Promoting Green Technologies and Innovative Solutions for a Sustainable Future in the Context of Higher Education

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ABSTRACT

This study investigated university students' knowledge of green technology and explored their innovative solutions for promoting sustainability. Employing a mixed methods design that combined a descriptive survey and a case study, the research gathered both quantitative and qualitative insights. A researcher-developed questionnaire, grounded in related literature and validated by five experts, was administered to 283 purposively selected students enrolled in the Bachelor of Secondary Education, Bachelor of Science in Entrepreneurship, Bachelor of Science in Criminology, and Bachelor of Science in Hotel Management programs. These students were taking courses such as Research, Teaching of Science, Environmental Science, and Science, Technology, and Society. Quantitative data were analyzed using percentages, means, and standard deviations, while qualitative data underwent coding, thematic analysis, and triangulation. Findings revealed that most students were only slightly familiar with green technology, except for the BS Entrepreneurship group, which reported a moderate level of familiarity. Although respondents acknowledged the importance of adopting environmentally friendly practices, their limited knowledge reflects the minimal availability and utilization of green technologies in local contexts. Notably, the majority expressed strong agreement that higher education institutions have a responsibility to integrate green technology and sustainability into teaching and campus practices. There was a statistical difference in the level of familiarity among university students. The results highlighted innovative, small-scale initiatives such as the use of recycled materials in instruction, signaling grassroots efforts toward ecological awareness. The study underscores the need for universities to revisit curriculum frameworks, strengthen institutional policies, and provide administrative support to enhance students' competencies in green technology. Embedding sustainability concepts in higher education is essential to equip future professionals with the knowledge and skills necessary to address the escalating impacts of climate change and environmental degradation.

Keywords: University Students, Awareness and Understanding, Facilities, Teaching Materials

INTRODUCTION

On April 11, 2022, northern Iloilo, Philippines, experienced the devastating impacts of Tropical Storm Agaton (internationally known as Megi), which struck unexpectedly during the summer season. The disaster brought torrential rains, landslides, and floods that claimed lives, displaced communities, and destroyed agricultural products and infrastructures. This unusual weather phenomenon alarmed the local population, as March to June is typically a dry season in the Philippines. Many residents attributed the severity of the disaster to unsustainable human activities, including improper waste disposal, widespread deforestation, and the conversion of mountain areas into corn plantations. These anthropogenic practices have long increased the vulnerability of the environment, making floods and landslides recurring threats whenever heavy rainfall occurs.

In this context, green technology (GT) emerges as a pivotal innovation designed to mitigate environmental impacts while fostering sustainability. However, while much has been written about global frameworks and policy strategies, there is limited research that explores the knowledge, perceptions, and innovative responses of students at the local level, particularly in Philippine higher education. University students represent future

professionals and leaders whose awareness and engagement with green technology are critical in advancing climate action within their communities.

Novelty of the Study. This study contributes uniquely by linking local disaster experiences in northern Iloilo with students' knowledge and innovative solutions concerning green technology. While existing literature often focuses on technological innovations or policy-driven climate initiatives, this research foregrounds the voices of students from diverse disciplines—Education, Entrepreneurship, Criminology, and Hotel Management, who are not typically represented in green technology studies. By examining how these learners conceptualize and propose sustainable practices, the study highlights the grassroots potential of higher education institutions to embed green technology and sustainability into their curriculum and practice. This local-global perspective not only deepens our understanding of green technology awareness but also underscores the role of education in bridging global climate frameworks with community resilience.

Green Technology, Green Tech, or GT refers to environmentally friendly technology that addresses problems related to the ecosystem. There are vital areas in GT, such as Renewable Energy, Energy Efficiency, Waste Management, Water Purification, and Sustainable Agriculture (Shruthi, 2014; Rose, 2024). Renewable energy refers to technologies that combine wind, solar, hydro, and geothermal energy. Energy efficiency relates to energy conservation innovation, such as LED lighting and advanced building materials that enhance insulation and lower energy usage. Waste Management indicates a method for recycling, composting, and waste-to-energy processes that reduce landfills and transfer waste into usable resources. Water Purification is a system that safeguards clean drinking water and sustainable wastewater management via purification. Sustainable agriculture is about organic, vertical, and precision agriculture that enhances food security while reducing environmental impact (Rose, 2024). One study on the global analysis of green technology revealed that government policies, economic incentives, and corporate sustainability goals are the key players in effectively implementing this innovation and breakthroughs for a more sustainable future (Huaxin, 2029). Thus, green practices and sustainable living balance the crisis we suffer from global warming. Society today needs green innovative technologies (GTI) and Internet of Things (IoT) technologies to foster green, durable, biodegradable, and eco-friendly results for a sustainable future (Bradu et al., 2023).

With all these trends to mitigate problems and issues of global warming, the education system plays a crucial role in promoting and implementing GT. The role of education in sustainability is not just significant but empowering. Many campuses of state Universities and Colleges (SUCs) are at the forefront of this effort, pushing for a sustainable campus environment, as Visayas State University launched its Going Green Project (Bayron, 2024). Another campus is geared toward environmental policies and firmly committed to sustainability. The campus acknowledges the obligation and pledge to protect the environment (Mariano Marcos State University, 2024). In Laguna and Quezon Provinces, another SUC spearheaded green initiatives (Laguna Polytechnic State University, 2024). And many more tertiary institutions follow those who advocate a greener curriculum. Northern Iloilo State University, as the lone higher education institution in the northern part of Iloilo, has a crucial role in protecting the diverse ecological environment in the district. From mountainous resources to crystal-evident marine biodiversity, northern Iloilo has a unique ecosystem that requires protection and preservation for the next generation. Just like other SUCs in the country, NISU has participated in initiating programs and related projects.

