

Research Paper



Environmental literacy levels and environmental pollution among senior high school students

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ABSTRACT

Environmental literacy plays a crucial role in shaping the attitudes, knowledge, and behaviours of individuals towards environmental issues, including pollution. This study assesses the environmental literacy levels of students of the UM Panabo College (UMPC) Senior High School (SHS) and examines their awareness and understanding of environmental pollution. The research employs a quantitative approach, using a survey questionnaire administered to a sample of UMPC SHS students. The questionnaire assesses various dimensions of environmental literacy, including knowledge of ecological concepts, understanding of environmental challenges, and willingness to take environmentally responsible actions, and explores students' perceptions of environmental pollution, its causes, and potential mitigation strategies. The study highlights the importance of enhancing environmental literacy among UMPC SHS students to promote sustainable practices and address environmental challenges, particularly pollution. The findings can guide educational institutions in designing effective environmental education programmes that foster knowledge, attitudes, and behaviours conducive to environmental stewardship, and can inform policymakers and curriculum developers in integrating comprehensive environmental education into the formal education system.

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1. INTRODUCTION

Environmental pollution is a serious concern for people all over the world, caused by human activities that introduce toxins and dangerous substances into the environment. It must be addressed urgently because it harms human health, ecosystems, and the economy. The World Health Organization (WHO) estimates that outdoor air pollution kills 4.2 million people and indoor air pollution 3.8 million people globally each year [1]. Outdoor air pollution is produced mainly by industrial emissions, transportation, and agricultural activities, whereas indoor air pollution is mostly caused by the use of solid fuels for cooking and heating in poorly ventilated spaces.

An estimated 1.8 billion people worldwide drink water contaminated with faeces, which can cause illnesses including cholera, dysentery, and typhoid [2]. Agricultural runoff, untreated sewage, and industrial waste are among the causes of water pollution. Soil pollution, caused by the accumulation of chemicals and hazardous waste in the soil, leads to soil deterioration and lower agricultural yields; its causes include chemical fertilizers and pesticides, improper disposal of hazardous waste, and industrial operations [3].

Environmental pollution is increasingly becoming an issue of significant public interest in many developing countries and in the international community at large [4]. Socioeconomic development driven by rapid urbanization and industrialization has led to the over-exploitation of natural resources and severe environmental problems. Environmental pollution is not a recent phenomenon, but it remains one of the biggest threats to humanity and a major environmental cause of disease and mortality; urbanization, industrialization, mining, and exploration are the human activities with the greatest impact on pollution worldwide [5], [6]. Although greater knowledge and stricter legislation in developed countries have helped to protect their environment, both developed and emerging countries share this responsibility [7], [8]. Plastic pollution illustrates the challenge: knowledge of how plastics degrade in the environment is still scarce, and there are considerable obstacles to developing effective biodegradation pathways [9].

Environmental awareness is crucial because it stimulates sustainable development, advocates the protection of natural resources, and fosters the preservation of fragile plant and animal species. Environmental awareness—understanding the vulnerability of the environment and the significance of its conservation—is linked to environmental education and to environmental literacy, which combines environmental knowledge, dispositions, competencies, and responsible behaviour [10]. Studies of students' environmental literacy and pollution knowledge in the Philippines and elsewhere have found that literacy levels, and the translation of knowledge into conservation behaviour, vary considerably among students [11], [12], [13], [14]. This study provides information on environmental literacy levels and environmental pollution among senior high school students at UMPC, which can serve as empirical evidence for further research on this topic.

2. METHOD

2.1 Research Design

A quantitative correlational research design was used to examine the relationship between environmental literacy levels and environmental pollution among UMPC SHS students.

2.2 Research Locale

The study was conducted at UM Panabo College, located on Pedro N. Arguelles St., Brgy. San Francisco, Panabo City, Davao del Norte, Philippines.

2.3 Population and Sample

Senior high school students of the University of Mindanao Panabo College in grades 11 and 12 were surveyed using a questionnaire: 21 students in grade 11 and 26 students in grade 12 of the HUMSS strand, and 24 students in grade 11 and 22 students in grade 12 of the ABM strand. The questionnaire collected

data on the level of environmental literacy and environmental pollution in three areas: knowledge, attitudes, and behaviour.

2.4 Data Collection

The researchers determined the respondents by obtaining from the school principal the list of students enrolled in grade 11 ABM, grade 11 HUMSS, grade 12 ABM, and grade 12 HUMSS. The questionnaire prepared by the researchers was validated by an expert. After validation, the researchers personally administered the questionnaire during the students' free time and conducted personal interviews to clarify the respondents' answers. The questionnaires were retrieved immediately, and the data were tallied, analysed, and interpreted with the help of a statistician.

2.5 Statistical Tools

The mean and standard deviation were used to determine the level of environmental literacy and environmental pollution among the senior high school students, and an independent-samples t-test was used to determine whether there was a significant difference in environmental pollution between year levels.

3. RESULTS AND DISCUSSION

3.1 Level of Environmental Literacy of SHS Students

The UMPC SHS students had a mean environmental literacy score of 4.25 with a standard deviation of 0.55, indicating a very high level of environmental literacy (Table 1). The statement with the highest mean (4.42) was Q15, "Whenever I see a polluted water source, walk around in smog, or come upon garbage, I think about the importance of keeping the environment clean and protecting it for our lives," while the lowest mean (3.99) was for "I can make conjectures on potential harm by landslides." This result agrees with the view that, to address environmental pollution, individuals need the knowledge, skills, attitudes, and values to understand the causes and effects of pollution and how to prevent or minimize it [15]. The descriptive equivalent "very high" suggests that the students possess substantial knowledge, attitudes, and skills regarding environmental concepts and issues.

