Challenges in Sustainability
https://www.acadlore.com/journals/CIS

Sustainability Visibility, Awareness, and Student Engagement in Higher Education: An Exploratory Study

Martha Katafygiotou[1*], Maria Aftzaki[2], Thomas Dimopoulos[1]

[1] Department of Real Estate, Neapolis University Pafos, 8042 Pafos, Cyprus
[2] Department of Maritime Transport and Commerce, Frederick University, 3080 Limassol, Cyprus

[*] Correspondence: Martha Katafygiotou (m.katafygiotou@nup.ac.cy)

Received: 06-30-2026 **Revised:** 10-05-2026 **Accepted:** 10-10-2026

Citation: Katafygiotou, M., Aftzaki, M., & Dimopoulos, T. (2026). Sustainability visibility, awareness, and student engagement in higher education: An exploratory study. *Chall. Sustain.*, *14*(5), 1117–1132. https://doi.org/10.56578/cis140513.

© 2026 by the author(s). Published by Acadlore Publishing Services Limited, Hong Kong. This article is available for free download and can be reused and cited, provided that the original published version is credited, under the CC BY 4.0 license.

Abstract: This study explores students' perceptions, awareness, and engagement with sustainability and energy-efficiency initiatives in higher education institutions, with particular attention to the visibility of campus sustainability practices. An exploratory cross-sectional survey was conducted among 149 students from five universities. Data were collected through a structured questionnaire and analyzed using descriptive statistical techniques, including frequencies, percentages and mean scores. Students demonstrated strong environmental concern and positive attitudes towards sustainability. However, awareness of institutional sustainability initiatives, environmental management systems (EMS) and energy-efficiency measures was generally low. Limited communication and visibility of sustainability actions were identified as potential barriers to student engagement. The findings should be interpreted in light of the convenience sampling approach and reliance on self-reported perceptions. Future studies could employ broader samples and more advanced analytical methods. Higher education institutions can strengthen sustainability engagement by improving communication, increasing the visibility of sustainability initiatives and creating more opportunities for student participation. Greater student involvement in sustainability initiatives may contribute to the development of environmentally responsible attitudes, behaviors and sustainability competencies. The study provides exploratory evidence on sustainability visibility and student engagement in higher education and highlights the importance of communication and institutional transparency in fostering sustainability awareness and participation.

Keywords: Sustainability visibility; Student engagement; Higher education; Sustainability awareness; Energy efficiency; University campuses

1. Introduction

Sustainability is now at the heart of the mission for many higher education institutions, which are playing a growing role in shaping the values, behaviors, and skills needed for a more environmentally responsible society. While research and academic initiatives are crucial, there is a growing consensus that universities need to lead by example, demonstrating sustainability in their own day-to-day operations, before they can truly inspire future generations. This is particularly true when it comes to energy efficiency and resource conservation. Because universities operate at the intersection of education and campus management, they are uniquely positioned to foster sustainable behaviors and promote environmental responsibility within their communities (Purcell et al., 2019).

The global movement toward sustainability, shaped by the United Nations' 2030 Agenda and the Sustainable Development Goals (SDGs), has made Education for Sustainable Development (ESD) a key force in changing the way society thinks and acts. Universities support these goals not only through teaching and research, but also by making their campuses more energy efficient, managing resources and waste responsibly, and using renewable energy in their operations (United Nations, 2015). In Cyprus, national initiatives like the Unit for Education for the Environment and Sustainable Development (EESD) have stepped up efforts to promote ESD in both formal and informal education. However, consistently weaving these practices into higher education remains an ongoing challenge (UNECE, 2025).

Even with strong global momentum, universities are still inconsistent in how they bring sustainability into everyday practice. While many institutions publicly commit to sustainability and support research in this area, only a small number succeed in weaving these principles throughout their governance, operations, and campus culture (Disterheft et al., 2012; Leal Filho et al., 2016; Too & Bajracharya, 2015). This reality holds true in Cyprus as well, where there's very little concrete evidence about what's happening on campuses. Most of what we know comes from institutional websites, rather than independent research or real-world case studies (Aftzaki, 2024).

One of the main challenges facing Cypriot universities is the disconnect between sustainability initiatives and student awareness. Our survey of 149 students from five different institutions found that, although students care deeply about environmental issues, most have little or no knowledge about their campus's environmental management systems (EMS), energy-saving measures, or even whether sustainable operations exist at all (Aftzaki, 2024). When these efforts aren't visible or clearly communicated, students are less likely to get involved, leading to lower engagement and uneven sustainability habits. This pattern matches what's been seen internationally: when sustainability initiatives are fragmented or poorly explained, it's hard to achieve real cultural change on campus (Evangelinos & Jones, 2009)

With higher education expanding quickly in Cyprus and universities increasingly aligning with European sustainability policies, there's a real opportunity to foster environmental citizenship on campus. Greener universities with energy-efficient buildings, sustainable real estate practices, and integrated EMS, provide hands-on ways for students to learn, build practical skills, and develop new habits. These changes don't just improve campus life; they help drive lasting cultural transformation by shaping how students think and act long after they leave university (Leal Filho et al., 2019b).

This study explores how students at Cypriot universities perceive, experience, and engage with sustainability efforts related to environmental management and energy use on their campuses. Attention is given to students' awareness of institutional sustainability initiatives, the perceived visibility of these practices, and their reported engagement with sustainability-related activities. By examining these dimensions from the student perspective, the study seeks to provide exploratory evidence that can inform university sustainability strategies and contribute to a more integrated culture of sustainability in higher education. From a sustainable campus management perspective, these student perceptions provide insight into how institutional sustainability practices are communicated, made visible, and connected to the everyday campus experience. Over the past two decades, sustainability has become a much bigger focus in higher education, reflecting widespread concern about environmental damage, constantly rising energy use, and actual climate change phenomena. Universities are at the heart of this transition, not only because they educate future leaders, but because they can influence society, conduct practical research, and prove what sustainable operations look like in action. This transition isn't just about adding new topics to the curriculum; the shift is about making sustainability a part of everyday campus life, from how resources are managed to how everyone on campus thinks and acts (Alshuwaikhat & Abubakar, 2008). Studies consistently highlight that for universities to truly lead in sustainability, they need to weave environmental values into both their curricula as well as the way they design and manage their facilities, covering everything from building use, energy and waste to transport, purchasing and awareness (Omazic & Zunk, 2021).

1.1 Sustainability and Environmental Management in Higher Education

Early research on sustainable universities often highlighted the importance of EMS as a starting point for making sustainability a lasting part of campus life. For example, Alshuwaikhat & Abubakar (2008) suggested that putting an EMS in place, especially when it's paired with inclusive governance and real stakeholder involvement, gives a campus a strong foundation for sustainability. Their approach shows that technical fixes, like cutting pollution or reducing waste, aren't enough on their own; what really matters is creating lasting changes in how the institution operates and thinks. More recent studies back this up, arguing that true sustainability in higher education needs a coordinated effort that brings together governance, day-to-day operations, teaching, and partnerships with the wider community (Hernández-Díaz et al., 2021).

Universities are gradually turning to formal certification systems like ISO 14001 or the European Eco-Management and Audit Scheme (EMAS) to help organize their environmental responsibilities and meet compliance standards Díaz de Junguitu & Allur (2019) examined the adoption of EMS across different organizational contexts, highlighting variations in their implementation and integration into organizational practices. But how effective these systems are can really depend on the university's culture, the resources they have, and how committed their leadership is. Salcă-Rotaru (2020) also pointed out that while EMS initiatives in universities can go "beyond regulations" and offer a way to make real strategic improvements, they often run into hurdles like weak monitoring, scattered responsibilities, and not enough involvement from faculty.

Apart from formal systems, more general sustainability integration into university governance has been investigated extensively as well. Hernández-Díaz et al. (2021) stressed the importance of embedding sustainability into all levels of the institution, policy, curriculum, research and campus operations, in order to create impact. The results show that the resources management and stakeholder engagement is much better in the universities where

sustainability governance frameworks exist. In literature, leadership as a necessary lever in moving sustainability forward is a consistent theme as senior administrators and dedicated sustainability officers serve as primary change agents for institutions (Hernández-Díaz et al., 2021; Omazic & Zunk, 2021).