In addition, from the curriculum perspective, Green Technology Education 1 is a subject in the Bachelor of Science in Social Work. The topic is environmental education, which focuses on increasing critical thinking, problem-solving, and practical decision-making abilities. It teaches students to evaluate several sides of an environmental issue to make informed and accountable decisions (Cotabato State University, 2024). To fully achieve the concept of green technology and educate the necessary concepts and skills about GT, students play a significant role in sustainable development. University students should be informed and trained about policies and decision-making on protecting and preserving the ecosystem with the advent of technological advancement (Sukumar, 2019). In NISU, specifically in Ajuy Campus, there is an organization related to the environment; some of the projects are solid waste management programs, mangroves, and tree planting. Even the

administration advocates using environmentally friendly appliances. It encourages faculty and staff to turn off appliances that are not in use and buildings with big windows to limit electricity use.

Figure 1 shows the conceptual framework of the study.

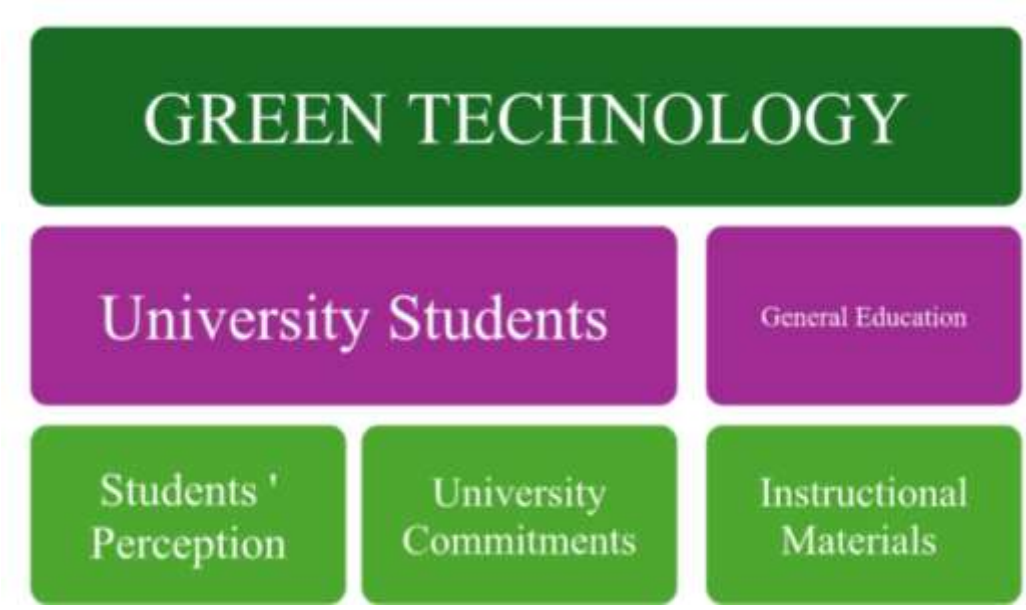

Figure 1. Conceptual Framework of the Study.

Main Objective

This research study aims to determine university students' knowledge about green technology and their innovative solutions for sustainable results.

METHODS

This study used a descriptive survey mixed with interviews and observations. The research instrument is a 15item researcher-made questionnaire validated by science experts. The questionnaire is divided into two categories: the first is about personal knowledge of green technology, and the second is about the institution's implementation of green technology. The presentation of the results is based on the category of choices. The sampling method is purposive sampling because all the students taking up research in Bachelor of Secondary Education, Environmental Science in Bachelor of Entrepreneurship and Bachelor of Criminology, and Science Technology and Society of Bachelor of Hotel Management were given a survey questionnaire of Northern Iloilo State University (NISU), Ajuy campus, Ajuy, Iloilo, Philippines (See Table 1).

Table 1. The Profile of the Respondents.

Category		
Course		
	Frequency	Percentage (%)
BSED (Bachelor of Secondary Education	23	8
BSEntrep (Bachelor of Science in Entrepreneurship	17	6
BSCrim (Bachelor of Science in Criminology)	152	54

BSHM (Bachelor of Science in Hotel Management)	91	32
TOTAL	**283**	**100%**

The researcher conducted this study during his class as part of his subjects' lessons. The statistics were frequency count, percentage, mean, and standard deviation, and for inferential Kruskal-Wallis Test was employed. For the qualitative part, the responses were coded, themed, and triangulated.

RESULTS AND DISCUSSION

Table 2 shows the university students' responses at NISU, Ajuy Campus, about their familiarity with Green Technology.

Table 1. Responses of the selected University Students in NISU, Ajuy Campus, Iloilo, Philippines on the Familiarity with GT.

