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Challenges Encountered by Students in Participating in Campus Greenovation Initiatives

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Abstract: Higher Education Institutions are central agents for environmental sustainability, yet campus-wide initiatives frequently encounter operational bottlenecks among the student body. This study investigated the practical, structural, and behavioral barriers preventing student engagement in the "Greenovation" program at the University of the Cordilleras in Baguio City. Employing a quantitative, descriptive research design grounded in the Diffusion of Innovations framework, data were gathered from a stratified sample of n = 391 students across 11 academic colleges using validated diagnostic survey checklists and open-ended text fields. Quantitative data were processed using frequency counts and percentage ranking, while qualitative responses were evaluated via thematic analysis. The findings reveal a complex, multi-dimensional matrix of participation obstacles. Psychological and behavioral constraints emerged as the most widespread hurdles, led by a lack of personal interest and academic time limitations (68.0%). Resource limitations presented severe practical barriers, characterized by inadequate funding for student-led eco-projects (64.2%) and the high cost of green consumer alternatives (50.6%). Structurally, data dissemination blockages (49.1%) and fragmented administrative reporting systems (44.5%) significantly widened the campus "awareness-action gap," causing students to disengage from reporting infrastructure issues like facility leaks. Qualitative feedback further highlighted visibility gaps, slow administrative responses, and peer social apathy. The study concludes that objective environmental guidelines are ineffective without strong internal support structures. Fostering an active green culture requires centralized data platforms, student-accessible micro-funding, and continuous capacity-building workshops to bridge the gap between sustainability awareness and actual student action.

Keywords: Greenovation, Higher Education Institutions, Student participation, Innovation diffusion, Environmental barriers, Campus sustainability, Baguio City

1. INTRODUCTION

The global environmental crisis stands as a cornerstone of modern policy discussions, playing a pivotal role in forcing organizations to re-examine resource consumption, waste mitigation, and ecological preservation frameworks. Innovative organizations worldwide are redefining their operations by adopting environmentally friendly products and transitioning toward sustainable, green systems. Concurrently, there is a growing international emphasis on integrating sustainability principles within education. Higher Education Institutions (HEIs) have emerged as critical agents for environmental transformation because of their structural influence on young people's ecological knowledge, attitudes, and behaviors [1]. Enabling broad campus sustainability is seen as a key driver for international development objectives, including the United Nations 2030 Agenda for Sustainable Development [2].

Within this developmental landscape, the Philippines represents a highly vulnerable emerging nation exposed to severe climate variations, accelerating environmental deterioration, and resource depletion. Local HEIs bear a profound socio-ecological responsibility to cultivate environmental stewardship within their academic networks. In response to this mandate, the University of the Cordilleras (UC), located in Baguio City, Benguet, institutionalized environmental conservation as a core pillar of its corporate social responsibility (CSR) and operational agenda through the "Greenovation: Towards an Eco-Friendly UC" program. This institutional framework includes distinct policy targets covering energy conservation, comprehensive waste management systems, water resource management, and localized environmental education.

However, despite clear administrative guidelines and the broader ecological benefits of the Greenovation program, active student participation across the university remains uneven. While precise comparative data against other local universities are limited, general observations indicate a persistent "awareness-attitude-action gap" or "knowledge-action gap" within the student population [3]. Students frequently demonstrate high conceptual support for green values but fail to participate in active campus sustainability behavior [4]. This hints at significant underlying operational problems preventing widespread student engagement.

A clear paradox emerges: while the Greenovation program provides clear paths for environmental conservation and student-led leadership, a large segment of the student body remains disengaged or minimally involved. This disparity suggests the presence of significant barriers that counteract the institutional benefits of the programs. Focusing solely on isolated technical solutions or policy rules without addressing the internal social and structural dynamics often undermines the effectiveness of sustainability actions [5]. Understanding these inhibiting elements is crucial for fostering greater institutional cooperation and student engagement.

Despite the potential for environmental transformation and the administrative presence of the Greenovation framework, a significant portion of the student population remains disengaged from active participation. This study seeks to identify and analyze the specific challenges, both external-structural and personal-behavioral, that contribute to this limited involvement, thus hindering broader financial and operational integration of sustainability on campus.