1.2 Energy Efficiency, Campus Operations, and Behavioral Drivers

Energy consumption on university campuses contributes substantially to their environmental footprint and is a major focus of sustainability strategies. The characteristics of higher education buildings also mean a different operational profile, including various occupancy patterns, specialized laboratory facilities, and extended operating hours. Consequently, university buildings tend to consume more energy than other institutional buildings of similar size (Soares et al., 2015). However, technical interventions rarely achieve anticipated savings when not complemented with user engagement. Retrofitting measures, such as optimized heating, ventilation, and air conditioning (HVAC) systems, building envelope upgrades, and LED lighting, can improve building performance (Ürge-Vorsatz et al., 2016).

Behavioral factors play a major role in how much energy is used on campus, but they're often overlooked. Studies on student energy use show that things like awareness, social norms, a sense of control, and personal responsibility all have a strong impact on the choices students make about saving energy (Bakar et al., 2021; Horhota et al., 2014). For instance, Li et al. (2024) used the Theory of Planned Behavior (TPB) to show that students are more likely to adopt energy-saving habits when their university makes sustainability visible, communicates clearly, and shows that student values align with campus priorities. Similarly, Rebelatto et al. (2022) found that energy efficiency programs, like feedback tools, awareness campaigns, or hands-on training, work best when students feel like active participants, not just passive users of campus resources.

Beyond just behavior, factors like thermal comfort and students' sense of control over their environment also affect how energy is used in campus buildings. Ma (2022) found that when students feel they have control over things like temperature and air quality, they're more willing to be flexible and adopt energy-saving habits. Their research suggests that using user-friendly control systems, real-time feedback tools, and adaptive ventilation can improve both comfort and energy efficiency.

But student engagement with sustainability goes beyond just energy use. While many students say they care about environmental issues, studies show this concern doesn't always lead to real action (Dagiliūtė et al., 2018). Research points out that clear communication and making sustainability efforts visible are crucial if universities want students to get involved, otherwise, low awareness can create a gap between what institutions say they value and what actually happens day to day (Bakar et al., 2021; Evangelinos & Jones, 2009; Too & Bajracharya, 2015). This pattern shows up in international research and fits what we see in Cyprus too, where many students aren't sure what EMS exist on their campuses or how they make a difference (Aftzaki, 2024).

1.3 Assessment Frameworks and the Need for Integrated Sustainability Approaches

A variety of tools and frameworks are currently available to help universities measure, compare, and improve their sustainability efforts. One of the most popular is the Sustainability Tracking, Assessment & Rating System (STARS), which is run by the Association for the Advancement of Sustainability in Higher Education (AASHE) (AASHE, 2019). STARS looks at four main areas: academics, engagement, operations, planning and administration. It's become a vital resource for universities that want a clear structure for reporting on their progress and seeing how they stack up against others.

Another well-known framework is the Universitas Indonesia (UI) GreenMetric World University Ranking, which assesses universities based on factors like campus infrastructure, energy use and climate policies, waste and water management, transportation, and sustainability education. Still, some researchers have pointed out issues with the way GreenMetric works. For example, Lauder et al. (2015) noted that its scoring system and heavy reliance on self-reported data can make it hard to fairly compare universities, and others have argued that it doesn't always reflect regional or institutional differences.

Other frameworks suggest going beyond just environmental numbers by including things like governance, education, research, and community engagement in the mix. Dawodu et al. (2022), in a review of campus sustainability indicators, identified 15 key areas universities should pay attention to when building their strategies, stressing how environmental, social, and economic factors all connect. Similarly, Oliveira & Proença (2025) argued that running a truly sustainable campus means focusing not only on carbon neutrality, waste, water, and transportation, but also on circular economy ideas, strong leadership, and getting everyone involved. Horan & O'Regan (2021) proposed a streamlined set of sustainability indicators for HEIs that enable meaningful international comparisons while minimizing data collection burdens. Their framework focuses on seven domains: on-site energy use, carbon emissions, waste, travel, education, research, and governance. This approach supports monitoring and policy decision-making across diverse institutional contexts. Even with all these frameworks available, there are still loopholes when it comes to putting sustainability into actual practice, reporting on progress,

and involving everyone who should have a stake. Many universities make bold statements about their commitment to sustainability, but there's often a noticeable difference between what they say and what's happening on the ground. Especially in how campus operations run and how many students and staff are involved (Aftzaki, 2024; Horhota et al., 2014; Li et al., 2024; Too & Bajracharya, 2015). These gaps tend to be made worse by things like tight finances, a lack of coordinated leadership, poor communication, and sustainability efforts that aren't well connected across the university (Hernández-Díaz et al., 2021; Lauder et al., 2015; Salcă-Rotaru, 2020).

In Cyprus, there's still not much concrete evidence about how sustainability is actually put into practice on university campuses. While it's clear that universities take part in research collaborations, update their curricula, and run some sustainability projects, campus-wide EMS and energy-saving initiatives often aren't very visible or thoroughly evaluated (Aftzaki, 2024; Franco et al., 2025; Putra et al., 2024). With Cyprus aligning more closely with European sustainability goals and its higher education sector growing, it's especially important to have research that focuses on students' awareness, perceptions, and involvement in campus sustainability and energy-efficient practices. Against this background, the present exploratory study addresses the following research questions:

RQ1. What levels of sustainability awareness, environmental concern, and self-reported sustainable behavior are observed among the surveyed students?

RQ2. To what extent are surveyed students aware of sustainability initiatives and energy-efficiency measures implemented or communicated by their universities?

RQ3. What patterns emerge between students' perceived visibility of institutional sustainability practices and their reported engagement and willingness to participate in sustainability-related activities?

1.4 Conceptual Framework

This study draws on the TPB as a conceptual lens for interpreting students' sustainability-related attitudes and behaviors (Li et al., 2024). TPB proposes that behavioral intentions are shaped by attitudes, subjective norms, and perceived behavioral control. In the present exploratory study, these concepts provide a theoretical context for understanding patterns of student awareness, engagement, and environmentally responsible behavior; however, the study does not seek to formally test the TPB model or the relationships among its constructs. Building on TPB, this study also looks at how the visibility of sustainability initiatives and the way sustainability is governed at the institutional level affects student engagement with environmental and energy-saving practices. Sustainability governance in higher education isn't just about having policies on paper, it's about putting those policies into practice, keeping everyone informed, involving students and staff in decision-making, and making sure the EMS is part of everyday campus life (Alshuwaikhat & Abubakar, 2008; Hernández-Díaz et al., 2021; Omazic & Zunk, 2021). However, earlier studies have shown that these efforts often fall short if students don't see them in action or if they feel disconnected from their daily experience on campus (Evangelinos & Jones, 2009; Too & Bajracharya, 2015).

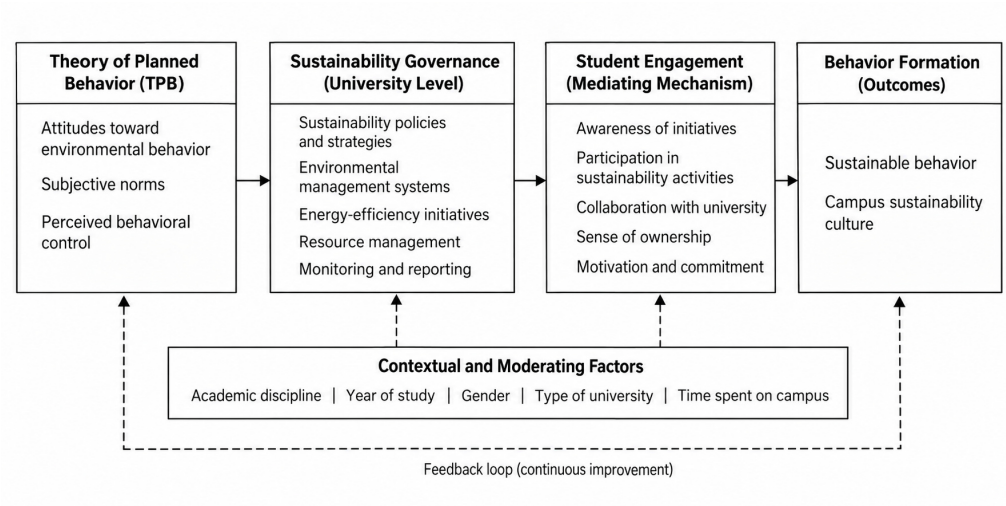


Figure 1. Conceptual framework showing the links between sustainability governance, institutional visibility, and student engagement on university campuses

The framework behind this study starts from the belief that having good intentions about the environment isn't enough on its own to create real, lasting changes in how students act. What really tips the balance is whether sustainability efforts, like energy-saving measures or environmental strategies, are visible, well-communicated, and woven into daily campus life. When students can see and understand what's being done, they're much more

likely to get involved. That kind of engagement not only encourages individual action, but also helps build a stronger, more sustainable campus culture overall.

