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## Environmental Literacy Influence on Pro-environmental Behaviour of Library Personnel in South-West Nigeria Public Universities

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### Abstract

Pro-Environmental Behaviour (PEB) is crucial in addressing global environmental challenges. However, public university libraries in South-West Nigeria do not engage in PEB due to high energy consumption and inadequate recycling programmes, which have increased their carbon footprints. The objective of the study is to examine the influence of Environmental Literacy (EL) on PEB among library personnel in public universities in South-West, Nigeria. Theoretical frameworks, such as the theory of planned behaviour and the model of responsible environmental behaviour, were used to anchor the study. The population comprises 444 library personnel across 12 public university libraries in South-West Nigeria, and a questionnaire was used to collect data. Reliability was assessed for the questionnaire, and the Cronbach's Alpha was 0.71 or above. Data were analysed using descriptive and inferential statistics. The findings revealed that the level of PEB in public university libraries in South-West, Nigeria, was high. Also, EL significantly influenced PEB ( $Adj. R^2 = 0.16$ ,  $F(3, 360) = 24.63$ ,  $p < 0.05$ ). EL indicators: ecological knowledge ( $\beta = 0.184$ ,  $t = 3.321$ ,  $p = 0.001$ ) and attitude ( $\beta = 0.240$ ,  $t = 3.773$ ,  $p = 0.000$ ) were significant, while cognitive skills ( $\beta = 0.084$ ,  $t = 1.226$ ,  $p = 0.221$ ) is not significant. The study concluded that environmental literacy enhanced pro-environmental behaviour among library personnel at public universities. The study recommended that the university library management should implement focused green literacy workshops and practical training sessions on environmental sustainability behaviours.

**Keywords:** Environment, Environmental Literacy, Library Personnel, Pro-Environmental Behaviour, Public University Libraries

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### Introduction

Climate change is an inevitable reality today, and it has not only affected the environment but also impacted man himself. The burning of coal, oil, and natural gas for energy remains the most significant cause of climate change, releasing carbon dioxide (CO<sub>2</sub>), one of the greenhouse gases that trap heat in the atmosphere (Shivanna, 2022). Thus, employees'

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behaviour change to mitigate environmental problems is urgently needed. Pro-Environmental Behaviours (PEB) emerged as a significant solution, as anthropogenic activities such as deforestation, mining, etc., have accelerated ecological issues, including climate change, biodiversity loss, and high risk to human health (Landrigan et al., 2024). The magnitude of these issues could increase over the next decade if action is not taken (Tong & Ebi, 2019). Moreover, there is a growing understanding that organisations can make a noteworthy impact on the natural environment by implementing and practising pro-environmental behaviour (Alherimi et al., 2024). Likewise, the United Nations Rio Declaration (2011) stated that environmental problems require the involvement of the public as a whole. Thus, library personnel are expected to demonstrate strong environmental stewardship to become key players in advocating for a sustainable environment.

Libraries, as organisations, generally play a crucial role in achieving environmental sustainability. They are attached to public institutions and form the heart and centrepiece of the educational institutes. The primary mandate of the library is to provide access to information that supports the mother institution's mission: teaching, learning, community service, and research. They are also established to preserve, conserve, and safeguard intellectual, grey, and scholarly resources within their parent universities in order to carry out their core vision (Onifade, 2015). The library's operations and working gadgets are not considered sustainable. Observations showed that most library buildings are high energy consumers for lighting, heating, air conditioning, and ventilation. Many electronic installations, such as photocopiers, printers, computers, laptops, scanners, digitisation machines, and robots, consume large amounts of energy and emit greenhouse gases. The print materials stacked on the shelves cause air pollution and poor indoor air quality; cleaning products lack organic ingredients, and e-waste from old technologies is dumped in an abandoned office, which is not environmentally friendly. Studies by Okpidi-Urhib (2023), Dada (2021), and Oyelude and Alabi (2013) highlighted that libraries are not well-grounded in sustainable behaviours.

Emmanuel and Okojie (2022) found that PEBs are challenged by a lack of awareness of the green library concept, insufficient information on the step-by-step implementation process, and librarians' lack of basic skills in advocating for green libraries to their institutional administrators. One crucial factor influencing pro-environmental behaviour is Environmental Literacy (EL). The influence of EL on PEB lies in its capacity to raise environmental awareness, enriching and enlightening library personnel with the knowledge to recognise the inequities and threats the environment faces and to develop positive attitudes and skills to make decisions to protect it. Kuswendi and Arga (2020) contend that EL comprises knowledge of environmental concepts and problems, as well as the cognitive abilities, skills, and attitudes needed to make effective decisions across various ecological contexts. Goldman et al. (2018) described EL as an individual's ability to interact with the environment. In a library setting, EL involves understanding environmental problems and various methods for caring for the environment.