Theoretical Framework

Innovation diffusion and behavioral theories offer a crucial lens through which to understand the structural and psychological underpinnings of student choices, which often deviate from simple administrative compliance models. Central to this study is the Diffusion of Innovations (DOI) Theory developed by Rogers [6], which posits that the adoption of any new practice depends on how target users perceive its relative advantage, compatibility, complexity, trialability, and observability. Within a campus ecosystem, transitioning to sustainability requires students to move through the stages of knowledge and persuasion before making a firm decision to adopt green behaviors [7]. If university systems make green practices feel overly complex or hidden, students face a significant adoption barrier.

This is directly complemented by the Theory of Planned Behavior (TPB) [8], which explains that an individual's behavioral intentions are driven by attitudes, subjective norms, and perceived behavioral control [9], [10]. In environmental contexts, even if a student holds positive attitudes, their actions are limited if they perceive low behavioral control [11], [12]—such as a lack of time, confusing reporting channels, or inadequate facilities. Concurrently, Corporate Social Responsibility (CSR) and Stakeholder Theories highlight that educational institutions have a social contract to integrate ethical practices into their governance [13], [14]. However, if the institutional transparency or the visibility of these systems is weak, stakeholders experience information asymmetry [15], [16]. This disconnect prevents students from internalizing corporate green initiatives, turning active participation into a secondary priority behind their immediate academic tasks.

Literature Review on Campus Sustainability Challenges

Extensive research globally demonstrates a direct and significant correlation between an institution's communication transparency and stakeholder involvement in green programs. Higher visibility of environmental metrics often translates into a greater likelihood of students engaging in conservation behaviors [15]. Conversely, low baseline awareness [17] and a lack of specific knowledge regarding policy details [18] are consistently identified as major barriers to campus sustainability, creating a sense of confusion and detachment. Effective communication programs and tailored educational workshops are seen as vital to overcome these knowledge gaps and build long-term student commitment [19]. Explicitly integrating these topics into the curriculum and establishing clear leadership roles are key methods for strengthening student knowledge retention [20].

Beyond knowledge, economic and financial constraints play a crucial role. Studies across various higher education networks highlight institutional budget limits, personal financial capacities, and the availability of development funding as crucial determinants of green project success [21], [22]. A significant practical barrier observed globally is simply a lack of dedicated funding to support student-proposed sustainability ideas [23], [24]. High implementation costs or the expensive nature of green consumer alternatives further exclude students [25], especially those with limited disposable income. Research also confirms that when universities allocate specific funds to community-proposed ideas, student innovation rates increase [24].

Psychological and practical elements also heavily influence student actions. Demanding academic workloads and time constraints are prominent barriers, as students prioritize coursework over voluntary eco-activities. Furthermore, a lack of immediate, visible outcomes from conservation actions can limit participation [26]. The perceived complexity of tracking or reporting environmental damage can be a substantial barrier, making it challenging for non-technical users to engage [27]. Trust in institutional frameworks is also a significant determinant. Studies show that transparent data shared across campus strengthens social trust and reinforces green behaviors [28].

Local research offers key insights into environmental habits within the Philippines. A study focusing on local HEIs found that while students display strong environmental values and intentions, their actual behavior is often limited by program visibility and a lack of holistic implementation [29]. This highlights a distinct gap between intent and action within local student demographics. Another study on Philippine innovation ecosystems revealed that funding limitations and complex administrative processes frequently constrain student entrepreneurial engagement [23]. This indicates that even when students are motivated, institutional bureaucracy can stifle creative action.

Environmental literacy is a key area of focus in the Philippines, with studies underscoring its importance for overall sustainable development. Research indicates that structured environmental orientations positively correlate with better waste sorting and energy-saving actions on campus [30]. The Commission on Higher Education (CHED) has recognized climate change adaptation and sustainable development as key national agendas, emphasizing the need for universities to accelerate green actions.

In line with global trends, Filipinos' perceptions of convenience and access heavily influence their willingness to adopt green habits. The tendency of consumers to favor cheap, single-use plastics highlights a general preference for immediate convenience over long-term sustainability [31]. While some elite private universities have successfully deployed comprehensive zero-waste systems and energy-saving programs [32], the launch and success of these initiatives across broader local settings depend on student acceptance and easy access to facilities [30].