Figure 1 presents the conceptual framework informing the study. It illustrates the theoretical context through which student attitudes, institutional visibility, sustainability governance, and engagement are considered. The framework is used as an interpretive guide rather than as a model that is formally tested through the empirical analysis.

However, limited empirical evidence exists on how students in Cypriot universities perceive the visibility and communication of institutional sustainability and energy-efficiency initiatives and how they engage with such practices. This study addresses this gap by examining sustainability awareness, institutional visibility, and student engagement across five Cypriot universities. The present study defines institutional sustainability visibility as the degree to which institutional sustainability and energy efficiency initiatives are recognized, visible and communicated to students through their educational experiences. This includes students' knowledge of what the institution is doing about sustainability and how they share this knowledge, as well as students' perception of how much sustainability-related practices, infrastructure, and operations exist on campus.

2. Methodology

2.1 Research Design, Data Collection, and Sampling

This study uses a quantitative research design, following a positivist approach that focuses on collecting measurable data to better understand how students see sustainability on their campuses. This method builds on the foundation set out in the original thesis and is in line with what's commonly done in research on environmental behavior and higher education (Creswell, 2023). To gather data, we sent out a structured online questionnaire to students at five Cypriot universities: Cyprus University of Technology, University of Nicosia, European University Cyprus, Frederick University, and Neapolis University Pafos. These universities were chosen because of their size and because they make information about their sustainability efforts publicly available. Students from all five institutions participated; however, the data were analyzed and reported at the aggregate level because the study was intended to explore overall patterns in student perceptions rather than to compare individual universities.

The survey asked 20 questions in total, covering things like student demographics, awareness of sustainability issues, and opinions about how well their campus manages environmental matters. There was also an open-ended question where students could share their own ideas for improvement. The questionnaire was developed using established research in both sustainability and higher education, and we tested it out with six people first to make sure the questions were clear and relevant (Tuckman & Harper, 2012). Questions 1–8 collected demographic and background information, while Questions 9–12 assessed general awareness and knowledge of environmental sustainability. Questions 13–19 consisted of multi-item scales addressing personal sustainable behaviors (Q13), knowledge of university sustainability activities (Q14), participation in sustainability-related activities (Q15), perceived presence and visibility of sustainability-related campus practices and infrastructure (Q16), perceptions of university sustainability (Q17), environmental attitudes, concern and willingness to engage (Q18), and priorities for university sustainability action (Q19). The final question (Q20) was open-ended and invited students to propose incentives that universities could provide to encourage environmentally sustainable attitudes and behaviors. Response formats included multiple-choice questions and frequency, knowledge, perceived-presence, agreement, and priority scales. Responses to the open-ended question (Q20) were qualitatively reviewed and categorized according to the type of incentive proposed. Similar responses were grouped into common response categories, and their frequencies were calculated to provide supplementary descriptive evidence alongside the quantitative findings. A summary of the questionnaire structure and measurement domains is provided in Appendix.

Because a complete sampling frame of students across the participating institutions was not available, a non-probability convenience sampling approach was employed. The study was designed to provide an exploratory overview of student perceptions across Cypriot universities rather than to evaluate or compare the sustainability performance of individual institutions. Responses from the five participating universities were therefore pooled for analysis to preserve institutional confidentiality and to avoid attributing students' perceptions to specific universities. Accordingly, the findings are reported at the aggregate level and should not be interpreted as an assessment or ranking of the sustainability performance of any participating institution.

Under the convenience sampling procedure, the questionnaire was disseminated electronically to students at five public and private universities in Cyprus, which were selected based on their size, location, and evidence of academic and research activity related to environmental sustainability. Based on standard sample-size calculations for a finite population and national higher-education population data, a target sample size of 378 students was initially estimated. A total of 149 complete and validated questionnaires were ultimately included in the analysis. Because the target sample size of 378 did not represent the number of students directly invited to participate, a conventional survey response rate could not be calculated. The final sample therefore represents approximately 39.4% of the calculated target sample size. For analytical purposes, the survey questions were organized into

thematic domains covering sustainability awareness, institutional visibility, student engagement, and energy-related behaviors, reflecting dimensions identified in previous research (Dagiliūtė et al., 2018; Vasconcelos et al., 2021). The questionnaire was informed by the existing literature and refined through pilot testing to improve the clarity and relevance of the questions (Creswell, 2023; Tuckman & Harper, 2012). As the present study is primarily descriptive and exploratory, the findings are interpreted as patterns within the surveyed sample rather than as statistically representative estimates for the wider student population.

2.2 Survey Instrument and Analysis

The questionnaire was designed based on established sustainability survey models and campus operations frameworks, incorporating elements commonly used in research on environmental awareness, student engagement, and energy-related behavior (Vasconcelos et al., 2021). The 20-question instrument included demographic and background questions, questions addressing sustainability awareness and knowledge, and scaled items examining students' environmentally responsible behaviors, awareness of university sustainability activities, participation and engagement, perceived visibility of sustainability-related campus practices, environmental attitudes and concern, and priorities for university sustainability action. The final question was open-ended and invited students to suggest measures that universities could adopt to encourage environmentally sustainable attitudes and behaviors. An overview of the questionnaire structure, including its thematic sections and the main areas examined, is presented in Appendix.

Data were analyzed using descriptive statistics (frequencies, percentages, and cross-tabulations), allowing for the identification of awareness levels, engagement patterns, and perceptions of institutional performance. Institutional sustainability visibility was assessed primarily through survey items evaluating students' knowledge of university sustainability activities (Q14) and their perceptions regarding the presence of sustainability-related practices, infrastructure, and operational measures on campus (Q16). These dimensions enabled visibility to be examined from both an informational perspective (awareness and communication) and a campus-practice perspective (perceived presence of observable sustainability measures). Responses to the open-ended question (Q20) were reviewed and descriptively categorized to complement the quantitative findings. Similar responses expressing the same or closely related suggestions were grouped into common thematic categories. These qualitative responses were utilized as supplementary descriptive evidence, rather than being subjected to a separate qualitative analysis. The internal consistency of the multi-item questionnaire dimensions was assessed using Cronbach's alpha. The resulting coefficients were 0.789 for Q13 (9 items), 0.928 for Q14 (7 items), 0.928 for Q15 (7 items), 0.894 for Q16 (18 items), 0.728 for Q17 (9 items), 0.731 for Q18 (10 items), and 0.955 for Q19 (14 items). All coefficients exceeded 0.70, indicating acceptable internal consistency across the multi-item questionnaire dimensions.

2.3 Study Scope, Criteria, and Limitations

Only students who were currently enrolled at the participating institutions completed all questionnaire items, and provided informed consent were included in the study. Partial, duplicate, or inconsistent responses were excluded during the data-cleaning process. The scope of the research is focused on student perceptions, with institutional sustainability practices being evaluated as they were experienced and interpreted by students, rather than through direct institutional audits.

Several methodological limitations should be acknowledged. First, the use of convenience sampling restricts the representativeness of the findings, although this approach is commonly employed in higher-education perception studies and was necessitated by access constraints. Second, the cross-sectional design of the study means that perceptions were captured at a single point in time, without accounting for seasonal or annual variations in sustainability initiatives or energy use. Third, reliance on self-reported data may introduce risks of socially desirable responses or varying interpretations of sustainability terminology. Finally, the availability of institutional sustainability information in Cyprus remains inconsistent, with many universities providing only partial or promotional material online, thereby limiting deeper triangulation regarding operational practices.

