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Assessment of early career students' interest in forestry and environmental management in delta state Nigeria

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ABSTRACT

Interest among early-career students in Forestry and Environmental Management (FEM) was assessed. Approximately 225 students were randomly selected from Senior Secondary Schools (SSS) in Delta State. Data on students' demographics, awareness levels of FEM, and willingness to enroll (WTE) in FEM were collected. The awareness level of students regarding FEM and their WTE to enroll in FEM at university were analyzed using 3-point and 4-point Likert scales, respectively. A logistic regression model was employed to examine the relationship between WTE into FEM and several predetermined variables. Additionally, students' knowledge of environmental problems and their intentions to study FEM were evaluated using Spearman's rank correlation coefficient. A Chi-square test examined the association between students' gender and their intention to study FEM. Females (51.1%), 16 to 18 years (36.9%), and students in SSS 3 (59.6%) dominated. Students (77.3%) affirmed the existence of environmental problems, 88.4% heard of FEM from television (64.9%), with 74.2% aware (1.97±0.03) of FEM as a Profession. Students' intention to study FEM was very weak (39.6%) with a mean value of 2.06±0.03. The students' intention to study FEM was relatively weak, with only 39.6% expressing interest and a mean score of 2.06±0.03. The level of awareness regarding environmental problems, support for solving these issues despite discomfort, and the overall forestry and environmental awareness significantly influenced ($P < 0.05$) the willingness to pursue a career in FEM. An r value of -0.06 indicates that students' familiarity with environmental problems did not significantly correlate with other variables in the study ($P > 0.05$) influence their WTE into FEM. A significant relationship ($P < 0.05$) exists between gender and students' intention to pursue careers in forestry professions ($\chi^2 = 119.85$). Females are more interested in studying Forest and Environmental Management (FEM). Increasing awareness of FEM among early-career students can enhance their interest in this field.

Contribution/Originality: The interest of early-career students in Forestry and Environmental Management (FEM), which is essential for environmental sustainability, is original due to the target audience, the underexplored area, and the urgent need to recruit green ambassadors for Earth's protection, thereby fostering responsible environmental citizenship.

1. INTRODUCTION

Environmental Education (EE), as defined by Ezeudu (2003) and UNESCO (2007), is teaching that boosts people's awareness about nature, its challenges, how important skills and capabilities are developed to solve problems, and how views, drives, and dedication promote making the right choices and actions (Adejo, Shaibu, & Shaibu, 2025). Education is frequently used as learning within school (primary to post-graduate). Additionally, the use of print

materials, websites, media campaigns, and other tools of learning to teach the public is termed education. The environmental education goals and objectives, as defined by the Tbilisi Declaration of 1977 at the World Intergovernmental Conference, involve teaching that aims to develop a population that is aware of and cares for the environment and its complexities. This education fosters knowledge, skills, perspectives, motivations, and commitments necessary for individuals and communities to work personally and collectively towards solving current environmental problems and preventing future issues (UNESCO, 2007). Consequently, a general EE adage "think globally, act locally".

With numerous environmental complications emanating from human actions, Turbuck and Lutgen (2004) opined the it is prudent for man to imagine effects of these complications, how they can be avoided or mitigated while harnessing the positive outcome from favorable human interactions. Onuoha and Ezirim (2010) recommend that mankind benefits from nature when they are knowledgeable about their personal and collective activities that create environmental problems (EPs) and develop beneficial and responsive attitudes towards the environment.

Food and Agrıculture Organızatıon of the Unıted Natıons Publishers (2005) reports extreme rate of global deforestation and rated Africa second with annual net damage of 4.0 million hectares. Globally, Nigeria tops in net loss of natural forest with estimate of 11.1% annually and if not curtailed, the country will be bare of natural forest soon (Ohwo, Onakpoma, & Okoromaraye, 2020). Most environmental problems faced across the globe are linked to the alteration of forest lands for other uses (Ofomata & Phil-Eze, 2001; Ürkmez, Sevim, & Çatık, 2024). Globally, EPs in numerous countries have captivated concern of individuals, organizations and governments.

