Naturalistic Intelligence Among Undergraduate Students: A Study on Environmental Sensitivity in Higher Education

Darakhshan Sadaf, Prof. Adam Paul Patteti

Manuu Satellite Campus, Cte – Darbhanga

DOI: https://doi.org/10.51244/IJRSI.2025.120700109

Received: 22 July 2025; Accepted: 24 July 2025; Published: 06 August 2025

ABSTRACT

In the wake of intensifying global environmental crises such as climate change, ecological degradation, and biodiversity loss the cultivation of environmental sensitivity among youth has become a critical imperative for higher education. Naturalistic Intelligence, conceptualized by Gardner (1999) as the ability to recognize and classify elements of the natural world while demonstrating ecological awareness, offers a vital lens through which educational institutions can foster sustainability-oriented thinking. This study examines the levels and dimensions of Naturalistic Intelligence among undergraduate students in Bihar, India, highlighting its role in shaping environmentally responsible attitudes. The findings reveal that a considerable proportion of students exhibit moderate to high levels of naturalistic awareness, particularly in the domains of Sensory Awareness and Environmental Stewardship, indicating an emerging, albeit surface-level, ecological consciousness. The relatively low engagement in Cultural-Historical Connections and Personal Reflection suggests a disconnect from deeper environmental meaning-making. A significant gender-based variation was observed in favor of male students, while no notable differences emerged across academic stream or residential background. By advancing Naturalistic Intelligence within educational frameworks, universities can play a transformative role in fostering planetary stewardship among future generations.

Keywords: Naturalistic Intelligence, Environmental Sensitivity, Higher Education, Sustainability Education.

INTRODUCTION

“The naturalist intelligence enables human beings to recognize, categorize, and draw upon certain features of the environment.” — Howard Gardner

In recent decades, the planet has witnessed an alarming escalation in ecological crises ranging from climate change and habitat destruction to declining biodiversity and pollution. These challenges, driven largely by human actions, demand not only scientific and policy-level interventions but also profound educational reform that fosters ecological consciousness (UNESCO, 2021). Within this context, the role of higher education institutions becomes pivotal, especially in equipping students with the values, competencies, and intelligences necessary for sustainable living (Sterling, 2010).

Naturalistic Intelligence (NI), as proposed by Howard Gardner in his Theory of Multiple Intelligences (1999), refers to the cognitive and emotional capacity to recognize patterns in nature, exhibit sensitivity to flora and fauna, and classify living and non-living environmental elements. While traditionally overlooked in mainstream education that prioritizes linguistic and logical-mathematical intelligences, Naturalistic Intelligence is uniquely positioned to cultivate a deeper, personal connection with the natural world (Gardner, 1999; Armstrong, 2009).

Emerging research supports that students with high levels of Naturalistic Intelligence tend to demonstrate greater environmental concern, pro-environmental behaviors, and an enhanced capacity for systems thinking (Kellert, 2012; Louv, 2005). However, this form of intelligence is rarely assessed or nurtured explicitly within undergraduate curricula, particularly in developing regions. With global efforts increasingly emphasizing

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue VII July 2025

Education for Sustainable Development (ESD), it becomes critical to explore how higher education can serve as a catalyst for awakening Naturalistic Intelligence among youth (UNESCO, 2017).

This study, situated in the Indian context, investigates the levels and dimensions of Naturalistic Intelligence among undergraduate students and analyzes its variation across demographic variables such as gender, academic stream, and place of residence. It aims to reveal how naturalistic tendencies manifest in students and what implications these hold for reimagining higher education as a space for ecological sensitivity and planetary well-being.

Need and Significance of the Study

As the world grapples with accelerating environmental degradation, education systems must evolve to meet the challenges of the Anthropocene. The climate crisis, resource depletion, and pollution not only threaten ecosystems but also social stability and human health. India, as a rapidly developing nation, faces mounting environmental pressures including urban pollution, unsustainable industrialization, deforestation, and biodiversity loss (MoEFCC, 2023). These concerns require more than technical solutions they necessitate the nurturing of environmentally conscious mindsets, particularly among the country's youth.

Naturalistic Intelligence, conceptualized by Gardner (1999), offers a transformative potential for fostering such ecological awareness. By enabling individuals to perceive, classify, and emotionally connect with elements of the natural world, Naturalistic Intelligence lays the foundation for empathy toward the environment and responsible decision-making (Armstrong, 2009). Yet, despite its importance, Naturalistic Intelligence remains underrepresented in traditional pedagogical approaches, which often neglect students' experiential learning with nature.

Higher education plays a critical role in this transformation. As future educators, professionals, and policy influencers, undergraduate students must be equipped not only with academic knowledge but also with environmental values and competencies. Integrating Naturalistic Intelligence into higher education curricula can enhance students' ability to engage in sustainable practices, participate in environmental problem-solving, and adopt lifelong ecological perspectives (Sterling, 2010; Thomas, 2009).