Furthermore, because the analysis was conducted using pooled data, the study does not assess institution-specific differences or the proportional representation of individual universities within the final sample; this limits conclusions regarding the representativeness of the findings at the institutional level.

Despite these limitations, the methodology is considered to provide a robust and structured overview of student awareness and engagement in sustainability and energy-efficiency practices across Cypriot university campuses, offering a solid foundation for the empirical findings presented in the subsequent sections.

3. Results

In this section, the empirical findings obtained from 149 student responses across five Cypriot universities are

presented, accompanied by an integrated discussion that links these results to international research. The analysis focuses on sustainability awareness, sustainable and energy-related behavioral patterns, and perceptions of institutional sustainability initiatives. All referenced figures and tables are listed at the end of the section.

3.1 Student Demographics

The demographic profile of respondents is summarized in Table 1. The sample was predominantly composed of undergraduate students aged 18–25, representing a wide range of academic fields including humanities, business, engineering, and science. This distribution is considered to broadly reflect the composition of the tertiary education population in Cyprus and is regarded as ensuring sufficient diversity for the analysis of sustainability perceptions across faculties. In addition, a significant portion of respondents (60.4%) indicated a satisfactory level of presence in university premises daily.

Table 1. Respondent demographic profile

Variable	Category	Percentage (%)
Gender	Male	55.7
	Female	44.3
Age	18–25	93.3
	26–35	5.4
	36+	1.3
Field of study	Humanities/Social Sciences	32.9
	Business	15.4
	Engineering	12.1
	Other fields (not separately reported)	39.6

Note: The three individually reported fields of study account for 60.4% of respondents. The remaining 39.6% represents fields not separately identified in the available aggregated data.

3.2 Sustainability Awareness and Environmental Concern

To offer a more cohesive understanding of the survey results, composite sustainability indicators were created. These indicators were formed by grouping related questionnaire items into broader categories representing environmental concern, institutional awareness, behavioral engagement, and perceived sustainability visibility. This approach aligns with established methods for assessing sustainability perceptions in higher education research (Dagiliūtė et al., 2018; Vasconcelos et al., 2021). The indicators were calculated using the average scores from responses on a five-point Likert scale, which allowed for a comparative analysis of student perceptions across these key sustainability dimensions. The resulting mean scores were used as descriptive summary measures to facilitate comparison across the dimensions examined. The qualitative categories reported in Table 2 (Low, Moderate, Moderate–High, and High) were used to provide a descriptive interpretation of the resulting mean scores rather than to represent independently validated psychometric classifications. Furthermore, the utilization of grouped behavioral dimensions (see Table 2) is consistent with research on sustainability behavior in higher education that is based on the TPB (Du & Pan, 2022; Li et al., 2024).

For descriptive purposes, the scores reported in Table 2 were categorized as follows: 1.00–2.49 = Low, 2.50–3.49 = Moderate, 3.50–3.99 = Moderate–High, and 4.00–5.00 = High. These categories are intended to facilitate interpretation of the relative patterns observed across the survey dimensions and do not represent independently validated psychometric classifications or thresholds. The indicators summarize selected dimensions of sustainability awareness, perceptions, and engagement examined through the questionnaire, with mean scores presented on a five-point scale.

Table 2. Composite sustainability awareness and engagement indicators

Indicator	Mean Score (1–5)	Interpretation
Environmental concern	4.3	High
Sustainability literacy	2.8	Moderate
Awareness of university sustainability initiatives	2.4	Low
Awareness of energy-efficiency measures	2.2	Low
Personal energy-saving behavior	3.7	Moderate–High
Willingness to participate in sustainability activities	4	High
Perceived institutional communication effectiveness	2.3	Low
Perceived visibility of sustainability actions	2.1	Low

The study's results indicate that students exhibit a strong concern for the environment, particularly in relation

to how environmental damage negatively affects human health. As depicted in Figure 2, a substantial majority expressed agreement or strong agreement with this assertion. Nevertheless, despite these firm attitudes, their understanding of sustainability concepts was inconsistent; many students expressed uncertainty regarding specific sustainability concepts or terminology related to EMS. This contrast, characterized by robust environmental values coupled with a variable level of sustainability knowledge, aligns with trends observed internationally among university student populations (Du & Pan, 2022). These findings suggest that sustainability concepts and related institutional communication may not be sufficiently visible or consistently recognized by the surveyed students.

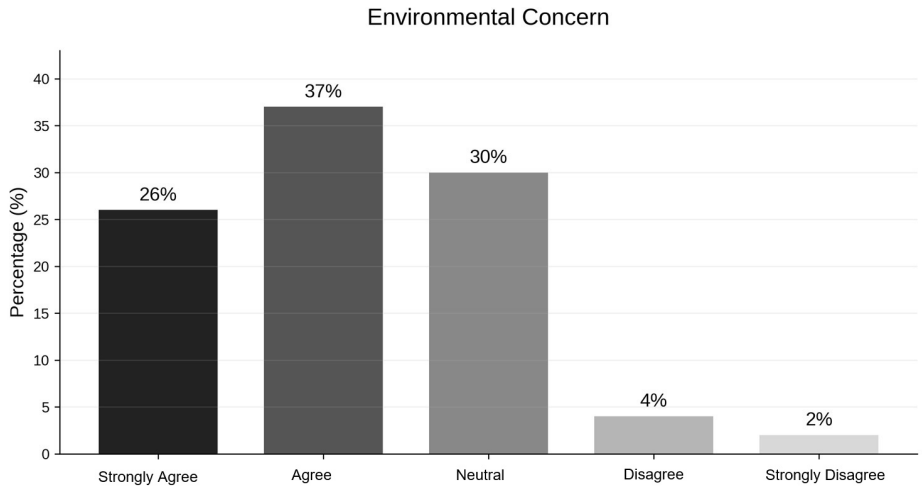


Figure 2. Students' concern about environmental impacts on human health

3.3 Sustainable Lifestyle Behaviors and Energy Practices

Mixed engagement in sustainable daily practices was reported by students. As shown in Figure 3, the most common energy-saving behavior was identified as switching off electrical appliances when not in use, with over 70% of students indicating that this was done "often" or "always". Water-saving practices were found to be moderately consistent, while behaviors requiring financial investment, such as the purchase of energy-efficient appliances (Figure 4), were reported less frequently, with many students indicating inconsistent or occasional adoption. These results exemplify the widely recognized attitude–behavior gap, in which support for environmental protection is expressed but sustainable practices are not consistently adopted when barriers related to cost, convenience, or effort are present (Horhota et al., 2014). Recycling behavior also varied across respondents, while reported transportation choices appeared to reflect structural constraints, such as limited public transport options.