The reviewed literature consistently highlights that participation in campus sustainability, both globally and in the Philippines, is significantly influenced by a combination of external-structural challenges and individual behavioral factors. Key themes include the crucial role of program visibility, the practical constraint of limited funding, the pressure of academic time limits, and the perceived complexity of administrative processes. Macroeconomic conditions and localized financial realities set the broader context for green innovation. There is a strong consistency across studies regarding the positive impact of explicit training on green behaviors, alongside the inhibiting effects of institutional data blockages and a lack of convenient facilities.

However, despite these insights, there remains a dearth of comprehensive research specifically investigating the multifaceted operational challenges that prevent Filipino students from actively participating in campus green programs. Previous local studies have touched upon student intentions or broad environmental literacy, but a detailed examination of the interconnected financial, behavioral, and organizational barriers specific to a large student population

within the Cordilleran region is limited. This study aims to fill this void by providing a more holistic analysis of these barriers, thereby contributing to a deeper understanding of the dynamics hindering student green engagement in the Philippines.

This study aims to comprehensively investigate the various challenges faced by students in participating in the Greenovation initiatives of the institution. Specifically, it seeks to answer the following research question:

- What challenges do students encounter in participating in Greenovation initiatives of the institution?

Understanding these challenges will empower individual students by informing the development of more targeted green literacy programs and enabling them to take an active role in sustainable development. The findings can also provide valuable insights for university administrators, student councils, and environmental committees to develop more effective communication strategies, create accessible green products, and formulate better policies aimed at encouraging broader student participation. Furthermore, this research can inform institutional plans related to regional sustainability metrics (such as the UI GreenMetric world university rankings [33]) by highlighting critical areas where structural improvements or support programs are most needed. Finally, this study contributes to the existing body of knowledge on stakeholder behavior in emerging educational markets, specifically the Philippines, and opens avenues for further investigation into behavioral finance, green entrepreneurship, and innovation diffusion in local contexts.

2. METHODOLOGY

The study focused on the student population of the University of the Cordilleras in Baguio City, which had an enrollment of 16,367 students spread across 11 academic colleges. To determine an appropriate and statistically representative sample size, Slovin's Formula was applied with a 5% margin of error (e = 0.05). Through this calculation, a total sample size of n = 391 respondents was established. To ensure a fair and proportional representation of students across the diverse academic disciplines, stratified random sampling was employed [35]. The resulting demographic distribution consisted of 45.8% first-year students, 39.6% second-year students, 12.5% third-year students, and 2.0% fourth-year and above students [36]. This breakdown ensured that the data captured the perspectives of both newly admitted students and those with longer exposure to the campus environment.

Data collection was conducted using a structured, self-administered survey questionnaire that was thoroughly reviewed and validated by a research adviser. The diagnostic tool included a specialized multi-selection checklist section that allowed respondents to identify multiple applicable obstacles across four key operational domains:

- Financial and Resource-related barriers
- Awareness and Engagement barriers
- Institutional and Structural barriers
- Educational and Capacity-building barriers

Additionally, the tool included open-ended qualitative text fields ("Others: Please specify") at the end of each section. This allowed the study to capture the authentic voice of the participants, gathering nuanced feedback on unique personal situations, localized infrastructure gaps, and administrative experiences that standard multiple-choice options might miss.

The quantitative data collected from the diagnostic checklists were processed using frequency counts and percentage ranking to build a clear hierarchy of barriers, showing which operational issues were most pervasive across the student body. For the qualitative data gathered from the open-ended text fields, a rigorous process of thematic analysis was conducted [37]. Raw textual responses were systematically coded to identify recurring keywords and phrases, such as "lack of bins," "administrative delay," and "peer indifference". These initial codes were then grouped into broad conceptual themes. Finally, the quantitative rankings and qualitative themes were synthesized and evaluated against the Diffusion of Innovations and Planned Behavior models to explain why these participation barriers persist within the local university environment

3. RESULTS AND DISCUSSION

The The empirical data collected from the 391 student respondents revealed a multi-dimensional matrix of barriers that limit active engagement in campus sustainability. The quantitative findings are organized according to the four diagnostic domains established in the methodology.