Environmental literacy will help repair the damage done to the Earth by ignorance and can be attained through organized study instructions that impart knowledge, skills, values, and views to foster responsible living that positively supports nature (Shobeiri, Omidvar, & Prahallada, 2005). Environmental awareness agendas are becoming vital in providing solutions to minimize environmental degradation globally (Sewall, 1995). Young (2002) states that EE plays an indispensable role in creating a society that strengthens citizens to encourage business and policy to transition to sustainable development (UNEP, 2007). Developing concern and recognizing how the environment thrive helps motivate people to embrace wise attitudes towards it (Ahmedin, 2013). Thus, a global synergy between energy efficiency and sustainable development in education systems exists.

The Nigerian Conservation Foundation and the World Wildlife Fund created a National Conservation Strategy and educational curriculum, which was adopted by the Federal Ministry of Education as instructional materials at all educational levels in Nigeria. Ezeudu (2003) observed that environmental education (EE) is relatively new, and its uniqueness stems from the integration of social, ecological, economic, and cultural factors that are central to EPs. The EE program in Nigerian schools will help create awareness and develop skills among students and educators regarding actions needed to mitigate environmental problems and prevent new ones from arising (Chima & Sobere, 2011).

Belgrade Charter summarized EE objectives from the Landmark Conference jointly organized by UNESCO and UNEP in 1989 as awareness, knowledge, attitude, skills, evaluation and participation. The first three objectives have recorded great achievements (UNEP, 2007). However, the skills, evaluation, and participation objectives have not been fully achieved. Through education, management skills, evaluation, and people's perspectives are transformed to foster environmental care (UNESCO, 2019), thus minimizing environmental destruction while stating the essential step needed to save our environment (Kofoworola, 2007). This goes logically by exposing students to environmental management (Baumgart, 2014). Environmental enthusiasm, societal expectations, attitudes, and economic incentives are some reasons individuals participate in environmental management (Bartlett, 2005).

The need to examine awareness of Forestry and Environmental Management (FEM) among students is urgent. Although it is now well recognized through the integration of government agencies, state agencies, NGOs, and private individuals, the expected results do not align with the level of awareness, as evidenced by students' low enrollment in FEM disciplines at Nigerian universities. The ripple effect of this situation is a population with little

or no environmental education, poor skills to evaluate environmental problems (EPs), low participation in solving these issues, and a negative impact on the planet. Therefore, it is timely to assess students' awareness of FEM to prevent the imminent environmental disasters that threaten the planet, which has prompted a global effort for a greener Earth. Unfortunately, there is a shortage of workforce in the forestry sector. However, environmental sustainability cannot be achieved with an inadequate workforce lacking essential knowledge and skills. Recognizing environmental problems and fostering students' willingness to address them will provide the necessary healing for a dying Earth (Arshad, Saleem, Shafi, Ahmad, & Kanwal, 2021). Delta State is gifted with lavish natural forest-tropical, freshwater and mangrove swamps (Ohwo et al., 2020). However, these ecosystems, which provide numerous services and sustain the livelihoods of forest stakeholders, are damaged by human activities such as urbanization, logging, oil exploration, and exploitation, leading to negative consequences (Ohwo et al., 2020). When ecosystems are stressed, they act abnormally, and people respond accordingly. The efforts by the Delta State Government to promote sustainable development become ineffective without a sustained environment.

Schools are fundamental in the process of building environmental knowledge, views, and actions, and they educate students on being environmentally conscious. It is of utmost importance that students in schools develop sustainable environmental values, which positively influence their affinity to care for and protect the environment through decisions that foster a holistic understanding of environmental complexity and proper management as a profession.

With these objectives achieved, environmental ambassadors are prepared to help convey knowledge, skills, views, and morals to effectively evaluate and participate in solving environmental problems (EPs). Although studies exist on students' interest in EPs, none have been conducted in Delta State. This study examined the awareness level of FEM among students in Delta State and their willingness to enroll in FEM disciplines to create environmental ambassadors. Specifically, it addressed students.

i. Level of awareness on Forest and Environmental Management (FEM) and related topics.
ii. Willingness To Enroll (WTE) into FEM.

The following hypothesis was tested.

H_0: Students' knowledge of EPs does not significantly influence their intention to pursue a career in the FEM profession in Delta State.

H_0: There is no association between gender and students' intention to study FEM.

2. METHODOLOGY

This study examined students' career choices in Senior Secondary Schools (SSS) in Delta State. Two hundred and twenty-five (225) students were randomly selected. The data collected included students' demographics, their level of awareness of Forest and Environmental Management (FEM), and their willingness to enroll (WTE) in FEM, using a questionnaire.

