate governance frameworks (formal regulations or unwritten standards) to promote sustainability. This is a moderate problem with a ranking of 8. Sustainability policies that are inconsistent or poorly implemented might result from ineffective governance. Direction and accountability can thus be provided by putting in place explicit governance frameworks, such as sustainability committees or regulations.

External Engagement Deficit (Rank 6)

One of the main obstacles to HEI sustainability is believed to be the poor industry-academia connections. These difficulties draw attention to the lack of strong industry-HEI relationships, which restrict the use of sustainability in real-world applications. They have a mediocre rating of 9. For graduates with a concentration on sustainability, strong industry linkages may offer resources, practical applications, and employment prospects. Thus, forming alliances with sectors dedicated to sustainability can improve resource sharing and hands-on training.

Foundational and Systemic Weaknesses (Rank 7)

The least frequently cited—but still critical—challenges (each noted by 9 respondents) include: Low levels of stakeholder loyalty to HEIs, financial resources, ambiguity and complexity, organizational complexity, and sustainability-related knowledge and abilities also matter a lot for promoting sustainability in HEIs. They are lower-priority issues with a ranking of 10, but the combination of variables points to systemic difficulties. Poor communication or a lack of trust may be the cause of low shareholder loyalty. Organizational complexity and goal ambiguity can impede development, while knowledge gaps prevent successful implementation. Stakeholder participation can therefore be increased by outreach and clear communication, organizational process simplification, and training.

Absence of dedication, consciousness, enthusiasm, and participation from academic personnel, students, workers, administrators, and policymakers also creates a pervasive cultural deficit. They may be a sign of larger problems (such as a lack of resources or a bad culture), which is why they are lower-priority issues. Sustainability initiatives, however, will fail if stakeholders do not support them. Campaigns for awareness, training, and participatory governance can thereby increase commitment and engagement.

In addition, the absence of contextual assessment tools for sustainable development suggests it is less immediate but still relevant for embedding sustainability in HEIs. Without specialized assessment instruments, HEIs are unable to precisely assess progress or spot deficiencies. Therefore, creating context-specific indicators and tools can assist HEIs in monitoring and enhancing their sustainability practices.
These overall challenges can be categorized into four major themes: structural/systemic, cultural/behavioral, external/relational, and knowledge and capacity (Table 2). Addressing these challenges requires a holistic approach, combining policy changes, stakeholder engagement, and innovative use of technology. By tackling the higher-ranked issues first, HEIs can create a foundation for overcoming lower-ranked barriers, ultimately fostering a more sustainable institutional ecosystem.

Table 2: Key challenges and relative ranks

Themes	Top challenges (ranks 1–2)	Middle challenges (ranks 3–5)	Lower priority challenges (ranks 6–7)
Structural/Systemic	• Traditional organizational structures, strategies, and systems • Insufficient institutional capacity • Disciplinary silos • Ineffective use of ICT • Unscientific reward systems • Inadequate integration of social, economic, and environmental dimensions into teaching and operations	• Unsustainable development practices, weak policy design, and implementation gaps • Cultural and socioeconomic inequalities embedded in policy • Traditional governance systems • Insufficient formal/informal sustainability governance frameworks	
Cultural/Behavioral	• Lack of administrative support • Low student motivation	• Misaligned institutional culture • Faculty engagement in non-knowledge-based activities • Low application of sustainability knowledge • Absence of dedication, awareness, enthusiasm, and participation across stakeholder groups	• Low stakeholder loyalty and commitment • Ambiguity and complexity in sustainability goals • Organizational inertia and resistance to change
External/Relational			• Poor industry–academia linkages • Limited collaboration with external stakeholders (NGOs, government, communities)
Knowledge & Capacity	• Insufficient staff development processes • Lack of sustainability-related knowledge and skills among faculty and staff	• Inadequate data infrastructure and absence of well-structured databases • Gaps in transdisciplinary teaching capacity • Weak monitoring and evaluation systems	• Absence of contextual assessment tools for sustainable development • Limited access to sustainability resources due to socioeconomic disparities • Low sustainability literacy among students and staff

Discussion

Result shows that the most significant challenges are the traditional organizational structure, strategy, and system; insufficient staff development processes; disciplinary barriers; insufficient institutional capacity; and incapacity to utilize ICT strengths effectively. It implies systemic institutional inertia, structural fragmentation, and underdeveloped human and technological resources are primary barriers to embedding sustainability. These structural and operational limitations inhibit cross-disciplinary collaboration and innovation, which are essential for sustainability integration (Heiss, 2022; Adhikari & Shah, 2021).