Q1: How familiar are you with green technology?					
Course		**N**	**Mean**	**SD**	**Description**
	BSED	23	1.91	.10	Slightly Familiar
	BSEntrep	17	3.23	1.25	Moderately Familiar
	BSCrim	152	2.04	1.07	Slightly Familiar
	BSHM	91	1.87	1.02	Slightly Familiar
Total		**283**	**2.05**	**1.10**	Slightly Familiar

The findings revealed that most students across programs reported being only “slightly familiar” with green technology (GT), with the notable exception of Bachelor of Science in Entrepreneurship (BSEntrep) students, who demonstrated a *moderate level of familiarity*. This suggests that exposure to GT concepts remains limited within most disciplines, and knowledge acquisition may be incidental rather than systematically integrated into the curriculum.

The relatively higher familiarity among BSEntrep students may be attributed to the nature of their academic training, which often emphasizes innovation, enterprise, and sustainability in the context of business ventures. Entrepreneurial education frequently introduces concepts such as eco-friendly products, sustainable business models, and green enterprise development—areas where GT is increasingly applied. In contrast, programs such as Education, Criminology, and Hotel Management appear to provide fewer structured opportunities for students to engage with GT in ways that are directly relevant to their fields of study.

Gonzaga’s (2016) study on college students’ level of awareness of green technology revealed a moderate level of awareness but a low level of program implementation. These findings suggest the need for a more holistic and integrated approach to strengthen both understanding and practice, ensuring that the goals of green technology are fully realized.

These findings highlight a critical implication: universities bear the responsibility of mainstreaming green technology education across disciplines. The lack of familiarity among students suggests that current curricular offerings and institutional initiatives may not sufficiently address sustainability and technological innovation as cross-cutting concerns. This aligns with global perspectives that position higher education institutions as key drivers in advancing the United Nations’ Sustainable Development Goal 13: Climate Action by equipping

students with the knowledge and skills necessary to respond to environmental challenges (UNESCO, 2021).

Moreover, the disparity among programs underscores the need for a more interdisciplinary approach to sustainability education. Regardless of professional trajectory, students must develop competencies in GT to contribute meaningfully to climate action in their respective fields. For example, future educators can model sustainable practices in schools, criminology graduates can engage in policy enforcement related to environmental protection, and hospitality professionals can advance eco-friendly tourism. Embedding GT into diverse curricula would ensure that sustainability becomes a shared responsibility rather than a niche concern.

In sum, while the results reveal gaps in students' knowledge of green technology, they also signal opportunities for universities to revisit curriculum design, expand institutional initiatives, and strengthen sustainabilityoriented pedagogy. Such efforts will not only enhance student familiarity with GT but also foster innovative, context-based solutions that address both local and global environmental challenges.

It is essential to include Green Technology items in the curriculum of each study program so that students can recognize how to use and innovate technologies that sustainably preserve the environment (Naustion & Febriani, 2028). To make students fully aware of green technology, teachers must be the main instrument for effective implementation. However, despite the interest of faculty in integrating GT into the curriculum and programs of the institution because they are concerned about the happenings and situations of the earth, their commitment is still low due to heavy loads and support from the institution and the collaboration into the industry must be improved (Li et al., 2023).

Table 4 indicates the responses of the Northern Iloilo State University, Ajuy Campus, students on questions with different categories.

Table 4. Responses of the Northern Iloilo State University, Ajuy Campus on Selected Questions related to Green Technology

Q3: How likely are you to invest in green technology?						
Course	**Not Likely at all**	**Slightly Likely**	**Moderately Likely**	**Very Likely**	**Extremely Likely**	**Total**
BSEd	4	4	9	3	3	23
BSEntrep	0	7	3	3	4	17
BSCrim	24	65	29	17	12	147
BSHM	16	43	25	4	0	88
Total	44	119	66	27	19	275
Q4: How satisfied are you with the current availability of green technology options in the market?						
Course	**Not satisfied at all**	**Slightly satisfied**	**Moderately satisfied**	**Very satisfied**	**Extremely satisfied**	**Total**
BSEd	0	9	9	4	0	22
BSEntrep	2	5	6	2	2	17
BSCrim	15	69	31	26	9	150
BSHM	21	36	14	8	8	87
Total	38	119	60	40	19	276

Q7: How often do you research or seek information about green technologies?						
Course	**Never**	**Rarely**	**Occasionally**	**Frequently**	**Always**	**Total**
BSEd	4	9	7	2	1	23
BSEntrep	1	5	5	3	3	17
BSCrim	35	53	26	25	11	150
BSHM	14	30	29	12	5	90
Total	54	97	67	42	20	280
Q8: How satisfied are you with the current impact of green technology on environmental sustainability?						
Course	**Not satisfied at all**	**Slightly satisfied**	**Moderately satisfied**	**Very satisfied**	**Extremely satisfied**	**Total**
BSEd	1	7	8	6	1	23
BSEntrep	2	4	9	2	0	17
BSCrim	32	58	25	28	6	149
BSHM	16	33	15	21	3	88
Total	51	102	57	57	10	277

On the question, *"How likely are you to invest in green technology?"* many students (n=119) indicated that they were "Slightly Likely" to invest. This was followed by "Moderately Likely" (n=66), "Not Likely at All" (n=44), "Very Likely" (n=27), and "Extremely Likely" (n=19). A noteworthy observation is that none of the Bachelor of Science in Hotel Management (BSHM) students expressed an "Extremely Likely" inclination, suggesting that this group may perceive green technology as less relevant to their field or too costly to adopt in practice.