2.1. Data Analysis

The level of FEM awareness among students in the state was analyzed using a three-point Likert scale, where 1 indicates not aware, 2 indicates aware, and 3 indicates much aware. A mean score of 1.5 was used to categorize students' awareness levels; scores above 1.5 indicate awareness, while scores below 1.5 indicate a lack of awareness. Students' willingness to enroll (WTE) in FEM disciplines to contribute to environmental sustainability was assessed using a four-point Likert scale: 4 (high), 3 (moderate), 2 (weak), and 1 (very weak). The factors influencing students' WTE in FEM were analyzed using a four-point Likert scale: 4 (strongly agree), 3 (agree), 2 (disagree), and 1 (strongly disagree). A mean value of 2.5 was used to categorize students' WTE into FEM as high/agree (above 2.5) and weak/disagree (below 2.5).

Logistic model (1) tested the relationship between WTE and FEM with some predetermined variables.

$$\ln\left[\frac{p^i}{1-p^1}\right] = \beta_0 + \beta_1 X_1 + \cdots \ldots \ldots \ldots \ldots + \beta_{11} X_{11} + e \quad (1)$$

Where,

$\beta_0 - \beta_5$ are the coefficients

x is a vector of variables reflecting respondents or other characteristics

X_1 = Age.

X_2 = Students' exposure to FEM.

X_3 = Awareness of EPs.

X_4 = Gender.

X_5 = Educational level (Classes).

X_6 = Visitation of natural recreational facilities.

X_7 = Decision to increase workforce to combat EPs.

X_8 = Support to solve EPs, undermining the discomfort.

X_9 = Obeying God's command to take care of the Earth.

X_{10} = Protecting the environment for future generations.

X_{11} = Awareness level of FEM.

e = Experimental error.

Students' knowledge of EPs did not significantly influence their intention to study the FEM profession, as tested using the Spearman rank correlation method (Equation 2).

$$r_s = 1 - \frac{6\sum d^2}{n(n^2-1)} \quad (2)$$

Where

d= Difference between paired ranks.

n= Number of pairs.

H_0: No association exists between genders on student intention to Forestry profession was tested using Chi square in Equation 3.

$$\chi^2 = \sum \frac{(O-E)^2}{E} \quad (3)$$

Where,

χ^2 = Chi-square.

O= Observed frequency.

E= Expected frequency.

3. RESULTS

3.1. Demographic Profile of Students

The socio-economic profile of students (Table 1) indicates that females (51.1%), students aged 16 to 18 years (36.9%), and students in SSS3 (59.6%) are the predominant groups. Additionally, 77.3% of the students reported that problems exist within their environment.

Table 1. Students' socio-economic characteristics.

Variables	Frequency	Percentage
Gender		
Male	110	48.9
Female	115	51.1
Total	**225**	**100.0**
Age (years)		
10-12	23	10.2
13-15	38	16.9
16-18	83	36.9
Above 18	81	36.0
Total	**225**	**100.0**
Class		
SSS 1	48	21.3
SSS 2	43	19.1
SSS 3	134	59.6
Total	**225**	**100.0**
Is there a problem with the environment		
Yes	174	77.3
No	51	22.7
Total	**225**	**100.0**

Source: Field survey (2024).

3.2. The FEM Awareness Level of Students

Students' awareness of FEM in Table 2 shows that 88.4% of students heard of the discipline from various sources such as television (64.9%), the internet (49.8%), school (49.8%), books (49.8%), and news (49.8%). About 74.2% of the students were aware that FEM is studied in University. Students' awareness level of FEM as a course of study in a tertiary institution shows that SSS students were aware of FEM with a mean score of 1.97±0.03 (Table 3).

Table 2. Student awareness of FEM.

Variable	Frequency	Percentages
Heard of FEM education		
Yes	199	88.4
No	26	11.6
Total	**225**	**100.0**
Sources of awareness (Multiple responses)		
School	112	49.8
Television	146	64.9
Books	112	49.8
Articles	56	24.9
Government	24	10.7
News	112	49.8
Internet	114	50.7
Blog	48	21.4
From friends and neighbors	64	28.5
Newspaper	78	34.7
A relative studied FEM	26	11.6
A relative work in Forestry related organization	12	5.4
A relative sawmilling/Wood business	2	0.9
Magazines	54	24
Non-Governmental Organisation	26	11.6
Radio	66	29.4
Total	**225**	
Awareness level		
Not aware	32	14.2
Aware	167	74.2
Much aware	26	11.6
Total	**225**	**100.0**

Source: Field survey (2024).

