



RESEARCH ARTICLE

Awareness on environmental issues and sustainable practices among college students - With special reference to the Chennai city region

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Abstract

Addressing global environmental issues demands not only awareness but also collective responsibility and proactive engagement from all sectors of society, particularly the youth. This study investigates the impact of demographic characteristics and key drivers of environmental awareness on the adoption of sustainable practices among college students. Using a convenience sampling technique, data were collected through an online survey administered to 133 college students in Chennai. The results highlight those real-life experiences and easily accessible platforms—such as social media, interactive workshops, and campaigns—play a more effective role in fostering sustainable practices compared to traditional academic courses on environmental studies. Moreover, when combined with targeted awareness-building efforts, demographic factors significantly influence students' commitment to environmentally conscious behaviors. The study recommends incorporating experiential learning opportunities into academic curricula, including environmental quizzes, awareness campaigns, and hands-on workshops. These interactive approaches can enhance student engagement, deepen their understanding, and inspire long-term commitment to sustainable practices, making environmental education both practical and transformative.

Keywords: Environmental issues, Sustainable practices, Information channels, Personal engagement, Environmental curriculum, Climate change, Demographic variables.

Introduction

Environmental education serves as a cornerstone for addressing pressing global issues such as climate change, resource depletion, and pollution. The Intergovernmental Panel on Climate Change (IPCC, 2022) report highlights the severe impacts of human-induced climate change and the urgent need for action. It emphasizes the protection and

restoration of ecosystems to reduce climate risks and support essential resources. Vulnerable populations, particularly billions worldwide, face disproportionate challenges. By fostering sustainable practices, particularly among younger generations, it equips individuals with the knowledge and skills necessary to mitigate environmental degradation and promote long-term sustainability (UNESCO, 2021; IPCC, 2022). College students, poised to become future leaders and decision-makers, are particularly critical in driving sustainability efforts through informed and responsible practices (Levine & Strube, 2012; Masongsong, 2024).

Although environmental education has been widely emphasized in existing research, a limited understanding remains of how demographic factors, such as age, gender, and educational background, influence students' engagement with sustainability initiatives (Doe & Roe, 2019). For example, gender differences have been observed in the implementation of eco-friendly practices, with women often showing higher levels of involvement in conservation activities compared to men (Ningrum & Herdiansyah, 2018). Similarly, variations in educational background have been linked to disparities in environmental awareness and participation rates (Szeberenyi *et al.*, 2022).

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Despite these findings, the interplay between demographic characteristics and environmental awareness drivers in shaping sustainable behaviors among college students has not been extensively explored. This study addresses this gap by examining how these variables interact to influence students' engagement with sustainability. The findings aim to provide actionable insights for designing more inclusive and effective environmental education programs, thereby enhancing their impact on diverse student populations and promoting broader sustainability outcomes.

Review of Literature

The studies reviewed emphasize the critical role of environmental awareness and behavior among students across diverse global contexts. However, the findings reveal variations and contradictions that warrant further exploration. For instance, He *et al.* (2011) and Abbas and Singh (2014) report high levels of environmental knowledge and positive attitudes among students, yet, both studies highlight significant gaps in active participation. This disparity suggests that knowledge and attitudes alone are insufficient to drive behavioral change, underscoring the need for targeted interventions to promote effective change. Levine and Strube (2012) offer valuable insight into this issue, demonstrating that explicit attitudes and intentions are more direct predictors of pro-environmental behavior.

Gender differences also emerge as a recurring theme. Sivamoorthy *et al.* (2013) and Ningrum & Herdiansyah (2018) highlight disparities in the practical application of eco-friendly practices, despite similar levels of awareness. These findings suggest that gender-specific factors may influence environmental behavior, a point that warrants further investigation. Furthermore, studies like Yildiz & Budur, (2019) demonstrate the effectiveness of hands-on experiences—such as tree planting and clean-up initiatives—in fostering positive attitudes and enhancing environmental awareness. Similarly, Masongsong (2024) emphasizes the importance of community participation in fostering sustainable behaviors and achieving long-term impact.

Contrasting perspectives on the link between knowledge and action are evident in few studies, which emphasize the need for improved efforts to bridge this gap. Both studies highlight low participation in environmental activities despite high awareness levels, particularly in regions where environmental literacy and engagement are less prioritized (Erhabor & Don, 2016; Shri & Tiwari, 2021). This reinforces the importance of integrating sustainability education into formal curricula and fostering community-based programs, a strategy supported by the findings of Hakiki and Saputra (2024).