Table 1. Level of Environmental Literacy of SHS Students

Variable	S.D.	Mean	Description
Environmental literacy	0.55	4.25	Very high

For environmental pollution, the UMPC SHS students reported a mean score of 4.08 with a standard deviation of 0.60, with the descriptive equivalent "high" (Table 2). The statement with the highest mean (4.30) was Q27, "I have taken measures to protect the living beings in my immediate vicinity," while the lowest mean (3.90) was for "Of the issues threatening our world such as nuclear pollution, acid rain, and sea pollution, I have done research on at least one." The authors interpret this as signifying a high level of environmental pollution in the surroundings of the school, highlighting the need for further investigation of the sources and causes of pollution in the vicinity and for strategies to mitigate it.

Table 2. Level of Environmental Pollution of SHS Students

Variable	S.D.	Mean	Description
Environmental pollution	0.60	4.08	High

The findings suggest a potential disparity between the high level of environmental literacy and the presence of environmental pollution among UMPC SHS students, raising questions about how effectively students' knowledge, attitudes, and skills translate into actions that reduce pollution; such gaps between environmental knowledge and pro-environmental behaviour are well documented [16], [17], [18]. Possible factors include a lack of opportunities for practical application of environmental knowledge, limited access

to resources for pollution control, and inadequate implementation of sustainable practices within the school community. Bridging this gap requires educational programmes, awareness campaigns, and community engagement initiatives that target specific audiences, together with active participation in environmental projects, behaviour change, and policies that prioritize pollution prevention [19].

3.2 Difference in Environmental Pollution According to Year Level

Table 3 compares environmental pollution scores between grade 11 and grade 12 students. Grade 11 students (N = 45) had a mean of 3.76 with a standard deviation of 0.50, while grade 12 students (N = 47) had a higher mean of 4.40 with a standard deviation of 0.52. The t-value of -6.005 and p-value of 0.000 indicate a significant difference between the two year levels, so the null hypothesis is rejected. The negative t-value shows that grade 12 students rated environmental pollution higher than grade 11 students, implying that students' understanding and perception of environmental pollution grow as they advance through senior high school.

Table 3. Difference in Environmental Pollution according to Year Level

Variable	Grade	N	Mean	S.D.	T	P
Environmental pollution	11	45	3.76	0.50	-6.005	0.000
	12	47	4.40	0.52		

These findings are consistent with prior research suggesting that environmental understanding and recognition of environmental problems develop with continued environmental education [16], [20]. As students advance in their studies, they are exposed to more comprehensive environmental education, which contributes to heightened awareness of environmental issues, including pollution [21]. This highlights the need for continued efforts to foster environmental consciousness and proactive engagement in environmental conservation among senior high school students. Future research can explore additional factors contributing to the difference between year levels, and interventions can be developed to mitigate pollution and promote sustainable practices among senior high school students.

4. CONCLUSION

Based on the research on environmental literacy and pollution among UMPC SHS students, there is a need for increased awareness and education on environmental issues and for more comprehensive programmes to address environmental pollution. Environmental literacy is crucial in combating pollution: by educating senior high school students on the causes and effects of pollution, schools can encourage them to take action and create a cleaner and more sustainable environment. An interdisciplinary approach to environmental education should be promoted, in which students from different academic backgrounds collaborate to develop sustainable solutions, so that students become responsible and environmentally conscious citizens capable of driving positive change in their communities and beyond.

4.1 Recommendations

Educational institutions should prioritize environmental literacy in their academic programmes by integrating environmental education into the core curriculum, including interdisciplinary topics such as climate change, pollution, and sustainable development. Schools should create opportunities for students to participate in environmental projects, research, and community-based activities that allow them to apply their knowledge to real-world situations, and should invest in eco-friendly initiatives such as recycling programmes, green buildings, and renewable energy projects that provide a learning environment aligned with the principles of environmental literacy.

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Authors Contributions Statement

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Hazel Ann C. Mahinay	✓					✓		✓	✓		✓			
Mary Shenny A. Marapao		✓				✓	✓	✓		✓				
Joshua B. Jempero			✓		✓	✓					✓			
Jovany Gleen L. Allawan	✓	✓		✓						✓		✓	✓	✓

C : Conceptualization

M : Methodology

So : Software

Va : Validation

Fo : Formal analysis

I : Investigation

R : Resources

D : Data Curation

O : Writing - Original Draft

E : Writing - Review & Editing

Vi : Visualization

Su : Supervision

P : Project administration

Fu : Funding acquisition

Conflict of Interest Statement

No conflict of interest.

Informed Consent

Not Applicable.

Ethical Approval

Not Applicable.

Data Availability

This study draws on publicly available data. No new datasets were created.

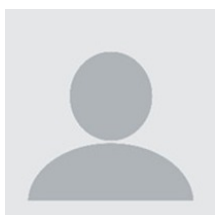
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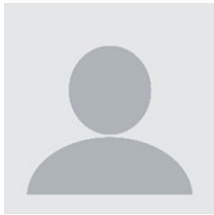
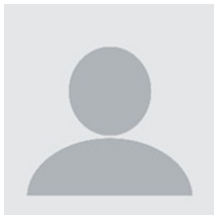
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