Fostering environmental literacy is a key factor in encouraging people (library personnel) to adopt more sustainable behaviours. PEB of an individual is likely shaped by environmental knowledge, practical environmental skills for sound dealings with nature, and recognition of greening solutions. An environmentally literate library staff member is expected to be well-informed, have a positive attitude, and implement practicable, responsible environmental behaviour. Study, Pilare, and Acledan (2025) stated that ecological literacy is fundamental



and that a consciousness of climate issues enhances engagement in sustainable practices. This implies that individuals with higher levels of environmental literacy are more likely to engage in pro-environmental behaviours. Also, an understanding of environmental issues will inspire library personnel to act in ways that benefit the environment.

### **Statement of Problem**

In recent years, global awareness of PEB, such as recycling, energy conservation, and proper waste management, has significantly heightened, as these measures can reduce environmental degradation and enhance the quality of the natural environment. Libraries are expected to play a crucial role in fostering pro-environmental behaviour. The persistent ecological challenges in Nigeria show that many citizens have yet to embrace these PEBs. In some instances, inadequate waste-disposal infrastructure can lead to littering, excessive reliance on fossil fuels, and inefficient energy use, all of which are concerns. Also, most libraries have not fully imbibed the practice of PEB, which is a primary concern for environmental preservation (Dada, 2021; Rafie et al., 2021; and Muhammad & Pervais, 2022). Thus, delving into the implementation and the factors that drive PEB in libraries becomes crucial. Furthermore, there is limited research on the extent to which university libraries incorporate PEB and the nexus between environmental literacy and PEB within the context of libraries. Therefore, this study investigated the influence of environmental literacy on pro-environmental behaviour among library personnel in public universities in South-West Nigeria.

### **Objectives of the Study**

The main objective was to investigate the influence of environmental literacy on pro-environmental behaviour among library personnel in public universities in South-West, Nigeria. The specific objectives were to:

- i. Establish the level of pro-environmental behaviour among library personnel in public universities in South-West, Nigeria
- ii. Ascertain the level of environmental literacy among library personnel in public universities in South-West, Nigeria; and
- iii. Determine the effect of environmental literacy on pro-environmental behaviour among library personnel in public universities in South-West, Nigeria?

### **Research Questions**

1. What is the level of pro-environmental behaviour among library personnel in public universities in South-West, Nigeria?
2. What is the level of environmental literacy among library personnel in public universities in South-West, Nigeria?
3. Does environmental literacy have a positive effect on PEB among library personnel in public universities in South-West, Nigeria?

### **Literature Review**

#### **Pro-Environmental Behaviour**

PEB, in its entirety, is a behaviour practised consciously or unconsciously to reduce the grievous effects of climate change. Regrettably, there are significant problems with the practice of PEB. One such issue is that the library staff has not fully embraced PEB. This might be due to a lack of adoption, a lack of readiness, insufficient funding, the absence of institutional support and inadequate training or EL in short (Iroeze et al., 2022). To begin

with, PEB ought to highlight human behaviours conducive to the healthy development of the ecological environment. Within this context, PEB encompasses energy conservation, waste avoidance, recycling and environmental citizenship. These behaviours are implemented at various levels by individuals, communities, organisations, and governments to support the global transition towards ecological sustainability.

Globally, scholars such as Kasim (2023), Hasan and Panda (2023), Demirtas-Dogan and Gurpinar (2023), Mwanzu (2022), Mwanzu, Bosire-Ogechi, and Odero (2022), and Singh and Mishra (2019) equate pro-environmental behaviour with organisational practices. According to Iroeze et al. (2022) and Dada (2021), libraries in Nigeria have yet to adopt PEB as practised worldwide. A sub-group within the International Federation of Library Associations (IFLA), Environmental Sustainability (ENSULIB), designated the library as a role model and advocate for sustainable green behaviour, an outcome of pro-environmental behaviour. Rachman and Ratnasari (2022) found that majority of pro-environmental behaviour or sustainable library preservation and conservation practice implemented in libraries are related to sustainable energy use (such as use of led lights for collection exhibitions, lighting system that gives off little heat etc); digitization (recording, scanning, filming etc); waste management practices (collection of old bookmarks and scrap paper to be reused and recycled, partnering with other communities to facilitate waste management etc); sustainable labs and storage rooms (such as direct sunlight from windows to illuminate workspace). This implies that not all libraries have embraced the environmentally sustainable community as defined by IFLA and ALA.

