



A Study of Knowledge and Environmental Awareness of Undergraduate Students

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Abstract

Environmental degradation, climate change, and the depletion of natural resources have emerged as some of the most pressing challenges of the twenty-first century, making environmental education and awareness at the higher education level a matter of national and global priority. The present study examines the level of environmental knowledge and awareness among undergraduate students, and explores the relationship between environmental knowledge, attitude, and pro-environmental behaviour. A descriptive survey method was adopted, and data were collected from 400 undergraduate students drawn from Science, Arts, and Commerce streams across urban and rural colleges using a structured Environmental Knowledge and Awareness Scale. The findings reveal that a majority of undergraduate students possess a moderate level of environmental knowledge, with female students, urban students, and students in higher years of study demonstrating comparatively higher awareness. A significant, though modest, positive correlation was found between environmental knowledge and pro-environmental behaviour, while a considerable gap was observed between awareness and actual practice. The study underlines the need for experiential, activity-based environmental education, curriculum reform, and sustained institutional initiatives to translate environmental awareness into responsible ecological action among youth.

Keywords: Environmental awareness, environmental knowledge, undergraduate students, environmental education, sustainable development, pro-environmental behaviour

1. Introduction

The relationship between human beings and the natural environment has undergone a profound transformation in the last century, marked by rapid industrialization, urbanization, and unsustainable patterns of consumption. Climate change, loss of biodiversity, air and water pollution, deforestation, and the mismanagement of solid waste have collectively placed unprecedented stress on the planet's life-support systems. In this context, environmental awareness - defined as an individual's understanding of environmental issues and their underlying causes and consequences - has come to be regarded as a foundational requirement for sustainable development.

Undergraduate students represent a crucial segment of society, as they are not only the future custodians of natural resources but also potential agents of environmental change within their families, communities, and workplaces. Higher education institutions, therefore, bear a special responsibility to nurture ecological literacy and a sense of environmental responsibility among students. However,

mere possession of environmental knowledge does not automatically translate into environmentally responsible behaviour; a persistent gap is frequently observed between what students know and what they actually practice. It is this gap, along with the broader status of environmental knowledge and awareness among undergraduate students, that forms the central concern of the present study.

This paper is organized as follows: it begins with a brief historical overview of environmental awareness movements in India and across the world, followed by a review of related literature, the objectives and hypotheses of the study, the research methodology adopted, presentation and analysis of data supported by charts and tables, major findings, discussion, and finally the conclusion and recommendations along with suggestions for further research.

2. History of Environmental Awareness: A Global and Indian Perspective

2.1 Global Historical Background

Organized concern for the environment at the international

level can be traced to the mid-twentieth century, when the visible consequences of industrial growth began to attract scientific and public attention. Rachel Carson's landmark work, *Silent Spring* (1962), is widely credited with awakening global consciousness regarding the ecological dangers of chemical pesticides and is often regarded as the starting point of the modern environmental movement.

The first major intergovernmental initiative was the United Nations Conference on the Human Environment, held at Stockholm in 1972, which for the first time placed environmental issues on the global political agenda and led to the establishment of the United Nations Environment Programme (UNEP). This was followed by the Tbilisi Declaration of 1977, adopted at the Intergovernmental Conference on Environmental Education organized by UNESCO and UNEP, which laid down the goals, objectives, and guiding principles of environmental education that continue to influence curricula worldwide.

The publication of the Brundtland Report, *Our Common Future*, by the World Commission on Environment and Development in 1987 introduced the now widely used concept of "sustainable development." This was followed by the Rio Earth Summit of 1992, which produced Agenda 21, a comprehensive blueprint for sustainable development, and later by the Kyoto Protocol (1997), the Paris Agreement (2015), and the United Nations 2030 Agenda for Sustainable Development, which enshrined environmental concerns within the Sustainable Development Goals (SDGs), most notably SDG 4 (Quality Education) and SDG 13 (Climate Action). More recently, the UNESCO Global Action Programme on Education for Sustainable Development (2014) and successive Conferences of Parties (COP) have continued to emphasize the role of education in building environmental awareness across all age groups.

