

Between green imagination and ecological awareness: environmental identity and teachers' beliefs in pre-service education

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Abstract: This study examines environmental identity among pre-service teachers, focusing on the relationship between affective connection with nature, attitudes toward environmental protection, and the representational frameworks through which nature is imagined. Situated within the fields of educational research and environmental education, the study addresses a relevant gap by approaching environmental identity not only as a measurable disposition, but also as a meaning-making process shaped during initial teacher education. A quantitative descriptive–correlational design was integrated with a qualitative free-association task. Data were collected from 83 pre-service teachers enrolled in a teacher education program using the Revised Environmental Identity Scale (EID-R) and an open-ended prompt inviting participants to report immediate associations with the concept of nature. Quantitative analyses included descriptive statistics, non-parametric tests, correlations, and exploratory factor analysis, while qualitative responses were examined through inductive thematic content analysis. Results indicate moderately high levels of both connection with nature and attitudes toward environmental protection, with no statistically significant differences across school contexts. However, qualitative findings show that these orientations are predominantly supported by aesthetic and naturalistic representations of nature, with limited reference to human agency or socio-ecological interdependence. Overall, the study highlights the value of combining quantitative and qualitative approaches to better understand the structure and development of environmental identity in pre-service teacher education.

Keywords: environmental identity; environmental education; pre-service teacher education



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1. Introduction

Education is never a neutral act. Every teacher teaches not only what they know, but above all what they believe. Beliefs, values, and implicit representations permeate teaching practices, influencing how educators interpret knowledge, relate to students, and make sense of the world they inhabit. These convictions often operate beneath conscious awareness, guiding daily pedagogical decisions without being explicitly articulated or questioned. Within this perspective, teachers' beliefs have long been recognized as a central component of professional identity. Research has consistently shown that beliefs function as cognitive and emotional filters through which teachers interpret curricular demands, educational reforms, and classroom experiences (Pa-

jares, 1992; Borg, 2003; Beijgaard et al., 2004). They shape instructional choices, pedagogical priorities, and the meanings attributed to learning itself. In the field of environmental education, this influence becomes even more pronounced, as teaching about sustainability inherently involves ethical positioning, value judgments, and representations of the human–nature relationship (Cotton, 2006). Environmental education is not simply concerned with transmitting ecological knowledge or promoting environmentally responsible behaviors. Rather, it reflects deeper assumptions about nature: whether it is perceived as a resource to be managed, a space of aesthetic contemplation, or a living system to which humans belong. Teachers' personal views of nature therefore play a decisive role in shaping how environmental themes are addressed in educational settings and what kind of relationship students are invited to develop with the natural world. Over the past decades, scholars have emphasized that teachers who experience a strong sense of connection with nature are more likely to adopt participatory, experiential, and reflective pedagogies (Mayer et al., 2009; Nisbet et al., 2011). Such approaches encourage learners to link abstract environmental concepts to lived experience, local contexts, and everyday practices. Conversely, when environmental education is grounded primarily in technical or normative frameworks, it risks remaining superficial, disconnected from students' emotional engagement and sense of responsibility (Wals, 2015; Bonnett, 2022).

At the intersection of these perspectives lies the concept of environmental identity (Clayton, 2003; 2021), understood as the way individuals perceive themselves in relation to the natural world. Environmental identity integrates affective, cognitive, and ethical dimensions, encompassing feelings of connection with nature, values related to environmental protection, and a sense of belonging within ecological systems. Rather than being a purely psychological construct, environmental identity can be read pedagogically as a disposition that influences how educators interpret sustainability, design learning experiences, and position themselves as moral and educational agents. Spatial and territorial experiences further contribute to the shaping of environmental identity (Sierra-Barón et al., 2023). Growing up or working in rural contexts often entails direct, embodied contact with natural environments and seasonal rhythms, while urban settings may limit everyday interaction with nature, fostering instead symbolic or idealized representations. Peri-urban areas, situated between these two realities, represent hybrid spaces where natural and built environments coexist, often generating ambivalent ecological imaginaries. These territorial dimensions influence not only how nature is experienced, but also how it is imagined and narrated within educational practices. In the Italian context (MIUR, 2018; MIM, 2020; MIM, 2021), the relationship between teachers' beliefs, environmental identity, and educational responsibility is embedded within a rapidly evolving policy framework. National curricular guidelines and recent legislative measures have positioned sustainability and ecological transition as foundational elements of civic and educational responsibility. Within this scenario, initial teacher education emerges as a crucial space for fostering ecological awareness, not merely in terms of competences and knowledge, but as a process of identity formation. Pre-service teachers are called to move from declarative understandings of sustainability toward more embodied, reflective, and ethically grounded forms of engagement. Despite the growing body of research on environmental education and sustainability, relatively few studies have examined how environmental identity manifests among pre-service teachers, particularly in relation to their territorial background and educational beliefs. Even fewer

