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Research Article

Student Teachers' Attitudes Toward Environmental Conservation: A Comparative Analysis

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ABSTRACT

The preservation of the environment is a critical concern in the modern era. The rapid growth of science and technology has introduced significant global threats. Therefore it is imperative that we foster attitudes that uphold the gifts that Mother Nature has given us in order to preserve the ecosystem. Despite being well-educated about environmental issues, teachers often display a disconnect between their understanding and true preservation attitudes. This study examines this paradox among 732 student teachers in Kolkata and surrounding districts through a quantitative descriptive survey using the Environmental Attitude Inventory (Milfont & Duckitt, 2009). The result shows that while student teachers possess a high level of environmental knowledge their preservation attitudes remain relatively low. Female student teachers displayed stronger environmental attitudes and commitment to personal conservation behaviours than their male counterparts, aligning with previous research on gender differences in environmental concern. Subject-wise, Language group students exhibited more active engagement in conservation efforts than those specializing in Physical Sciences. Conversely, students specializing in Life Sciences and Social Sciences failed to exhibit significantly higher environmental awareness, raising questions about the effectiveness of their education in facilitating environmentally responsible behaviour.

Keywords: Environmental Knowledge, Environmental Attitude, Preservation Attitude, Conservation Behavior, Student Teachers, Education for Sustainable Development

Introduction:

Nature has endowed humanity with everything necessary for survival. However, in our endless greed and incessant quest for development, we have inflicted life-threatening environmental changes. The tremendous growth of human intervention has caused catastrophic ecological disasters, leading to devastating consequences for both living creatures and the Earth's physical environment. The relentless pursuit of development has led to the ruthless consumption of natural resources. Severe pollution has deprived us of the pleasure of birdsong and fresh air. Numerous flora and fauna species are on the verge of extinction. Forests are diminishing at an alarming rate, and land masses are eroding. Human-induced pollution affects both natural spaces and biodiversity, leading to ecosystem imbalances and habitat degradation. Many species, including the Hilsa fish, Ganga river dolphins, and urban vultures, face extinction due to overfishing, habitat destruction, and pollution (Ghosh, 2018; Palita & Purohit, 2008). Similarly, tiger habitats and elephant corridors are increasingly encroached upon.
Climate change has led to rising global temperatures, melting glaciers, and rising sea levels, endangering regions like the Sundarbans (Tripathi et al., 2017). Unpredictable monsoons, ozone depletion, and acid rain

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further exacerbate environmental instability. Chemical fertilizers and pesticides have contaminated food, while deforestation has caused landslides and soil erosion. The scarcity of potable water is another acute issue. Reports indicated that by 2020, 21 Indian cities, including Delhi and Chennai, faced groundwater depletion, affecting 100 million people (Dinka, 2017). Rapid industrialization, urbanization, and vehicular emissions have worsened air quality, leading to respiratory diseases like asthma (Soga et al., 2019). According to the WWF, major environmental threats of the 21st century include deforestation, pollution, and biodiversity loss (Medina et al., 2017).

Human-induced ecological disasters, such as the Chornobyl nuclear accident, oil spills in the Niger Delta and Gulf of Mexico, and the Fukushima disaster, have had devastating effects on ecosystems (Broadstock et al., 2018). The burning of fossil fuels has significantly contributed to global warming, emphasizing the urgency of transitioning to renewable energy (Carvalho et al., 2016). The exponential growth of population exacerbates these issues, intensifying poverty, malnutrition, and sanitation problems. The global population surged from 1.5 billion in 1900 to 6.3 billion in 2003, with an estimated 8.9 billion by 2050 (Cohen, 2003; United Nations, 2002).

The anthropocentric approach to nature must reform. A shift in mindset is essential to ensure a sustainable future. Environmental education plays an important role in shaping attitudes and behaviors of student teachers toward conservation (Diaz & Fuentes, 2018). Recycling is an essential practice for waste reduction (Ugulu, 2015). However, the lack of environmental education and sensitivity among teachers remains a challenge. It is imperative to equip educators with environmental knowledge, enabling them to instill environmental consciousness in future generations. By prioritizing environmental stewardship, we can restore the planet's vitality and create a more sustainable world for all living beings.