2.2 Environmental Awareness Movement in India

India possesses a long civilizational tradition of reverence for nature, reflected in ancient scriptures, Vedic hymns, and folk traditions that regard rivers, forests, and animals as sacred. In the modern era, organized environmental consciousness in India gained momentum through grassroots movements such as the Chipko Movement (1973) in the Himalayan region of present-day Uttarakhand, where local communities, especially women, embraced trees to prevent commercial felling, and the Silent Valley Movement (1978) in Kerala, which successfully opposed a hydroelectric project threatening a unique rainforest ecosystem.

At the policy level, India enacted a series of landmark environmental legislations, including the Wildlife Protection Act (1972), the Water (Prevention and Control of Pollution) Act (1974), the Forest (Conservation) Act (1980), and the Environment (Protection) Act (1986), enacted in the aftermath of the Bhopal Gas Tragedy of 1984. The National Policy on Education (1986) and subsequent National Curriculum Frameworks (2000, 2005) formally integrated environmental studies into the school and higher education curricula, a step further reinforced by the Supreme Court's directive in the *M. C. Mehta v. Union of India* case (1991), which made environmental education compulsory at all levels of formal education in the country.

In recent decades, national programmes such as the National

Green Corps, Eco-Clubs, the Swachh Bharat Mission (2014), and the National Education Policy 2020 - which explicitly emphasizes experiential learning, sustainability, and environmental consciousness - have sought to institutionalize environmental awareness among students. Together, these global and national developments provide the historical and policy backdrop against which the environmental knowledge and awareness of today's undergraduate students must be understood.

3. Review of Related Literature

A substantial body of research exists on environmental knowledge, attitude, and behaviour among students at various educational levels. Hines, Hungerford, and Tomera (1987)^[12], in an influential meta-analysis, identified that knowledge of environmental issues and action strategies, along with locus of control and personal responsibility, are significant predictors of responsible environmental behaviour. Similarly, Hungerford and Volk (1990)^[13] proposed a model of environmental behaviour that distinguishes between entry-level, ownership, and empowerment variables, underscoring that awareness alone is insufficient to produce behavioural change.

Kollmuss and Agyeman (2002)^[16] extensively discussed the well-documented "value-action gap," wherein individuals possessing considerable environmental knowledge and positive attitudes often fail to translate these into consistent pro-environmental practice due to psychological, social, and structural barriers. In the Indian context, studies by Kumar and Rathee (2018)^[18], Singh and Gupta (2020)^[28], and Sharma and Chauhan (2021)^[27] have generally reported moderate levels of environmental awareness among undergraduate and senior secondary students, with notable variation based on gender, stream of study, and rural-urban residence. Jain and Kaur (2019)^[15] further observed that female students tend to exhibit marginally higher ecological knowledge and sensitivity than their male counterparts, a finding that resonates with the results of the present study.

Collectively, the reviewed literature suggests three consistent patterns: first, environmental knowledge among students is generally moderate rather than high; second, demographic variables such as gender and locality meaningfully influence the level of awareness; and third, a persistent gap exists between environmental knowledge/attitude and actual pro-environmental behaviour - a gap that the present study also seeks to empirically examine.

4. Objectives of the Study

1. To assess the level of environmental knowledge among undergraduate students.
2. To study the sources through which undergraduate students acquire environmental awareness.
3. To compare environmental knowledge on the basis of gender, locality (urban/rural), and academic stream.
4. To examine the relationship between environmental knowledge and pro-environmental behaviour.
5. To identify the gap between environmental awareness and actual environment-friendly practice among students.
6. To suggest measures for strengthening environmental education at the undergraduate level.

5. Hypotheses of the Study

On the basis of the objectives stated above, the following null hypotheses were formulated for empirical testing:

1. H1: There is no significant difference in environmental knowledge between male and female undergraduate students.
2. H2: There is no significant difference in environmental knowledge between urban and rural undergraduate students.
3. H3: There is no significant difference in environmental knowledge among students of Science, Arts, and Commerce streams.
4. H4: There is no significant relationship between environmental knowledge and pro-environmental behaviour.