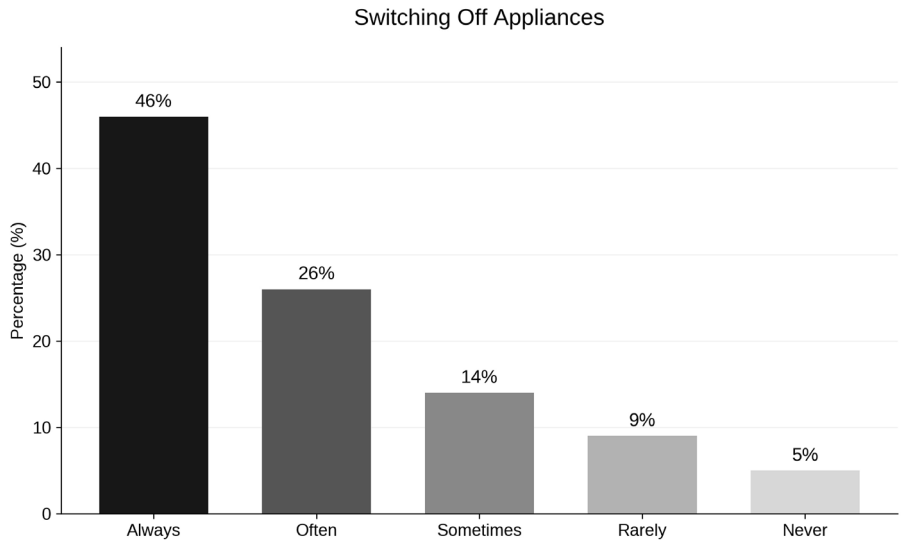


Figure 3. Frequency of switching off electrical appliances when not in use

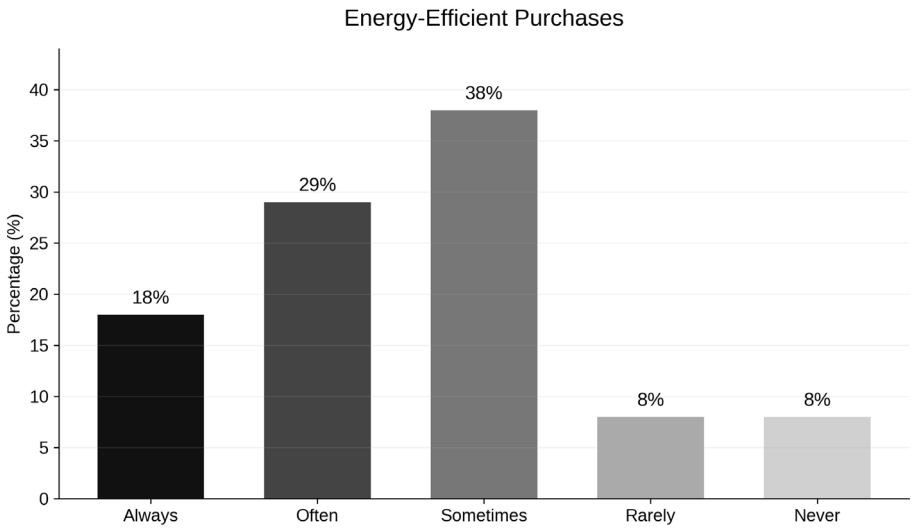


Figure 4. Frequency of purchasing energy-efficient household or electronic products

The data suggest that while Cypriot students exhibit pro-environmental attitudes, their actions are selective and contingent upon external enabling conditions. This observation is consistent with existing literature on energy behavior (Horhota et al., 2014; Mouchrek et al., 2022).

3.4 Awareness of University Sustainability Initiatives

A prominent finding was the limited student awareness of sustainability-related operations and initiatives at their universities. Over half of the students surveyed indicated they had minimal to no knowledge regarding their institution's environmental strategies, sustainability initiatives, or energy-efficiency measures. Specifically, students reported a lack of information and communication concerning environmental missions, details about academic research activities, conferences, workshops, and volunteer opportunities. This deficit in awareness is visually represented in Figure 5.

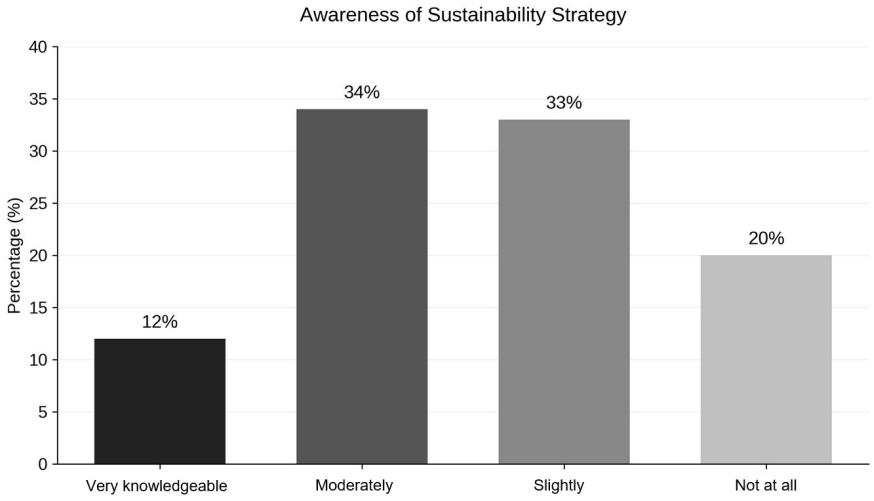


Figure 5. Student awareness of university sustainability strategies and initiatives

Students reported limited awareness of energy-efficiency measures on their campuses. Many respondents were uncertain whether university buildings incorporated energy-efficient systems, whether energy use was monitored, or whether renewable-energy technologies were in place. This lack of awareness isn't just a Cyprus issue; studies from around the world show that without clear reporting and communication across the campus, energy-efficiency efforts often go unnoticed by students (Emanuel & Adams, 2011; Mbah, 2019). Limited perceived visibility of energy-related information may reduce opportunities for students to encounter behavioral cues associated with energy conservation. Studies indicate that when users can access real-time energy dashboards, building

performance labels, or comparative energy displays, their energy-saving behaviors tend to improve significantly (Du & Pan, 2022). Within the surveyed sample, limited awareness of such tools occurred alongside relatively limited engagement with some energy-related sustainability practices. The open-ended responses provided supplementary context to the quantitative findings. Responses to the open-ended question (Q20) were grouped into common categories based on the type of incentive proposed. The most frequent response was the adoption of more sustainable campus practices (34.9%), followed by non-monetary incentives for student engagement (18.8%), provision of classes, seminars, or information on ESD (13.4%), and promotion of campus sustainability events (11.4%). A further 11.4% of responses indicated uncertainty, 6.0% were categorized as invalid, and 4.0% proposed no action. These findings provide supplementary descriptive context to the quantitative results concerning students' priorities for university sustainability action.

Such suggestions align with the best global practices in higher education energy management (Emanuel & Adams, 2011). This pattern suggests possible communication and perceived visibility gaps from the student perspective. Studies from around the world indicate that sustainability actions fall short when they're carried out but are not effectively communicated to the campus community, students, academic and administrative staff (Emanuel & Adams, 2011; Mouchrek et al., 2022). The patterns observed among the surveyed students are broadly consistent with this literature. From the student perspective, limited visibility or integration of sustainability initiatives into daily campus life may be associated with lower awareness and recognition of such initiatives.

The findings indicate that students expressed a strong desire for their universities to become more environmentally sustainable, with 72% agreeing or strongly agreeing with this statement (Figure 6). Separately, 62.5% agreed or strongly agreed that universities should prioritize creating a greener campus before introducing related teaching and academic research initiatives (Table 3).

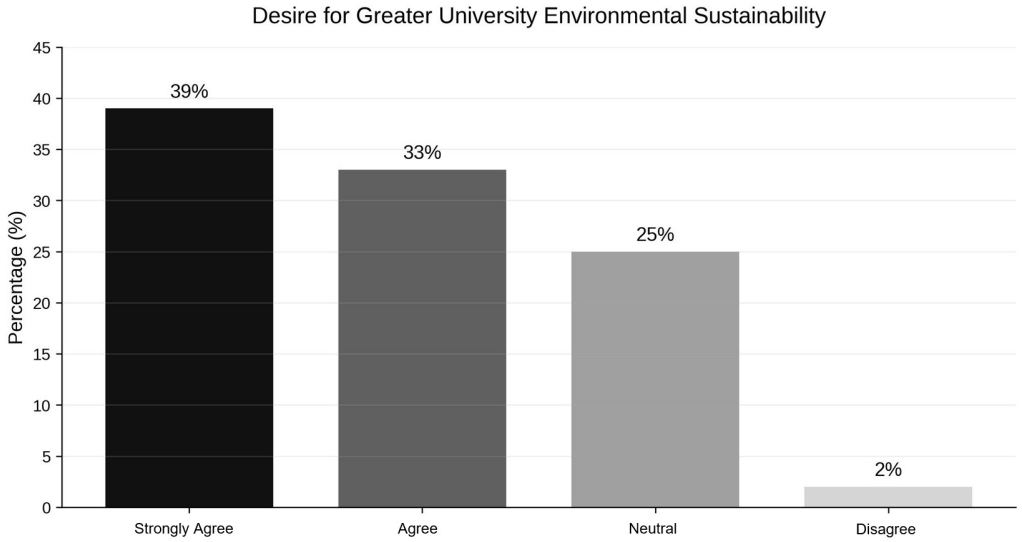


Figure 6. Student opinion on the improvement of university environmental sustainability practices