Review of Related Literature:

Environmental attitudes significantly shape behaviours that impact the environment. Perlstring (1997) defines environmental attitude as "learned tendencies that result in consistent positive or negative behaviours toward the environment." Schultz et al. (2004) describe attitude as a combination of beliefs, emotions, and behavioral inclinations toward environmental concerns. Milfont (2007) defines it as a psychological tendency to evaluate the environment favorably or unfavorably, influencing beliefs and behaviors (Milfont & Duckitt, 2009).

Environmental attitudes are categorized into eco-centric (focused on preservation) and anthropocentric (focused on human benefits) perspectives. Studies (Kaiser et al., 2020) indicate that attitudes influence conservation behaviors. While some researchers argue that increasing environmental knowledge enhances attitudes (Indriani et al., 2019), others believe attitudes shape environmental knowledge (Taube et al., 2021).

Future generations rely on today's natural resources (Carson, 1962). Schools play a crucial role in fostering environmental education (EE) (Laddawan & Joan, 1987), instilling positive attitudes in students. Studies indicate women generally have a more favorable environmental outlook than men (Zelezny et al., 2000; Stephens et al., 2010). Research also suggests female teachers exhibit stronger environmental attitudes than male teachers (Rou, 1995; Shobeiri, 2005; Ozgen, 2012), though some studies found no gender differences (Shaila, 2003).

Teachers significantly impact environmental education (Ekborg, 2003; Vlaardingerbroek & Taylor, 2007). Those with high environmental literacy integrate Environmental Education into classrooms (Chung Ko & Kin Lee, 2003; Kim & Fortner, 2006), whereas those lacking literacy hesitate to teach it (Smith-Sebasto & Smith, 1997). Therefore, the effectiveness of Environmental Education depends on teachers' environmental literacy, attitudes and practices.

OBJECTIVES OF THE STUDY:

The study examines student teachers' preservation attitudes, comparing differences by gender and subject specialization. It aims to identify factors influencing these variations and propose improvements in teacher education to foster environmentally conscious practices and sustainable development.

3. Method

3.1: The Research model

This is a quantitative descriptive study designed in a survey model investigating preservation attitudes towards the environment of teacher candidates enrolled in B.Ed and M.Ed courses in terms of different variables.

1. 3.2: Population and sample

The population of the study consists of Student Teachers of B.Ed and M.Ed courses from various teacher education institutions in Kolkata and surrounding districts of West Bengal. The sample consisted of 732 B.Ed and M.Ed Student Teachers from 15 Colleges of Teacher Education in two districts of South 24 Parganas and North 24 Parganas. These were urban and suburban colleges catering to middle socioeconomic communities. The sampling of the study was purposive and selected as follows:

Table 3.2.1: The Sample for the quantitative phase

Gender	Stream of study				
	Language (LA)	**Life Science (LS)**	**Physical Science (PS)**	**Social Science (SS)**	**Total**
Male	91	34	74	104	**303**
Female	122	49	99	159	**429**
Total	**213**	**83**	**173**	**263**	**N= 732**

3.3: Data collection tools:

The Environmental Attitude Inventory (EAI) by Milfont & Duckitt (2009) was selected for this study. The preservation (P) scale predicts ecological behavior and reflects moral and altruistic values, linking it to sustainability, democratic attitudes and self- transcendence. It comprises seven constituent scales, each containing six items (three directly coded and three reverse coded), forming a 42-item, 7-point Likert-type scale. The EAI is uni-dimensional, demonstrating high internal consistency, homogeneity, and test-retest reliability while minimizing social desirability bias.

The inventory was translated into Bengali and validated by five experts, incorporating recommended language modifications. A pilot study with 26 participants further refined the translation. Standardization involved 78 representative participants, with a one-month test-rest procedure. Pearson's product-moment correlation yielded a reliability coefficient of 0.90, confirming the robustness and consistency of the translated version for assessing environmental attitudes.