have attempted to integrate quantitative measures of environmental identity with qualitative insights into how future teachers imagine and represent nature. This gap is particularly relevant in teacher education, where beliefs and identities formed during initial training may shape professional practice for decades. Against this backdrop, the present study aims to explore how pre-service teachers perceive and experience their relationship with nature, focusing on two core dimensions of environmental identity: personal connection with the natural world and attitudes toward environmental protection. By examining these dimensions in relation to school context (urban, peri-urban, rural), the study seeks to understand how territorial experiences may contribute to different ecological sensibilities. Furthermore, by integrating quantitative data with qualitative representations of nature, the research allows for an educational interpretation of environmental identity as a potential resource for cultivating ecologically conscious teaching practices.

In doing so, this study contributes to ongoing debates on sustainability education by highlighting the importance of teachers' inner landscapes-the beliefs, emotions, and representations that silently shape how environmental education is lived, taught, and transmitted.

2. Aim

The aim of this study was to investigate environmental identity among pre-service teachers, focusing on its two core dimensions: personal connection with nature and attitudes toward environmental protection.

Specifically, the study sought to examine how these dimensions coexist and relate to each other within a sample of future teachers in initial training. A secondary objective was to explore whether environmental identity varies according to the school context (urban, peri-urban, rural), understood as a proxy for different territorial experiences of nature. Finally, the findings were interpreted from a pedagogical perspective, in order to reflect on the role of environmental identity as a potential resource for fostering ecologically conscious teaching orientations in teacher education.

3. Materials and Methods

Participants were 83 pre-service teachers enrolled in the TFA Sostegno program at an Italian university. The sample was selected through convenience sampling, as it coincided with the cohort of student teachers attending a university course taught by the researcher during the academic year. No a priori selection criteria were applied beyond participants' status as teachers in initial training, which constitutes the population of interest for the study. Participation was voluntary and anonymous. All respondents were informed about the aims of the research and provided consent in accordance with ethical standards and GDPR regulations. Although the sample was not statistically representative, it is considered methodologically appropriate for an exploratory study focused on understanding environmental identity within pre-service teacher education. Data analysis was conducted in direct relation to the study objectives. First, descriptive statistics were used to examine overall levels of environmental identity and its two dimensions, addressing the primary aim of exploring how connection and protection are expressed among pre-service teachers. Second, Spearman's rank cor-

relations were computed to investigate the relationship between the two dimensions of environmental identity, in line with the objective of examining how personal connection with nature relates to attitudes toward environmental protection. Third, Kruskal–Wallis tests were employed to explore potential differences in environmental identity scores across school contexts (urban, peri-urban, rural), addressing the secondary aim concerning the influence of territorial background. Given the non-normal distribution of the data, non-parametric tests were considered the most appropriate analytical choice. Finally, an exploratory Principal Component Analysis (PCA) was conducted to verify whether the empirical structure of the scale within this sample was consistent with the theoretically expected bifactorial model (connection and protection). This step was intended to support the internal coherence of the instrument in the specific educational context under investigation. Although methodologically simple, this design allows for a coherent and interpretable reading of pre-service teachers' environmental identity, consistent with the exploratory and educational nature of the study. In addition to the standardized scale, a qualitative task based on free word association was included in the questionnaire. Participants were asked to write the first three images or elements that immediately came to mind when thinking about "Nature". Free association techniques are commonly used in educational and psychosocial research to access spontaneous representations, implicit meanings, and pre-reflective imagery related to a given concept. Unlike structured questionnaires, this method allows respondents to express culturally and emotionally salient elements without being constrained by predefined categories, thus providing insight into underlying representations and symbolic frameworks. Responses were analyzed through a thematic content analysis with an inductive approach (Braun & Clarke, 2006). Individual words and expressions were coded, grouped into semantic clusters, and then aggregated into broader thematic categories. The analysis focused on the recurrence of natural elements, the presence or absence of human-related references, and the functional or symbolic meanings attributed to nature. The instrument employed - the Revised Environmental Identity Scale (EID-R), in its Italian validated version by Ariccio and Mosca (2023) - consists of 14 items rated on a 7-point Likert scale. Ten items measure connection with nature, exploring affective and perceptual aspects such as the pleasure of spending time outdoors, the feeling of unity with the natural world, and the sense of well-being derived from contact with green spaces. Four items measure environmental protection, focusing on the ethical and behavioral dimensions of care, responsibility, and ecological awareness. The scale showed high internal reliability ($\alpha = .93$ for Connection; $\alpha = .88$ for Protection), consistent with previous validations (Olivos & Clayton, 2017). Beyond its psychometric reliability, the EID-R is designed to capture both affective and attitudinal dimensions of individuals' relationships with nature, allowing for the joint assessment of emotional connection and orientations toward environmental responsibility.

