



Research Article

A multi-dimensional exploration of university students' sustainable consumption and environmental awareness in Pakistan

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ABSTRACT

As we continue the journey to evolve into an increasingly environmentally conscious world, understanding the factors that shape sustainable consumption and green behavior among university students is important because they will be our future innovators and leaders. This research delves into the nuanced dimensions of consciousness for sustainable consumption and ecofriendly behavior among university students in Pakistan. This study aims to capture important characteristics of university students and uncover the intricate interplay between these characteristics and sustainable consumption behavior. The study spans different universities, incorporating survey data from 441 students in various universities of Pakistan. Using the online platform of Google Forms, a 5-point Likert scale was used to gather responses of the survey questionnaires. The analytical framework of this study is employing rigorous statistical techniques of ANOVA and multiple linear regression. The findings indicate that ecological awareness significantly impacts green purchasing and sustainable consumption behaviour among the students of universities in Pakistan with some significant mean differences between boys and girls. This research extends its gaze toward a holistic understanding of consciousness for sustainable consumption of students of universities. The resulting narrative embarks on a journey to guide universities and societies in nurturing environmentally responsible citizens and cultivating a sustainable future for all.

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1. INTRODUCTION

Environment sustainability ensures that essential environmental processes and functions are preserved and maintained to meet the needs of not only the current generation but also those of future generations (Basiago, 1995). The responsibility to protect ecosystems, natural resources, and the overall health of the planet to ensure its continued viability and well-being for posterity (Klugman, 2011), is the main theme underscored by this approach. Environmental Sustainability has reached a level of urgency all around the world with an unprecedented focus on addressing environmental quality and fitness issues that are looming in the present and the ones that future generations will have to face (Du-Pisani, 2007). While faced with a growing array of environmental challenges that cast a long shadow over the future, people do find themselves at a crossroads. An intricate web woven

by nature due to these challenges that span a wide spectrum, from the terrifying spectacle of climate change and the relentless march of resource depletion to the dynamic symphony of biodiversity loss and the extreme level of pollution. Sustainable consumption and practices emerge as central aspects of sustainable development under these troubling and ubiquitous concerns. This is the most obvious way that has the transformative power to reduce the burden on our fragile environment while nurturing important pillars of social and economic well-being. However, navigating the maze of sustainable consumption and behavior is not a trivial task. It is loaded with complicated difficulties that necessitate a thorough examination of the structure of these concerns. The intricacy of these difficulties goes well beyond simple surface-level observation and necessitates study that improves awareness of the numerous elements that impede or potentially impede present and future generations' adoption of green practices. It is important to identify the barriers that stand in the way of sustainable consumption and behavior as climate change and environmental degradation looms over our future and the clamor for resource depletion grows louder and this could only be addressed through careful analysis and a deeper understanding of these constraints while hoping to paint a clearer picture.

Understanding Pakistan's intricate setting, a country whose environmental terrain faces several environmental difficulties, helps to provide a proper sketch of the difficult road ahead. The concept of environmental sustainability is something that is in its initial phase of understanding in Pakistan, with the majority normally not observing the habit of safeguarding and protecting the environment. The devastating deforestation that destroys its lush green environment to the noxious air pollution that chokes the cities, from the dire scenario of water scarcity to the desperate mismanagement of waste in Pakistan. The environmental challenges are as diverse as they are urgent for this region. The Environment Performance Index (2022) shows that Pakistan is placed at 176 out of 180 countries in performance related to environment at the bottom of the list. Among these challenges, it is a nation where youth represents a big and overwhelming portion. We are therefore, compelled to understand the factors that influence sustainable consumption among university students in Pakistan.

Environmental sustainability holds immense importance within higher education institutions like universities as their operations encompass a spectrum of activities, encompassing electricity consumption, generation of waste, use of material, substantial human traffic in and out of premises, and on-campus and off-campus transportation, all of which exert direct and indirect impacts on the environment. The attainment of campus sustainability can most effectively be realized by actively engaging students since they constitute the primary stakeholders within university sectors (Zamora-Polo et al., 2019). As we investigate the variables that affect sustainable consumption and, more crucially, ecological consciousness among university students, the importance of this effort cannot be denied because it will be the students who will be responsible for the destiny of Pakistan and they will steer the nation's course over the ensuing years. This research emphasizes the crucial role that students have in tackling the severe environmental difficulties facing the nation. It is grounded in the distinctive natural setting of Pakistan. By harnessing the untapped potential of these future leaders and innovators, we can start a ripple effect,

where conscious consumption becomes the norm, not the exception for the future generation. A focal point of this research is whether university students in Pakistan are changing their consumption to sustainable patterns and are experiencing increased environmental awareness. In this study, we explore the dynamic relationship between student characteristics, consumption, habits, and ecological consciousness. This is a challenging and significant subject, but it is critical since it includes students from several Pakistani higher education institutions, presenting a comprehensive picture of insights into the complicated connection. The study's major objective and purpose is to shed light on the complex elements that impact eco-consciousness, ecologically responsible behavior, and green consumption among Pakistani university students. These results have significant significance for Pakistan's environmental problems since they open the door to encouraging environmentally conscious behavior in individuals and the advancement of a sustainable future. This study thus supports the critical significance of comprehending the complex interactions between factors that influence or limit sustainable consumption behavior and decisions. It also offers valuable insights that can give a direction to policymakers and higher education institutions in Pakistan towards more effective and fruitful strategies for the improvement and advancement of universities for achieving sustainable goals. This study is organized in a way that section 2 discusses previous literature on the matter in hand, section 3 explains methodology employed in this study, section 4 exhibits Empirical Results, and section 5 consists the conclusions of this study.