3.1 Financial and Resource-Related Challenges

Table 1 summarizes the economic and resource constraints that prevent students from pursuing or supporting green alternatives on campus.

Table 1. Financial and Resource-Related Challenges (n=391)

Indicator	Frequency (f)	Percentage (%)	Rank
Limited Funding for Student Initiatives	251	64.2%	1
High Cost of Green Products	198	50.6%	2
Resource Demands for Setting Up Initiatives	153	39.1%	3

Financial constraints emerged as a primary operational bottleneck. A significant majority of respondents (64.2%) identified **Limited Funding for Student Initiatives** as a major hurdle, noting that student organizations lack the budget required to launch or scale environmental projects. This is directly accompanied by the **High Cost of Green Products** (50.6%), which acts as an economic barrier for students trying to buy sustainable goods on a limited budget. Additionally, 39.1% of students highlighted the high **Resource Demands for Setting Up Initiatives**, showing that the physical materials and coordination required for eco-projects often exceed student capacities.

3.2 Awareness and Engagement Challenges

Table 2 outlines the personal, behavioral, and interest-based barriers that cause an alignment gap between student attitudes and active participation.

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Table 2. Awareness and Engagement Challenges (n=391)

Indicator	Frequency (f)	Percentage (%)	Rank
Lack of Interest and Time	266	68.0%	1
Low Levels of Awareness	207	52.9%	2
Resistance to Change	81	20.7%	3

The data indicates that personal and behavioral factors are the most widespread barriers on campus. **Lack of Interest and Time** was selected by 68.0% of the respondents, making it the highest-ranked challenge across the entire study. This demonstrates that demanding university course schedules often push voluntary sustainability actions aside. Furthermore, **Low Levels of Awareness** affected 52.9% of the sample, revealing that more than half of the student body remains disconnected from the specific details and operational targets of the Greenovation program. **Resistance to Change** (20.7%) presented a smaller but notable behavioral hurdle to modifying daily campus habits.

3.3 Institutional and Structural Challenges

Table 3 ranks the organizational, systemic, and administrative barriers within the university environment.

Table 3. Institutional and Structural Challenges (n=391)

Indicator	Frequency (f)	Percentage (%)	Rank
Limitations in Data Integration and Dissemination	192	49.1%	1
Fragmented Accountability Structures in Reporting	174	44.5%	2
Lack of Consistent Leadership and Student Turnover	148	37.9%	3
Inadequate Conditions for Implementation	130	33.2%	4
Negotiating Campus Bureaucracy	80	20.5%	5

On an institutional level, communication and systemic setups create prominent blockages. **Limitations in Data Integration and Dissemination** was cited by 49.1% of participants, showing that information does not flow efficiently across all campus sectors. **Fragmented Accountability Structures in Reporting** followed closely at 44.5%, indicating that unclear reporting channels confuse students on how to flag environmental issues. Additionally, **Lack of Consistent Leadership and Student Turnover** (37.9%) highlights that green projects regularly lose momentum as student leaders graduate. **Inadequate Conditions for Implementation** (33.2%) and **Negotiating Campus Bureaucracy** (20.5%) further reflect the administrative friction students face when attempting to launch green initiatives.

3.4 Educational and Capacity-Building Challenges

Table 4 presents the technical, training, and skill-based gaps that restrict the student body from participating effectively.

Table 4. Educational and Capacity Building Challenges (n=391)

Indicator	Frequency (f)	Percentage (%)	Rank
Limited Access to Resources	191	48.8%	1
Need for Continuous Stakeholder Training	176	45.0%	2
Lack of Training	175	44.8%	3
Weak Institutional Support	124	31.7%	4

Capacity-building deficiencies present significant operational hurdles. **Limited Access to Resources** was selected by 48.8% of students, indicating that reference materials and tools are difficult to find. Gaps in training were equally critical: the **Need for Continuous Stakeholder Training** (45.0%) and a basic **Lack of Training** (44.8%) emphasize that one-time orientations are insufficient to build long-term sustainability skills. Finally, 31.7% of respondents noted **Weak Institutional Support**, feeling that the university administration does not provide enough active guidance to sustain student-led environmental work.