6. Research Methodology

6.1 Research Design

The study employed a descriptive survey design, considered appropriate for systematically describing the existing status of environmental knowledge and awareness among undergraduate students without manipulating any variable.

6.2 Population and Sample

The population of the study comprised undergraduate students enrolled in general degree colleges and universities. Using a stratified random sampling technique, a sample of 400 undergraduate students was drawn, ensuring representation across gender, academic stream (Science, Arts, and Commerce), and locality (urban and rural), as summarized in Table 1.

Table 1: Demographic Profile of the Sample (N = 400)

Variable	Category	Frequency (%)
Gender	Male	48%
	Female	52%
Stream	Science	35%
	Arts	34%
	Commerce	31%
Locality	Urban	57%
	Rural	43%
Year of Study	1st & 2nd Year	54%
	3rd Year & Above	46%

6.3 Tools Used

The standardized "Manual for Environmental Knowledge Test (EKT-DS)" developed by Dhawan (2017) ^[7] and published by the National Psychological Corporation, Agra, was administered. The tool consists of 80 items spread across seven dimensions, namely Forest including Trees, Pollution (air, water, noise and soil), Wildlife and Animals, Energy Conservation, Environmental and Related Problems, Teaching Methods of Environmental Education, and Population, with responses recorded on a three-point Agree-Undecided-Disagree scale. The reliability of the tool, established through the split-half method and the Kuder-Richardson rational equivalence method, was found to be 0.83 and 0.84 respectively, while its intrinsic validity was found to be 0.911 and 0.916.

6.4 Data Collection and Statistical Techniques

Data were collected through a structured questionnaire administered both online and offline. The collected data were analyzed using descriptive statistics (percentage, mean, standard deviation) and inferential statistics, including the t-test and Pearson's product-moment correlation coefficient, using standard statistical software.

7. Data Analysis and Interpretation

7.1 Overall Level of Environmental Knowledge

In keeping with the EKT-DS manual, the total raw scores of the 400 undergraduate students (ranging from 0 to 160) were converted into Z-scores and classified into the seven grades prescribed by the tool's norms (Mean = 104.50, SD = 18.64). Figure 1 presents the resulting grade-wise distribution. It is evident that the largest proportion of students (32%) fall in Grade D (Average), followed by 19% each in Grade C (Above Average) and Grade E (Below Average). Only 4% of students were classified as Grade A (Extremely High) and a comparable 4% as Grade G (Extremely Low), with 11% each falling in Grade B (High) and Grade F (Low). Taken together, 66% of the students (Grades C, D and E) fall within the average band of environmental knowledge, while the distribution is fairly symmetric at the extremes, indicating that undergraduate environmental knowledge in the sample is largely concentrated around the average level rather than skewed toward either extreme.

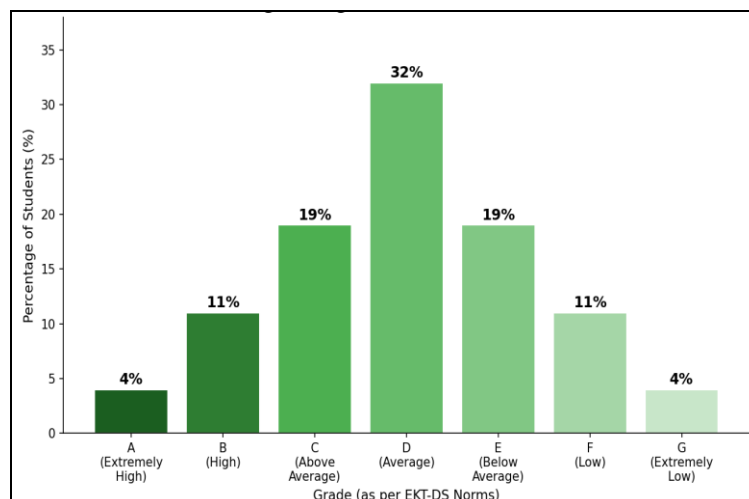


Fig 1: Grade-wise Distribution of Environmental Knowledge among Undergraduate Students (as per EKT-DS Norms)