2. LITERATURE REVIEW

2.1. ECOLOGICAL CONSCIOUSNESS & GREEN CONSUMPTION

Ecological consciousness can be envisioned as a profound reflection of the intricate interplay between humanity and the natural world, shaping our actions, perceptions, and values in this delicate relationship. At its core, it encapsulates the intricate web of connections between our psyche and nature, acting as a prism through which we view and engage with the environment. It is a dynamic mental landscape, a holistic education of the mind, fostering an evolving awareness of our place within the intricate tapestry of the natural world (Panov, 2013). Achieving this ecological consciousness is important and it can be achieved through education and awareness of ecological concerns. Ecological consciousness has connected empirically to have an influence on consumption and behavior that are sustainable environmentally (Mishal et al., 2017). According to Ahn and Shamim (2022), it is evident that the primary driving force behind the formation of intention to purchase for consumption lies in the level of ecological consciousness exhibited by consumers. The environmentally sustainable concept of consumption coined green consumption has been around for a period of time. Green consumption, as Connolly and Prothero (2008), refers is the voluntary adoption of eco-friendly consumer behaviors. It encompasses a diverse array of practices and a wide spectrum of products that are environmentally sustainable. According to Vantamay (2018), sustainable consumption implicitly involves meeting basic needs while enhancing quality of life, respecting ecological limits, balancing self-sufficiency and sharing, and preserving resources for future

generations. There has been a surge in attention surrounding green consumption in recent years that stems from its pivotal role in seamlessly integrating environmentally conscious philosophies into practical patterns of consumption (Sun et al., 2019). Contemporary research in the realm of green consumption predominantly centers around three key themes: consumer green behavior, corporate green production, and the dynamics of green marketing within the realm of social media platforms. Notably, among these areas of investigation, consumer behavior garners the highest degree of research attention and engagement, signifying its prominence and relevance in the field (Yao et al., 2022). A notable trend in the realm of Green Consumption (GC) research is the growing emphasis on interdisciplinary collaboration, encompassing fields like ecology, psychology, health, systematics, politics, and economics. This trend underscores the intertwined nature of Green Consumption research with crucial aspects of human existence, including survival, health, psychological well-being, and societal progress. It highlights the recognition that addressing environmental challenges through Green Consumption is not only a scientific pursuit but also an imperative for holistic human and environmental well-being (Huang et al., 2022). Green consumption also has the potential to contribute significantly to environmental improvement, even in the absence of supply-driven policies and also it is essential to recognize that a comprehensive policy approach, encompassing green consumption as a vital component, proves to be a more efficient and effective strategy for promoting sustainability and environmental well-being (Jiang & He, 2022). Moreover, a crucial link has been identified where the intention for green consumption emerges as a pivotal factor in elucidating the person who buys goods or services eco-friendly actions and behaviors (Duong, 2021). Ecological consciousness plays a constructive role in this regard, fostering the inclination to purchase eco-friendly products that lead to green consumption, and in circumstances marked by heightened ecological consciousness, the anticipation of guilt also exerts a positive influence on the intention to support green purchases that again leads to green consumption (Haj-Salem et al., 2022). According to findings from the study of Shen and Wang (2022), underscore a clear relationship between ecological consciousness serving as the foundational cornerstone upon which green consumption practices are built. University students specifically in the young consumers section, who possess a level of green consumption attitude, that is moderate can show a degree of awareness of high sustainability awareness in consumption. Such behavior could be improved through the application of policy-driven constraints (Ahamad & Ariffin, 2018). Nevertheless, within university settings, it is evident that the awareness and consciousness regarding green consumption products like organic products are not yet at the desired or optimal level, emphasizing the need for proactive efforts to enhance this consciousness through awareness among students and faculty (Zeynalova & Namazova, 2022). Furthermore, a direct correlation was observed between the prevalence of positive initiatives in green consumption and practices and the elevated standing of Higher Education Institutions (HEIs) within the overall ranking of higher education institutions listing (De-la-Poza et al., 2021). Green consumption stands as a pivotal concern, demanding both governmental and public commitment to underpin the enduring sustainable development of humanity. It transcends the boundaries of time, space, social class, and ideology, emphasizing its universal significance and the collective responsibility to

safeguard our planet's future well-being (Lu & Park, 2022). Given the above arguments in mind, we suggest ecological consciousness will have a positive effect on green consumption and propose the following hypothesis:

H_i: Green Consumption has a significant positive effect on Ecological Consciousness

2.2. ECOLOGICAL CONSCIOUSNESS & ENVIRONMENTAL-FRIENDLY BEHAVIOR

As human actions are the underlying causes of many environmental challenges (Thondhlana & Hlatshwayo, 2018). Researchers and policymakers hold the belief that encouraging environment-friendly behaviors will lead to a reduction in these issues (Dornhoff et al., 2019). Engaging in pro-environmental actions encompasses a range of practices such as recycling (e.g., the reuse of paper, plastic, and glass containers), practicing water conservation (e.g., limiting water usage during showers and handwashing), adopting energy-saving habits (e.g., switching off unnecessary lights), embracing reusability (e.g., opting for reusable cups), utilizing public transportation, cycling, or walking for commuting, responsible disposal of non-recyclable waste, minimizing paper usage through practices like double-sided printing, and choosing to purchase and use eco-friendly products (Bissing-Olson et al., 2016). Ecological awareness and consciousness have an influencing relation to the behavior of a person that would be environment-friendly (Van-Birgelen et al., 2008). A significant relationship has been underscored that the greater the environment-friendly behaviors and environmentally caring character individuals exhibit, the more pronounced their influence on the decision-making process when it comes to choosing or remaining in environmentally friendly options (Widhiarini et al., 2023). Consumers who exhibit a strong eco-consciousness tend to harbor more positive attitudes and hold elevated perceptions of value when it comes to environment-friendly products for example those crafted from recycled materials. Furthermore, their willingness to purchase such environment-friendly products is notably higher compared to those with lower eco-consciousness levels (Tong & Su, 2022). This has led to a surge in interest in scientific and academic circles and specifically many studies have been conducted to understand behavior related to the environment of students as one in many social groups (Chen et al., 2017). The importance of higher education institutions is crucial in fostering the transformation of individual behaviors into personal values centered around environment-friendly conduct and by doing so, mitigation of the adverse environmental consequences and work towards the overarching goal of sustainability could be effectively attained (Song et al., 2022). According to the research (Vicente-Molina et al., 2018), the promotion of environment-friendly behavior among students can be facilitated through university initiatives and measures, which might involve the provision of disposable containers or the inclusion of environmentally-focused courses in the curriculum. The findings of a research study by Zeng et al. (2023), whose primary focus of analysis was the student population, demonstrated a robust and affirmative correlation between environmental-friendly behavior and sustainable consumption practices among the student demographic. Higher education institutions occupy a pivotal position in nurturing rationality and objectivity among students concerning environmental challenges and the principles of sustainable development and the prevailing norms within university campuses exert a substantial