Other challenges include insufficient financial resources, low student motivation, a lack of resources, and a lack of administrative support. They highlight both material constraints (funding, resources) and socio-behavioral factors (motivation, leadership support), aligning with findings that administrative buy-in and adequate funding are critical for sustainability initiatives (Leal Filho et al., 2022). The result shows that unscientific reward systems and reward plans point to misaligned academic incentives, which also create barriers to sustainability. Traditional reward systems in HEIs often prioritize publication output over engagement with sustainability or community impact, discouraging faculty from participating in sustainability-related teaching or outreach (Adhikari & Shrestha, 2023; Shrestha, 2025; Veer Ramjeawon & Rowley, 2017).

In some instances, ineffective incorporation of social, economic, and environmental practices into operations and teaching reflects a gap between sustainability theory and practice. Despite curricular efforts, many HEIs fail to operationalize sustainability across campus functions (e.g., procurement, energy use, curriculum), indicating a lack of holistic integration (Machado & Davim, 2025). Results further reveal institutional, cultural, and systemic barriers. For instance, unsustainable development practices, policy origins, implementation strategies, and cultural and socioeconomic inequalities imply that broader societal inequities and top-down policy frameworks may undermine local sustainability efforts (Hallinger & Chatpinyakoop, 2019). Traditional systems of governance and insufficient formal and informal governance to tackle sustainability indicate governance models that are rigid, hierarchical, and not adaptive to sustainability's transdisciplinary and participatory nature (Parvez & Agrawal, 2019; Dlouhá et al., 2022; Hossain & Mohammad, 2015; Adhikari & Shrestha, 2024). The result also shows that Poor industry-academia connections limit knowledge transfer and real-world application of sustainability principles, reducing opportunities for collaborative problem-solving (Verhulst & Lambrechts, 2015; Vogt & Weber, 2020; Shrestha, 2025; Shrestha et al., 2025).

Low stakeholder loyalty, financial constraints, ambiguity, organizational complexity, and gaps in sustainability-related knowledge and skills indicate the multifaceted nature of engagement and capacity-building challenges (Aleixo et al., 2018; Adhikari & Shrestha, 2024; Shrestha & Chhetri, 2024). Moreover, the absence of dedication, consciousness, enthusiasm, and participation from academic personnel, students, workers, administrators, and policymakers reflects a cultural and motivational deficit across institutional roles, which can stall bottom-up initiatives (Shrestha, 2025).

Finally, the absence of contextual assessment tools for sustainable development highlights a methodological gap (Albareda-Tiana et al., 2018; Jain et al., 2013). It implies that HEIs lack tailored metrics to evaluate

their sustainability performance in locally relevant ways, impeding accountability and progress tracking (Caeiro et al., 2020).

In fact, the challenges are not isolated but interlocking: structural rigidity stifles innovation; misaligned incentives discourage participation; weak governance fragments action; and cultural disengagement erodes momentum. Addressing sustainability in Nepalese HEIs, therefore, demands more than technical fixes—it requires transformative institutional change that remains leadership, restructures incentives, rebuilds capacity, and reorients the university's role in society toward justice, resilience, and relevance.

Measures to Address Challenges in Embedding Sustainability in HEIs

Overcoming key challenges previously noted calls for a systematic and multi-stakeholder strategy in order to successfully embed sustainability into HEIs. HEIs can promote sustainable development by implementing several strategic measures at the institutional level.

1. Immediate Foundational Challenges (within 1 year)

The most critical barriers—identified unanimously by participants—stem from rigid institutional architectures and systemic inertia. To lay a solid foundation for sustainability integration, HEIs must act decisively within the first year.

Institutional Restructuring & Capacity Building: Establishing a central Sustainability Office is essential to provide strategic direction, coordination, and accountability. This office should include representatives from faculty, administration, students, and facilities management to ensure cross-functional collaboration. Concurrently, mandatory sustainability induction and upskilling programs must be rolled out for all staff, equipping them with foundational knowledge of the SDGs, climate literacy, and transdisciplinary approaches. To dismantle academic silos, HEIs should develop interdisciplinary teaching modules (e.g., combining environmental science with economics or ethics) and offer seed grants to incentivize collaborative course design and research.

Digital Enablement: Many Nepalese HEIs underutilize ICT despite its potential to enhance efficiency and transparency. A comprehensive ICT infrastructure audit should be conducted, followed by targeted upgrades. A sustainability data dashboard can then be deployed to monitor real-time metrics such as energy consumption, water usage, waste generation, and curriculum coverage of sustainability topics—enabling data-driven decision-making and progress tracking.

Incentive Realignment and Leadership Commitment: Current reward systems prioritize traditional academic outputs, disincentivizing sustainability engagement. HEIs must revise promotion and tenure guidelines to formally recognize contributions such as SDG-aligned research, community-based projects, sustainability curriculum development, and green campus leadership. Crucially, this shift requires visible endorsement from top leadership—ideally through a Vice-Chancellor-led Sustainability Charter that publicly commits the institution to embedding sustainability across all functions.