The United Nations' Sustainable Development Goal 4.7 emphasizes the need for education that promotes sustainable development, including knowledge and appreciation of the natural environment (UN, 2015). Therefore, understanding the current state of Naturalistic Intelligence among undergraduates is vital for designing nature-integrated, value-based educational interventions. This study thus holds significance in highlighting the need for a pedagogical shift that not only acknowledges but actively fosters environmental sensitivity in higher education institutions.

Review of Related Literature

As global ecological crises intensify, the relevance of Naturalistic Intelligence in higher education has grown, with UNESCO (2017, 2021) and Sterling (2010) emphasizing its role in sustainability education. Research indicates that socio-demographic factors, particularly gender, influence NI Özdemir and Gümüş (2006) found that female students often demonstrate deeper emotional connections to nature, while Wilson's (1993) biophilia hypothesis affirms an innate human affinity for the natural world. Experiential approaches, such as outdoor learning and fieldwork, have been found to strengthen NI more effectively than classroom instruction (Kellert, 2012; Louv, 2005), with Louv further warning against "nature-deficit disorder" in urban, digitally dependent youth. Urban-rural differences also matter, as rural students typically show higher nature-connectedness due to frequent natural exposure, though structured environmental programs can help urban students bridge this gap (Rickinson et al., 2004). Cultural traditions, especially indigenous knowledge systems, embed Naturalistic Intelligence in sustainable practices and values (Armstrong, 2009), offering models for integrating traditional ecological knowledge (TEK) into mainstream curricula. Institutions of higher learning are thus pivotal in cultivating Naturalistic Intelligence not only through academic content but also through campus sustainability culture, interdisciplinary teaching, and student engagement (Thomas, 2009; Filho et al.,

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue VII July 2025

2018). Despite existing literature, there is a lack of empirical research examining the multidimensional aspects of Naturalistic Intelligence among undergraduates across diverse contexts.

Objectives

1. To assess the level of Naturalistic Intelligence among undergraduate students.
2. To examine the dimensions of Naturalistic Intelligence among undergraduate students.
3. To analyze significant differences in Naturalistic Intelligence with respect to demographic variables (gender, subject of study, and place of residence).

Hypotheses

1. There is no significant difference in the overall level of Naturalistic Intelligence among undergraduate students.
2. There is no significant variation among the dimensions of Naturalistic Intelligence.
3. There is no significant difference in Naturalistic Intelligence across gender, subject of study, and place of residence.

METHODOLOGY

This study adopts an Explanatory Sequential Design to explore Naturalistic Intelligence among undergraduate students by combining both quantitative and qualitative methods. The participants include 100 purposively selected undergraduates from state and central universities in Bihar, all recognized by the University Grants Commission (UGC, 2022). The purposive sampling ensures diversity in academic and socio-geographic backgrounds. Naturalistic Intelligence Scale was used to measure the level of Naturalistic Intelligence.

Data Analysis and Results

Table 1 Distribution of Naturalistic Intelligence (N = 100)

Level	Frequency	Percentage	χ^2 Value	Significance
Low	32	32%	8.70	Significant ($p < 0.05$)
Average	46	46%		
High	22	22%		

Table 1 presents the distribution of Naturalistic Intelligence among 100 university students. The results indicate that **32%** of the students fall into the *low* category, **46%** in the *average* range, and only **22%** demonstrate a *high* level of Naturalistic Intelligence. A chi-square test was applied to examine the significance of this distribution, yielding a value of $\chi^2 = 8.70$ (df = 2), which is statistically significant at the *0.05 level*. This suggests that the variation in students' Naturalistic Intelligence levels is not random but meaningful. The data reflects a concentration in the low-to-average range, pointing to a potential lack of strong connection with nature among students.

Table 2 Rank-wise Distribution of Naturalistic Intelligence Dimensions

S. No	Dimension	Percentage	Rank
1	Sensory Awareness	61%	I
2	Environmental Stewardship	59%	II

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue VII July 2025

3	Outdoor Skills	53%	III
4	Ecological Awareness	41%	IV
5	Cultural & Historical Connections	38%	V
6	Personal Reflection & Growth	29%	VI

Table – 2, presents the rank-wise distribution of dimensions of naturalistic intelligence among 100 undergraduate students, highlighting the percentage of students excelling in each dimension along with their respective ranks. Sensory Awareness emerges as the highest-ranking dimension, with 61% of students demonstrating a strong ability to perceive and respond to sensory stimuli in the natural world, securing the first rank. Environmental Stewardship, reflecting students' sense of responsibility toward environmental protection, follows with 59%, taking the second rank. Outdoor Skills, at 53%, ranks third, indicating students' practical abilities in interacting with natural environments. Ecological Awareness, with 41%, ranks fourth, reflecting an understanding of ecological processes and the interrelationship between organisms and their environments. Cultural and Historical Connections, with 38%, ranks fifth, showing a moderate level of engagement in understanding the cultural and historical significance of natural environments. Lastly, Personal Reflection and Growth, at 29%, ranks sixth, indicating the lowest engagement in self-reflection related to nature and personal growth through natural experiences. The study suggests that students demonstrate the highest levels of engagement in sensory awareness and environmental stewardship, while personal reflection and growth, as well as cultural and historical connections, appear to be less emphasized.