Okpidi-Urhib's (2023) findings revealed that librarians have a clear understanding of greening initiatives and have incorporated them into policies, practices, and services to support environmental sustainability. Ren (2022) measured librarians' attitudes towards providing environmental education services in Georgia. The findings showed that half of the participants' reported libraries have adopted environmentally sustainable practices to reduce their operations' environmental impact. These practices are the 3 Rs: recycle, reuse, and reduce. Likewise, a study by Singh and Mishra (2019) on environmentally sustainable approaches in academic libraries. The results showed that the central universities' libraries in Uttar Pradesh have implemented some environmentally sustainable (green) practices in building design features, water conservation, energy efficiency/conservation, waste management, sustainable collection development, and sustainable technology. These findings collectively highlighted some PEB practices in libraries; however, they did not show the level of PEB within the context of energy conservation, waste avoidance, recycling, and environmental citizenship in South-West, Nigeria.

### **Environmental Literacy**

According to Pilare and Acledan (2025), environmental literacy is a fundamental understanding of climate issues that enhances engagement in sustainable practices. Consequently, environmental literacy encompasses ecological knowledge, cognitive skill and attitude. Ecological knowledge encompasses biotic, abiotic, and life components, human interactions with nature, and the basic elements of the social system (Sari, Andayani & Suwandi, 2022). Attitude is an individual's sensitivity to their environment (Naeimi et al., 2018). Skill is the personal capacity to solve environmental problems by applying environmental knowledge and attitudes (Timur, Timur & Yilmaz, 2013).



Akbulut et al. (2017) examined the environmental literacy of academic librarians in Ankara, Turkey. The findings revealed that participants' ecological awareness exceeded the rate of green practice implementation. Another study by Fleming and Schmidt (2019) found that librarians, as information specialists, possess moderate to high levels of environmental literacy. Likewise, the studies by Siami et al. (2024) and Warnasooriya (2019) revealed that librarians' green information literacy is above the average level and satisfactory across all four indicators used to measure EL. Conversely, Onokpite (2018) examined the environmental literacy programme as a catalyst for proper waste disposal. The findings revealed that participants still indulge in indiscriminate waste disposal due to inadequate environmental literacy and sensitisation programmes. Erbasan and Erkol (2019), Goulgouti et al. (2019), and Vasquez-Tomas et al. (2022) reported that the environmental literacy levels of primary, elementary, and pre-service schoolteachers are moderate. The above findings highlighted the level of ecological literacy practices; however, the studies failed to show which EL indicators are strong predictors, and there was likewise little information on the cognitive EL skill aspect.

### **Environmental Literacy and Pro-Environmental Behaviour**

Studies have shown that environmental literacy predicts/influences PEB. Kim and Kim (2018) and Janmaimool and Khajohnmanee (2019) found that EL provides a high level of knowledge and awareness of environmental problems and ways to address them, leading to sustainable and pro-environmental behaviour. The studies conducted by Srivastava (2024), Amruloh and Yulianto (2022), Safari et al. (2020), Syaiful et al. (2016), and Hlaing (2016) found that environmental knowledge and environmental attitude were significantly positively correlated with pro-environmental behaviours, and environmental expertise was significantly positively correlated with ecological attitude. At the same time, Paco and Lavrador (2017) found the opposite: no relationship between knowledge and behaviour, and a weak relationship between attitudes and behaviour. These contrasting findings collectively highlight the complexity of the relationship between attitude and behaviour, underscoring the need for further investigation in the Nigerian context. Also, there were limited studies on the relationship between cognitive skill and PEB.

## **Theoretical Framework**

### **Theory of Planned Behaviour and Model of Responsible Environmental Behaviour**

TPB and the model of responsible environmental behaviour serve as a practical framework for this study. They shaped the study's understanding by identifying key areas in EL and PEB, influencing the questionnaire design to include sections on EL and PEB, and providing a basis for interpreting and discussing the results. The frameworks ensured that the study remained theoretically grounded throughout. The Theory of Planned Behaviour (TPB) is a valuable framework for predicting and promoting library personnel's intentions and a range of pro-environmental behaviours to achieve ecological sustainability within the library setting. This theory was propounded by Icek Ajzen in 1985. It is a theory that predicts a person's purpose in acting a certain way at a given time and location to understand behaviour. The TPB has three main determinants, which are attitudes, subjective norms and perceived behavioural control, that can influence library personnel's intention to practice PEB. This theory has been applied to studies on diverse topics, including, but not limited to, recycling intention (Arsalan & Sara, 2025), microplastics in beauty products (Deng et al., 2022), and environmentally

friendly behaviours in the workplace (Yuriev et al., 2020). TPB is essential to fostering PEB within the library context because it has shown that library management can capitalise on TPB determinants to shape and enhance sustainable behaviour among library personnel.