influence on shaping student behavior, prompting them to adopt eco-conscious roles as responsible green commuters, avid recyclers, and prudent utility savers (Eiman-Negm, 2023). The values that individuals cultivate throughout their educational journey wield considerable influence over their attitudes and actions concerning the natural world (Yadav, 2023). According to the findings from a study by Zia et al. (2023), a critical issue is that the existing societal infrastructure in Pakistan falls short of supporting the realization of an ecological civilization. Notably, they observed that some university students' in Pakistan personal aspirations may not consistently align with environmentally conscious ideals, hindering the adoption of ecological civilization principles that promote environment-friendly behavior. Moreover, it became evident that university students in Pakistan face challenges in actively participating in the establishment of an ecological civilization. Consequently, it becomes imperative to foster collaborative efforts aimed at advancing the practice of ecological civilization. These efforts should involve cooperation among various stakeholders, including students in them specifically. Each university student's commitment is integral to the collective endeavor of embracing ecological civilization. To facilitate this transition, it is crucial for the government, social organizations, families, and universities to create an enabling environment that encourages students to embrace ecological civilization practices and environment-friendly behavior. This encompasses both direct and indirect education from society, families, and universities to instill a sense of duty and cultivate a positive self-concept among students enhancing their ecological consciousness. This journey towards ecological civilization is a shared responsibility, and the active involvement of every university student is paramount. By working collaboratively and establishing supportive conditions, they can collectively strive toward a more sustainable and ecologically conscious future. Pivotal agents who can bring changes are young consumers, particularly the Gen Z demographic like university students and they occupy a central position in driving sustainable behaviors and exerting substantial influence not only within their peer groups but also across other generations (Lisboa et al., 2022), therefore, university students are an important group to be focused upon. Given the above arguments in mind, we suggest environment-friendly behavior and green consumption has a positive effect on Ecological awareness (Fig. 1) with the following hypothesis:

H₂: Environment-Friendly Behavior has a significant positive effect on Ecological Consciousness

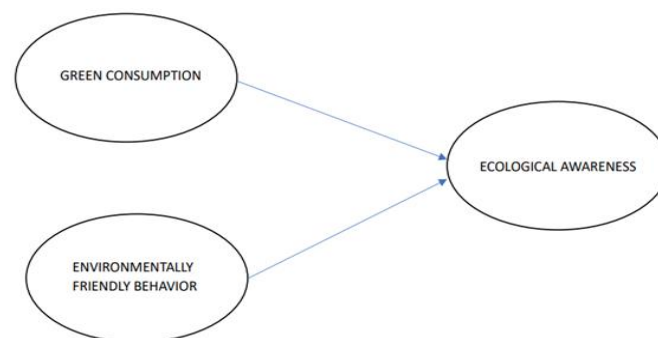


Fig. 1. Conceptual Framework

Source: Author's own work

3. METHODOLOGY

This study begins with an aim to collect data from more than 600 university students using an online questionnaire through Google Forms. The survey was conducted from July to September 2023. We were able to get 441 university students' responses through this survey, and after cleaning of data, we were left with 421 responses. In this study, the respondents are university students representing different universities in Pakistan. The questionnaire used in this survey consists of four parts, the first part is the demographic information, the second is the questions related to the variable of Green Consumption, the third part is the questions related to the variable of Environment-friendly behavior, and the fourth and last consist of questions related to variable of Ecological Awareness. The questionnaire had a total of 57 items adopted from Wardhana (2022), which was modified further and consisted of 13 questions on Green Consumption, 16 questions on Environment-friendly behavior, and 16 questions on Ecological Awareness.

Table 1. Validity & Reliability Results

Indicator	%	α
<i>GREEN CONSUMPTION</i>		
Do you reuse paper for printing when possible?	.302	0.618
How frequently do you print on both sides of a paper?	.298	
How often do you choose to send emails instead of using hard copy outputs?	.267	
How often do you prefer reading documents on a computer instead of printing them on paper?	.193	
How frequently do you avoid using plastic bags?	.291	
How often do you do grocery shopping?	.120	
Do you prefer using e-books or physical books when reading?	.169	
Do you often consume snacks or drinks that come in plastic packaging?	-.078	
How often do you repair or mend items rather than replace them?	.397	
Do you actively seek out products with eco-friendly certifications or labels?	.400	
Do you avoid single-use plastics (such as plastic bags, straws, and bottles) whenever possible?	.338	
When shopping, do you prioritize buying products with minimal packaging?	.343	
How frequently do you make an effort to buy second-hand or used items?	.325	
<i>ENVIRONMENT FRIENDLY</i>		
How often do you dispose of used materials in designated waste collection boxes?	.274	0.631
How frequently do you use rechargeable batteries instead of disposable batteries?	.310	
How much do you prefer using long-lasting, sustainable products over disposable ones?	.334	
How much do you pay attention to water consumption when using sinks and toilets?	.348	
How consistently do you ensure that you dispose of garbage properly and leave no trash behind?	.390	
How often do you make an effort to use light and electrical devices only when necessary to prevent unnecessary energy use?	.382	
How frequently do you turn off your computer and printer when not in use to conserve energy?	.312	
How consistently do you check if lights need to be turned off when leaving a room/place?	.397	
How often do you shave?	-.003	
How often do you take a bath?	.256	
How often do you recycle?	.334	
How often do you use a personal vehicle (car, motorcycle, etc.) for transportation?	.072	
Do you consider using public transportation, carpooling, or other alternatives?	.044	
Have you ever considered switching to an electric or hybrid vehicle?	.223	
Have you ever participated in or organized community clean-up events?	.299	
Do you grow your own produce or herbs at home, even on a small scale?	.167	
<i>ECOLOGICAL AWARENESS</i>		