Table 3. Ranked level of students' awareness of FEM in Universities.

Variable	Mean	Median	Mode	Standard error
Students' Alertness Level of FEM as a Profession	1.97	2.00	2.00	0.03

Note: N.B.: Not aware (1), aware (2) and much aware (3).
Source: Field survey (2024).

3.3. Students' Willingness to Enroll in FEM

The results of students' preferred courses at university (Table 4) indicate that 30.2% of students wish to pursue courses other than those listed. Approximately 17.8% and 16.4% of students expressed interest in studying Accounting and Law, respectively. With a growing emphasis on environmental protection, 63.6% of students are not inclined to study FEM. The students' interest in FEM remains weak, with only 39.6% showing willingness to study it, while 36.4% are interested (Table 5). The mean value of students' intention to study FEM, 2.06±0.07, further confirms this weak interest (Table 5). Table 6 identifies factors influencing students' decision to study FEM. The top three factors are love for visiting natural recreation facilities (3.39±0.04), love for observing nature and wild animals in their natural environment (3.24±0.06), and obeying God's command to maintain the earth (environmental responsibility) (3.18±0.07), ranked first, second, and third, respectively. The least influential factor is support for solving environmental problems (EPs) that cause discomfort (2.98±0.05). The overall mean score of 3.12±0.05 suggests that students can be highly influenced to study FEM.

The percentage response of factors influencing students' decision to study FEM (Table 7) shows that the majority (51.6%, 48.4%, and 47.6%) can be influenced by obeying God's command to maintain the earth (environmental responsibility), protecting the environment for future generations, and love for visiting natural recreation facilities with a strongly agree response, respectively. About 45.3%, 45.3%, and 22.7% agreed that their love for visiting natural recreation facilities, support to solve environmental problems (EPs) undermining discomfort, and love to see nature and wild animals free in their natural environment might influence their decision to study FEM.

Table 4. Students' intention to study FEM.

Variable	Frequency	Percentage
Course intended to study at university		
Law	36	16.0
Medicine	28	12.4
Pharmacy	9	4.0
Engineering	27	12.0
Accounting	40	17.8
Nursing	17	7.6
Others	68	30.2
Total	**225**	**100.0**
With rising concern for environmental protection, do you intend to study FEM in University		
Yes	82	36.4
No	143	63.6
Total	**225**	**100.0**
Level of intention to study FEM		
Very weak	89	39.6
Weak	56	24.9
Moderate	58	25.8
High	22	9.8
Total	**225**	**100.0**
Reason for not studying FEM		
Not interested	69	30.7
Interested	82	36.4
Others	74	32.9
Total	**225**	**100.0**

Source: Field survey (2024).

Table 5. Level of students' intention to study FEM in University.

Variable	Mean	Median	Mode	Standard error
Students' level of intention to study FEM in University	2.06	2.00	1.00	0.07

Source: Field survey (2024).

Table 6. Factors that influence students' decisions to study FEM.

S/N	Variable	Mean	Median	Mode	Standard error	Rank
1	Exposure to the course from school or other sources	3.02	3.00	4.00	0.07	6
2	Awareness of Eps	3.01	3.00	3.00	0.06	7
3	Love to visit natural recreation facilities	3.39	3.00	4.00	0.04	1
4	To increase manpower to solve Eps	3.00	3.00	4.00	0.06	8
5	Support to solve EPs, undermining the discomfort	2.98	3.00	3.00	0.05	9
6	Love to see nature and wild animals free in their natural environment	3.24	3.00	4.00	0.06	2
7	Obeying God's command to maintain the earth	3.18	4.00	4.00	0.07	3
8	Protecting the environment for future generations	3.16	3.00	4.00	0.06	4
9	A sick environment harbors sick individuals	3.07	3.00	4.00	0.06	5
	Total	3.12			0.05	

Source: Field survey (2024).

Table 7. Percentage response of factors influencing students' decision to study FEM.