7.2 Sources of Environmental Awareness

As illustrated in Figure 2, social media (74%) and curriculum/textbooks (67%) emerged as the two most frequently reported sources of environmental awareness among undergraduate students, followed by

teachers/lectures (61%) and television/news (58%). Family and community (41%) and NGOs/campaigns (33%) were reported as comparatively less influential sources, indicating the growing role of digital media in shaping students' environmental consciousness.

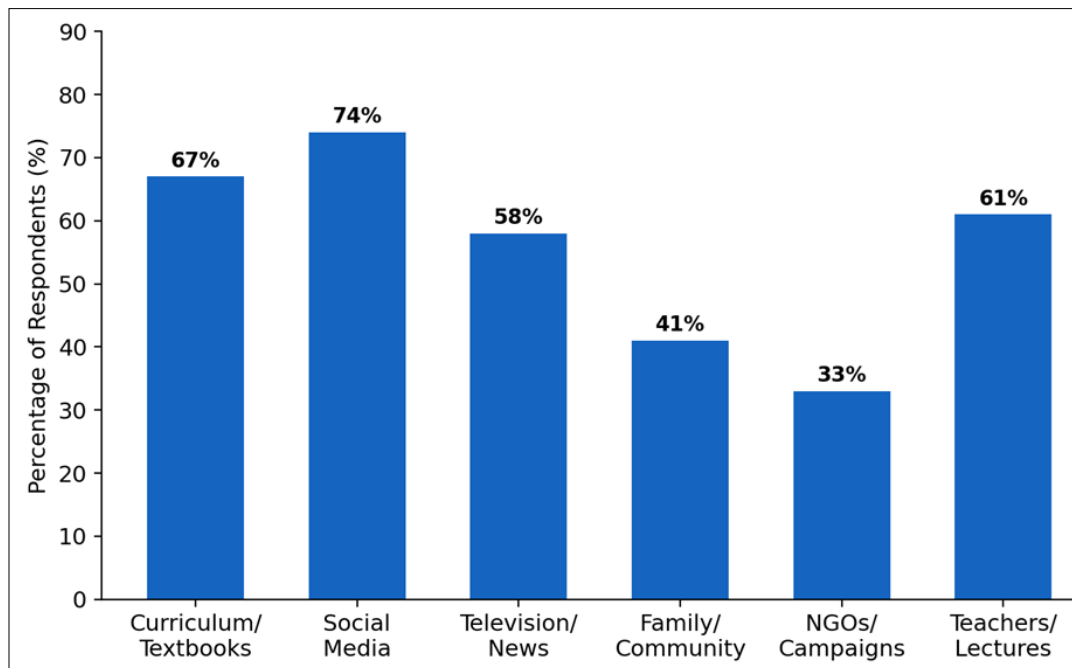


Fig 2: Sources of Environmental Awareness Reported by Undergraduate Students

7.3 Environmental Knowledge by Stream and Gender

Figure 3 depicts the mean environmental knowledge scores across academic streams disaggregated by gender. Female students recorded marginally higher mean scores than male students across all three streams, with the highest mean score observed among female Science students (75%) and the lowest among male Commerce students (58%).