Indicator	%	α
How familiar are you with the concept of sustainable consumption?	.391	0.756
How often do you consider the environmental impact of your actions in daily life?	.448	
Are you involved in any student organizations or clubs related to sustainability or the environment?	-.139	
Have you participated in any seminars, projects, volunteer activities, or initiatives related to environmental conservation?	-.248	
Are you pursuing any minors or concentrations related to environmental studies or sustainability?	-.285	
How often do you engage in outdoor activities, such as hiking, biking, or gardening?	.216	
Are you aware of what 'carbon emissions per capita' refers to?	.410	
Do you believe that reducing carbon emissions per capita is important for environmental sustainability?	.624	
In your opinion, how much do governmental and non-governmental organizations in your country prioritize environmental protection?	.098	
Do you believe that all university students should take subjects related to environmental awareness?	.526	
How significant is the choice of using public transport for a sustainable environment, in your opinion?	.533	
How essential are promotions of renewable energy resources for a sustainable environment?	.600	
To what extent do you believe promotions of energy-saving practices are important for a sustainable environment?	.575	
How often do you put in your best effort to prevent environmental pollution and raise awareness?	.447	
How much do you agree that recycling waste is crucial for environmental protection and preserving natural resources?	.509	
How important is the separate collection of waste in different dustbins for a sustainable environment?	.528	

Source: Author own Calculation

Second, the 5-point Likert scale type was used to measure every variable. All observed variables were determined to have validity and reliability, and the findings supported Table 1's presentation of valid and reliable items. The statistical analysis, which included multiple linear regression, assessing the suitability and quality of the study's framework, and calculating the influence of each variable, was carried out using the SPSS program. All of the question items passed the validity and reliability tests that were performed. Table 1 displays all aspects of the validity and reliability of the question items.

4. RESULTS & DISCUSSION

4.1. DEMOGRAPHIC ANALYSIS

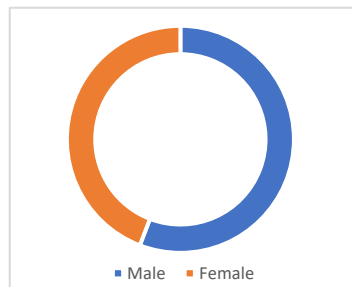
An online Google Forms-based survey conducted and 441 responses gathered from students from various universities in Pakistan, after cleaning 421 responses assembled for analysis. The demographic summary includes gender, age, marital status, area of living, university, field of study, year of study, financial support, financial constraint, affordability, and accessibility of eco-friendly products.

As shown in the table 2, 55.8% of students are male and 44.2% of students are female. 96.2% of students belong to the age group of 18-30 years old, and 2.9% of students belong to the age group of 31-44 years old. 90.7% were single and 9.3% of students were married (see Fig. 2, 3, & 4 respectively).

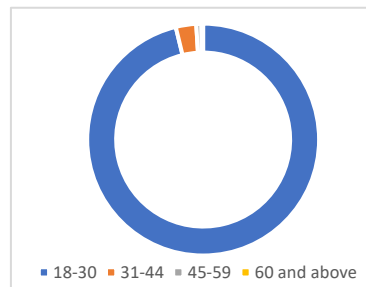
Table 2. Respondent's Characteristics

Indicator	Frequency	Percent
<i>Gender</i>		
Male	235	55.8%
Female	186	44.2%
<i>Age</i>		
18-30	405	96.2%
31-44	12	2.9%
45-59	3	0.7%
60 and above	1	0.2%
<i>Marital Status</i>		
Single	382	90.7%
Married	39	9.3%

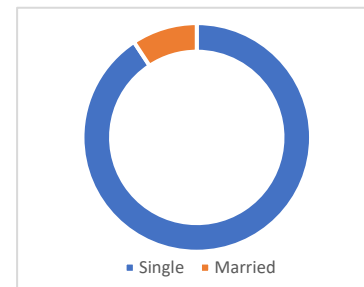
Source: Author's own Calculation

**Fig. 2.** Gender

Source: Author's own work

**Fig. 3.** Age of Respondent

Source: Author's own work

**Fig. 4.** Marital Status

Source: Author's own work

As shown in the table 3 below, 25.9% students belonged to East District of Karachi Division, 25.7% to Central District of Karachi Division, 13.3% belonged to the Malir District of Karachi Division, 10.2% from the Korangi District of Karachi Division, 9.5% from the South District of Karachi Division, 9.3% from other areas of Pakistan, 4.0% from West District of Karachi Division, 1.4% from Kemari District of Karachi Division, 0.2% from Peshawar District of Peshawar Division, 0.2% from Charsadda District of Peshawar Division and 0.2% from Quetta District of Quetta Division (see Fig. 5).

Table 3. Respondent's Characteristics as per the Area of Living

Indicator	Frequency	Percent
<i>Area</i>		
Other	39	9.3%
Karachi Division (Central District)	108	25.7%
Karachi Division (East District)	109	25.9%
Karachi Division (South District)	40	9.5%
Karachi Division (West District)	17	4.0%
Karachi Division (Korangi District)	43	10.2%
Karachi Division (Malir District)	56	13.3%
Karachi Division (Kemari District)	6	1.4%
Peshawar Division (Peshawar District)	1	0.2%
Peshawar Division (Charsadda District)	1	0.2%
Quetta Division (Quetta District)	1	0.2%

Source: Author's own Calculation

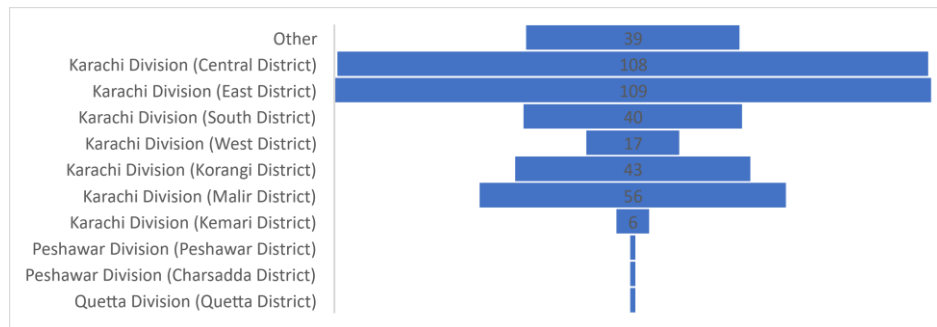


Fig. 5. Area of Respondents

Source: Author's own work

The data shown in Table 4 below, reveals the distribution of student respondents among various universities, at the forefront, with the highest representation, are Iqra University and Mohammad Ali Jinnah University, with 20.4% and 20% of the respondents respectively. Following closely behind, are the NED University of Engineering and Technology at 13.1% and the University of Karachi at 7.1%. These universities command the largest share of respondents in the survey. Further down the list, universities like Dawood University of Engineering and Technology, Karachi Institute of Economics and Technology, and the University of Sindh account for around 1.7%, 1.4%, and 1.4% of the respondents respectively (Fig. 6). A wide range of universities, with percentages ranging from 0.2% to 1.2%, also make up the remainder of the respondent pool.