The model of responsible environmental behaviour is another essential framework to drive ecological literacy in the library. This model was propounded by Jody M. Hines, Harold R. Hungerford, and Audrey N. Tornera in 1987. The central tenet of the model is to understand and promote environmentally responsible behaviours by emphasising the interplay among awareness, knowledge, attitudes, skills, and behavioural intentions. The model stated that an individual's intention to act is simply an artefact of several factors acting together (e.g., knowledge, cognitive skills, and personality factors). The model suggested that PEB will occur exclusively when there is an understanding of environmental issues, as well as knowledge, attitudes, skills, and behavioural intentions, all of which are indices of ecological literacy. Integrating this model into library programs can empower library personnel to make informed, responsible environmental decisions and encourage sustainable behaviours that contribute to ecological sustainability.

## Methodology

The study adopted a survey research design. This research design is suitable for this study because Sincero (2012) emphasised that survey research has high generalisability, strong statistical significance, and no observer subjectivity. The study population comprised 444 library personnel from 12 public universities in South-West Nigeria. The public universities are University of Lagos (UNILAG), University of Ibadan (UI), Obafemi Awolowo University (OAU), Federal University of Technology, Akure (FUTA), Federal University of Agriculture, Abeokuta (FUNAAB), Federal University, Oye-Ekiti (FUOYE), Lagos State University (LASU), Osun State University (UNIOSUN), Ladoko Akintola University (LAUTECH), Adekunle Ajasin University, Akungba-Akoko (AAUA), Olabisi Onabanjo University (OOU) and Ekiti State University (EKSU). The public universities were limited to the first federal and state public universities in the South-West of Nigeria, because some universities had just been upgraded to university level. Their focus will be on institutional development, including infrastructure upgrades, academic expansion, organisational changes, and improvements to library personnel qualifications.

The sample comprises six (6) federal universities and six (6) state universities in the South-West of Nigeria, and the total enumeration technique was adopted because the population is manageable. A structured questionnaire that ensured confidentiality was used for data collection because it can improve data accuracy by addressing potential biases and reducing the need for extensive pilot and evaluation studies, along with a theoretical explanation of how the instrument was developed (Daunert & Seel, 2020). The questions were adapted from the literature. Section A of the questionnaire captured demographic characteristics, while Sections B and C elucidated data on pro-environmental behaviour and environmental literacy using a 4-point Likert-type scale. After piloting with 30 participants, the Cronbach's alpha reliability coefficient ranged from 0.71 to 0.90, indicating that the scales are good and reliable for research purposes. The questionnaire was distributed to library personnel with research assistance, and the response rate was 81.9 per cent. The research approach is quantitative, and the numerical data were analysed using descriptive and inferential statistics.



## Results

Data collected to address the research questions were analysed using frequency, percentage, mean, and standard deviation. For the first research question, the respondents were asked about the level of pro-environmental behaviour in public university libraries in South-West, Nigeria, and the result is presented in Table 1:

**Table 1: Level of Pro-environmental Behaviour of Library Personnel**

<b>Pro-environmental behaviour</b>	<b>Very High Level Freq. (%)</b>	<b>High Level Freq. (%)</b>	<b>Low Level Freq. (%)</b>	<b>Very Low Level Freq. (%)</b>	<b>M (<math>\bar{x}</math>)</b>	<b>SD</b>
<b>Waste avoidance</b> <i>The level at which my library....</i>					<b>2.92</b>	<b>.74</b>
Encourages staff to avoid wasting water in the office toilet.	158 (43.4)	122 (33.5)	56 (15.4)	28 (7.7)	3.13	.94
Saves resources by refurbishing furniture, reusing old electronics, initiating a book exchange, and printing and writing on both sides of paper is...	138 (37.9)	138 (37.9)	67 (18.4)	21 (5.8)	3.08	.89
Ensure collection and services are digital to avoid waste is	136 (37.4)	117 (32.1)	77 (21.2)	34 (9.3)	2.98	.98
Gives out things such as books, journals that they do not need or use to others is...	131 (36.0)	125 (34.3)	75 (20.6)	33 (9.1)	2.97	.96
Donating e-waste to the company that needs it is...	120 (33.0)	68 (18.7)	117 (32.1)	59 (16.2)	2.68	1.10
Repairs and reuse of e-waste rather than discarding it is...	101 (27.7)	105 (28.8)	98 (26.9)	60 (16.5)	2.68	1.05
<b>Environmental citizenship</b> <i>The level at which my library....</i>					<b>2.89</b>	<b>.78</b>
Actively participating in an environmental and conservation protection group is...	131 (36.0)	129 (35.4)	80 (22.0)	24 (6.6)	3.01	.92