Table 3.3.1: Preservation (P) Scale:

SCALE 1	*SCALE 2*	*SCALE 3*	*SCALE 4*	*SCALE 5*	*SCALE 6*	*SCALE 7*
Enjoyment of Nature	*Support for Interventionist conservation policies*	*Environmental Movement Activism*	*Environmental Threat*	*Personal Conservation behaviour*	*Eco-Centric Concern*	*Support for Population Growth Policies*

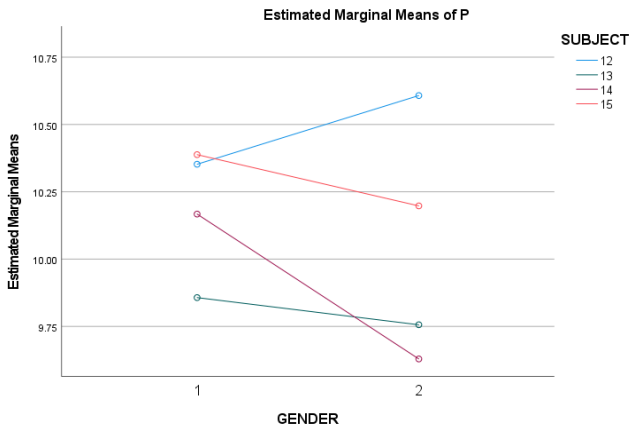
3.4: Data Analysis:

In order to detect the preservation attitude of student teachers, besides descriptive statistics One Way Variance Analysis (ANOVA) and Tukey HSD test (Post-Hoc) were used to determine whether the observed differences of Preservation (P) scores are significant as per gender and subject group wise.

4. FINDINGS:

The descriptive statistics of P was calculated in terms of the whole sample, gender-wise and subject-wise basis.
Table 4.1: Descriptive Statistics of P in terms of Gender and Subject-wise

Descriptive Statistics of Preservation (P)		**Preservation (P)**					
		Gender		**Subject of Study**			
		Male	Female	Language	Life. Sc.	Phy.Sc.	Social Sc.
MEAN	10.2110	10.1325	10.2664	10.4614	9.8158	9.9372	10.3129
MEDIAN	10.2857	10.2857	10.4286	10.5714	9.8571	9.8571	10.4286
MODE	10.71	10.5921	10.753	10.7914	9.9397	9.6969	9.8406
SD	2.62349	2.64117	2.64117	2.60187	2.41650	2.84421	2.56218



Key: LA= Language, LS= Life Science, PS= Physical Science, SS= Social Science

Figure - 4.1.1: Gender and Subject group-wise means of Preservation

The table 4.1 shows that
- The preservation attitudes of both genders are nearly the same.
- The preservation attitude of the Language and Social Science groups are higher than the other two groups.

Figure 4.1.1 shows that
- There is not much significant Gender difference in P for the Life Science group.
- Females have higher P than males among the Physical Science groups.
- Males have higher P than females in the Language group.
- Females in the Social science group have higher P scores than males.
- The Language group is notably distinct from the other Subject Groups, demonstrating the highest

Preservation levels. In contrast with other Subject Groups, males in the Language Group have higher Preservation than females.

P: Comparisons (Gender and Subject group wise comparisons of Preservation with inferential statistics)

The data was analyzed to see whether the observed differences of Preservation (P) scores are significant as per gender and subject groups by using ANOVA technique.
The required null hypotheses were:
H_{oGP}: There is no significant Gender wise difference in Preservation.
H_{oSP}: There is no significant Subject group wise difference in Preservation

Table 4.2: ANOVA

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	60.147[a]	7	8.592	1.242	.277
Intercept	60390.692	1	60390.692	8731.905	.000
GENDER	3.037	1	3.037	.439	.508
SUBJECT	46.347	3	15.449	2.234	.083
GENDER * SUBJECT	15.025	3	5.008	.724	.538
Error	5007.253	724	6.916		
Total	81388.551	732			
Corrected Total	5067.400	731			

a. R Squared = .011 (Adjusted R Squared = .002)

Observation:
- The difference in P between Genders is not significant. Therefore H_{oGP} is to be accepted.
- The difference in P between Subject groups is not significant. Therefore H_{oSP} is to be accepted.
- There is no interaction effect between Gender and Subject group as per P.