Table 4. Respondent's Characteristics as per the Educational Institutions

Indicator	Frequency	Percent
<i>University</i>		
Bahauddin Zakariya University	3	0.7%
Bahria University	7	1.7%
Baqai Medical University	1	0.2%
Dawood University of Engineering and Technology.	7	1.7%
DHA Suffa University	2	0.5%
Dow University of Health Sciences	5	1.2%
FAST NUCES	3	0.7%
Federal Urdu University of Arts, Sciences & Technology	1	0.2%
Foundation University	2	0.5%
Habib University	1	0.2%
Hamdard University	5	1.2%
Indus University	4	1.0%
Indus Valley School of Art and Architecture	1	0.2%
Institute of Business Administration	1	0.2%
Institute of Cost and Management Accountants of Pakistan	1	0.2%
Institute of Management Sciences	1	0.2%
Iqra University	86	20.4%
Jinnah University for Women	3	0.7%
Karachi Institute of Economics and Technology	6	1.4%
Lasbela University of Agriculture, Water and Marine Sciences	4	1.0%
Liaquat University of Medical & Health Sciences	1	0.2%
Mohammad Ali Jinnah University	84	20.0%
NED University of Engineering and Technology	55	13.1%
Newports Institute of Communications and Economics	1	0.2%
Pakistan Institute of Engineering and Applied Sciences	1	0.2%

Indicator	Frequency	Percent
Rawalpindi Medical University	1	0.2%
SBB Dewan University	1	0.2%
Shaheed Zulfikar Ali Bhutto Institute of Science and Technology	1	0.2%
Sindh Madressatul Islam University	2	0.5%
Sir Syed University of Engineering and Technology	2	0.5%
The Aga Khan University	3	0.7%
University of Karachi	30	7.1%
University of Lahore	1	0.2%
University of Sialkot	2	0.5%
University of Sindh	6	1.4%
Virtual University	1	0.2%
Ziauddin University	1	0.2%