4. Results

The analysis of the Revised Environmental Identity Scale (Clayton, 2021) explored the levels of personal connection with nature and environmental protection attitude among pre-service teachers. Following the bifactorial structure proposed in the

original validation (Olivos & Clayton, 2017), ten items were aggregated to compute the Connection subscale and four items to compute the Protection subscale.

4.1. Reliability and descriptive statistics

The analysis of the Revised Environmental Identity Scale (Clayton, 2021) explored the levels of personal connection with nature and environmental protection attitude among pre-service teachers. Following the bifactorial structure proposed in the original validation (Olivos & Clayton, 2017), ten items were aggregated to compute the Connection subscale and four items to compute the Protection subscale.

Both subscales displayed strong internal consistency ($\alpha = .93$ for Connection; $\alpha = .88$ for Protection), confirming the scale's reliability in this sample.

Mean scores indicated moderately high levels of environmental identity:

- Connection with nature: $M = 5.29$, $SD = 1.10$
- Environmental protection attitude: $M = 5.31$, $SD = 1.18$ (on a 1–7 Likert scale).

Shapiro–Wilk tests suggested mild departures from normality; therefore, non-parametric analyses were used for between-group comparisons. These patterns, while not strikingly different across contexts, offer a meaningful glimpse into how ecological awareness begins to take root among future teachers.

4.2. Differences by School Context

Scores were compared according to the school context (urban, peri-urban, rural). Kruskal–Wallis tests revealed no statistically significant differences across groups, either for Connection ($H(2) = 3.14$, $p = .208$) or for Protection ($H(2) = 3.29$, $p = .193$). Nevertheless, descriptive trends showed higher mean scores in peri-urban and rural areas compared with urban ones ($M_{\text{conn_periurban}} = 5.65$; $M_{\text{conn_rural}} = 6.00$; $M_{\text{conn_urban}} = 5.19$).

Figure 1. Connection with nature by school context.

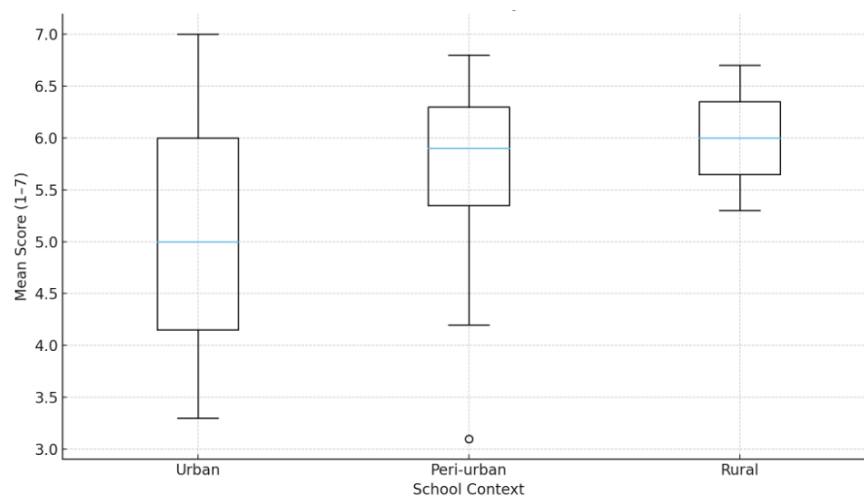
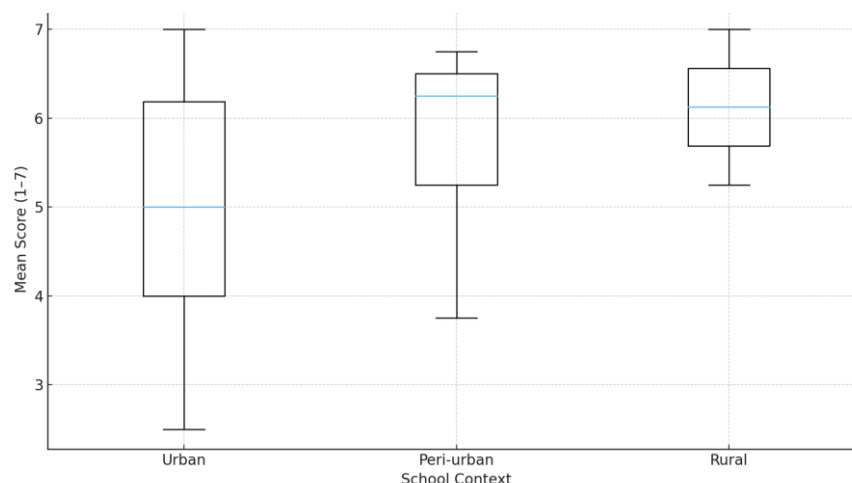