Constituent Scales of Preservation (p)

Preservation consisted of different scales. These were examined on a gender wise and subject wise basis.

P : Gender wise comparisons of constituent scales

The mean scores of the constituent scales of Preservation were compared Gender wise. As the whole sample is the combined group of males and females, the combined means is the mean of the whole sample.

Table -4.3: Gender wise means for Preservation of constituent scales

Name of the scale	Combined Mean	Females Mean	Males Mean
Scale 1	11.96	11.95	11.97
Scale 2	7.73	7.79	7.64
Scale 3	9.49	9.40	9.62
Scale 4	9.23	9.48	8.87
Scale 5	10.97	11.29	10.51
Scale 6	9.34	9.34	9.34
Scale 7	12.76	12.60	12.98

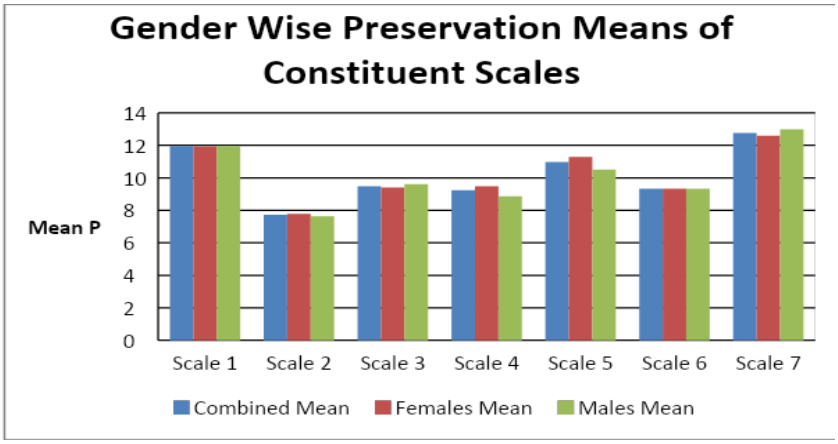


Figure - 4.1.2: Gender wise Preservation means of constituent scales

Observation:

• The first column of Table 4.3 and Fig 4.1.2, show that the main contributors of Preservation are scale 1, i.e. Enjoyment of Nature, and scale 12, i.e. Support for Population Growth Policies. However, Scale 2, i.e. Support for Interventionist Conservation Policies has the least influence on Preservation.

• The second and third columns of Table 4.3 and Fig 4.1.2 show that gender differences for all the contributory scales of P are minimal. Although certain scales such as Scale 4 (Environmental Threat) and scale 5 (Personal Conservation behavior), exhibit notable differences between males and females. In contrast, other scales like scale 1 (Enjoyment in Nature) and scale 6 (Eco-centric Concern), show no significant gender differences. These findings suggest that certain aspects of preservation may be influenced by gender, while others remain consistent across both genders.

COMMENT:

• The above incisive look at Preservation shows that the participants of both genders enjoy the beauty and pleasures of nature and are aware of the detrimental effects of overpopulation on the environment. But they are not ready to take any initiatives to maintain environmental well being.

• Females are more aware about environmental threats and are more proactive in personal conservation behavior compared to males.

P: Subject group wise Comparison of constituent scales:

The mean scores of the constituent scales of Preservation were compared Subject group wise.

Table -4.4: Subject group wise means for Preservation

NAME OF SCALE	LANGUAGE MEAN	LIFE SC. MEAN	PHYSC. MEAN	SOCIAL SC. MEAN
Scale 1	12.28	11.49	11.72	12.00
Scale 2	7.56	7.20	7.54	8.15
Scale 3	9.86	8.72	8.94	9.81
Scale 4	9.45	8.52	8.74	9.60
Scale 5	11.84	10.46	10.18	10.95
Scale 6	9.28	9.11	9.87	9.13
Scale7	12.97	13.20	12.58	12.56