Table 3. Student opinion of greener campus practices

Response Category	Percentage (%)
Strongly agree	28.90
Agree	33.60
Neutral	25.50
Disagree	12.10

Table 4 presents a descriptive summary of the main sustainability-related patterns and perceived gaps identified from student responses. The findings suggest that the most substantial perceived gaps relate not necessarily to environmental attitudes, but rather to the visibility, communication, and operational transparency of sustainability practices within university campuses. Students generally demonstrated strong support for environmentally responsible universities; however, many perceived sustainability practices as insufficiently communicated or disconnected from daily campus experience. The findings suggest that, from the students' perspective, greater visibility, communication, and opportunities for participation could strengthen the connection between institutional sustainability initiatives and everyday campus experience. In particular, the findings indicate that institutional visibility may represent an important enabling condition associated with student awareness, engagement, and energy-conscious behavior. This supports emerging literature emphasizing that operational

sustainability measures achieve greater behavioral impact when students can directly observe, understand, and participate in environmental actions within campus environments (Emanuel & Adams, 2011; Mbah, 2019; Mouchrek et al., 2022). This observation is also relevant to international university sustainability assessment frameworks, such as STARS and UI Green Metric, which increasingly emphasize stakeholder engagement, campus operations, communication transparency, and participatory sustainability governance as core dimensions of institutional sustainability performance (Leal Filho et al., 2019a). The qualitative descriptors presented in Table 4 summarize the relative prominence of the patterns observed in student responses and do not denote statistical significance.

Table 4. Institutional sustainability visibility and engagement gaps identified from student perceptions

Sustainability Dimension	Student Expectations	Observed Student Perception	Descriptive Pattern
Sustainability communication	Clear and regular communication	Limited awareness of sustainability initiatives	Limited awareness
Energy-efficiency visibility	Visible operational practices and monitoring	Low awareness of energy systems and measures	Low perceived visibility
Student participation opportunities	Active involvement in sustainability actions	Limited engagement opportunities reported	Moderate participation gap
Sustainability education	Integration into courses and campus life	Inconsistent sustainability literacy	Moderate educational integration
Institutional transparency	Accessible sustainability information	Low familiarity with strategies and policies	Limited institutional awareness
Campus sustainability culture	Visible environmental commitment	Perception of early-stage sustainability development	Limited perceived development

3.5 Student Priorities on Sustainability Actions

When students were asked about what sustainability actions they wanted the institution to focus on, many clearly favored adopting more eco-friendly operational practices. They really believe these changes could help shift attitudes and encourage everyone to act in more environmentally friendly ways. There was also a strong desire for academic integration; initiatives such as adding sustainability modules, offering coursework centered on ESD, and sharing more info on ESD practices. It is stated that about 11.4% of those surveyed suggested that hosting sustainability events on campus could really help raise awareness and build a sense of community engagement (Figure 7).

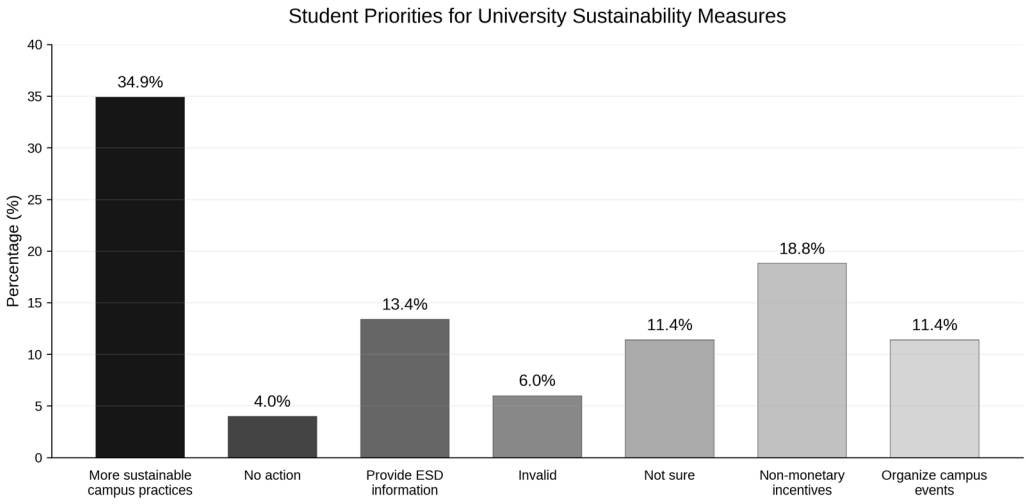


Figure 7. Priority levels assigned by students to proposed university sustainability measures

All these findings are consistent with the current literature indicating that sustainable universities are characterized by the implementation of both operational and campus initiatives, as well as ESD teaching and research, with campus environmental sustainability serving as the link between the two. Furthermore, it has been shown that curriculum-based engagement yields a more sustained behavioral and cultural impact than isolated operational initiatives (Mbah, 2019).

4. Discussion

Building on the findings presented above, this section discusses their broader implications for sustainability governance in Cyprus. The results reveal several opportunities and challenges that should be considered when strengthening governance structures, institutional capacity, and sustainability-related decision-making processes.

Taken together, the findings indicate a contrast between strong environmental concern and more uneven sustainability literacy and behavioral engagement among the surveyed students. Students generally reported greater engagement with low-effort sustainable practices, while awareness of institutional sustainability and energy-efficiency initiatives was comparatively limited. Importantly, these findings reflect students' perceptions and reported experiences rather than direct assessments of institutional performance. At the same time, students' expressed interest in greater curricular and participatory engagement suggests opportunities for universities to strengthen the connection between sustainability education, campus operations, and student involvement. From a university sustainability management perspective, these findings have several practical implications in the Cypriot context. Regular communication and reporting of sustainability initiatives could be strengthened so that existing environmental strategies, operational measures, and progress are made more visible to students. Additionally, energy-related information may be rendered more accessible through student-facing mechanisms, such as energy-use displays, building-performance dashboards, or other forms of campus communication. Opportunities for student participation could be enhanced through involvement in environmental or sustainability committees, consultation processes, and campus sustainability activities. Furthermore, establishing clearer connections between operational sustainability projects and teaching could enable campus initiatives to function not only as management measures but also as opportunities for ESD. These actions are particularly relevant given the surveyed students' limited awareness of institutional sustainability and energy-efficiency practices, as well as their expressed interest in greater engagement with sustainability initiatives.

Figure 8 should be distinguished from the conceptual framework presented in Figure 1. Whereas Figure 1 provides the theoretical and conceptual context informing the study, Figure 8 is a descriptive synthesis of the principal patterns identified in the survey findings and discussed in this section. It is not intended as a revised or empirically validated version of Figure 1, nor as a causal model.

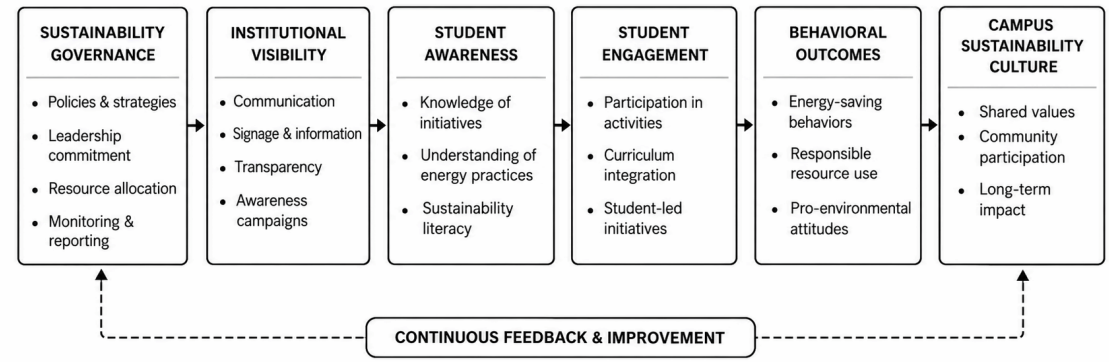


Figure 8. Descriptive synthesis of sustainability governance, institutional visibility, student engagement, and campus sustainability culture

Rather, it summarizes how sustainability governance, institutional visibility, student awareness and engagement, and campus sustainability culture can be interpreted together in light of the findings. Figure 8 presents a descriptive synthesis of three prominent patterns identified in the study: environmental attitudes, sustainable behaviors, and perceived institutional visibility, and situates these dimensions within the broader context of campus sustainability culture in Cypriot universities.