Figure 2. Environmental protection attitude by school context



Spearman correlations between the ordinal context variable (0 = urban; 1 = peri-urban; 2 = rural) and subscale scores were positive but not significant ($\rho \approx .19$, $p \approx .08$). The *Kruskal–Wallis* effect size ($\varepsilon^2 \approx .04$) indicated a small contextual effect.

4.3. Exploratory factor analysis

A two-component Principal Component Analysis (PCA) confirmed a clear functional separation between items related to affective connection and those referring to environmental responsibility, jointly explaining about 52% of total variance. This result supports the two-factor structure underlying the Revised EID Scale (Clayton, 2021).

4.4. *Qualitative analysis*

The qualitative analysis of the free association task revealed a highly consistent pattern across responses. Participants' representations of nature were predominantly organized around natural elements and landscapes, with a strong prevalence of vegetal and environmental imagery. Three main thematic clusters emerged. The first and most recurrent cluster consisted of vegetal and landscape elements, such as trees, leaves, flowers, grass, forests, fields, mountains, rivers, and practices. These terms often appeared in combination with sky-related or atmospheric elements (sun, clouds, wind), suggesting an idealized and visually rich conception of nature. A second cluster referred to water and open environments, including sea, beach, lakes, rivers, and oceans. These elements were frequently associated with light and space (sky, sun, stars), reinforcing a sense of vastness, purity, and openness. A third, less frequent cluster included animals and sensory elements, such as birds, butterflies, animals, scents, and silence. These associations evoked an affective and experiential dimension of nature, often linked to feelings of calm and well-being. Notably, references to human presence, social practices, responsibility, or interaction with nature were almost entirely absent. Nature was represented as an external and autonomous entity, observed rather than inhabited. Only a very limited number of responses introduced abstract concepts such as freedom, family, or pollution, indicating marginal awareness of social or ethical dimensions.

5. Discussion

The present study investigated environmental identity among pre-service teachers by combining quantitative measures with a qualitative free-association task, allowing for a complementary reading of declared attitudes and spontaneous representations. At the quantitative level, participants reported moderately high scores on both dimensions of the Revised Environmental Identity Scale-Connection with nature and Environmental protection-supported by strong internal consistency indices. These findings indicate that, within this sample, environmental identity is generally endorsed as a positive personal orientation, consistent with previous evidence showing that environmental identity tends to function as a relatively stable dispositional construct linked to pro-environmental attitudes (Clayton & Mannetti, 2020). The two subdimensions appeared aligned rather than oppositional, suggesting that affective closeness to nature and endorsement of protective attitudes co-occur within the same individuals. However, group comparisons across school contexts (urban, peri-urban, rural) did not yield statistically significant differences, and effect sizes were small. Although descriptive trends pointed toward higher scores among peri-urban and rural participants, the limited size and imbalance of subgroups-particularly the very small rural group-substantially constrain inferential strength. As such, the present data do not support robust conclusions regarding the role of territorial context in differentiating environmental identity within this cohort, and observed trends should be interpreted as exploratory rather than confirmatory. The qualitative findings complicate this picture by revealing a narrower semantic structure underlying participants' spontaneous representation of nature. Free associations were highly homogeneous and concentrated on a limited set of naturalistic elements, predominantly vegetal and landscape-related (e.g., trees, leaves, flowers, forests, sea, sky, sun), with occasional references to animals and sensory features. These elements form a coherent but

largely descriptive and aesthetic semantic field, in which nature is represented as a visually salient and emotionally positive environment. References to human presence, social practices, ecological interdependence, or responsibility were rare or absent, and abstract ecological concepts were almost entirely missing. This pattern suggests that, when not prompted by evaluative items, participants tend to conceptualize nature primarily as an external and contemplative entity rather than as a relational system involving human agency. The discrepancy between relatively high quantitative scores on environmental protection and the absence of responsibility-related language in free associations highlights a potential gap between declarative endorsement and spontaneous meaning-making. One interpretation is that the scale captures a generalized attitudinal disposition, whereas the associative task accesses pre-reflective and culturally shared imagery, which in this sample remains predominantly naturalistic and non-systemic. An alternative explanation concerns methodological constraints: the brevity of the task and the use of single-word responses may privilege concrete imagery over abstract or ethical concepts. Nonetheless, taken together, the results suggest that environmental identity among these pre-service teachers is affectively grounded and positively oriented, yet semantically anchored to idealized representations of nature that do not readily integrate humans as ecological actors. This divergence does not undermine the validity of the quantitative findings but rather delineates the specific form that environmental identity takes within this sample, underscoring the importance of combining self-report measures with qualitative approaches when examining complex identity constructs.