Source: Author's own Calculation

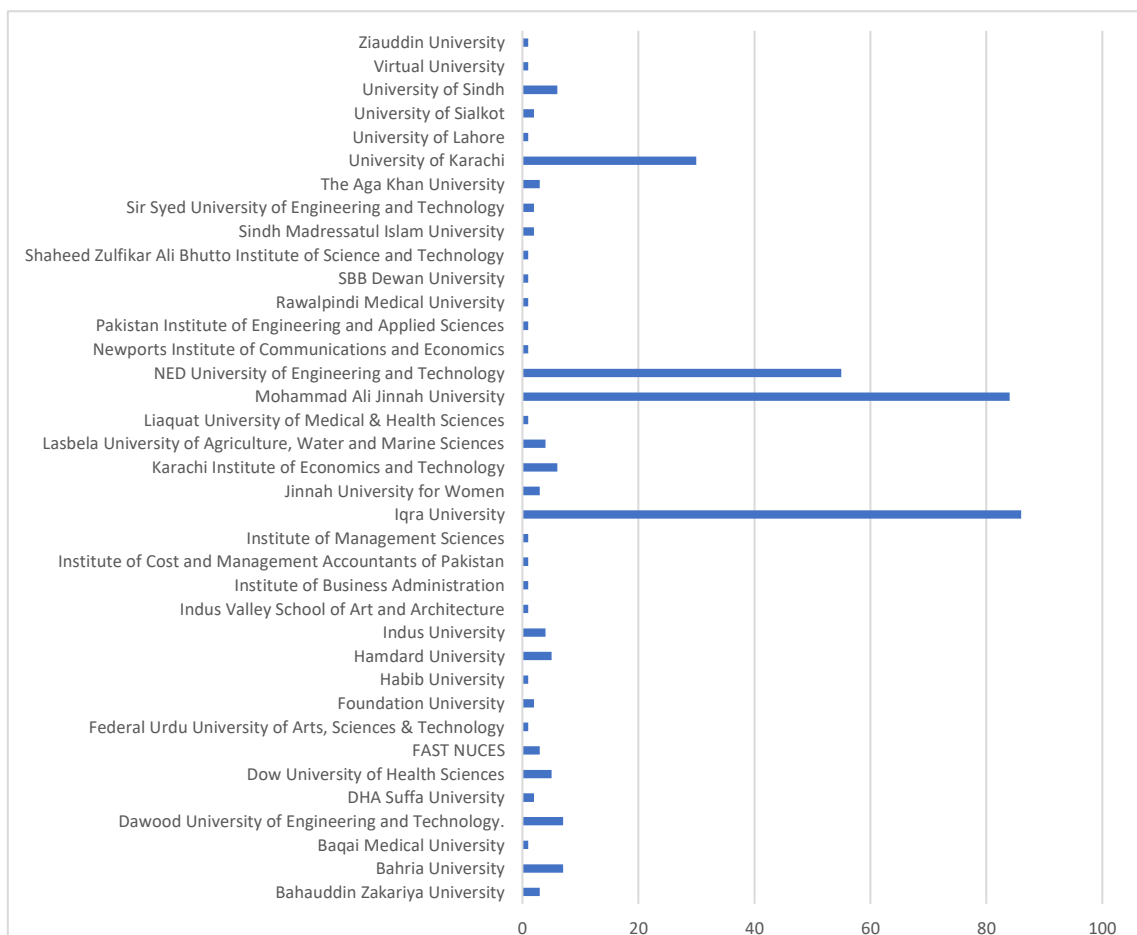


Fig. 6. University of Respondents

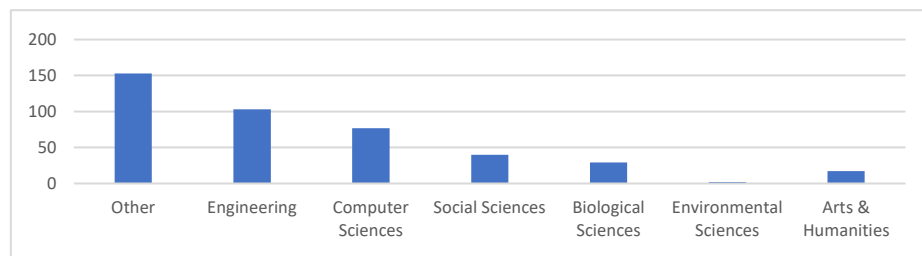
Source: Author's own work

As shown in Table 5, the largest portion of student respondents, constituting 36.3%, falls under the field of study category of "Other," indicating a diverse range of academic disciplines. Next comes the field of "Engineering" with 24.5% of respondents. "Computer Sciences" make up 18.3% of the respondent's field of study. "Social Sciences" account for 9.5%, and "Biological Sciences" encompass 6.9% of the respondents (Fig. 7). "Environmental Sciences" are represented by 0.5%. Lastly, "Arts & Humanities" constitute 4.0% of the field of study of student respondents.

Table 5. Respondent's Characteristics as per the Field of Study

Indicator	Frequency	Percent
<i>Field of Study</i>		
Other	153	36.3%
Engineering	103	24.5%
Computer Sciences	77	18.3%
Social Sciences	40	9.5%
Biological Sciences	29	6.9%
Environmental Sciences	2	0.5%
Arts & Humanities	17	4.0%

Source: Author's own Calculation

**Fig. 7.** Field of Study

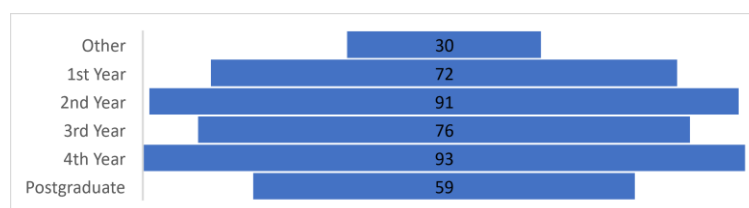
Source: Author's own work

As per the Table 6, among the student respondents, the largest group consists of those in their "4th Year," representing 22.1% of the total. Following closely are students in their "2nd Year" at 21.6%, and those in their "3rd Year" at 18.1%, demonstrating a substantial presence from the middle years of study. "1st-year" students make up 17.1% of the respondents, signifying a significant representation of freshmen. "Postgraduate" students constitute 14.0%, indicating a notable presence of students pursuing advanced degrees (Fig. 8). The category of "Other" encompasses 7.1%, representing students in various unique study circumstances.

Table 6. Respondent's Characteristics as per the Year of Study

Indicator	Frequency	Percent
<i>Year of Study</i>		
Other	30	7.1%
1st Year	72	17.1%
2nd Year	91	21.6%
3rd Year	76	18.1%
4th Year	93	22.1%
Postgraduate	59	14.0%

Source: Author's own Calculation

**Fig. 8.** Year of Study

Source: Author's own work

Table 7 below shows that the majority of student respondents, comprising 65.6%, mentioned that their "Family bears the cost of fees," suggesting that a significant proportion of students rely on their families for financial support. Meanwhile, 25.4% of respondents stated that they "Bear the cost of studies themselves," indicating a substantial number of self-supported students. 6.2% of student respondents were dependent on scholarships/grants. Finally, the category of "Other" encompasses 2.9%, representing students with various unique financial support circumstances (Fig. 9).

Table 7. Respondent's Characteristics as per the Financial Support

Indicator	Frequency	Percent
<i>Financial Support of Study</i>		
Other	12	2.9%
My family bears the cost of fees	276	65.6%
I bear the cost of studies myself	107	25.4%
Scholarship/Grant	26	6.2%

Source: Author's own Calculation

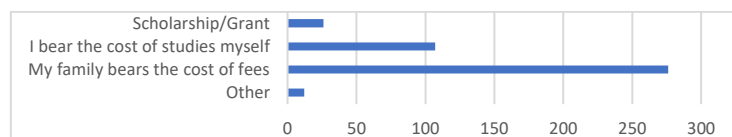


Fig. 9. Financial Support

Source: Author's own work

When it comes to the influence of financial constraints (Table 8) on adopting sustainable practices, the responses from student respondents show distinct groups. A significant portion, 47.7%, responded with "Yes, often," indicating that financial constraints frequently affect their decisions regarding sustainable practices. Additionally, 33.7% responded with "Yes, occasionally," suggesting that financial constraints occasionally come into play when considering sustainable practices. A smaller group, 18.5%, responded with "No, not at all," indicating that they do not perceive financial constraints as a significant factor in their decisions to adopt sustainable practices (Fig. 10).

Table 8. Respondent's Characteristics as per the Financial Constraints

Indicator	Frequency	Percent
<i>Have financial constraints ever influenced your decision to adopt sustainable practices?</i>		
Yes, often	201	47.7%
Yes, occasionally	142	33.7%
No, not at all	78	18.5%

Source: Author's own Calculation

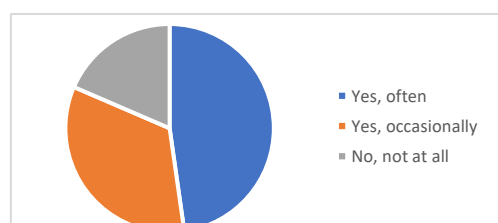


Fig. 10. Financial Constraints

Source: Author's own work

When asked about the affordability of eco-friendly products compared to conventional alternatives, student respondents provided diverse perspectives (Table 9). A noteworthy 28.7% expressed that eco-friendly products are "Somewhat more affordable" than their conventional counterparts, while 24.0% believed they are "About the same" in terms of affordability. Additionally, 19.0% of respondents considered eco-friendly products to be "Much more affordable" than conventional alternatives, indicating a positive perception regarding affordability. On the other hand, 20.2% found eco-friendly products to be "Somewhat less affordable," and 8.1% considered them "Much less affordable" when compared to conventional options (Fig. 11).