The synthesis highlights that strong pro-environmental attitudes were observed alongside selective sustainable behaviors. As shown in the earlier sections, behavioral engagement varied across practices and may be associated with factors such as cost, convenience, and infrastructural limitations. The figure also highlights perceived institutional visibility, representing the extent to which sustainability and energy-efficiency initiatives were observable, communicated, and recognizable to students. Limited perceived visibility occurred alongside limited student awareness and engagement in several areas; however, the descriptive design does not establish causal relationships between these dimensions.

Figure 8 therefore summarizes these patterns within the broader context of sustainability governance and campus sustainability culture. Institutional governance, operational practices, sustainability communication, perceived visibility, student awareness, and opportunities for participation are presented as interrelated dimensions relevant to the interpretation of the survey findings. The figure also recognizes continuous feedback and

improvement as relevant considerations within the broader context of long-term sustainability engagement and institutional sustainability culture.

Overall, the findings suggest that sustainability governance in higher education should extend beyond the implementation of environmental policies and operational measures. The visibility of sustainability initiatives, effective communication, and opportunities for student participation appear to be relevant dimensions associated with sustainability awareness and engagement. Strengthening these dimensions may contribute to the development of a more integrated and enduring sustainability culture within Cypriot universities.

5. Conclusions

An evidence-based assessment of students' awareness, perceptions, and engagement with sustainability and energy-efficiency initiatives across Cypriot university campuses has been provided by this study. Drawing on survey data collected from 149 students across five higher education institutions, several structural and behavioral challenges that constrain the development of a robust campus sustainability culture in Cyprus have been identified.

First, a high level of concern regarding environmental degradation was observed to contrast with limited understanding of sustainability concepts, governance systems, and energy-efficiency practices. This gap highlights the need for more systematic integration of sustainability into both teaching and curricular development, as well as operational practices.

Second, student behaviors were found to reflect moderate but selective sustainability practices. Low-effort pro-environmental behaviors, such as switching off appliances, were widely adopted, whereas cost- or effort-intensive behaviors were less frequent, pointing to well-documented psychological and structural barriers

Third, a major perceived institutional visibility gap was identified. Many students reported limited awareness of sustainability strategies, operational initiatives, or energy-efficiency measures associated with their universities. Importantly, this finding reflects students' awareness and perceptions and should not be interpreted as evidence that such initiatives were absent or ineffective. Limited perceived communication and transparency occurred alongside relatively low awareness of institutional sustainability practices and selective engagement with energy-related behaviors. The limited visibility reported by surveyed students may therefore indicate opportunities for improving student-facing communication and engagement.

Fourth, students reported limited awareness of energy-efficiency practices within their university environments. Students reported limited awareness of energy monitoring, efficient building operations, and renewable energy installations. Given the importance of energy efficiency in EU policy and climate goals, it is suggested that strengthening institutional visibility and adopting standardized SEM/EMS frameworks may help bridge this gap.

Despite limited visibility, a strong preference for curriculum-based and participatory sustainability engagement was expressed by students. This includes involvement in the implementation of operational on-campus practices as well as requests for sustainability-focused modules, seminars, research topics, and active participation in sustainability initiatives. This demand is interpreted as an indication of untapped potential for universities to cultivate sustainability leadership.

Overall, the findings from the 149 surveyed students provide exploratory evidence of strong environmental concern and positive sustainability attitudes alongside selective sustainable behaviors and limited perceived visibility of several institutional sustainability and energy-efficiency practices. Based on these observed patterns, universities may consider strengthening sustainability communication, increasing the visibility of campus sustainability and energy-related initiatives, and expanding opportunities for student participation. From a campus management perspective, the findings highlight the importance of making sustainability-related operations more visible and understandable to students so that institutional initiatives can become a more recognizable part of everyday campus experience. These recommendations represent practical implications inferred from the survey findings rather than interventions directly tested by the study. Given the convenience sampling approach and the Cyprus-specific context of the five participating universities, the findings should not be assumed to be representative of all university students in Cyprus or directly generalizable to higher education institutions in other national contexts. Future research using larger and more representative samples and institution-level or comparative designs could examine whether similar patterns occur across different higher education settings.

Author Contributions

Conceptualization, M.K.; methodology, M.K. and T.D.; validation, T.D.; formal analysis, M.A.; investigation, M.A.; data collection, M.A.; writing—original draft preparation, M.A.; writing—review and editing, M.K. and T.D.; supervision, M.K. All authors have read and agreed to the published version of the manuscript.

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

Ethical Approval

The study was approved by the Cyprus National Bioethics Committee prior to data collection (approval number: EEBK Eli 2024.01.302; date: 13 November 2024). The study was conducted in accordance with the applicable ethical and data protection requirements.

Data Availability

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Acknowledgments

The authors would like to thank all participating students and the collaborating higher education institutions for their contribution to this study.

Conflicts of Interest

The authors declare no conflicts of interest.

Declaration on the Use of Generative AI and AI-assisted Technologies

During the preparation of this work, the authors utilized ChatGPT (OpenAI) for language editing, text refinement, and drafting support. The authors subsequently reviewed and edited the content as necessary and take full responsibility for the content of the publication.

References

AASHE. (2019). *STARS technical manual (Version 2.2)*. Association for the Advancement of Sustainability in Higher Education. https://stars.aashe.org/wp-content/uploads/2019/07/STARS-2.2-Technical-Manual.pdf

Aftzaki, M. (2024). *Environmentally sustainable practices in Cypriot university campuses: Perspectives from student communities* [Mastersthesis]. Neapolis University Pafos, Pafos, Cyprus.

Alshuwaikhat, H. M. & Abubakar, I. (2008). An integrated approach to achieving campus sustainability: Assessment of the current campus environmental management practices. *J. Clean. Prod., 16*(16), 1777–1785. https://doi.org/10.1016/j.jclepro.2007.12.002.

Bakar, M. N. A., Salleh, H. M., Rahim, N. M., Ne'matullah, K. F., & Idris, Z. (2021). Sustainable campus: An integrated student knowledge, waste (WS), energy and climate change (EC) for recognition in "UI-Green Metric World College Ranking." *Selangor Humaniora Rev., 5*(2), 93–101.

Creswell, J. W. (2023). *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research* (*6th ed*.). Pearson.

Dagiliūtė, R., Liobikienė, G., & Minelgaitė, A. (2018). Sustainability at universities: Students' perceptions from Green and Non-Green universities. *J. Clean. Prod., 181*, 473–482. https://doi.org/10.1016/j.jclepro.2018.01.213.

Dawodu, A., Dai, H., Zou, T., Zhou, H., Lian, W., Oladejo, J., & Osebor, F. (2022). Campus sustainability research: Indicators and dimensions to consider for the design and assessment of a sustainable campus. *Heliyon, 8*(12), e11864. https://doi.org/10.1016/j.heliyon.2022.e11864.

Díaz de Junguitu, A. & Allur, E. (2019). The adoption of environmental management systems based on ISO 14001, EMAS, and alternative models for SMEs: A qualitative empirical study. *Sustainability, 11*(24), 7015. https://doi.org/10.3390/su11247015.

Disterheft, A., da Silva Caeiro, S. S. F., Ramos, M. R., & de Miranda Azeiteiro, U. M. (2012). Environmental Management Systems (EMS) implementation processes and practices in European higher education institutions—Top-down versus participatory approaches. *J. Clean. Prod., 31*, 80–90. https://doi.org/10.1016/j.jclepro.2012.02.034.

Du, J. & Pan, W. (2022). Gender differences in reasoning energy-saving behaviors of university students. *Energy Build., 275*, 112458. https://doi.org/10.1016/j.enbuild.2022.112458.

Emanuel, R. & Adams, J. N. (2011). College students' perceptions of campus sustainability. *Int. J. Sustain. High. Educ., 12*(1), 79–92. https://doi.org/10.1108/14676371111098320.