2. Short-Term Operational and Motivational Challenges (1–2 years)

Once foundational structures are in place, HEIs must focus on operationalizing sustainability in daily practices and fostering motivation among students and staff.

Resource Mobilization and Green Campus Operations: Chronic underfunding can be mitigated through innovative financing. A Sustainability Innovation Fund—sourced from minor student levies (e.g., NPR 20–50 per semester), alumni contributions, and competitive green grants—can support pilot initiatives like campus composting, solar installations, or biodiversity gardens. Simultaneously, campus-wide green operations should be implemented: transitioning to renewable energy (e.g., rooftop solar), enforcing waste segregation, adopting eco-friendly procurement policies, and reducing single-use plastics. These visible changes model sustainability in action and generate cost savings over time.

Curriculum and Culture Transformation: Sustainability must move beyond isolated courses to become a cross-cutting competence. All academic programs should integrate SDG-aligned learning outcomes, with discipline-specific applications (e.g., sustainable architecture, ethical AI, green finance). Transdisciplinary pilot courses—co-taught by faculty from different departments—can demonstrate the value of integrated problem-solving. To boost student engagement, HEIs should launch sustainability clubs, green internships with local NGOs or municipalities, and annual recognition awards for outstanding student or staff contributions.

Governance Modernization: Outdated governance models must evolve to support long-term sustainability goals. Sustainability Steering Committees—with real decision-making power and direct reporting lines to university leadership—should be formed at both institutional and faculty levels. These committees can oversee implementation, allocate resources, and resolve inter-departmental conflicts. Additionally, participatory governance tools such as sustainability town halls, online suggestion portals, and student representation on key committees foster inclusion and ownership. Finally, institutional databases must be built to systematically collect and analyze sustainability KPIs, ensuring transparency and continuous improvement.

3. Long-Term Strategic and Engagement Challenges (2+years)

Sustainability must ultimately become embedded in the institutional identity and external ecosystem of HEIs.

Policy and Equity Integration: Institutional policies must align with Nepal's national SDG roadmap and address socioeconomic and cultural inequities. This includes ensuring equitable access to sustainability education for students from marginalized communities (e.g., through targeted scholarships), incorporating indigenous knowledge systems, and designing inclusive campus facilities. Sustainability should be explicitly embedded in the institutional mission, vision, and strategic plans—not treated as a peripheral initiative.

Strategic External Partnerships: Weak industry–academia linkages limit real-world relevance and resource access. HEIs should proactively forge long-term partnerships with green enterprises, environmental NGOs, local governments, and international development agencies. These collaborations can support joint research on local sustainability challenges (e.g., water security in the Himalayas), provide internship and employment pathways for graduates, and unlock co-funding opportunities. Sustainability Incubation Hubs, co-managed with industry partners, can serve as innovation labs for student startups and community solutions.

Systemic Culture and Contextual Evaluation: A mature sustainability culture requires robust evaluation mechanisms. HEIs, in collaboration with Nepal's University Grants Commission (UGC) and Ministry of Education, should co-develop context-specific sustainability assessment tools that reflect local priorities—such as mountain ecosystem resilience, gender equity in STEM, or post-disaster recovery. Annual sustainability literacy surveys among students and staff can track awareness and attitudes, while public impact reports build trust and accountability. Finally, promoting community-engaged scholarship—where research directly addresses local needs—strengthens societal relevance and deepens stakeholder commitment.

The measures identified to address the key challenges in embedding sustainability are synthesized and presented in Table 3, which provides a structured overview of the proposed solutions, correlating them with the specific challenges outlined earlier. Beginning with institutional restructuring and leadership commitment, it progresses through operational greening and curriculum reform, culminating in strategic partnerships and context-specific evaluation. This pathway can transform HEIs from passive observers into active drivers of Nepal's sustainable development. Successful implementation depends on sustained political will, inclusive participation, and the alignment of global sustainability goals with local realities.

Table 3: Strategic measures to address challenges in embedding sustainability in HEIs

Priority category	Timeline	Key challenges	Strategic measures
Immediate Foundational Challenges	**Within 1 year**	• Traditional organizational structures, strategy, and systems (Rank 1) • Insufficient staff development processes (Rank 1) • Disciplinary barriers & low institutional capacity (Rank 1) • Ineffective ICT use (Rank 1) • Unscientific reward systems (Rank 2) • Lack of administrative support (Rank 2)	**1. Institutional Restructuring and Capacity Building:** – Establish a central Sustainability Office with cross-functional representation (faculty, admin, students, facilities). – Launch mandatory sustainability induction and up-skilling programs for academic and administrative staff. – Develop interdisciplinary teaching modules and seed grants to break disciplinary silos. **2. Digital Enablement:** – Audit and upgrade ICT infrastructure; deploy sustainability data dashboard for tracking energy, waste, and curriculum integration.