Recommends newsletters, magazines or other publications written by environmental groups is...	118 (32.4)	133 (36.5)	94 (25.8)	19 (5.2)	2.96	.89
Educating librarians and library officers to act in eco-friendly ways is...	140 (38.5)	102 (28.0)	75 (20.6)	47 (12.9)	2.92	1.10
Participates in environmental protection programmes such as tree planting, waste separation, recycling, and joins in community cleanup efforts is...	111 (30.5)	114 (31.3)	108 (29.7)	31 (8.5)	2.84	.96
Contributes money to environmental and conservation protection groups is...	120 (33.0)	102 (28.0)	98 (26.9)	44 (12.1)	2.82	1.03
Helps raise funds for environmental protection is...	111 (30.5)	106 (29.1)	108 (29.7)	39 (10.7)	2.79	1.10
<b>Energy conservation</b> <i>The level at which my library....</i>					<b>2.87</b>	<b>.66</b>
Mandates the turning off of the light when not in use is...	152 (41.8)	109 (29.9)	67 (18.4)	36 (9.9)	3.04	1.10
Uses fluorescent light and installed LED lamps in the stacks and reading rooms is...	142 (39.0)	116 (31.9)	68 (18.7)	38 (10.4)	2.99	.99
Discourages computers and devices (TV, stereo, computer, printer) from being in standby mode, rather than enabling power-saving features such as sleep mode, hibernation and screen saver is...	119 (32.7)	136 (37.4)	81 (22.3)	28 (7.7)	2.95	.93
Optimises the heating, ventilation and air conditioning (HVAC)	117 (32.1)	123 (33.8)	93 (25.5)	31 (8.5)	2.90	.95



system, or uses programmable thermostats to automate changes to the HVAC system, is ...						
Uses solar energy generation for alternative electricity is...	147 (40.4)	70 (19.2)	85 (23.4)	62 (17.0)	2.83	1.14
Subscribes to the use of energy-efficient refrigerators, laptops, and other computing gadgets is...	113 (31.0)	116 (31.9)	93 (25.5)	42 (11.5)	2.82	1.00
Adopting an intelligent lighting control system, such as motion sensors, dimmers, and timers, is...	105 (28.8)	113 (31.0)	105 (28.8)	41 (11.3)	2.77	.99
Uses a green rooftop for cooling to reduce heat...	97 (26.6)	99 (27.2)	122 (33.5)	46 (12.6)	2.68	1.00
<b>Recycling</b> <i>The level at which my library....</i>					<b>2.80</b>	<b>.88</b>
Serves as a pick-up point for library materials that can be recycled is...	126 (34.6)	69 (19.0)	127 (34.9)	42 (11.5)	2.88	1.07
Acquiring educational resources on recycling is...	117 (32.1)	67 (18.4)	144 (39.6)	36 (9.9)	2.81	1.04
Uses recycled paper for library operations, such as printing memos and making copies, etc., is...	128 (35.2)	82 (22.5)	112 (30.8)	42 (11.5)	2.80	1.07
Purchasing books from a publishing company that uses recycled soy or vegetable ink is...	130 (35.7)	78 (21.4)	109 (29.9)	47 (12.9)	2.77	1.05
Purchasing products made from recycled materials is...	154 (52.3)	170 (46.7)	35 (9.6)	5 (1.4)	2.73	1.02
<b>Grand Mean = 2.87; 0.67</b>						

Data in Table 1 show that pro-environmental behaviour among libraries in public universities in South-West, Nigeria, was high. This was subdivided into four areas: waste avoidance, environmental citizenship, energy conservation, and recycling. The result revealed that pro-environmental behaviour in public university libraries in South-West, Nigeria, was high, as indicated by a grand mean of 2.87 and a standard deviation of 0.67.