6. Limitations and future directions

Despite the coherence between quantitative and qualitative findings, several limitations should be acknowledged when interpreting the results of this study. First, the sample was obtained through convenience sampling and was limited in size, which constrains the generalizability of the findings. Although appropriate for an exploratory investigation within initial teacher education, the sample does not allow for robust inferential claims, particularly with regard to subgroup comparisons. The uneven distribution across school contexts, and especially the very small number of participants associated with rural settings, likely reduced statistical power and may account for the absence of significant contextual effects.

Second, the study relied exclusively on self-report measures. While the Revised Environmental Identity Scale demonstrated strong internal reliability and is well established in the literature, self-reported attitudes may not accurately reflect enacted behaviors or pedagogical practices. As such, the observed alignment between connection with nature and attitudes toward environmental protection should be interpreted as indicative of dispositional orientations rather than as evidence of consistent pro-environmental action.

Third, the qualitative component, based on a brief free-association task, offered access to participants' spontaneous representations but necessarily limited interpretative depth. The use of short, unelaborated responses favored the emergence of highly shared and conventional imagery, potentially obscuring more nuanced, reflective, or critical understandings of nature. Moreover, the absence of follow-up prompts prevented exploration of the meanings participants attributed to their associations, restricting the analysis to semantic patterns rather than narrative or experiential dimensions.

These limitations point to several directions for future research. Longitudinal and mixed-methods designs would allow for a more comprehensive examination of how environmental identity develops over time during teacher education and how it relates to pedagogical intentions and practices. Integrating standardized measures with in-depth qualitative approaches—such as semi-structured interviews, reflective journals, photovoice, or classroom and outdoor observations—could support triangulation and clarify the relationship between affective connection, conceptual understanding, and educational agency.

Further studies could also investigate the correspondence between quantitative environmental identity profiles and qualitative representational patterns, examining whether higher levels of connection with nature are associated with more relational or systemic conceptions of the human–nature relationship. Finally, extending the research to include in-service teachers and more diverse institutional, disciplinary, and territorial contexts would enhance ecological validity and contribute to a more differentiated understanding of environmental identity across stages of the teaching career.

7. Conclusions

Taken together, the findings of this study provide a clear and empirically grounded characterization of environmental identity among pre-service teachers in initial training. The quantitative results indicate that participants endorse environmental identity at relatively high levels, both in terms of personal connection with nature and attitudes toward environmental protection, confirming that environmental orientation is a salient and meaningful dimension within this cohort. At the same time, the qualitative analysis reveals that these orientations are supported by a restricted and highly conventional representational repertoire, largely centered on aesthetic and naturalistic imagery and only marginally inclusive of human agency or socio-ecological interdependence. This combination of results refines current understandings of environmental identity by showing that strong affective dispositions and pro-environmental attitudes do not necessarily correspond to equally complex or relational representations of nature. Rather than reflecting inconsistency, this pattern points to a layered configuration of environmental identity in which emotional endorsement, ethical positioning, and symbolic representation may develop along partially independent trajectories. From this perspective, environmental identity emerges not as a unitary construct, but as a composite phenomenon whose dimensions may align at the level of attitudes while remaining uneven at the level of meaning-making. A central contribution of this study lies in demonstrating the analytical value of integrating standardized measures with qualitative tools capable of capturing spontaneous representations. While self-report instruments effectively assess the strength of environmental orientations, they are less sensitive to the forms through which nature is cognitively and symbolically constructed. The present findings show that exclusive reliance on quantitative measures risks overestimating the coherence of environmental identity, particularly in educational contexts where representational frameworks are still in formation. By situating these results within the context of initial teacher education, the study delineates a critical empirical space for future research on how environmental identity is shaped during professional preparation. More broadly, it suggests that investigating environmental identity requires attention not only to

what individuals declare, but also to how nature is imagined, positioned, and rendered meaningful. In this sense, the study advances the field by shifting the focus from the mere presence of environmental commitment to the qualitative configuration of the human–nature relationship that underpins it.

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