3.5 Synthesis of Qualitative Feedback

Thematic analysis of the qualitative data collected from the open-ended fields uncovered three primary underlying issues [37]:

- **Visibility Gaps and Administrative Friction:** First-year students explicitly indicated a lack of uniform info dissemination, stating they *"rarely see or hear about it in school"* [16]. This is paired with *"slow response times between different administrative departments,"* which discourages student proactive efforts.
- **Physical Infrastructure Deficits:** Students noted a distinct *"lack of trash cans in other places"* which directly undermines localized waste processing and proper sorting [38].
- **Social Apathy:** Peer-to-peer friction remains a notable issue, with respondents highlighting a general indifference, observing that *"maraming students na walang pakialam sa paligid"* (many students do not care about the surroundings) and *"segregation is not followed despite having segregation bins"* [39].

3.6 Discussion and Synthesis of Critical Bottlenecks

The empirical findings reveal that student engagement in the university's Greenovation program is constrained by an interconnected mix of financial, practical, behavioral, and structural barriers.

The highest-ranked barrier across the entire study was a **Lack of Interest and Time** (f = 266, 68.0\%), highlighting that heavy academic workloads frequently crowd out voluntary environmental actions. This behavioral constraint is directly compounded by the primary financial challenge: **Limited Funding for Student Initiatives** (f = 251, 64.2\%). While students demonstrate a strong baseline willingness to support green values, a clear lack of financial backing and the intensive administrative **Resource Demands** (f = 153, 39.1\%) restrict student organizations from turning creative ideas into tangible campus projects [23]. This finding is consistent with literature noting that higher education sustainability projects often stall when they face insufficient funding or an absence of entrepreneurial support systems [23], [24]. Additionally, the **High Cost of Green Products** (f = 198, 50.6\%) serves as an economic deterrent, creating a direct conflict between green consumer choices and strict student budgetary limits [25].

On an institutional level, structural and communication gaps prevent active engagement. **Limitations in Data Integration and Dissemination** (f = 192, 49.1\%) and **Low Levels of Awareness** (f = 207, 52.9\%) indicate that information dissemination remains uneven across campus [17], [18]. This creates a visibility gap regarding specialized environmental resources and events [15], [16]. When students are disconnected from programmatic data, they are less likely to internalize corporate social responsibility (CSR) initiatives [40]. This supports the Diffusion of Innovations model [6], demonstrating that if an innovation's details are poorly communicated, target stakeholders remain stuck in the pre-adoption stages [7].

Furthermore, **Fragmented Accountability Structures in Reporting** (f = 174, 44.5\%) weaken the sense of collective responsibility [41]. This structural fragmentation explains the behavioral gap observed in water and facility management, where students perform immediate conservation tasks (e.g., turning off taps) but fail to engage in administrative conservation like reporting leaks due to a complex or confusing reporting system [42], [27]. This issue is exacerbated by a **Lack of Consistent Leadership and Student Turnover** (f = 148, 37.9\%), meaning project momentum is regularly lost as student leaders graduate [43].

Diagnostic Domain	Top Identified Barrier	Freq	%	Associated Theoretical Framework
Awareness & Engagement	Lack of Interest and Time	266	68.0%	Theory of Planned Behavior (Ajzen [54])
Financial & Resource	Limited Funding for Student Initiatives	251	64.2%	Innovation Ecosystem Model (Quimba [36])
Institutional & Structural	Limitations in Data Dissemination	192	49.1%	Diffusion of Innovations (Rogers [53])
Educational	Limited Access to Key	191	48.8%	Stakeholder Value
& Capacity	Resources			Alignment (Sulemana [46])

Finally, the data reveals severe capacity-building gaps. A **Lack of Training** (f = 175, 44.8\%) and the **Need for Continuous Stakeholder Training** (f = 176, 45.0\%) underscore that one-time orientations are insufficient [20]. Without continuous educational investment, students lack the specific knowledge and technical skills to bridge the gap between positive environmental attitudes and actual behavior [44], as outlined in the Theory of Planned Behavior [8], [9].