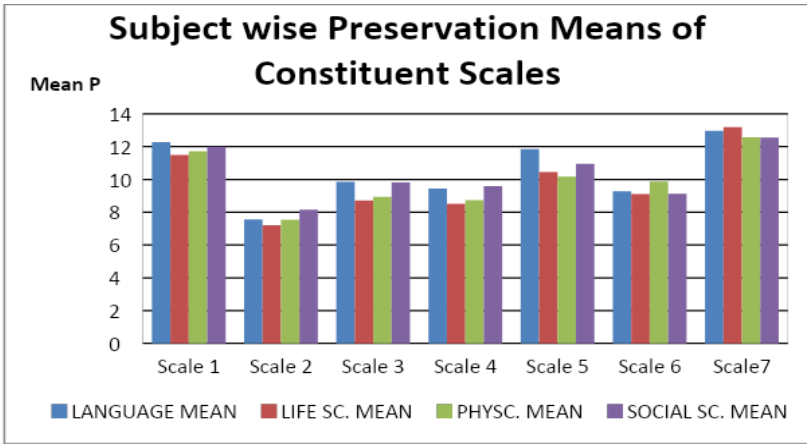


Figure - 4.1.3: Subject wise Preservation means of constituent scales

Observation:

The Table 4.4 and 4.1.3 figure depicts that,

- The mean scores of all four Subject groups are highest for scale 1 that is Enjoyment of Nature and scale 12 that is Support for Population control. Thus P is highlighted among all the Subject Groups by these two attributes.
- The mean Preservation score of the Social Science group and Language group (Humanities Groups) are nearly the same and higher than that of Life Science group and Physical Science group (Science Groups) indicating a greater awareness in various preservation behaviours and attitudes.
- For Scale 1, the Language group has the highest mean score (12.28) implying that this group gives the highest importance to Enjoyment of Nature. The intensity of the attribute is followed closely by the other three groups.
- For scale 2, the Social Science group means scores are higher (8.15) than the other three groups showing that they place their beliefs in support of interventionist policies for conservation. In fact, comparison for scale 3 shows that the Social Science group believes in Environmental Activism more than the other two groups.
- The Social Science group also has the highest mean score for scale 4, (9.60) that is, Environmental Threat; this means that they are the most aware of the threat to the environmental sustenance.
- The mean score for scale 5 is the highest for the Language group (11.84) showing that they are the most particular about Personal Conservation Behaviour.
- Life Science students have lower mean scores in several scales, particularly scales 2, 3 and 4, suggesting less engagement compared to other subject groups.
- Physical science group shows the highest mean score in scale 6 (9.87), indicating a particular strength in this area.

COMMENT:

These variations highlight the influence of subject specialization on students' engagement with different aspects of preservation, suggesting that educational focus can impact attitudes and behaviours related to environmental and personal conservation efforts.

Significance Testing for Gender Wise and Subject Group wise Comparisons of constituent scales:

For more exactitude, gender wise and subject wise differences of Preservation scales have been subjected to significance testing by conducting the ANOVA technique.

Preservation:

The scales contributing to P are 1, 2, 3, 4, 5, 6 and 7

Table: 4.5: Comparisons of P Scales:

N					
GENDER		**SUBJECT**			
FEMALE	**MALE**	**LA**	**LS**	**PS**	**SS**
429	303	213	83	173	263

Key: LA= Language, LS= Life Science, PS= Physical Science, SS= Social Science

The Preservation scale of the participants were compared by doing ANOVA

Table- 4.6: Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	Df	Mean Square	F	Sig.
GENDER	Scale1	15.942	1	15.942	.858	.355
	Scale2	44.686	1	44.686	1.710	.191
	Scale 3	1.644	1	1.644	.060	.807
	Scale 4	34.058	1	34.058	1.301	.254
	Scale 5	113.421	1	113.421	4.678	**.031**
	Scale 6	3.492	1	3.492	.124	.725
	Scale 7	14.646	1	14.646	.709	.400
SUBJECT GROUP	Scale1	37.418	3	12.473	.671	.570
	Scale2	116.594	3	38.865	1.487	.217
	Scale 3	165.610	3	55.203	2.016	.110
	Scale 4	122.595	3	40.865	1.561	.197
	Scale 5	306.948	3	102.316	4.220	**.006**
	Scale 6	53.920	3	17.973	.638	.590
	Scale 7	50.968	3	16.989	.822	.482