To answer the second research question, library personnel were requested to respond to statements about their level of environmental literacy on a four-point Likert-type scale. Their responses were analysed and presented in Table 2:

**Table 2: Level of Environmental Literacy**

<b>Environmental literacy</b> <i>I understand that....</i>	<b>Strongly Agree Freq. (%)</b>	<b>Agree Freq. (%)</b>	<b>Disagree Freq. (%)</b>	<b>Strongly disagree Freq. (%)</b>	<b>M (x̄)</b>	<b>SD</b>
<b>Ecological Knowledge</b>					<b>3.35</b>	<b>.42</b>
Green purchasing is an effective way to reduce the adverse impact of harmful consumption on human health and the environment	176 (48.4%)	165 (45.3%)	22 (6.0%)	1 (0.3%)	3.42	.62
The practice of energy conservation, proper waste management and conservation of water can reduce environmental problems	175 (48.1%)	160 (44.0%)	28 (7.7%)	1 (0.3%)	3.40	.64
Environmental issues such as climate change, pollution, and ozone depletion are causing environmental degradation	178 (48.9%)	159 (43.7%)	18 (4.9%)	9 (2.5%)	3.39	.70
Vehicle smoke forms part of the most significant factors that increase carbon monoxide	180 (49.5%)	154 (42.3%)	20 (5.5%)	10 (2.7%)	3.38	.72
Recycling and reusing are some of the ways to reduce environmental degradation	169 (46.4%)	161 (44.2%)	33 (9.1%)	1 (0.3%)	3.37	.66
Production residues and waste from industry form the primary cause of lake, river and ocean pollution	168 (46.2%)	166 (45.6%)	23 (6.3%)	7 (1.9%)	3.36	.69
The ozone layer protects humans from dangerous	154 (42.3%)	187 (51.4%)	17 (4.7%)	6 (1.6%)	3.34	.65



exposure to sunlight, which causes cancer						
Choosing and using Energy Star-compliant computer components is part of energy conservation	165 (45.3%)	154 (42.3%)	37 (10.2%)	8 (2.2%)	3.31	.74
Environmental phrases and symbols are printed on product packages	167 (45.9%)	149 (40.9%)	31 (8.5%)	17 (4.7%)	3.28	.81
<b>Cognitive Skills</b>					<b>3.31</b>	<b>.48</b>
When I hear information about environmental sustainability, I know how to check whether it is true.	172 (47.3%)	170 (46.7%)	17 (4.7%)	5 (1.4%)	3.40	.65
I can interpret environmental information received from a reliable source in relation to the environmental situation.	148 (40.7%)	190 (52.2%)	25 (6.9%)	1 (0.3%)	3.33	.61
I can explain why groups of people have certain opinions about sustainability.	159 (43.7%)	167 (45.9%)	37 (10.2%)	1 (0.3%)	3.33	.67
I can estimate whether a source of information on environmental sustainability is trustworthy.	150 (41.2%)	180 (49.5%)	31 (8.5%)	3 (0.8%)	3.31	.66
I can search for information about pro-environmental behaviour and use the information for personal support toward environmental interventions	154 (42.3%)	170 (46.7%)	35 (9.6%)	5 (1.4%)	3.30	.70
I empathise with opinions about environmental sustainability that are different from my own	152 (41.8%)	171 (47.0%)	34 (9.3%)	7 (1.9%)	3.29	.71
I can evaluate the authenticity of environmental sustainability information before consumption	132 (36.3%)	187 (51.4%)	42 (11.5%)	3 (0.8%)	3.23	.68
<b>Attitude</b>					<b>3.29</b>	<b>.46</b>
I do believe that protecting the environment is an important issue	204 (56.0%)	142 (39.0%)	17 (4.7%)	1 (0.3%)	3.51	.60

I am angry with people who cause environmental pollution.	183 (50.3%)	157 (43.1%)	19 (5.2%)	5 (1.4%)	3.42	.66
It is all right for humans to use nature as a resource for economic purposes	178 (48.9%)	151 (41.5%)	33 (9.1%)	2 (0.5%)	3.39	.64
I warn people who are damaging the environment without hesitation	156 (42.9%)	159 (43.7%)	45 (12.4%)	4 (1.1%)	3.28	.72
I am curious about the changes in nature	137 (37.6%)	189 (51.9%)	35 (9.6%)	3 (0.8%)	3.26	.66
I feel anxious because of the decline in forests.	155 (42.6%)	145 (39.8%)	62 (17.0%)	2 (0.5%)	3.24	.75
I feel guilty when they harm the environment.	143 (39.3%)	158 (43.4%)	52 (14.3%)	11 (3.0%)	3.19	.79
The so-called environmental problem facing humankind has been greatly exaggerated	113 (31.0%)	168 (46.2%)	64 (17.6%)	19 (5.2%)	3.03	.83
<b>Grand Mean = 3.32; 0.37</b>						

Table 2 reveals that environmental literacy in public university libraries in South-West, Nigeria. This was subdivided into ecological knowledge, cognitive skills and attitude. The result revealed that environmental literacy was high with a grand mean score of 3.23 and a standard deviation of 0.37. The high mean value indicates that library personnel in public universities in South-West, Nigeria, are generally well-prepared to support environmental education and sustainability initiatives and can also lead by example in their communities. In contrast, the low standard deviation indicates strong consistency in their responses. Generally, the results suggest that the participants collectively demonstrated a high level of environmental literacy.