- **Implications of the Study**

The study refines established models on campus sustainability by identifying behavioral and time constraints as the dominant barrier, reinforcing the idea that high academic workloads are fundamental deterrents in university ecosystems. These findings strongly support the Theory of Planned Behavior [8], demonstrating that low perceived behavioral control—driven by unclear reporting channels and inadequate facilities—prevents students from acting on their green intentions [9]. Crucially, the research adds a layer of nuance to Corporate Social Responsibility and Stakeholder Theories by highlighting that administrative policy design is insufficient without matching communication systems; poor data integration creates information asymmetry, leading to student disengagement [14], [15]. Furthermore, the discovery of fragmented reporting structures highlights that organizational friction can stop simple student actions, such as reporting facility leaks [42]. Finally, the emphasis on peer social apathy underscores the role of social norms, showing that a perceived lack of collective compliance can discourage motivated students regardless of their personal environmental values [39].

From a practical perspective, these findings necessitate the creation of targeted environmental literacy programs that simplify reporting processes and focus on building practical skills through student mentoring [20]. To overcome financial hurdles, the university should provide micro-funding and accessible resource grants to empower student organizations to scale green projects [24]. To mitigate confusion and build trust, administrators must enhance transparency, deploy clear digital reporting systems, and run consistent awareness campaigns across all academic units [19]. Additionally, facilities management should resolve physical deficits by optimizing bin placements and cutting response times between administrative departments [38]. By fostering a long-term sustainability mindset and offering continuous training [45], stakeholders can help students move past immediate academic constraints toward active environmental stewardship [46].

4. CONCLUSION

The study reveals that student participation in campus sustainability is hindered by a complex interplay of financial, structural, and behavioral factors. A lack of interest and limited time emerge as the most widespread hurdles, showing that heavy academic workloads regularly crowd out voluntary eco-actions. However, the research highlights that even when students are motivated, an absence of active institutional support prevents deep engagement; many students feel disconnected due to poor data dissemination or

believe that complex administrative bureaucracy makes launching green projects too difficult.

Beyond individual constraints, structural barriers such as fragmented reporting lines and inconsistent leadership turnover act as powerful operational deterrents. These are further compounded by practical infrastructure deficits, uneven training options, and a sense of peer social apathy that undermines basic green rules like waste segregation. Ultimately, the findings suggest that increasing student engagement in the Greenovation program requires more than just publishing rules—it demands a holistic approach that builds convenient reporting systems, provides accessible project funding, and maintains continuous capacity-building workshops for the average student.

Recommendations

Based on the study's findings and their implications, the following recommendations are proposed to foster greater student participation in the Greenovation initiatives of the university:

Develop a Continuous, Practical Green Literacy Program: The university should establish a regular environmental training framework integrated into student orientations and student leader training [20]. This program should focus on practical campus skills—such as proper waste sorting, energy auditing, and environmental project design—using student-led workshops and mentorship models to build long-term commitment [30].

Establish a Student Micro-Funding and Resource Grant Mechanism: To bypass financial hurdles, the administration should allocate a dedicated budget category for student-proposed eco-initiatives. Student organizations should have clear, streamlined access to micro-grants to fund localized sustainability projects, reducing the personal resource demands that limit student action [24].

Deploy a Unified Digital Infrastructure Reporting System: To eliminate fragmented reporting lines, a central digital platform or mobile application feature should be introduced, allowing students to easily report facility leaks, broken recycling bins, or energy waste [27]. This system should feature transparent tracking metrics to show students that their reporting actions result in immediate maintenance responses [26].

Optimize Campus Physical Infrastructure and Facility Placement: Facilities management must address localized infrastructure shortages by ensuring that clearly labeled segregation bins are uniformly distributed across all high-traffic campus zones [38]. This must be supported by campaigns in local student circles to reduce peer social apathy and reinforce proper waste sorting habits [39].

Conduct Future Quantitative and Inter-Institutional Research: Future studies should implement longitudinal quantitative models to measure the direct impact of specific training programs on student action rates [45]. Additionally, research should explore the specific drivers of social apathy across different year levels [39] and evaluate how digital tracking tools can be used to improve institutional green performance metrics [33].

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