S/N	Feelings towards environmental abuse	Strongly agree	Agree	Disagree	Strongly disagree
1	Exposure to the course from school or other sources	96 (42.7)	51 (22.7)	64 (28.4)	14 (6.2)
2	Awareness of Eps	81 (36.0)	84 (37.3)	42 (18.7)	18 (8.0)
3	Love to visit natural recreation facilities	107 (47.6)	102 (45.3)	13 (5.8)	3 (1.3)
4	To increase manpower to solve Eps	86 (38.2)	74 (32.9)	45 (20.0)	20 (8.9)
5	Support to solve EPs, undermining the discomfort	64 (28.4)	102 (45.3)	51 (22.7)	8 (3.6)
6	Love to see nature and wild animals free in their natural environment	100 (44.4)	92 (40.9)	21 (9.3)	12 (5.3)
7	Obeying God's command to maintain the earth	116 (51.6)	52 (23.1)	39 (17.3)	18 (8.0)
8	Protecting the environment for future generations	109 (48.4)	57 (25.3)	44 (19.6)	15 (6.7)
9	A sick environment harbors sick individuals	97 (43.1)	58 (25.8)	58 (25.8)	12 (5.3)

Source: Field survey (2024).

3.4. Relationship of Willingness to Enroll (WTE) into FEM Discipline to Create Environmental Ambassadors with Some Predetermined Variables

The connection of WTE into FEM discipline to create environmental ambassadors with some predetermined variables (Table 8) shows that awareness of EPs, support to solve these problems, undermining the discomfort and mean forestry and environmental awareness significantly influenced WTE into FEM at a 5 percent probability level. Table 9 shows that the correlation between knowledge of EPs and students' intent to study FEM was not significant, with an r value of -0.06, indicating that students' knowledge of EPs does not influence their intent to study FEM. Therefore, the formulated hypothesis was accepted.

The Chi-square test of gender and students' intention to Forestry profession (Table 10) shows that a significant relationship ($P < 0.05$) exists between gender and students' intention to Forestry professions with a Chi-square (χ^2) value of 119.85. The Phi value (0.3) shows a weak strength of association between gender and students' intention to Forestry profession. The formulated hypothesis was thus rejected. The percentage response (Figure 1) shows that male students have a very weak intention to study FEM, while female intention was high.

Table 8. Binary Logistic Regression of students' WTE into the FEM discipline.

Factors	B	S.E.	Wald	DF	Sig.	Exp(B)
Age	0.57	0.18	9.70	1	0.00	1.78
Student exposure	-0.70	0.41	2.91	1	0.09	0.50
Awareness level of Eps	0.03	0.33	0.01	1	0.92	1.03
Gender	0.63	0.37	2.99	1	0.08	1.88
Educational level	-0.55	0.21	6.86	1	0.01	0.58
Visitation to a natural site	-0.37	0.29	1.56	1	0.21	0.69
Workforce	1.65	0.34	24.19	1	0.00	5.20
Support to solve EPs, undermining the discomfort	-0.06	0.29	0.05	1	0.83	0.94
Obeying God's command	0.16	0.35	0.22	1	0.64	1.18
Protecting the environment for future generations	0.14	0.33	0.19	1	0.66	1.15
Mean Forestry and Environmental rated awareness level	0.07	0.33	0.04	1	0.84	1.07
Constant	-6.43	1.81	12.65	1	0.00	0.00

Source: Field survey (2024).

Table 9. Influence of knowledge causing EPs on students" intention to study FEM.

		Total Rank	Negative
Total rank	Spearman correlation	1.00	-0.06
	Sig. (1-tailed)	.	0.201
	N	225	225
Negative	Spearman correlation	-0.06	1.00
	Sig. (1-tailed)	0.201	.
	N	225	225

Source: Field survey (2024).

Table 10. Association between gender and students' intention to Forestry profession.

Variable	Value	degree of freedom	asymp.sig
Pearson's Chi-Square	19.853	3	0.00
Phi value	0.297		0.00

Source: Field survey (2024).