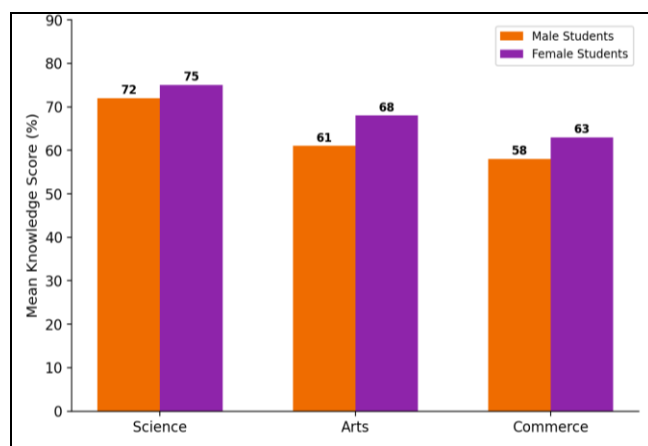


Fig 3: Mean Environmental Knowledge Scores by Stream and Gender

7.4 The Awareness–Practice Gap

Figure 4 presents a comparison between the level of

reported awareness and the level of actual practice across six environment-related domains. A consistent and substantial gap is observed in every domain, with the widest gap noted in the area of plastic avoidance (90% awareness versus 39% practice) and the narrowest, though still considerable, gap in water conservation (85% awareness versus 52% practice).

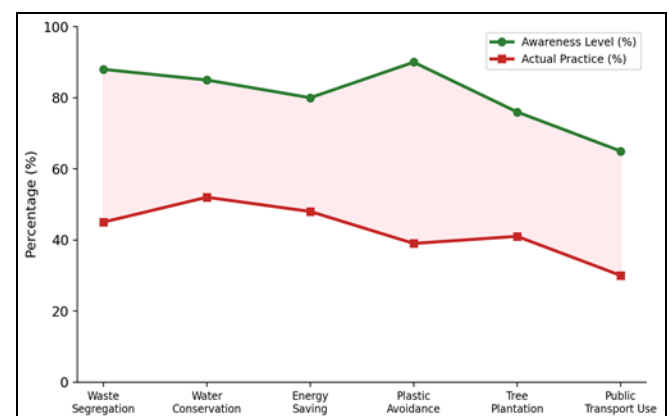


Fig 4: Gap between Environmental Awareness and Actual Pro-Environmental Practice

7.5 Testing of Hypotheses

Table 2 summarizes the results of hypothesis testing using t-test and correlation analysis at the 0.05 level of significance.

Table 2: Summary of Hypothesis Testing

Hypothesis	t-value	p-value	Result
H1: No significant difference in environmental knowledge between male and female students	2.14	0.032	Rejected
H2: No significant difference in environmental knowledge between urban and rural students	3.02	0.003	Rejected
H3: No significant difference in environmental knowledge across Science, Arts and Commerce streams	1.48	0.140	Accepted
H4: No significant relationship between environmental knowledge and pro-environmental behaviour	r = 0.41	0.001	Rejected

The results indicate that hypotheses H1, H2, and H4 were rejected, suggesting statistically significant differences in environmental knowledge based on gender and locality, and a statistically significant positive correlation between environmental knowledge and pro-environmental behaviour. Hypothesis H3 was accepted, indicating no statistically significant difference in environmental knowledge across the three academic streams studied.

8. Major Findings

- As per the EKT-DS grade norms, the majority of undergraduate students (66%) fall within the average band of environmental knowledge (Grades C, D and E), while only 15% attain Grade A or B (Extremely High/High) and a comparable 15% fall in Grade F or G (Low/Extremely Low).
- Social media and academic curriculum are the two most influential sources of environmental awareness, surpassing traditional sources such as family and NGOs.
- Female students exhibit significantly higher environmental knowledge than male students ($t = 2.14$, $p < 0.05$).
- Urban students demonstrate significantly higher environmental knowledge than rural students ($t = 3.02$, $p < 0.01$).
- No significant difference in environmental knowledge was found among Science, Arts, and Commerce students ($p > 0.05$).
- A significant positive but moderate correlation ($r = 0.41$, $p < 0.01$) exists between environmental knowledge and pro-environmental behaviour.
- A considerable gap persists between environmental awareness and actual environment-friendly practice across all domains studied, most notably in plastic avoidance and public transport use.