Several studies have shown that green innovation and entrepreneurship contribute significantly to sustainability within universities. Therefore, continued support for these initiatives is strongly recommended (Nguyen et al., 2025). In line with this, NISU Ajuy Campus should adopt similar recommendations to advance its goals and strengthen its commitment to green technology.

When asked, *"How satisfied are you with the current availability of green technology options in the market?"* most respondents across programs reported being "Slightly Satisfied" (n=119), followed by "Moderately Satisfied" (n=60), "Very Satisfied" (n=40), "Not Satisfied at All" (n=38), and "Extremely Satisfied" (n=19).

Interestingly, no student from the Bachelor of Secondary Education (BSEd) program selected "Extremely Satisfied," which may reflect either a lack of direct exposure to green technologies or limited awareness of their application in the education sector.

In the study of Sharif et al. (2024), the authors emphasize that policymakers must prioritize mechanisms that support long-term environmental goals. This serves as a call for leaders to remain vigilant and to implement appropriate sanctions and regulations that ensure compliance and sustained environmental commitment.

For the question, *"How often do you research or seek information about green technology?"* a significant proportion admitted to low engagement: "Rarely" (n=97) and "Never" (n=54) accounted for the majority. Only 20 students reported "Always" seeking information, while 42 indicated "Frequently" and 67 "Occasionally." This pattern highlights a clear knowledge gap and signals a lack of proactive behavior among students toward exploring sustainability-related innovations.

Regarding perceptions of GT's effectiveness, the question *"How satisfied are you with the current impact of green technology on environmental sustainability?"* revealed that the highest number of students reported "Slightly Satisfied" (n=102), followed by "Moderately Satisfied" and "Very Satisfied" (both n=57), "Not Satisfied at All" (n=51), and "Extremely Satisfied" (n=10). Notably, no student from the BS Entrepreneurship (BSEntrep) program selected "Extremely Satisfied," despite their earlier higher familiarity with GT, suggesting that while entrepreneurs recognize its importance, they may remain skeptical about its real-world effectiveness or accessibility.

The results paint a complex picture of students' perspectives on green technology. On one hand, there is a positive inclination toward investment—with many students indicating at least some likelihood of supporting GT—yet the overall responses cluster around "slightly" or "moderately" likely, revealing cautious optimism rather than strong commitment. This hesitancy may stem from economic barriers, such as perceived costs of GT adoption, or from limited consumer exposure to affordable and accessible green technologies in the local market. The absence of "Extremely Likely" responses from the BSHM program is particularly telling, as it suggests a gap in connecting sustainability innovations with the hospitality industry—an area that globally has been pushing toward eco-tourism and green hotel initiatives. This disconnect could indicate a missed opportunity in curriculum and industry linkage.

The general dissatisfaction with the availability of green technology also reflects structural and contextual barriers in the Philippine setting. While GT innovations exist globally, their availability and affordability in rural or semi-urban areas remain restricted. The lack of "Extremely Satisfied" responses from BSEd students underscores a broader issue: sustainability education often emphasizes environmental awareness but provides fewer opportunities for teacher education students to interact with or apply concrete green technologies. This limits their capacity to model eco-friendly practices in classrooms and communities.

Perhaps most striking is the low level of engagement in seeking information about green technology. With most students reporting "Never" or "Rarely," the findings reveal a passive stance toward sustainability knowledge acquisition. This reflects a critical gap in higher education: while universities may promote sustainability at an institutional level, students may not yet internalize GT as a personal or professional responsibility.

Finally, the responses regarding satisfaction with GT's impact on environmental sustainability suggest a mixture of optimism and skepticism. While many students acknowledge GT's potential, relatively few perceive it as having made a strong impact. The lack of "Extremely Satisfied" responses from BSEntrep students is particularly intriguing, as it may reflect a more critical and pragmatic outlook: they may understand GT's promise but remain unconvinced of its large-scale effectiveness due to systemic and infrastructural barriers in the Philippines.

In summary, these findings emphasize the need for curriculum reforms that mainstream GT concepts across all disciplines while linking them with practical applications relevant to each field. Furthermore, there is a need to enhance student engagement through active research, entrepreneurship, and community-based projects that highlight GT's feasibility and impact. By bridging this gap, universities can cultivate a generation of professionals who not only understand green technology but also possess the motivation and agency to implement it in diverse societal contexts.

Universities possess the essential resources to advocate for green technology, from curriculum development to institutional operations. Moreover, even academic institutions with limited technological capacity can still produce research that is impactful and sustainable (Husic, 2024). Therefore, it is important for higher education institutions to actively encourage both faculty and students to engage in and promote green technology initiatives.

Based on the foregoing on "Awareness and Practices in Green Technology of College Students," this study suggests developing a holistic program that integrates concepts and applications of green technology in tertiary education to engage students in actively promoting environmental sustainability (Gonzaga, 2016).