While these studies collectively underline the significance of environmental education and engagement, the literature lacks a comprehensive synthesis that integrates these diverse findings. Key contradictions—such as the inconsistent

roles of attitudes, knowledge, and gender—highlight the complexity of factors influencing environmental behavior. Addressing these gaps through a more cohesive review could offer a clearer understanding of the interplay between demographic factors, educational strategies, and behavioral outcomes, providing a stronger basis for future research and the development of targeted interventions in sustainability education.

Research Questions

What is the relationship between demographic factors (age, gender, education) and students' engagement in sustainable practices?

How do environmental awareness drivers (such as personal commitment, knowledge, and access to information) interact with demographic factors to influence sustainable practices among students?

Objectives

To examine the relationship between demographic factors (age, gender, education) and students' engagement in sustainable Practices.

Literature Gap

Previous studies have explored individual demographic factors, such as gender (Sivamoorthy *et al.*, 2013; Ningrum & Herdiansyah, 2018) or education (Abbas & Singh, 2014; Szeberenyi *et al.*, 2022), in relation to sustainability; however, few have systematically considered how these factors interact to influence student behavior. This objective will fill that gap by providing a more integrated view of how these variables work together to shape sustainable practices.

To analyze how environmental awareness drivers (personal commitment, knowledge, access to information) interact with demographic factors to influence students' sustainable practices.

Literature Gap

While research has demonstrated the importance of environmental awareness drivers in promoting sustainable practices (Levine & Strube, 2012; Shri & Tiwari, 2021), there is limited exploration of how these awareness drivers intersect with demographic factors. This objective aims to explore how the interaction of these variables influences students' engagement in sustainability initiatives.

Hypothesis of the Study

Null Hypothesis (H01)

There is no interaction between demographic factors (age, gender, education) and students' engagement in sustainable Practices.

Null Hypothesis (H02)

Environmental awareness drivers do not significantly interact with demographic factors to influence students' sustainable Practices.

Materials and Methods

Questionnaire Development, Validation, and Pilot Testing

Primary Data Collection

Primary data were collected from 133 students in the Chennai city region through a Google Form questionnaire. The questionnaire was distributed to participants to ensure ease of access and to reach a broad audience. A Likert scale analysis was used to measure participants' feelings about certain statements. This method helps capture their attitudes and opinions in a clear and structured way.

"Convenience sampling was selected for this study due to its practicality, enabling efficient data collection from participants within the constraints of time and accessibility. However, this approach limits the ability to generalize the findings to a larger population, as it is dependent on the ease of participant selection, which could introduce bias and distort the results to improve the generalizability of future studies, the use of random sampling would be a more appropriate method."

Measurement of Variables Used in this Study

Demographic Variables -Gender, age and educational qualification- categorical variables. Personal experiences related to environmental activities or events, such as participation in clean-up drives, tree-planting activities, or energy conservation at home. Likert scale- "Strongly Disagree" to "Strongly Agree". Exposure to formal or informal environmental education, such as courses, workshops, or

seminars. Likert Scale-"Not Exposed" to "Highly Exposed".

Awareness of specific environmental issues (e.g., climate change, resource depletion, pollution): Likert scale from "Not Aware" to "Very Aware".

Sources of information (e.g., social media, news providers, educational institutions) that provide information on environmental issues: Likert scale ranging from "Never" to "Very Often".

To ensure the validity of the questionnaire, it was reviewed by experts in the field of environmental education, who provided feedback on the content relevance, clarity, and alignment with the study's objectives. Based on their input, minor revisions were made to improve clarity and focus.

Additionally, a pilot test was conducted with a small group of participants, allowing for an analysis of the questionnaire's internal consistency. Cronbach's alpha was used to assess the reliability of the questionnaire, ensuring its ability to produce consistent and reliable results. Following the pilot test, adjustments were made to refine the questionnaire and ensure its relevance for the full study. This process of development, validation, and pilot testing helps ensure that the tool accurately measures the intended constructs and supports the reliability and validity of the study's findings.

Results

The sample predominantly comprises young females aged 18-25 with undergraduate qualifications. As a result, the study's findings are likely to be representative of this specific demographic (Table 1).

Table 1: Descriptive statistics

<i>Gender</i>					
		<i>Count</i>	<i>Proportion</i>	<i>Net percent</i>	<i>Cumulative percentage</i>
Valid	Male	47	35.3	35.3	35.3
	Female	86	64.7	64.7	100.0
	Total	133	100.0	100.0	
<i>Age</i>					
		<i>Count</i>	<i>Proportion</i>	<i>Net percent</i>	<i>Cumulative percentage</i>
Valid	18-25 years	131	98.5	98.5	98.5
	26-35 years	1	.8	.8	99.2
	Above 35 years	1	.8	.8	100.0
	Total	133	100.0	100.0	
<i>Educational qualification</i>					
		<i>Count</i>	<i>Proportion</i>	<i>Net percent</i>	<i>Cumulative percentage</i>
Valid	UG	116	87.2	87.2	87.2
	PG	12	9.0	9.0	96.2
	Others	5	3.8	3.8	100.0
	Total	133	100.0	100.0	