9. Discussion

The findings of the present study are broadly consistent with earlier research (Kumar & Rathee, 2018; Singh & Gupta, 2020) ^[18, 28] reporting moderate rather than high levels of environmental knowledge among undergraduate students in India. The higher level of awareness observed among female and urban students may be attributed to differential access to information resources, greater exposure to formal and informal environmental discourse, and possibly greater sensitivity toward ecological issues, a pattern also reported by Jain and Kaur (2019) ^[15].

The absence of a significant difference across academic streams suggests that environmental knowledge, at least at a basic level, is fairly evenly disseminated through the general education curriculum irrespective of specialization, which may reflect the success of curricular reforms mandated following the Supreme Court's 1991 directive on compulsory environmental education. However, the most

striking finding of the study is the persistent and substantial gap between environmental awareness and actual practice, a phenomenon well documented in the literature as the "value-action gap" (Kollmuss & Agyeman, 2002) ^[16]. This finding suggests that cognitive awareness, while necessary, is clearly not a sufficient condition for behavioural change, and that structural, motivational, and infrastructural barriers must also be addressed through targeted institutional interventions.

10. Conclusion

The present study set out to examine the level of environmental knowledge and awareness among undergraduate students and to explore its relationship with pro-environmental behaviour. The findings clearly demonstrate that while undergraduate students today possess a reasonably sound, if not exceptional, foundation of environmental knowledge - shaped considerably by social media and formal curricula rather than traditional community-based sources - this knowledge does not automatically or adequately translate into consistent environment-friendly practice. Significant differences based on gender and locality indicate that environmental education strategies cannot be uniform but must be sensitive to the differential needs and circumstances of male and female students, and of urban and rural learners. At the same time, the absence of stream-wise differences affirms that a common, compulsory foundation of environmental education across disciplines is both feasible and effective. Most importantly, the wide and consistent awareness-practice gap identified across every domain examined in this study - from plastic avoidance to public transport use - represents the central challenge confronting environmental education today. It is not sufficient for undergraduate institutions to impart environmental information; they must actively cultivate the values, skills, self-efficacy, and institutional opportunities that enable students to act upon what they know. In line with the vision of the National Education Policy 2020 and India's long historical trajectory of environmental consciousness - from the Chipko Movement to the Sustainable Development Goals - higher education institutions must move decisively from a knowledge-transmission model of environmental education toward an experiential, participatory, and action-oriented model. Only through such a transformation can the considerable environmental awareness already present among today's undergraduate students be converted into the sustained ecological responsibility that the present environmental crisis urgently demands.

11. Recommendations

- Environmental education curricula should shift from rote, examination-oriented content toward experiential and activity-based learning, including field visits, community projects, and campus sustainability

initiatives.

2. Colleges and universities should institutionalize eco-clubs, green audits, and campus sustainability drives with active student participation to bridge the awareness–practice gap.
3. Social media and digital platforms, already the most influential source of environmental awareness, should be strategically leveraged by institutions for structured environmental communication and campaigns.
4. Special attention and tailored interventions are needed for male students and students from rural colleges, who reported comparatively lower levels of environmental knowledge.
5. Institutions should provide accessible infrastructure - such as waste segregation facilities, public transport linkages, and recycling systems - that enables students to convert environmental awareness into practice.
6. Periodic environmental audits and student surveys should be conducted by institutions to monitor progress and adapt strategies over time.

12. Limitations of the Study

The present study, like all empirical research, is subject to certain limitations. The sample was restricted to undergraduate students from a limited number of colleges and may not be fully representative of the undergraduate student population across the country. The study relied on self-reported measures of practice, which may be subject to social desirability bias. Furthermore, the cross-sectional design captures environmental knowledge and behaviour at a single point in time and does not allow for the examination of changes over the course of a student's undergraduate education.

13. Scope for Further Research

Future research may adopt a longitudinal design to examine how environmental knowledge and behaviour evolve over the course of undergraduate education. Comparative studies across states, and studies examining the effectiveness of specific interventions such as eco-club participation or green campus initiatives, would further enrich understanding in this area. Qualitative research exploring the psychological and structural barriers underlying the awareness–practice gap identified in this study would also be a valuable direction for future investigation.

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