The research reveals a significant positive impact of the Green-Smart Campus program on student commitment and the university's corporate vision. Institutions raising green practices and awareness, like recycling programs and eco-friendly transportation options, experienced higher student engagement levels. Engaged students felt linked to the institution and actively participated in sustainability-related activities, enhancing the university's advocacy for a greener environment. Student engagement mediated the connection between the Green-Smart Campus initiative and the university's thrust to contribute to a green campus. Engaged students played a fundamental role in transforming sustainability projects into an enhanced institutional reputation by sharing positive experiences and advocating for the institution (Al-Dmour, 2023).

Students and young graduates have urged policymakers worldwide to embrace an understanding of green jobs that extend beyond the manufacturing, construction, and renewable energy sectors and include all roles that promote sustainability, conserve the environment, and respond to climate and ecological emergencies. On July 17, 2024, students joined Organising for Sustainability International, or SOS International, in New York, USA; they launched a Green Skills and Green Jobs Youth Consultation by the higher education Sustainability Initiative, joined by several United Nations units and higher education worldwide. This event emphasizes the call for higher education to align programs to the planet's needs. The youth today want green skills and green jobs that are intertwined with science, technology, engineering, and mathematics (STEM), the arts, humanities, and local and indigenous ways of knowing (Kigotho, 2024).

Moral norms and the Theory of Planned Behavior (TPB) play a significant role in influencing students to reuse, and behavioral control has the highest impact on continuing to support green university projects. Thus, the students recommended that the authorities create a plan of action for awareness and motivation among students to become environmentally concerned and adopt green behaviors to achieve environmental sustainability (Sanjoy, 2023).

Table 3 shows university students' responses to different questions with multiple answers.

Table 3. Questions with Multiple Responses from the Respondents

Q10: Do you know different green technologies (Select all that apply)														
	SP		**WP**		**HP**		**GE**		**EV**		**GB**		**R**	
	N	**Y**	**N**	**Y**	**N**	**Y**	**N**	**Y**	**N**	**Y**	**N**	**Y**	**N**	**Y**
BSEd	70%	30%	87%	13%	87%	13%	91%	9%	78%	22%	82%	17%	26%	74%
BSEntrep	24%	77%	65%	35%	88%	12%	100%	0%	41%	59%	77%	24%	23%	77%
BSCrim	30%	70%	84%	16%	93%	7%	87%	13%	74%	26%	94%	6%	60%	40%
BSHM	40%	60%	82%	18%	88%	12%	82%	18%	76%	24%	86%	14%	70%	30%
Legend: SP (Solar Power); WP (Wind Power); HP (Hydroelectric Power); GE (Geothermal Energy); EV (Electric Vehicle); GB (Green Building);R (Recycling)														
Q11: What specific green technologies does your school use? (Select all that apply)														
	SP		**LL**		**EEA**		**EV**		**ST**		**WSF**			
	N	**Y**	**N**	**Y**	**N**	**Y**	**N**	**Y**	**N**	**Y**	**N**	**Y**		
BSEd	26%	74%	39%	61%	78%	22%	61%	39%	35%	65%	70%	30%		

BSEntrep	53%	47%	18%	82%	59%	41%	77%	23%	47%	53%	65%	35%		
BSCrim	59%	41%	41%	59%	85%	15%	73%	27%	61%	39%	74%	26%		
BSHM	66%	34%	41%	59%	77%	23%	74%	26%	65%	35%	74%	26%		
Legend: SP (Solar panels); LL (LED lighting); EEA (Energy-efficient appliances); EV (Electric/hybrid vehicles); ST (Smart thermostats); WSF (Water-saving fixtures)														
Q12: What do you think the school considered when installing green technology? (Select all that apply)														
	CS		**EI**		**GI**		**EU**		**EE**		**SR**			
	N	**Y**	**N**	**Y**	**N**	**Y**	**N**	**Y**	**N**	**Y**	**N**	**Y**		
BSEd	74%	26%	48%	52%	78%	22%	87%	13%	96%	4%	61%	39%		
BSEntrep	47%	53%	35%	65%	59%	41%	71%	29%	88%	12%	59%	31%		
BSCrim	54%	46%	71%	29%	68%	32%	80%	20%	93%	7%	71%	29%		
BSHM	56%	44%	62%	38%	58%	42%	79%	21%	90%	10%	75%	25%		
Legend: CS (Cost Savings); EI (Environmental Impact); GI (Government Incentives); EU (Ease Of Use); EE (Energy Efficiency); SR (Social Responsibility)														

The results showed that only BSED knows about this green technology, 30% of solar power, and the three other programs have limited information between 60% and 77%. In wind power, all the programs know with only 13% to 35% selected no. They also know hydropower and geothermal energy, which many of them stated as part of their lessons in their science subjects. In electric vehicles, only BSEntrep has the most responses on NO, around 58%, and the rest is less than 27%. All programs have less knowledge of green building, with around 6% to 24% answering NO. However, in terms of recycling, all students were knowledgeable. Their knowledge is disconcerting because they are tech-generation. They should have enough information about GT, except for recycling, because they have projects and programs related to solid waste management.

In NISU, Ajuy Campus, solar panel, BSEd stated they don't use the technology with 74%, and the three have below 50%. All programs with the highest percentage, 82%, which is the BSEntrep, said they don't use LED lighting. All answers on energy-efficient appliances were below 50%. However, on Electric or hybrid vehicles, some faculty on campus were using this technology; thus, the participant's answers were all below 39%. Meanwhile, the smart thermostats, BSEd, and Entrep answered 65% and 53%, respectively, and BSCrim and BSHM were 39% and 35%. Conversely, in water-saving fixtures, all answers were below 35%, and the responses showed all students wanted the institution to use this technology. Their responses differ because most answered yes to the different GTs used in the institutions.