Table 2: Reliability test analysis

<i>Variables</i>	<i>Items</i>	<i>Cronbach's Alpha</i>
Environmental curriculum	5	0.886
Sources of Information	3	0.809
Personal Factors	5	0.909
Awareness on Environmental Issues	4	0.913

The reliability analysis shows strong internal consistency, indicating that the selected variables—personal experiences, environmental curriculum exposure, awareness of

environmental issues, and information sources—are well-suited to assessing environmental awareness. Cronbach's alpha values above 0.80 demonstrate good reliability, supporting their use as effective indicators for sustainable practices. This aligns with Nunnally and Bernstein, who suggest that Cronbach's alpha values above 0.70 indicate acceptable internal consistency, while those exceeding 0.80 reflect strong reliability (Nunnally & Bernstein, 1994). Such high reliability strengthens confidence in the study's findings by ensuring that the variables effectively measure the intended constructs (Table 2).

Table 3: Multiple regression statistics

Model overview

Model	R	R Square	Adjusted R square	Std. error of the estimate
1	0.184 ^a	0.034	0.012	3.861
2	0.899 ^b	0.808	0.797	1.750

a. Predictors: (Constant), Educational Qualification, Gender, Age

b. Predictors: (Constant), Educational Qualification, Gender, Age, Personal factors, Environmental Curriculum, Sources of Information, Awareness on Environmental issues.

ANOVA

Model		Sum of squares	df	Mean square	F	Sig.
1	Regression	67.700	3	22.567	1.514	0.214 ^b
	Residual	1922.661	129	14.904		
	Total	1990.361	132			
2	Regression	1607.610	7	229.659	75.003	0.000 ^c
	Residual	382.751	125	3.062		
	Total	1990.361	132			

a. Dependent Variable: Sustainable Practices

b. Predictors: (Constant), Educational Qualification, Gender, Age

c. Predictors: (constant), Educational Qualification, Gender, Age Personal factors, Environmental curriculum, Sources of Information, Awareness on Environmental issues.

Model		Unstandardized coefficients		t	Sig.	Collinearity statistics	
B		Std. Error			Tolerance	VIF	
1	(Constant)	17.486	2.115	8.267	0.000		
	Age	3.428	1.832	1.871	0.064	0.900	1.111
	Gender	-.279	0.707	-0.394	0.694	0.981	1.019
	Educational qualification	-1.173	0.763	-1.537	0.127	0.902	1.109
2	(Constant)	0.988	1.259	0.785	0.434		
	Age	0.617	0.845	0.730	0.467	0.869	1.150
	Gender	-0.069	0.323	-0.215	0.830	0.965	1.036
	Educational Qualification	-0.651	0.347	-1.876	0.063	0.896	1.116
	Environmental Curriculum	-0.157	0.062	-2.536	0.012	0.405	2.466
	Sources of Information	0.565	0.134	4.224	0.000	0.324	3.088
	Personal factors	0.455	0.095	4.807	0.000	0.180	5.552
	Awareness on Environmental issues	0.332	0.088	3.758	0.000	0.194	5.160

The model summary, ANOVA, and coefficients tables provide insights into how demographic variables (Age, Gender, Educational Qualification) and additional factors (Personal Factors, Sources of Information, Awareness of Environmental Issues, Environmental Curriculum) predict Sustainable Practices (Table 3).

Multicollinearity Diagnostics

In this study, all independent variables have VIF values below 10, indicating that multicollinearity is not a significant concern. This observation is consistent with the guidelines proposed by Shrestha (2020), which identify a VIF value below 10 as an acceptable threshold. Therefore, the regression model's coefficient estimates can be considered reliable, as they are not substantially affected by intercorrelations among the predictors.

Model Comparison

Model 1 reveals only demographic variables such as age, gender, and education, showed a low R-squared value of 3.4%. This indicates that these demographic variables account for a very small portion of the variance in sustainable practices. Moreover, the model was not statistically significant (Sig. = 0.214), suggesting that demographic characteristics alone do not serve as strong predictors of students' engagement in sustainable behaviors. This result aligns with earlier studies, which also found that demographic variables have limited influence on environmental behavior (Ningrum & Herdiansyah, 2018; Szeberenyi *et al.*, 2022). Thus, the null hypothesis is accepted, indicating that there is no direct correlation between these demographic factors and sustainable practices.