GENDER * SUBJECT GROUP	Scale1	84.785	3	28.262	1.521	.208
	Scale2	163.589	3	54.530	2.087	.101
	Scale 3	28.331	3	9.444	.345	.793
	Scale 4	54.808	3	18.269	.698	.553
	Scale 5	22.297	3	7.432	.307	.821
	Scale 6	45.815	3	15.272	.542	.653
	Scale 7	67.745	3	22.582	1.093	.351

Observation:

The table 4.6 shows that,

- The Gender differences in scales 1,2,3,4, 6, and 7 are not significant. Therefore, H_{01G}, H_{02G}, H_{03G}, H_{04G}, H_{06G} and H_{07G} are accepted.
- There is a significant Gender-wise difference at 5 % ($p<0.05$) significance level in scale 5 (personal conservation behavior). Therefore, H_{05S} is to be rejected at 5% level. Females scored higher than males on this scale, indicating that gender influences this particular aspect of preservation.
- The Subject Group wise differences in scales 1, 2, 3, 4, 6, and 7 are not significant. Therefore, H_{01S}, H_{02S}, H_{03S}, H_{04S} H_{06S} and H_{07S} are accepted. This suggests that subject specialization does not significantly impact these scales.
- There is a Significant Subject Group- wise difference in scale 5 (personal conservation behavior) at the 5 % significance level ($p< 0.05$). Therefore, H_{05S} is to be rejected at 5% level.
- The results reveal that there are no statistically significant interaction effects between gender and subject group across all seven scales ($p>0.05$). This indicates that the combined influence of gender and subject specialization does not have a significant impact on any of the preservation scales.

There is a difference between subjects in Scale 8. Therefore for scale 8 Post Hoc tests are required.

Post Hoc Test

Table- 4.7: Multiple Comparisons

	(I) SUBJECT GROUP	(J) SUBJECT GROUP	Mean Difference (I-J)	Std. Error	Sig.
Tukey HSD	LA	LS	1.38	.638	.135
		PS	1.65*	.504	**.006**
		SS	.89	.454	.209
	LS	LA	-1.38	.638	.135
		PS	.27	.658	.976
		SS	-.49	.621	.857
	PS	LA	-1.65*	.504	**.006**
		LS	-.27	.658	.976
		SS	-.77	.482	.387
	SS	LA	-.89	.454	.209
		LS	.49	.621	.857
		PS	.77	.482	.387

Key: LA=Language, LS= Life Science. PS= Physical Science, SS=Social Science.

Observation:

- The Post- hoc test (Tukey HSD) reveals that the personal conservation behavior of the Language group is significantly higher (5% level) than the Physical science group.

Summary of comparisons of Preservation (constituent scales):

The following is a summary of the Gender wise and Subject Group wise comparisons of P scales.

Table - 4.8: Summary of comparisons of P scales.

	P1	P2	P3	P4	P5	P6	P7	P
Gender	NS	NS	NS	NS	*	NS	NS	NS
Subject	NS	NS	NS	NS	*	NS	NS	NS

Key: ** = 1% level of significant, *= 5% level of significant, NS= Not significant.

Discussion

The study shows that despite participants' high level of education they display a low average preservation attitude, highlighting a gap between ecological knowledge and actual conservation behaviours. Education plays a significant role in fostering sustainability and pro-environmental behaviours. (Arcury, 1990). Patel (1987) found that experienced teachers tend to exhibit greater ecological responsibility. Teaching is often associated with idealistic views on future generations' welfare, which makes this paradox concerning.

Gender-wise Comparisons

The findings show no significant gender differences across most P scales, except for Scale 5 (Personal Conservation Behavior), where females scored higher. This is consistent with previous research showing that women tend to exhibit greater environmental concern and pro-environmental actions (Zelezny et al., 2000). Gilligan's research (1982, 1994, 1996) characterizes women as more caring and nurturing, traits that may drive their environmental engagement. Women often adopt reuse, recycle, and reduce practices more diligently, playing a key role in household conservation.