The third research question focused on the effect of environmental literacy on pro-environmental behaviour among library personnel in public universities in South-West, Nigeria, and the result is presented in Table 3:

**Table 3: Environmental Literacy Effect on Pro-environmental Behaviour among Library Personnel in South-West Nigeria Public Universities**

<i>Variables</i>	<i>B</i>	<i>Std. Error</i>	<i>Beta (β)</i>	<i>T</i>	<i>P.</i>		<i>R<sup>2</sup></i>	<i>Adj. R<sup>2</sup></i>
(Constant)	.322	.303		1.061	.290		0.170	0.163
Ecological knowledge	.295	.089	.184	3.321	.001			
Cognitive skills	.119	.097	.084	1.226	.221			
	.354	.094	.240	3.773	.000			



Attitude									
Dependent Variable: Pro-environmental behaviour. $F(3, 360) = 24.634, p < 0.05. T(df = 360)$									

**Significant at 0.05**

Table 3 indicates that environmental literacy (ecological knowledge, attitude and cognitive skills) significantly influenced the pro-environmental behaviour among library personnel in public university libraries in South-West, Nigeria (Adj.  $R^2 = 0.16, F(3, 360) = 24.63, p < 0.05$ ). Specifically, ecological knowledge ( $\beta = 0.18, t(360) = 3.32, p < 0.05$ ) and attitude ( $\beta = 0.24, t(360) = 3.77, p < 0.05$ ) had significant positive influences on pro-environmental behaviour. In contrast, cognitive skills ( $\beta = 0.08, t(360) = 1.22, p > 0.05$ ) did not influence library personnel's pro-environmental behaviour. The Adjusted R-squared of 0.16 indicates that 16% of the variance in pro-environmental behaviour is explained by environmental literacy. The overall significance model was evaluated using an F-test. The F-statistic,  $F(3, 360) = 24.63$ , indicates that the model has three independent indicators and is based on a sample size of 364, explaining a significant amount of variance in the dependent variable. Specifically, the F-value of 24.63 indicates the proportion of variance explained by the model relative to the unexplained variance. The P-value associated with the F-statistic was less than the chosen significance level ( $p < 0.05$ ); therefore, the null hypothesis was rejected.

### Discussion of Findings

The study reported that pro-environmental behaviour in public university libraries in South-West Nigeria is high. The findings further revealed that each of the indicators (energy conservation, waste avoidance, recycling and environmental citizenship) is practised at a high level in public university libraries in South-West, Nigeria. This finding is consistent with the survey report by Taher (2022), which found that pro-environmental behaviour in government parastatals is high. Likewise, Ren (2022) and Singh and Mishra (2019) found that libraries practice 3Rs- recycle, reuse and reduce, building design features, water conservation, energy efficiency/conservation, waste management, sustainable collection development, and sustainable technology, which is in line with the findings. Contrarily, the findings of Oyelude and Alabi (2013), Iroeze et al. (2022), Fresnido and Esposito-Betan (2018), and Dada (2021) revealed that libraries are weak in the practice of pro-environmental behaviour, which contradicts the findings of this study.

The high level of PEB observed among the library personnel can be explained through the theory of planned behaviour. The theory posits that a person's willingness to act in a behaviour at a given time and location is driven by intention, which is based on psychological factors. The high level of PEB (energy conservation, recycling, waste avoidance and environmental citizenship) observed among the library personnel suggested that library personnel possess positive attitude towards energy conservation, recycling, waste avoidance and ecological citizenship, believe the social circle attached to energy conservation, recycling, waste avoidance and environmental citizenship then feel confident in their ability to practice energy conservation, recycling, waste avoidance and ecological citizenship. They equally possess the tools to practice the behaviour. This indicates that the three factors mentioned by TPB are high, leading to the actual practice of the PEB. This assertion is supported by Effendi et al. (2020) and Phang and Iliham (2023), who found that attitude, subjective norms, and perceived behavioural control significantly impact PEB.

The finding that environmental literacy was high among library personnel in public universities in South-West, Nigeria, concurred with the study conducted by Akbulut et al.