Table 9. Respondent's Characteristics as per the Affordability of Eco-Friendly Products

Indicator	Frequency	Percent
<i>In your opinion, how affordable are eco-friendly products compared to conventional alternatives?</i>		
Much more affordable	80	19.0%
Somewhat more affordable	121	28.7%
About the same	101	24.0%
Somewhat less affordable	85	20.2%
Much less affordable	34	8.1%

Source: Author's own Calculation

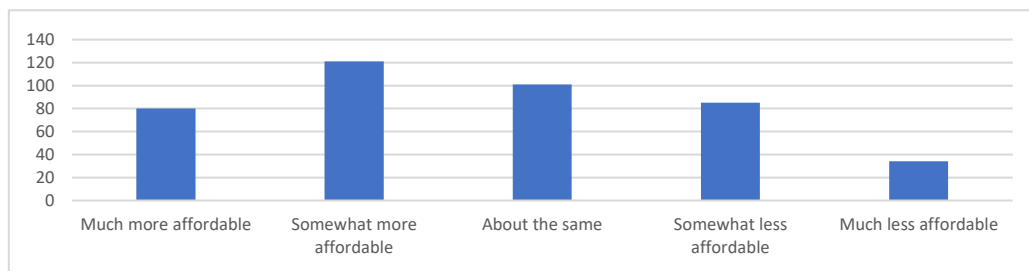


Fig. 11. Eco-Friendly Products Affordability

Source: Author's own work

Student respondents' opinions on the accessibility of eco-friendly products in comparison to conventional alternatives vary (Table 10). 23.3% of respondents considered eco-friendly products to be "Somewhat more easily" accessible, while 22.3% believed they are "About the same" in terms of availability. A portion of 12.1% perceived eco-friendly products as "Much more easily" accessible, reflecting a positive view of their availability. Conversely, 33.5% found eco-friendly products to be "Somewhat less easily" accessible, indicating some difficulty in obtaining them. Lastly, 8.8% of respondents considered eco-friendly products "Much less easily" accessible compared to conventional options (Fig. 12).

Table 10. Respondent's Characteristics as per the Availability of Eco-Friendly Products

Indicator	Frequency	Percent
<i>In your opinion, how easily are eco-friendly products available/accessible to conventional alternatives?</i>		
Much more easily	51	12.1%
Somewhat more easily	98	23.3%
About the same	94	22.3%
Somewhat less easily	141	33.5%
Much less easily	37	8.8%

Source: Author's own Calculation

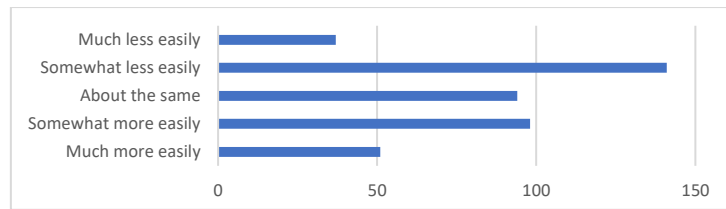


Fig. 12. Eco-Friendly Product Availability

Source: Author's own work

4.2. DESCRIPTIVE ANALYSIS

Table 11 in this section shows the average distribution of green consumption. The item with the lowest mean score, 1.66 (Low), was consuming snacks or drinks that come in plastic packaging, while the item with the highest mean score, 3.01 (Medium), was avoiding using plastic bags.

Table 11. Green Consumption

Green Consumption	Mean	Results
Do you reuse paper for printing when possible?	2.650	Medium
How frequently do you print on both sides of a paper?	2.270	Low
How often do you choose to send emails instead of using hard copy outputs?	1.930	Low
How often do you prefer reading documents on a computer instead of printing them on paper?	2.020	Low
How frequently do you avoid using plastic bags?	3.010	Medium
How often do you do grocery shopping?	2.990	Medium
Do you prefer using e-books or physical books when reading?	2.260	Low
Do you often consume snacks or drinks that come in plastic packaging?	1.660	Low
How often do you repair or mend items rather than replace them?	2.460	Low
Do you actively seek out products with eco-friendly certifications or labels?	2.920	Medium
Do you avoid single-use plastics (such as plastic bags, straws, and bottles) whenever possible?	2.740	Medium
When shopping, do you prioritize buying products with minimal packaging?	2.820	Medium
How frequently do you make an effort to buy second-hand or used items?	3.000	Medium

Source: Author's own Calculation

With the exception of one high item—the frequency of shaving with a mean score of 3.88—the average distribution of environment-friendly items in Table 12 is primarily low to medium.

Table 12. Environment Friendly

Environment Friendly	Mean	Results
How often do you dispose of used materials in designated waste collection boxes?	2.340	Low
How frequently do you use rechargeable batteries instead of disposable batteries?	2.380	Low
How much do you prefer using long-lasting, sustainable products over disposable ones?	2.040	Low
How much do you pay attention to water consumption when using sinks and toilets?	1.810	Low
How consistently do you ensure that you dispose of garbage properly and leave no trash behind?	1.720	Low
How often do you make an effort to use light and electrical devices only when necessary to prevent unnecessary energy use?	1.850	Low
How frequently do you turn off your computer and printer when not in use to conserve energy?	1.630	Low
How consistently do you check if lights need to be turned off when leaving a room/place?	1.590	Low

Environment Friendly	Mean	Results
How often do you shave?	3.880	High
How often do you take a bath?	1.660	Low
How often do you recycle?	2.490	Medium
How often do you use a personal vehicle (car, motorcycle, etc.) for transportation?	2.040	Low
Do you consider using public transportation, carpooling, or other alternatives?	2.630	Medium
Have you ever considered switching to an electric or hybrid vehicle?	2.400	Low
Have you ever participated in or organized community clean-up events?	2.420	Low
Do you grow your own produce or herbs at home, even on a small scale?	2.460	Low

Source: Author's own Calculation

The average distribution of ecological awareness is shown in Table 13 in the last section. The item that received the lowest mean score—0.31 (Very Low)—was participation in any student organizations or clubs focused on sustainability or the environment, while the one that received the highest mean score—2.89 (Medium)—was participating in outdoor activities like hiking, bicycling, or gardening.

