



AIR QUALITY AWARENESS AND BEHAVIORAL RESPONSE AMONG COLLEGE COMMUNITIES: A PSYCHOLOGICAL STUDY OF ENVIRONMENTAL SYSTEMS EDUCATION IN IMO STATE

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ABSTRACT

Air quality remains a pressing environmental and public health concern in rapidly urbanizing regions of Nigeria, with implications for respiratory health, cognitive performance, and long-term well-being. This study examined air quality awareness and behavioral responses among undergraduate students in three tertiary institutions in Imo State—Imo State University, Federal University of Technology Owerri, and Alvan Ikoku Federal College of Education—through the lens of environmental systems education and psychological frameworks. Grounded in the Theory of Planned Behavior (TPB), the mixed-methods research surveyed 300 students and conducted six focus group discussions. Findings indicated moderate awareness levels ($M = 58.4$, $SD = 13.2$ on a 100-point scale), with significant gaps in understanding the links between local sources such as vehicular emissions, open waste burning, and health outcomes. TPB constructs—attitudes, subjective norms, and perceived behavioral control predicted pro-environmental behavioral intentions, explaining 47% of variance in intentions to engage in actions such as waste segregation and advocacy. Environmental systems education correlated positively with higher awareness and stronger intentions; however, actual behaviors lagged due to infrastructural and cultural barriers. Urban-rural and faculty differences emerged, with science students showing greater knowledge but similar behavioral constraints. The study proposed evidence-based strategies for curriculum integration and campus interventions to bridge awareness-behavior gaps. These results underscored the psychological dimensions of environmental action and highlighted the potential of targeted education to foster sustainable practices among future leaders in college communities.

Keywords: Air Quality Awareness, Pro-Environmental Behaviour, Theory of Planned Behaviour, Environmental Education, Imo State, College Students.

Introduction

Air quality is a critical environmental issue with far-reaching implications for public health, cognitive functioning, and societal well-being. Poor air quality, driven by industrialization, vehicular emissions, open burning of waste, and unsustainable practices, has been linked to respiratory diseases, cardiovascular issues, psychological stress, and reduced life expectancy. In Nigeria, particularly in Imo State, rapid urbanization and limited environmental education have exacerbated these challenges. Vehicular traffic in Owerri metropolis and surrounding areas has contributed significantly to elevated levels of particulate matter (PM_{2.5} and PM₁₀), carbon monoxide (CO), and nitrogen dioxide (NO₂), often exceeding national and WHO guidelines, especially during dry seasons and peak traffic hours. College communities, comprising young adults who were both vulnerable to environmental impacts and potential agents of change,



represented a critical demographic for studying air quality awareness and behavioral responses. Understanding the psychological dimensions of how these communities perceived and responded to air quality issues informed targeted educational interventions to promote sustainable environmental practices.

Imo State, like many regions in Nigeria, faced significant air quality challenges due to vehicular emissions, open burning of waste, and industrial activities. Despite these issues, awareness among college students regarding the health and environmental consequences of poor air quality remained limited. Preliminary observations suggested that students in Imo State's tertiary institutions exhibited low engagement in pro-environmental behaviors, such as waste reduction, advocacy for cleaner transport, or participation in campus greening initiatives. This gap stemmed from inadequate environmental systems education, cultural attitudes toward pollution as an inevitable byproduct of development, or psychological barriers that hindered behavioral change. Moreover, there existed a paucity of research on how psychological factors—such as attitudes, perceived behavioral control, and social norms—shaped air quality-related behaviors among college students in Nigeria. Without targeted interventions informed by empirical data, efforts to improve air quality in Imo State remained ineffective. This study addressed this gap by examining the level of air quality awareness, the psychological drivers of behavioral responses, and the impact of environmental systems education in fostering sustainable practices among college communities.

The study aimed to explore the interplay between air quality awareness and behavioral responses among college students in Imo State, focusing on the role of environmental systems education. By integrating psychological theories such as the Theory of Planned Behavior (TPB) and broader environmental psychology frameworks, the research uncovered how knowledge, attitudes, and social norms influenced students' actions toward mitigating air pollution.

The findings contributed to designing effective environmental education programs tailored to college communities, fostering sustainable behaviors that aligned with global environmental goals. Specific objectives included: (1) assessing the level of air quality awareness among college students in Imo State; (2) examining the psychological factors (attitudes, subjective norms, and perceived behavioral control) influencing students' behavioral responses to air quality issues; (3) evaluating the effectiveness of environmental systems education in promoting pro-environmental behaviors among college students; and (4) proposing evidence-based strategies for enhancing air quality awareness and sustainable behaviors in college communities. These objectives merged seamlessly with the identification of persistent awareness-behavior gaps and the urgent need for psychologically informed interventions in a context where pollution sources such as congested markets in Owerri and seasonal waste burning continued to degrade local air quality.