On the question, "What do you think the school considered when installing green technology?" The responses again showed they were not interested, which is very alarming. Their reactions are somewhat adverse. Despite the effort to share the positive impact of green technology, university students are still confused.

Over the years, green technology has become one of the fastest-growing employment sectors. It has become essential, and many are investing in it due to its reduced effect on the environment. The technologies available are wind power, improved solar cells, and electric vehicles (Qamar et al., 2020). Green Campus initiatives, Smart Education strategies, Smart Campus facilities, and the influence of curriculum and course offerings collectively

contribute to advancing sustainable development practices within higher education institutions. Thus, students know these spectra of technology-driven elements (Shikakly et al., 2024). Students today are vast readers; with the help of gadgets and internet connections, everything is already on the tip of our fingers. When students discover new words or terms, they immediately rely on the internet.

Table 4 represents the responses of university students on question #15.

Table 4. Responses of University Students on Question #15.

Q15: How important is it for the institution to incorporate green technology?					
	NIA	***SI***	***MI***	***VI***	***EI***
BSEd	4%	9%	4%	61%	22%
BSEntrep	O%	0%	29%	47%	24%
BSCrim	8%	25%	18%	33%	16%
BSHM	15%	22%	13%	37%	13%

Legend: NIA - (Not Important At all); **SI** – (Slightly Important); **MI** – (Moderately important); **VR** – (Very Important); **EI** – (Extremely Important)

For Question #15, which asked students to evaluate the importance of green technology in addressing environmental issues, most respondents from NISU, Ajuy Campus, selected "Very Important." This response was particularly dominant among students enrolled in the Bachelor of Secondary Education (BSEd) and Bachelor of Science in Entrepreneurship (BSEntrep) programs, indicating a strong recognition of the role of green technology in promoting sustainability.

This finding suggests that while students' familiarity and practical engagement with green technology may be limited (as reflected in earlier results), they nevertheless acknowledge its critical importance in mitigating environmental degradation. The strong responses from BSEd students may be linked to their training as future educators, where sustainability is increasingly framed as an essential part of science and values education. Their recognition of GT's importance suggests potential for these students to become advocates and multipliers of sustainability practices in the classroom and in their future communities. Similarly, BSEntrep students' high valuation of GT can be associated with their exposure to concepts of innovation and enterprise development, where green technologies present new opportunities for sustainable business models and eco-friendly entrepreneurship.

From a broader perspective, the result underscores a positive attitudinal foundation among students: even if practical knowledge and adoption remain low, there is already an appreciation of GT's relevance. This provides universities with a strong entry point for curriculum enhancement, awareness campaigns, and project-based learning initiatives that transform recognition into practice. As prior research highlights, students' perception of importance often serves as the first step toward behavioral change, provided that enabling structures, resources, and institutional support are in place (Filho et al., 2023).

The recognition of green technology as "very important" demonstrates that NISU students value its potential as a solution to pressing environmental issues. What is needed moving forward is to translate this perceived importance into tangible actions through targeted policies, capacity-building programs, and increased opportunities for students to engage in hands-on sustainability initiatives.

Figure 2 displays the university students' responses to the questions answerable by YES or NO.

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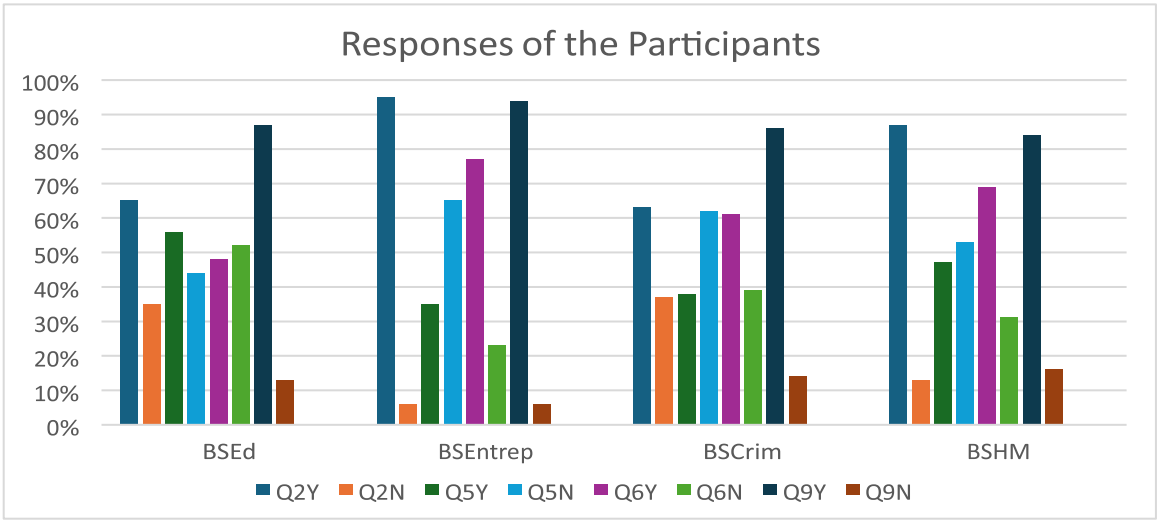

Figure 2. Responses of the University Students on the Questions Answerable by YES or NO.