Table 13. Ecological Awareness

Ecological Awareness	Mean	Results
How familiar are you with the concept of sustainable consumption?	2.180	Low
How often do you consider the environmental impact of your actions in daily life?	2.010	Low
Are you involved in any student organizations or clubs related to sustainability or the environment?	.310	Very Low
Have you participated in any seminars, projects, volunteer activities, or initiatives related to environmental conservation?	.550	Very Low
Are you pursuing any minors or concentrations related to environmental studies or sustainability?	.440	Very Low
How often do you engage in outdoor activities, such as hiking, biking, or gardening?	2.890	Medium
Are you aware of what 'carbon emissions per capita' refers to?	2.300	Low
Do you believe that reducing carbon emissions per capita is important for environmental sustainability?	1.990	Low
In your opinion, how much do governmental and non-governmental organizations in your country prioritize environmental protection?	3.160	Low
Do you believe that all university students should take subjects related to environmental awareness?	1.900	Low
How significant is the choice of using public transport for a sustainable environment, in your opinion?	2.140	Low
How essential are promotions of renewable energy resources for a sustainable environment?	1.850	Low
To what extent do you believe promotions of energy-saving practices are important for a sustainable environment?	1.760	Low
How often do you put in your best effort to prevent environmental pollution and raise awareness?	2.160	Low
How much do you agree that recycling waste is crucial for environmental protection and preserving natural resources?	1.750	Low
How important is the separate collection of waste in different dustbins for a sustainable environment?	1.670	Low

Source: Author's own Calculation

4.3. HYPOTHESIS TESTING

Table 14. Regression Result

Model Summary			
R	R Square	Adjusted R Square	Std. Error of the Estimate
0.375 ^a	0.140	0.1380	0.40082

Source: Author's own Calculation

According to the R square (table 14), the ecological awareness variable can be explained by the green consumption variable by 14.0%, with the remaining explanations coming from other factors. With a level of significance $0.000 > \alpha 0.05$, the F-test findings (table 15) also showed that green intake did influence the university students' environmental consciousness.

The t-test result (table 16) shows that environmentally friendly consumption has a significant impact on ecological awareness, which is in line with earlier studies that found that such consumption boosted people's knowledge and awareness of ecology and the environment.

Table 15. Analysis of Variance (ANOVA)

ANOVA	Regression	Residual	Total
Sum of Squares	10.990	67.316	78.306
df	1	419	420
Mean Square	10.990	.161	
F	68.408		
Sig.	.000b		

Source: Author's own Calculation

Table 16. Regression Result (t-test)

Coefficients		(Constant)	GC
Unstandardized Coefficients	B	.936	.349
	Std. Error	.108	.042
Standardized Coefficients	Beta		.375
t		8.657	8.271
Sig.		.000	.000

Source: Author's own Calculation

The ecological awareness variable may be described by the environmentally friendly behavior variable by 31.7%, according to the R square test Table 17, and the remaining portion is explained by other factors not related to this study. The F-test findings in Table 18 also showed that, at a level of significance $0.000 > \alpha 0.05$, ecologically friendly behavior did have an impact on university students' ecological awareness.

Table 17. Regression Result

Model Summary			
R	R Square	Adjusted R Square	Std. Error of the Estimate
.563 ^a	.317	.316	.35722

Source: Author's own Calculation

Table 18. Analysis of Variance (ANOVA)

ANOVA	Regression	Residual	Total
Sum of Squares	24.840	53.466	78.306
df	1	419	420
Mean Square	24.840	.128	
F	194.666		
Sig.	.000 ^b		

Source: Author's own Calculation

According to the t-test results Table 19, environmentally friendly behavior had a significant impact on ecological awareness. This finding was consistent with earlier research that showed that environmentally conscious behavior increased people's understanding of and concern for the environment and ecology.

Table 19. Regression Result (t-test)

Coefficients		(Constant)	EF
Unstandardized Coefficients	B	.537	.579
	Std. Error	.093	.042
Standardized Coefficients	Beta		.563
	t	5.756	13.952
Sig.		.000	.000

Source: Author's own Calculation

5. CONCLUSIONS

This study aimed to investigate how university students' environmentally conscious behaviors and green consumerism affect their ecological awareness. The study has provided empirical evidence for the considerable effects of environmental behavior and green consumption on ecological consciousness, respectively. Additionally, this study showed that university students' opinions of ecological awareness as well as their green consumption and ecologically friendly behavior are widely seen as acceptable. The findings of this survey also showed that respondents felt that it is crucial to promote ecological consciousness in everyday life, particularly in the context of education. Given their role as educational institutions, universities must actively encourage their stakeholders to contribute to the creation of a sustainable environment. The higher education institution should develop pertinent policies and plans with green and sustainable concepts including sustainability-based practices and behavior in the university domain, as well as offer supportive infrastructures. Despite the results' considerable influence, this study handled the restrictions to the findings' generalization. The results of this survey may not represent the view of university students worldwide because it was limited to the universities in Pakistan. Additionally, because people see things differently, there may be discrepancies in how sustainability or environmental practices, and behavior are understood. Expanding the sample and study's scope is something that might be considered for future research. However, this study did not evaluate the connection to specific activities; instead, it was merely concerned with determining the extent to which ecologically friendly behavior and green consumption had an impact on ecological awareness. This research may potentially be broadened to analyze additional variables like motivation or various trends in green

consumer purchasing that may interfere with and affect a person's behavior. The study underscores the need for policy actions to enhance ecological awareness and sustainable behavior among university students. We propose integrating sustainability activities into university curricula and promoting green campus initiatives. Additionally, incentives for sustainable practices and collaboration with relevant stakeholders can further support sustainability efforts. To ensure a global perspective and expand the research scope, future studies should include diverse activities and factors influencing ecological consciousness. These policies aim to create environmentally responsible educational environments and empower students and staff to contribute to a more sustainable future.

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Conceptualization, Asad Ali Khan and Dr. Muhammad Meraj.; methodology, Asad Ali Khan and Dr. Muhammad Meraj.; software, Asad Ali Khan.; validation, Asad Ali Khan and Dr. Muhammad Meraj.; formal analysis, Asad Ali Khan.; investigation, Asad Ali Khan.; resources, Asad Ali Khan and Dr. Muhammad Meraj.; data curation, Asad Ali Khan and Hafiza Marium Asif.; writing—original draft preparation, Asad Ali Khan.; writing—review and editing, Dr. Muhammad Meraj.; visualization, Hafiza Marium Asif.; supervision, Dr. Muhammad Meraj.; project administration, Dr. Muhammad Meraj.; funding acquisition, (No funding acquired).

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