Environmental psychology and behavioral theories have increasingly framed studies on air pollution responses, with the Theory of Planned Behavior (TPB) emerging as a robust predictor of pro-environmental intentions and actions. TPB posited that behavioral intentions were shaped by attitudes toward the behavior, subjective norms (perceived social pressure), and perceived behavioral control (belief in one's ability to perform the action). In Nigerian contexts, TPB



successfully explained littering prevention behaviors, where attitudes and norms strongly predicted intentions among urban residents. Similar applications in university settings demonstrated that attitudes and perceived behavioral control significantly influenced students' intentions to engage in air quality mitigation, such as reducing personal vehicle use or advocating for campus policies. In sub-Saharan Africa, air pollution studies highlighted vehicular emissions and open burning as dominant sources, with Imo State recording elevated PM10 and CO levels in urban hubs like Owerri, often surpassing US NAAQS and WHO thresholds.

Time-series analyses revealed worsening trends during dry seasons, compounded by generator fumes and traffic congestion in market vicinities. Despite these realities, awareness among youth remained inconsistent; many students recognized general environmental issues but failed to connect local actions such as indiscriminate waste disposal or reliance on old vehicles—to personal health or community air quality. Environmental education in Nigerian tertiary institutions varied by faculty, with science and environmental programs offering more exposure than humanities or social sciences, yet overall integration into general curricula remained limited.

Psychological barriers, including low perceived control due to infrastructural deficits (poor waste management systems, unreliable public transport) and weak social norms around collective action, contributed to the awareness-behavior gap. Studies extending TPB with risk perception or psychological distance showed that closer perceived proximity to pollution effects strengthened intentions. In college communities, where students represented future educators and professionals, low behavioral engagement risked perpetuating cycles of environmental degradation. This study built on these foundations by applying TPB specifically to air quality in Imo State's diverse tertiary settings, incorporating environmental systems education as a moderating factor to assess its role in shifting attitudes and norms.

Research Method

The study adopted a mixed-methods research design, combining quantitative surveys and qualitative focus group discussions to provide a comprehensive understanding of air quality awareness and behavioral responses. The research was conducted between January and September 2025 across three tertiary institutions in Imo State: Imo State University (IMSU), Federal University of Technology Owerri (FUTO), and Alvan Ikoku Federal College of Education (AIFCE). Ethical approval was obtained from institutional review boards and the Imo State Ministry of Education. Informed consent was secured from all participants, with assurances of anonymity and voluntary participation.

Participants and Demographics

A multi-stage sampling technique selected 300 undergraduate students (100 from each institution). Purposive selection targeted institutions based on size and diversity, followed by stratified random sampling across faculties (sciences, engineering/technology, humanities/social sciences, education) to ensure representation. Convenience sampling recruited participants for focus groups. Table 1 presents the demographic profile.



Table 1: *Demographic Characteristics of Student Participants (N = 300)*

Characteristic	Frequency	Percentage (%)
Gender		
Male	162	54.0
Female	138	46.0
Age Group		
18–21 years	135	45.0
22–25 years	120	40.0
26+ years	45	15.0
Institution		
Imo State University	100	33.3
Federal University of Technology Owerri	100	33.3
Alvan Ikoku Federal College of Education	100	33.3
Faculty		
Sciences/Engineering	110	36.7
Humanities/Social Sciences	95	
Education	95	31.7
Location Background		
Urban	165	55.0
Semi-rural/Rural	135	45.0
Prior Environmental Education Exposure		
Yes (Course/Workshop)	142	47.3
No	158	52.7

The quantitative component employed a structured questionnaire grounded in TPB, measuring air quality awareness (knowledge items on sources, health effects, and local conditions), attitudes, subjective norms, perceived behavioral control, behavioral intentions, and self-reported behaviors (Likert scales, 1–5). The instrument was pre-tested for reliability (Cronbach's α ranging from .78 to .91) and validity. Inferential statistics included descriptive means, standard deviations, Pearson correlations, and multiple regression to examine relationships and predictive power of TPB constructs. Qualitative data derived from six focus group discussions (two per institution, 8–10 participants each), exploring perceptions, barriers, motivations, and experiences with environmental systems education. Discussions were audio-recorded, transcribed verbatim, and analyzed thematically using NVivo software. Content from open-ended responses supplemented the analysis. Triangulation of quantitative and qualitative findings ensured robustness and depth.