Legend: Y (Yes); N (No); Q2 (Question 2)- Do you use green technologies daily; Q5 (Question 5) - How likely are you to invest in green technologies shortly; Q6 (Question 6) - Have you ever participated in any green technology initiatives or campaigns; Q9 (Question 9) - Are you willing to pay a premium for products/services that incorporate green technology; Q12 (Question 12) -Do you think governments should provide more incentives to encourage the adoption of green technologies.

These questions were answerable by yes or no in the context of a university student. Most respondents answered" YES" to almost all five questions. The responses showed they have enough knowledge of green technology. They understand that nowadays, we need these types of tools to support the rapid impact of both natural and human activities on nature. If they don't make a stand, the next generation will suffer significantly from the effects of global warming.

Figure 3 shows the responses of the four programs of NISU Ajuy Campus on Question # 13.

Q13

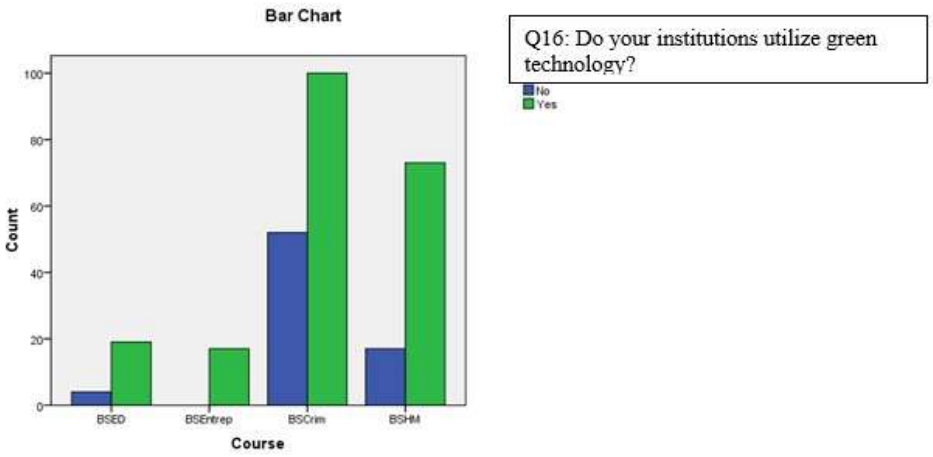

Figure 3. Responses of Selected University Students on Question 13.

Most of them answered YES to Question # 16. They have seen the university's effort to utilize environmentally friendly facilities. The study about higher education, technological innovation, and green development in China shows the country is gearing towards these above relationships. Regions that persist in green development

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advocate for it in the educational system, but specific policies are suggested to maintain the positive impact (Zhang et al., 2023).

Figure 4 represents the responses of the university students to Question #14.

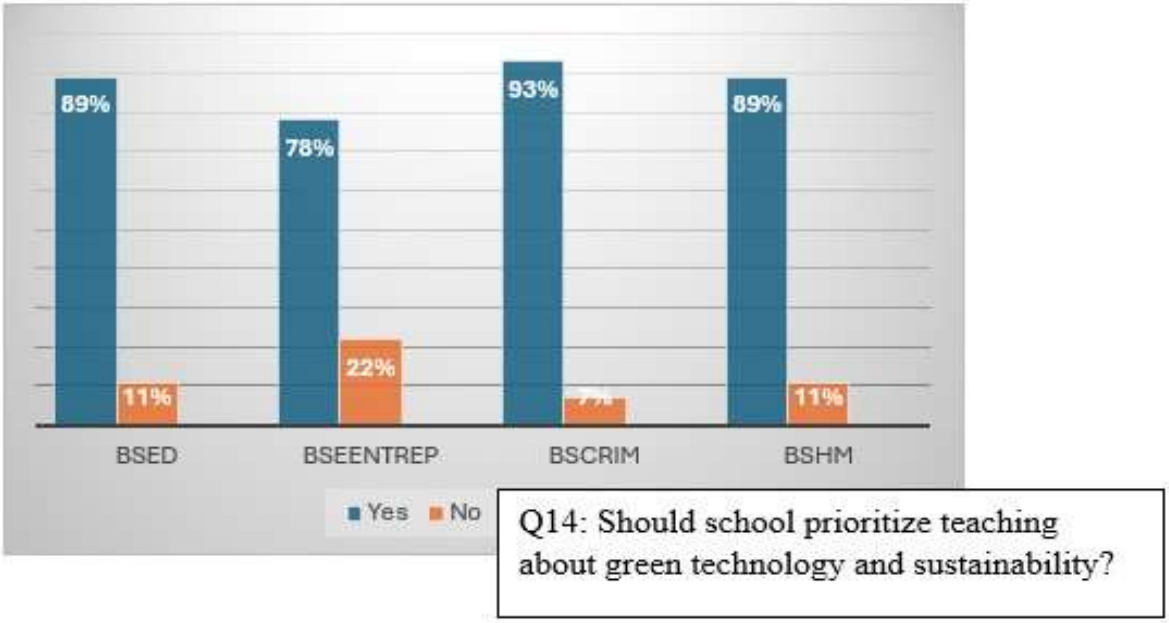

Figure 4. Responses of University Students on Question #21.