(2017), which found that participants' environmental awareness was higher than the rate of implementation of green practices. Fleming and Schmidt (2019) revealed that librarians as information specialists possess a moderate to high level of environmental literacy, in alliance with Siami et al. (2024) and Warnasooriya (2019) findings that the level of librarians' green information literacy is above an average level and satisfactory, which agrees with these study findings. On the other hand, the findings contradict Onokpite (2018), who argues that participants still indulge in indiscriminate waste disposal due to inadequate environmental literacy and sensitisation programmes. Likewise, the finding negates Liang et al.'s (2018) survey, which reported that participants had a relatively low level of environmental knowledge and a moderate level of environmental attitudes. The high level of environmental literacy (ecological knowledge, cognitive skills, and attitudes) observed among the library personnel aligned with the model's recommendations for responsible environmental behaviour. The findings indicated that library personnel possess relevant ecological knowledge about environmental issues, demonstrate critical thinking and problem-solving skills, and express concern for the environment through their attitudes. This indicates that the indicators outlined in the model of responsible environmental behaviour are prevalent, thereby promoting high environmental literacy among library personnel.

The study's findings provided strong evidence that environmental literacy (ecological knowledge and attitudes) has a significant positive influence on pro-environmental behaviour. At the same time, cognitive skills are not significant predictors of pro-environmental behaviour among library personnel in public universities in South-West Nigeria. Specifically, a unit increase in environmental literacy (ecological knowledge and attitude) will lead to an increase in pro-environmental behaviour. This implies that library personnel with a higher level of environmental knowledge and attitude will engage in actions such as energy conservation, waste reduction, recycling, and environmental citizenship, as well as other initiatives supporting environmental sustainability. The finding underscores the importance of environmental literacy as a predictor of pro-environmental behaviour. It suggests that improving library personnel's understanding of ecological issues and sensitivity will play an essential role in promoting PEB that contribute to environmental sustainability. This finding supports both the theory of planned behaviour and the model of responsible environmental behaviour that underpins this study. Although TPB does not explicitly mention EL, library personnel who are environmentally literate are likely to develop positive attitudes, recognise supportive social norms and feel empowered to act. In this way, EL strengthened the psychological components of the TPB framework that drive PEB. Therefore, promoting EL can be seen as a strategy that encourages PEB among library personnel.

The finding aligned with the previous studies of Kim and Kim (2018) and Janmaimool and Khajohnmanee (2019). They established that EL provides a high level of knowledge and awareness of environmental problems and ways to address them, resulting in sustainable, pro-environmental behaviour. In some other studies conducted by Amrulloh and Yulianto (2022), Safari et al. (2020), Syaiful et al. (2016), and Hlaing (2016) agreed with this study's findings that environmental knowledge and environmental attitude were significantly positively correlated with pro-environmental behaviours and environmental knowledge was significantly positively correlated with ecological attitude. The implication is that environmental knowledge is positively and statistically significant in explaining pro-environmental behaviour. This finding does not align with Paço and Lavrador's (2017) finding of no relationship between knowledge and behaviour.



## Conclusion

The practice of pro-environmental behaviour is critical in the library setting, given the world's profound climate change and environmental problems. In a nutshell, the practice of PEB in libraries is challenged by inadequate environmental literacy; however, the study uncovered that pro-environmental behaviour in the library was high, and that environmental literacy was also high. This asserts that libraries in public universities are practising pro-environmental behaviour and that library personnel possess ecological literacy. The finding also demonstrated that ecological literacy plays a significant role in shaping PEB. Using the model of responsible environmental behaviour, there is evidence that ecological knowledge, cognitive skill and attitudes contribute to library personnel's PEB. Although this study did not measure TPB indicators, the observed indicators aligned with the theory's postulations. Thus, environmental literacy increases the practice of pro-environmental behaviours that contribute to global environmental sustainability.

## Recommendations

**Based on the findings, the following are the study's recommendations:**

1. The study reported that while PEB was high in public university libraries in South-West, Nigeria, energy conservation, waste avoidance, recycling and environmental citizenship still need to be improved and move to a very high status. To address this, the library management should implement specialised green literacy workshops, seminars, and practical training sessions on environmental sustainability behaviours. The library management should periodically audit its PEB practices to identify areas for further improvement. They should develop guidelines or a handbook for PEB practices, specifically focusing on energy conservation and recycling, and distribute it to library personnel.
2. The study discovered a high level of environmental literacy in public university libraries in South-West, Nigeria. Nevertheless, ecological knowledge, cognitive skill, and attitudes still need to be maintained at a very high level. This can be addressed by university library management through organising lecture series on advanced environmental knowledge and curating specialised environmental collections to support library personnel. Library management should adopt ideas from the International Federation of Library Associations (IFLA)'s Green Library Manifesto. This will further enhance library personnel's understanding of pro-environmental behaviour practices implemented in different libraries across the globe.

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