Results

Quantitative findings revealed moderate air quality awareness (overall $M = 58.4$, $SD = 13.2$), with higher scores on general knowledge (e.g., vehicular emissions as a source) but lower on specific health linkages and personal mitigation strategies. Science/engineering students scored significantly higher ($M = 64.7$) than education or humanities peers ($M = 52.1$; $F(2,297) = 12.45$, $p < .001$). TPB constructs correlated positively with behavioral intentions: attitudes ($r = .58$), subjective norms ($r = .49$), and perceived behavioral control ($r = .52$), all $p < .01$. Regression analysis indicated that the model explained 47% of variance in intentions ($R^2 = .47$, $F(3,296) =$



87.6, $p < .001$), with attitudes emerging as the strongest predictor ($\beta = .41$). Students with prior environmental systems education exposure reported higher awareness ($M = 65.8$ vs. 51.9) and stronger intentions ($M = 3.82$ vs. 3.21 on 5-point scale). Actual behaviors remained lower ($M = 2.94$), indicating a gap. Focus group themes highlighted barriers such as “lack of campus recycling facilities,” “perception that individual actions make little difference,” and “social norms favoring convenience over sustainability.” Participants noted seasonal increases in dust and smoke from waste burning, linking them to respiratory discomfort but rarely to advocacy. One student remarked, “We know the air is bad during harmattan, but what can one person do when generators run all day?” Urban students expressed greater concern over traffic-related pollution, while rural-background students emphasized agricultural burning.

Table 2: *Mean Scores for TPB Constructs and Behavioral Intentions by Faculty and Education Exposure*

Group	Awareness	Attitudes	Subjective Norms	Perceived Behavioral Control	Behavioral Intentions
Sciences/Engineering	64.7	4.12	3.85	3.68	3.95
Humanities/Social Sciences	53.2	3.45	3.28	3.12	3.18
Education	52.1	3.67	3.41	3.29	3.42
With Env. Education	65.8	4.05	3.92	3.81	3.82
Without Env. Education	51.9	3.52	3.25	3.05	3.21

Discussion

The moderate awareness levels and significant predictive role of TPB constructs aligned with prior applications in Nigerian and international contexts, where attitudes consistently drove intentions toward littering prevention and air quality mitigation. The stronger effect of attitudes suggested that shifting personal evaluations of air pollution’s consequences—through vivid health impact education—offered a promising lever for change. Perceived behavioral control’s influence highlighted infrastructural barriers on campuses, such as inadequate waste systems and limited green transport options, which reduced students’ sense of agency. Subjective norms played a moderate role, indicating that peer and institutional influences could be amplified via campus campaigns. Environmental systems education proved effective in elevating awareness and intentions, consistent with evidence that curriculum exposure bridges knowledge gaps in university settings.

However, the persistent awareness-behavior gap echoed broader findings on pro-environmental actions in developing contexts, where systemic constraints outweighed individual motivation. Faculty differences underscored the value of interdisciplinary integration, as non-science students lagged despite their future roles as educators. Locational variations reflected real pollution exposure, with urban students more attuned to vehicular sources documented in Owerri studies. These results extended TPB applications by contextualizing them within Imo State’s air quality challenges, including elevated pollutants from markets and seasonal burning. Limitations included self-reported data potentially subject to social desirability bias and the cross-sectional design



limiting causal inferences. Future longitudinal research could track behavior changes post-intervention.

Conclusion

This study provided a comprehensive understanding of air quality awareness among college students in Imo State, identifying moderate levels with notable gaps in actionable knowledge. It pinpointed key psychological factors—particularly attitudes and perceived behavioral control—as primary influencers of pro-environmental behaviors, while demonstrating the positive impact of environmental systems education on awareness and intentions. Practical recommendations for policymakers and educational institutions included embedding air quality modules across curricula, establishing campus sustainability clubs to strengthen social norms, improving waste and transport infrastructure to enhance perceived control, and launching awareness campaigns linking local pollution sources to personal health. These strategies aimed to foster sustainable behaviors in college communities, contributing to broader air quality improvements in Imo State. By addressing psychological drivers alongside educational enhancements, the research supported the development of targeted interventions that empowered students as agents of environmental change, aligning with national and global sustainability objectives.

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