However, the absence of gender differences in scales like Enjoyment of Nature and Eco-centric Concern suggests that both genders share similar environmental values (Diamantopoulos et al., 2003). Some studies counter the notion of female environmental supremacy, indicating no gender impact on attitudes (Shaila, 2003; Bhuveneswaralakshmi & Shailaja, 2007). Others suggest males engage more in environmental activism and policy support (Tindall, Davies & Mauboules, 2003), though this was not reflected in the present study. Cultural and contextual differences may influence these variations.

Subject-wise Comparisons

The study found minimal differences between subject groups, except in Scale 5 (Personal Conservation Behavior), where Language students scored higher than Physical Science students. This suggests that humanities students may be more engaged in personal conservation efforts due to the empathetic and imaginative nature of their discipline (Cotton & Alcock, 2013). Previous studies have also indicated that humanities student's exhibit greater environmental concern (Kagawa, 2007).

Surprisingly, other scales showed no significant differences, contrary to research suggesting that science students are more Eco-conscious (Ewert & Baker, 2001). Despite studying environmental topics, Life Science students did not demonstrate stronger environmental attitudes, indicating they may not have internalized the knowledge or develop a deeper connection with nature. Similarly, Social Science students, who are expected to have a better understanding of human-nature interactions, did not show notable enthusiasm for environmental issues. This raises concerns about the effectiveness of education in promoting environmentally conscious behavior.

These findings underscore the limitations of an exam-driven education system that emphasizes degrees and job prospects over profound involvement with subjects. This pragmatic approach may hinder students from forming an emotional attachment with their studies, leading to apathy towards environmental issues. The preference for textbook learning over experiential understanding might explain the lack of subject-based variations in environmental attitudes.

In contrary to this study, researchers argue that subject background plays a crucial role for shaping environmental awareness. Vipinder & Jaswinder (2005), and Ozsoy (2012) found that science teachers exhibited higher environmental awareness than their counterparts in social sciences and languages. Gupta (1986) and Karpiack & Bariletal (2008) observed that biology teachers demonstrated greater environmental concern. However, this trend was not evident among the Life Science teachers in the present study.

This study's findings align with Amirand et al. (2011), who also found no significant advantage among science teachers regarding environmental awareness. Likewise, Shaila (2003) reported no notable difference in environmental attitudes between science and arts teachers in secondary schools.

Conclusion

This study exposes a critical paradox: while education is expected to foster environmental responsibility, highly educated student teachers exhibited low preservation attitudes. This gap between environmental knowledge and real-world action highlights the limitations of traditional education in fostering sustainable behaviours. Despite their academic exposure, participants lacked the motivationand engagement needed to translate knowledge into meaningful conservation efforts.

Gender differences align with existing literature—female student teachers exhibited higher environmental awareness and personal conservation behavior, likely influenced by social and psychological factors related to nurturance and responsibility. However, the finding that Language students demonstrated greater conservation efforts than Life Science or Social Science students challenges the assumption that scientific training inherently fosters stronger environmental attitudes. The lack of significant higher ecological concern among science teachers raises serious questions about the effectiveness of their education in cultivating environmental responsibility. This suggests that knowledge alone is insufficient,affective and experiential components must be integrated to bridge this gap.

To bridge this gap educational institutions must re-imagine environmental education as a holistic, interdisciplinary endeavour. Strengthening sustainability within curricula, embedding environmental ethics, and emphasizing hands-on, experiential learning are essential strategies. Additionally, integrating critical thinkingand problem solving exercises can foster proactive conservation attitudes. Community-based projectsand institutional collaborationwould provide real life exposure, reinforcing the significance of sustainability beyond the classroom.

Assessment methods should move exam-centric approaches to prioritize reflective learning and problem-solving skills. Leveraging technology and media can foster engagement, making environmental education more interactive. Long-term institutional programsshould emphasizesustainability, fostering a lasting culture of environmental consciousness.

By adopting these reforms, future educators can be equipped to translate knowledge into action cultivating a generation of environmentally responsible and sensitive teachers and citizens.

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