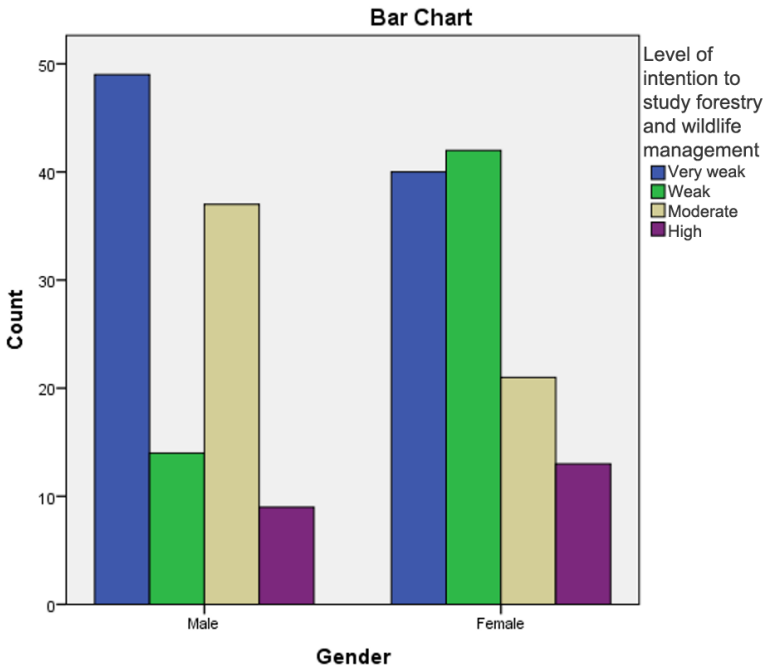

Figure 1. Level of students' intention to study FEM.

4. DISCUSSION

4.1. Demographic Profile of Students

The dominance of female students and adolescents in the final year of secondary school affirms the observation of Hassan, Noordin, and Sulaiman (2010) and Chima and Sobere (2011), respectively. Students' affirmation of the existence of EPs underscores (Muttu & Bhukye, 2021).

4.2. The FEM Awareness Level of Students

Ohwo, Oyibo, and Itoje (2024) listed television, newspaper and articles as the major sources of environmental information channels. Oztekin, Delen, Turkyilmaz, and Zaim (2013) and Navimipour, Rahmani, Navin, and Hosseinzadeh (2015) reported e-learning as a rapidly used tool for environmental alertness. Akpoghiran, Umukoro, and Okoro (2018) observed social media as a useful instrument for environmental management. Asunlegan et al. (2020) reported that 57.9% of SSS students were highly aware of Forestry as a profession. Students' awareness level of FEM as a course of study in a tertiary institution corroborates (Asunlegan et al., 2020), who reported that 92.5% of senior secondary school students in Oyo State are aware of Forestry as a course of study.

4.3. Students' Willingness to Enroll in FEM

Students' weak intention to study FEM corroborates (Asunlegan et al., 2020) that students' responses to studying courses related to the environment were very low (0.8%), while Onyema et al. (2021) reported that students favor other discipline to FEM related courses. The identified factors that might influence students' decision to study FEM affirm those listed by Ahmedin (2013), which were EE and affection for the environment. Kofoworola (2007) confirms that environmental responsibility, protection for recreational purposes, and support for keeping nature and animals in their habitats further influence students' decisions to study FEM.

4.4. Relationship of Willingness to Enroll (WTE) into FEM Discipline to Create Environmental Ambassadors with Some Predetermined Variables

The significant influence of awareness of EPs, support to solve these problems, undermining the discomfort, and mean forestry and environmental awareness on students' WTE in FEM affirms the report of Arshad et al. (2021). The acceptance of the hypothesis that knowledge of EPs does not influence students' intent to study FEM negates the reports of Arshad et al. (2021).

The significant association of students' gender and their intention to study forestry profession led to the rejection of the formulated hypothesis. Male students have a very weak intention to study FEM, while female intention was high. Hassan et al. (2010) and Muttu and Bhukye (2021) reported that females are more environmental loving than males.

5. CONCLUSION

Early career students in Delta have good knowledge of Forestry and Environmental Management from television programmes and the internet. Although the students see environmental literacy as important in solving environmental problems, they show weak willingness to enroll in Forestry and Environmental Management. However, environmental responsibility, environmental protection for future generations, love for visiting natural recreation facilities, environmental problem awareness, and support to mitigate these problems, undermining the discomfort and mean forestry and environmental awareness level, can attract students to forestry and environmental management. Emphasis on what students can do to secure the environment for future generations and aggressive awareness and education of Forestry and Environmental Management to early career students should be promoted across all social media to stimulate positive students' environmental interest.

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Transparency: The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.
Competing Interests: The authors declare that they have no competing interests.
Authors' Contributions: Both authors contributed equally to the conception and design of the study. Both authors have read and agreed to the published version of the manuscript.

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