Evangelinos, K. I. & Jones, N. (2009). An analysis of social capital and environmental management of higher education institutions. *Int. J. Sustain. High. Educ., 10*(4), 334–342. https://doi.org/10.1108/14676370910990684.

Franco, A., Crisostomi, E., Leccese, F., Mugnani, A., & Suin, S. (2025). Energy savings in university buildings: The potential role of smart monitoring and IoT technologies. *Sustainability, 17*(1), 111. https://doi.org/10.3390/su17010111.

Hernández-Díaz, P. M., Polanco, J. A., Escobar-Sierra, M., & Leal Filho, W. (2021). Holistic integration of sustainability at universities: Evidence from Colombia. *J. Clean. Prod., 305*, 127145. https://doi.org/10.1016/j.jclepro.2021.127145.

Horan, W. & O'Regan, B. (2021). Developing a practical framework of sustainability indicators relevant to all higher education institutions. *Sustainability, 13*(2), 629. https://doi.org/10.3390/su13020629.

Horhota, M., Asman, J., Stratton, J. P., & Halfacre, A. C. (2014). Identifying behavioral barriers to campus sustainability: A multi-method approach. *Int. J. Sustain. High. Educ., 15*(3), 343–358. https://doi.org/10.1108/IJSHE-07-2012-0065.

Lauder, A., Sari, R. F., Suwartha, N., & Tjahjono, G. (2015). Critical review of a global campus sustainability ranking: GreenMetric. *J. Clean. Prod., 108*, 852–863. https://doi.org/10.1016/j.jclepro.2015.02.080.

Leal Filho, W., Shiel, C., & Paço, A. (2016). Implementing and operationalising integrated approaches to sustainability in higher education: The role of leadership. *J. Clean. Prod., 133*, 126–135. https://doi.org/10.1016/j.jclepro.2016.05.079.

Leal Filho, W., Skanavis, C., Kounani, A., Brandli, L. L., Shiel, C., do Paço, A., Pace, P., Mifsud, M., Beynaghi, A., Price, E., et al. (2019a). The role of planning in implementing sustainable development in a higher education context. *J. Clean. Prod., 235*, 678–687. https://doi.org/10.1016/j.jclepro.2019.06.322.

Leal Filho, W., Skouloudis, A., Brandli, L. L., Lange Salvia, A., Veiga Avila, L., & Rayman-Bacchus, L. (2019b). Sustainability and procurement practices in higher education institutions: Barriers and drivers. *J. Clean. Prod., 231*, 1267–1280. https://doi.org/10.1016/j.jclepro.2019.05.202.

Li, J. S., Zeng, Y. X., Gu, Z. P., Chen, H. Y., Chen, X., Zou, D. J., Liu, Y. D., & Deng, L. Y. (2024). Research on the energy saving behaviors of university students based on TPB in a hot summer–cold winter area in China. *Heliyon, 10*(17), e36995. https://doi.org/10.1016/j.heliyon.2024.e36995.

Ma, Z. (2022). Survey data on university students' experience of energy control, indoor comfort, and energy flexibility in campus buildings. *Energy Inform., 5*, 50. https://doi.org/10.1186/s42162-022-00239-y.

Mbah, M. (2019). Can local knowledge make the difference? Rethinking universities' community engagement and prospects for sustainable community development. *J. Environ. Educ., 50*(1), 11–22. https://doi.org/10.1080/00958964.2018.1462136.

Mouchrek, N., Cullen, C., Ganino, A., Gliga, V., Kramer, P., Mahesh, R., Maunder, L., Murray, S., Scott, K., & Shaikh, T. (2022). Investigating environmental values and psychological barriers to sustainable behaviors among college students. *Consilience, 26*, 1–18. https://doi.org/10.52214/consilience.vi26.10153.

Oliveira, M. C. & Proença, J. (2025). Sustainable campus operations in higher education institutions: A systematic literature review. *Sustainability, 17*(2), 607. https://doi.org/10.3390/su17020607.

Omazic, A. & Zunk, B. M. (2021). Semi-systematic literature review on sustainability and sustainable development in higher education institutions. *Sustainability, 13*(14), 7683. https://doi.org/10.3390/su13147683.

Purcell, W. M., Henriksen, H., & Spengler, J. D. (2019). Universities as the engine of transformational sustainability toward delivering the sustainable development goals: "Living labs" for sustainability. *Int. J. Sustain. High. Educ., 20*(8), 1343–1357. https://doi.org/10.1108/IJSHE-02-2019-0103.

Putra, A. K., Irawan, L. Y., Khalidy, D. A., Wijaya, H. W., Mustika, S. N., & Yembuu, B. (2024). Student perceptions of environmental sustainability. *Visions Sustain., 21*, 51–66. https://doi.org/10.13135/2384-8677/10250.

Rebelatto, B. G., Salvia, A. L., Reginatto, G., Brandli, L., & Frandoloso, M. A. L. (2022). Energy efficiency initiatives and the academic community's behaviour: A Brazilian experience. *Discov. Sustain., 3*, 33. https://doi.org/10.1007/s43621-022-00101-x.

Salcă-Rotaru, C. M. (2020). Environmental management systems in higher education institutions, beyond regulations. *Bull. Transilv. Univ. Braşov, 13*(2), 83–90. https://doi.org/10.31926/but.ssl.2020.13.62.4.10.

Soares, N., Dias Pereira, L., Ferreira, J., Conceição, P., & Pereira da Silva, P. (2015). Energy efficiency of higher education buildings: A case study. *Int. J. Sustain. High. Educ., 16*(5), 669–691. https://doi.org/10.1108/IJSHE-11-2013-0147.

Too, L. & Bajracharya, B. (2015). Sustainable campus: Engaging the community in sustainability. *Int. J. Sustain. High. Educ., 16*(1), 57–71. https://doi.org/10.1108/IJSHE-07-2013-0080.

Tuckman, B. W. & Harper, B. E. (2012). *Conducting Educational Research*. Bloomsbury Publishing USA.

UNECE. (2025). *Cyprus: Format for reporting on the implementation of the United Nations Economic Commission for Europe Strategy for Education for Sustainable Development*. United Nations Economic Commission for Europe, Geneva, Switzerland. https://unece.org/sites/default/files/2025-05/CYPRUS_NIR_final.pdf

United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development*.

https://sdgs.un.org/2030agenda
Ürge-Vorsatz, D., Kelemen, A., Tirado-Herrero, S., Thomas, S., Thema, J., Mzavanadze, N., Hauptstock, D., Suerkemper, F., Teubler, J., Gupta, M., et al. (2016). Measuring multiple impacts of low-carbon energy options in a green economy context. *Appl. Energy, 179*, 1409–1426. https://doi.org/10.1016/j.apenergy.2016.07.027.
Vasconcelos, C. R., Ferreira, P., Araújo, M., Cordeiro, D., & Dias Silva, S. M. (2021). Students' perception of campus sustainability in a Brazilian university. In *Universities, Sustainability and Society: Supporting the Implementation of the Sustainable Development Goals* (pp. 285–304). Springer, Cham. https://doi.org/10.1007/978-3-030-63399-8_19.

Appendix

Table A1. Questionnaire structure and measurement domains

Questions	Domain Assessed	No. of Items	Response Format
Q1–Q8	Participant characteristics	8	Categorical/open response
Q9–Q12	Sustainability awareness and knowledge	4	Multiple choice
Q13	Environmentally responsible and energy-related behavior	9	Always–Never
Q14	Awareness/knowledge of institutional sustainability activities	7	Very knowledgeable–Not at all knowledgeable
Q15	Participation and behavioral engagement	7	Often–Never
Q16	Perceived visibility/presence of sustainability-related campus operations	18	Definitely Yes–Definitely No
Q17	Perceptions of university sustainability	9	Strongly agree–Strongly disagree
Q18	Environmental attitudes, concern and willingness to engage	10	Strongly agree–Strongly disagree
Q19	Priorities for institutional sustainability action	14	Essential priority–Not a priority at all
Q20	Proposed incentives for sustainable behavior	1 open-ended question	Free-text response