Table 3 Comparison of Naturalistic Intelligence by Demographic Variables

Variable	Category	N	Mean	SD	*t*-value	Significance
Gender	Male	50	26.80	6.13	6.54	Significant at 0.01
	Female	50	17.16	7.01		
Subject	Science	50	19.23	5.42	1.86	NS
	Arts	50	16.85	5.96		
Residence	Rural	50	20.14	6.83	1.79	NS
	Urban	50	22.94	7.13		

*Significant at 0.01 level, NS Not significant at 0.05 level

Table – 3, Compares the naturalistic intelligence of undergraduate students across three variables i.e gender, subject of study, and place of residence. For gender, the mean naturalistic intelligence score for male students is significantly higher than that of female students with a t-value of 6.54, which is significant at the 0.01 level. In terms of subject of study, the mean scores for science students and art students are relatively close, with a t-value of 1.86, which is not statistically significant (NS). This indicates no significant difference in naturalistic intelligence between science and art students. Regarding place of residence, rural students and urban students also show no significant difference in their naturalistic intelligence. The results indicate that gender has a significant effect on naturalistic intelligence, while subject of study and place of residence do not appear to have a notable impact.

RESULTS

1. The study found that lower and average level of naturalistic intelligence among undergraduate students.
2. Sensory Awareness (61%) and Environmental Stewardship (59%) ranked highest in naturalistic intelligence, while Personal Reflection and Growth (29%) and Cultural and Historical Connections (38%) ranked lowest.
3. A significant difference was found between male and female students in naturalistic intelligence.
4. It was observed that there was no significant difference found between science and art students.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue VII July 2025

5. Further it was noticed No significant difference was found between rural and urban students.

CONCLUSION

This study underscores the critical role of Naturalistic Intelligence (NI) in fostering environmental sensitivity among undergraduate students, affirming its growing significance in the context of higher education. While students exhibited strong traits in Sensory Awareness and Environmental Stewardship, the lower engagement in Personal Reflection and Cultural-Historical Connections highlights a fragmented ecological consciousness that requires educational attention. Embedding Naturalistic Intelligence into higher education not only deepens students' connection with nature but also nurtures the values, attitudes, and behaviors essential for planetary stewardship and sustainable citizenship. As environmental crises intensify, universities must leverage Naturalistic Intelligence to cultivate a generation that is not only environmentally aware but also ethically responsible and action-oriented.

REFERENCE

1. Armstrong, T. (2009). Multiple intelligences in the classroom (3rd ed.). ASCD.
2. Filho, W. L., Shiel, C., & Paço, A. (2018). Implementing sustainable development in higher education institutions: best practices, challenges and future perspectives. International Journal of Sustainability in Higher Education, 19(3), 473–492.
3. Gardner, H. (1999). Intelligence Reframed: Multiple Intelligences for the 21st Century. Basic Books.
4. Kellert, S. R. (2012). Birthright: People and Nature in the Modern World. Yale University Press.
5. Louv, R. (2005). Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder. Algonquin Books.
6. Ministry of Environment, Forest and Climate Change (MoEFCC). (2023). Annual Report 2022–2023. Government of India.
7. MoEFCC. (2023). Annual Report 2022–2023. Ministry of Environment, Forest and Climate Change, Government of India.
8. Özdemir, G., & Gümüş, S. (2006). The effects of gender and environment-based activities on students' environmental attitudes. Educational Research Quarterly, 30(1), 37–50.
9. Özdemir, G., & Gümüş, S. (2006). The relationship between nature relatedness and emotional intelligence: A study on university students. Educational Sciences: Theory and Practice, 6(2), 462–470.
10. Rickinson, M., Dillon, J., Teamey, K., Morris, M., Choi, M. Y., Sanders, D., & Benefield, P. (2004). A Review of Research on Outdoor Learning. National Foundation for Educational Research.
11. Sterling, S. (2010). Transformative Learning and Sustainability: Sketching the Conceptual Ground. Learning and Teaching in Higher Education, 5(11), 17–33.
12. Sterling, S. (2010). Transformative Learning and Sustainability: Sketching the Conceptual Ground. Learning and Teaching in Higher Education, 5(11), 17–33.
13. Thomas, I. (2009). Critical Thinking, Transformative Learning, Sustainable Education, and Problem-Based Learning in Universities. Journal of Transformative Education, 7(3), 245–264.
14. UNESCO. (2017). Education for Sustainable Development Goals: Learning Objectives. Paris: United Nations Educational, Scientific and Cultural Organization.
15. UNESCO. (2021). Education for sustainable development: A roadmap. United Nations Educational, Scientific and Cultural Organization.
16. UNESCO. (2021). Futures of Education: A New Social Contract. UNESCO Publishing.
17. United Nations. (2015). Transforming Our World: The 2030 Agenda for Sustainable Development. United Nations.
18. Wilson, E. O. (1993). Biophilia and the conservation ethic. In S. R. Kellert & E. O. Wilson (Eds.), The biophilia hypothesis (pp. 31–41). Island Press.