Model 2, which incorporated personal factors, environmental awareness, environmental curriculum exposure, and information sources, resulted in a dramatic increase in the R-squared value to 0.808. This implies that these variables collectively explain a significant 80.8% of the variance in sustainable practices. The model is highly significant (Sig. = 0.000), leading to the rejection of the null hypothesis and acceptance of the alternative hypothesis that these factors contribute substantially to sustainable behaviors. These results support prior studies, which indicated that personal attitudes, knowledge, and exposure to environmental information are key drivers of pro-environmental behavior (Levine & Strube, 2012; Sivamoorthy *et al.*, 2013).

Significance of Added Variables

Personal Factors ($B = 0.455$, Sig. = 0.000): Personal values and beliefs about environmental protection were found to be a significant predictor of sustainable practices. This supports research by Ningrum and Herdiansyah (2018), who also emphasized the strong role that personal values play in shaping environmental actions. Sources of Information ($B = 0.565$, Sig. = 0.000): The importance of access to

environmental information was highlighted, showing a positive relationship with sustainable practices. This aligns with Arshad *et al.* (2021), who stressed that reliable sources of information influence awareness and environmentally responsible behaviors.

Environmental Awareness ($B = 0.332$, Sig. = 0.000): Greater awareness of issues such as climate change and pollution was positively associated with engagement in sustainable practices, echoing the findings of Levine and Strube (2012), which showed a strong link between environmental knowledge and pro-environmental behavior. Environmental curriculum ($B = -0.157$, Sig. = 0.012): Interestingly, exposure to environmental education through formal curricula had a small but negative effect. This suggests that while education is important, its theoretical nature may not always lead to practical changes in behavior. This observation aligns with the work of Yildiz & Budur (2019), who found that theoretical environmental education may not be sufficient in fostering active, sustainable practices.

Role of Demographic Variables

Despite being included in Model 2, the demographic variables (Age, Gender, and Education) remained statistically insignificant with high *p-values*. This indicates that without the mediating role of factors such as personal values, awareness, and sources of information, demographic factors alone do not significantly predict sustainable behaviors. These findings reinforce the conclusions drawn by other studies, suggesting that environmental behaviors are influenced by a combination of factors rather than demographic characteristics alone (Sivamoorthy *et al.*, 2013; Ningrum & Herdiansyah, 2018).

Discussion

The analysis reveals that demographic factors, such as age, gender, and education, alone do not serve as strong predictors of students' engagement in sustainable practices unless mediated by other variables, including personal experiences, awareness of environmental issues, and access to relevant information sources. This aligns with Abbas and Singh, who found that while students may have high environmental awareness, this does not always lead to active participation in sustainability efforts (Abbas & Singh, 2014). This suggests that demographic characteristics alone do not effectively predict engagement in sustainability actions. Similarly, Sivamoorthy *et al.*, (2013) observed that while environmental awareness is important, demographic differences—such as gender—play a significant role in practical actions. Their findings support the idea that focusing solely on demographic data overlooks other crucial factors for encouraging sustainable behaviors. In addition, Ningrum and Herdiansyah (2018) argue that environmental awareness is much more impactful when combined with personal factors, further emphasizing that demographic characteristics cannot stand alone as reliable

predictors. Furthermore, hands-on experiences, as noted by Yildiz and Budur (2019), enhance environmental awareness and involvement, indicating that practical engagement may be just as vital as theoretical knowledge.

The negative impact of environmental curricula on sustainable practices is a notable finding. This result suggests that while students may gain important environmental knowledge through formal education, such knowledge alone might not be sufficient to encourage the desired behavioral changes. Theoretical content may lack practical application, which could explain why such curricula do not always foster tangible, sustainable behaviors among students. Reforms in environmental education that focus on integrating practical experiences, such as fieldwork, sustainability projects, or community-based learning, might be more effective in translating knowledge into real-world environmental actions (Yildiz & Budur, 2019). Such changes would bridge the gap between academic knowledge and actual sustainable practices.

Conclusion

This research highlights the significance of environmental awareness in promoting sustainable behaviors, with personal experiences and easy access to information proving more influential than demographic factors. Given these findings, it is recommended that educators and policymakers focus on enhancing the accessibility and engagement of sustainability-related content. This could be achieved through interactive workshops and effective social media campaigns that directly engage the intended audience. Additionally, the study highlights the limited effectiveness of existing environmental curricula in promoting sustainable practices that endure. A potential solution would be to offer academic credit for hands-on activities such as tree planting, beach cleanups, or programs that emphasize reducing and reusing plastics. These experiences could foster a deeper commitment to sustainability among students and positively influence their behaviors in the long term.

Recommendations for Future Research

To build on this study, future research could investigate the effectiveness of different teaching methods, such as community-based initiatives or digital platforms, in raising environmental awareness. It would also be valuable to explore the long-term impact of experiential learning on sustainable behaviors to determine how educational institutions can better incorporate sustainability into their teaching strategies.

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