The findings respondents exposed showed that almost all respondents answered YES that the institution should prioritize teaching about green technology and sustainability, with BSEd, BSEntrep, BScrim, and BSHM, 89%, 78%, 93%, and 89%, respectively. One study recommended that university programs boost regular curriculum reviews and coursework in different disciplines to set precedence for conducting green economy studies and their significance (Ngare et al., 2022). The study's findings by Bartolini (2024) included the implication of combining sustainability into the institution's foundation by outlining steps to create positive behavior toward the program. The study's results suggested a recommendation from the commitment of all stakeholders: create administrative positions focusing only on sustainability, improving students' interest, and training and workshops. Further, another proposal is to produce sustainable infrastructure and continue monitoring the programs and projects.

Table 5 shows the inferential results on the familiarity of green technology per program.

Table 5 Inferential Results on the Familiarity of Green Technology per Programs

Chi-Square	**df**	**Asymp. Sig.**
17.679	3	.001

The results showed a p-value of .001, which means less than the predetermined significance level of .05, which is interpreted as statistical significance. The results exposed that different programs in NISU, Ajuy Campus, Iloilo, Philippines, were familiar with green technology.

Despite the government's efforts to educate citizens about green technology, the higher education curriculum remains weak. Therefore, it is recommended that comprehensive improvements be made to existing policies, particularly in curriculum design, facilities, and other support mechanisms, to strengthen the integration of green technology in higher education (Kedla et al., 2025). At NISU, Ajuy Campus, many faculty members advocate for environmental protection and awareness; thus, many of them have integrated mechanisms to protect our ecosystem from further damage.

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Figure 5 illustrates some of the innovative instructional materials created from locally found waste products on campus.

Figure 5. Some Innovative Instructional Materials from Waste Products.

One of the contributing factors related to green technology in the perspective of science pedagogy is that institutions are innovating instructional materials from waste products found within the campus, such as used paper and cardboard, old newspapers, used paints and art materials, plastic cups and bottles, and many more were utilized in creative innovations but specifically focused on Ocean Literacy. These products were outputs from science activities and innovations and part of the lesson plans from the participants on their subjects, Environmental Science, The Teaching of Science and Science, Technology, and Society. Also, for longer use of the materials, these will be donated to the basic education science curriculum in the District of Ajuy, Iloilo, Philippines. According to Yeboah et al. (2027), waste materials can be recycled to create suitable and effective instructional resources that are practical for teaching and learning art lessons, and probably in other subjects like science. According to Tanveer et al. (2022), waste materials were used as teaching tools in electronic waste, circular economy transition, plastic waste, bio-based waste management, lifecycle assessment, ecological impacts, and construction and demolition waste management. The study also proposed creating guidelines for all stakeholders to connect waste management and technological innovations in future endeavors.

Green technology has the potential to be a key topic in research. In Environmental Science, Module 20 is about the Greenhouse Effect and Global Warming: Basic Concepts, and Module 21 is about El Nino (Cadiz & Macasil, 2015); green technology is one possible solution to mitigate this global warming. Chapter III of Science, Technology, and Society (STS) concerns specific issues in science, technology, and society. The subtopics are about Climate Change (Serafica et al., 2018). Teaching students about the current situation of our ecosystem increases their interest in finding ways to solve long-overdue problems. Since the first Industrial Revolution, scientists and experts have documented some activities that affect our planet Earth. Nonetheless, no solutions have been formulated, and until now, our various biodiversity is still suffering. With the development of technologies

CONCLUSION

The findings of this study reveal that while students at Northern Iloilo State University (NISU), Ajuy Campus, demonstrate awareness of environmental issues, their knowledge and practical engagement with green technology (GT) remain limited. Despite exposure to sustainability-related topics in courses such as Environmental Science and Science, Technology and Society, the application of GT as a concrete solution to

environmental challenges has yet to be fully realized. Students recognize the urgency of mitigating global warming and environmental degradation, but their familiarity with, and willingness to adopt, GT is restrained by limited access, minimal institutional integration, and low personal engagement. These gaps highlight the critical role of universities in advancing climate action. NISU, Ajuy Campus, in collaboration with stakeholders, must strengthen institutional policies and mechanisms that mainstream GT in curriculum, research, and campus operations. Faculty members should be empowered through training and workshops to integrate GT into teaching, research, and extension activities, while students should be provided with practical exposure to sustainable technologies and facilities available in the market. Existing best practices, such as the creative use of recycled materials in teaching, demonstrate promising grassroots initiatives but require stronger institutional support and funding to scale their impact. Furthermore, a whole-of-university approach is essential. Investment in environmentally friendly infrastructure, integration of GT into student-led projects, and the active promotion of sustainability-focused clubs and organizations can collectively transform awareness into practice. Administrative leadership is equally crucial to ensure that programs and projects are not only conceptualized but also sustainably implemented. In conclusion, the study underscores that bridging the gap between awareness and application of green technology in higher education requires policy support, faculty development, and student engagement. By embedding GT concepts into curriculum, infrastructure, and institutional culture, universities can cultivate future professionals equipped to champion sustainability and contribute meaningfully to the global fight against climate change.

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