			3. Incentive Realignment and Leadership Commitment – Revise promotion and reward policies to recognize sustainability teaching, community engagement, and SDG-aligned research. – Secure leadership endorsement through a Vice-Chancellor-led sustainability charter.
Short-Term Operational and Motivational Challenges	**1–2 years**	• Insufficient financial resources & lack of resources (Rank 2) • Low student motivation (Rank 2) • Ineffective integration of social, economic, and environmental practices into teaching/operations (Rank 2) • Traditional governance systems (Rank 4) • Inadequate formal/informal sustainability governance (Rank 5) • Misaligned institutional culture & weak data infrastructure (Rank 5)	**1. Resource Mobilization and Green Operations:** – Create a Sustainability Innovation Fund via minor student levies, alumni donations, and green grants. – Implement campus-wide sustainability practices: solar energy, waste segregation, green procurement. **2. Curriculum and Culture Transformation:** – Integrate SDG-aligned learning outcomes across all programs; pilot transdisciplinary courses. – Launch student sustainability clubs, green internships, and recognition awards to boost engagement. **3. Governance Modernization:** – Form Sustainability Steering Committees at the university and faculty levels with decision-making authority. – Adopt participatory governance models (e.g., town halls, suggestion portals) to foster inclusion. – Build institutional databases to monitor sustainability key performance indicators (KPIs) and inform policy.
Long-Term Strategic and Engagement Challenges	**2 + years**	• Unsustainable policy design & socioeconomic inequalities (Rank 3) • Poor industry–academia linkages (Rank 6) • Low stakeholder loyalty & organizational complexity (Rank 7)	**1. Policy and Equity Integration:** – Align institutional policies with national SDG frameworks and inclusive development goals; ensure equitable access for marginalized groups.

		• Absence of dedication/ participation across stakeholders (Rank 7) • Lack of contextual assessment tools for sustainable development (Rank 7)	**2. Strategic External Partnerships:** – Forge long-term collaborations with green industries, NGOs, and government bodies for joint research, internships, and funding. – Establish Sustainability Incubation Hubs co-managed with industry partners. 3. Systemic Culture and Evaluation: – Embed sustainability in institutional mission and strategic plans. – Co-develop Nepal-specific sustainability assessment tools with national agencies and universities. – Conduct annual sustainability literacy surveys and publish impact reports to build trust and accountability. – Promote community-engaged scholarship to strengthen societal relevance and stakeholder buy-in.

Conclusion

This study set out to explore the critical challenges in embedding sustainability within HEIs in Nepal and to propose actionable measures to overcome them. The integration of sustainability into HEIs in Nepal is hindered by a complex interplay of structural, cultural, financial, and governance-related challenges. As revealed in the findings, the most critical barriers include traditional organizational structures, insufficient financial and administrative support, unscientific reward systems, and the ineffective incorporation of sustainability into teaching and operations. These reflect deep-rooted systemic inertia, fragmented institutional capacity, and misaligned incentives that collectively constrain transformative change. Furthermore, challenges such as disciplinary silos, underutilization of ICT, weak industry-academia linkages, and a lack of contextual assessment tools underscore the need for a holistic, institution-wide approach. The dominance of traditional governance models and the absence of formal mechanisms to support sustainability indicate that current institutional frameworks are ill-equipped to foster the transdisciplinary collaboration and adaptive leadership required for sustainable development. To overcome these challenges, Nepalese HEIs must adopt a comprehensive and context-sensitive strategy that prioritizes structural reform, stakeholder engagement, and capacity development. This includes reimagining governance through dedicated sustainability units, revising academic reward systems to recognize sustainability contributions, investing in staff development, and embedding sustainability across curricula and campus operations. Strengthening partnerships with industry and local communities can enhance real-world relevance, while the development of localized assessment tools will improve monitoring and accountability. Ultimately, embedding sustainability in HEIs is not merely an operational adjustment but a paradigm shift—one that requires visionary leadership, policy coherence, and a cultural transformation toward long-term resilience and social responsibility. By addressing the highest-ranked

challenges first, Nepalese HEIs can lay the foundation for systemic change and position themselves as key agents of sustainable development in alignment with national goals and the global SDGs.

Research Limitations

This study acknowledges a number of limitations. The findings are primarily derived from the perspectives of institutional leaders, which, while offering valuable top-down insights, may not fully capture the on-the-ground experiences of academic staff, students, and operational personnel. As a result, the transferability of the findings to other higher education contexts may be constrained by this narrow focus. Future research should address this gap by actively incorporating the voices of these key internal and external stakeholders to develop a more comprehensive, multi-level understanding of how sustainability is embedded within institutions. In addition, integrating mixed-methods approaches could strengthen the evidence base by complementing qualitative insights with quantitative data that measure the prevalence, reach, and impact of sustainability initiatives and the challenges associated with them.

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