

Sentiment and Stance in EFL Responses to AI-Generated Environmental Content

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Abstract

Recent advances in generative AI have enabled the large-scale production of environmental imagery and descriptions, yet questions remain regarding how such content represents emotion, agency, and responsibility. This study examines how human evaluators respond to AI-generated environmental representations, focusing on sentiment, stance, and argumentation as dimensions of qualitative evaluation. Data were collected from 81 multilingual secondary-school EFL learners in Cyprus, who engaged with AI-generated environmental images and accompanying AI-written descriptions through a sequence of structured tasks. Using qualitative discourse analysis informed by sentiment- and stance-oriented frameworks, the study analyses learner-produced texts to identify affective evaluations, moral positioning, and alignment with or challenge to AI-generated discourse. Findings suggest that participants consistently moved beyond surface-level description to articulate emotional engagement, assign responsibility, and critique omissions in AI-generated content, particularly regarding the representation of human-environment relations. The study contributes to research on human-centered AI evaluation by demonstrating the value of sentiment and stance analysis for assessing AI-generated environmental language and highlights the potential of educational contexts as sites for examining human interpretive responses to automated discourse.

Keywords: Ecolinguistics, Evaluation of AI-generated Environmental Discourse, Sentiment Analysis

1. Introduction

Recent advances in generative artificial intelligence have enabled the automated production of environmental imagery and written descriptions that depict animals, ecosystems, and ecological crises. Such AI-generated content is increasingly available in educational, media, and public domains, shaping how environmental issues are framed, interpreted, and evaluated. However, while these systems are often presented as neutral, their representations may implicitly privilege anthropocentric perspectives, downplay emotion, or weaken questions of agency and responsibility in human-environment relations.

From an ecolinguistic perspective, language plays a central role in constructing how the more-than-human world is perceived and valued. Discursive patterns shape emotional engagement, ethical judgement, and ultimately how animals and ecosystems are treated (Cook, 2015; Stibbe, 2012; 2015). Research in environmental communication similarly demonstrates that affective framing plays a crucial role in motivating attention, engagement, and action, with negative or emotionally charged representations often eliciting stronger responses than neutral ones (Brader, 2006; Bachleda et al., 2020; Soroka et al., 2019; Hart et al., 2024). In this sense, environmental imagery functions as a powerful affective trigger that invites sentiment, stance, and argument (Hoewe & Ahern, 2017; Wong-Parodi & Feygina, 2021).

Sentiment analysis (SA) has been widely applied in domains such as economics, healthcare, and governance to examine how people emotionally evaluate discourse topics, products, and policies (Ibrohim et al., 2023). In environmental contexts, SA has been used to analyze public perceptions of environmental conditions and climate-related policies, particularly through large-scale social media and public datasets (Du et al., 2019; Stede & Patz, 2021). However, much of this work has focused on automated or large-scale analyses, offering limited insight into how affect, stance, and moral evaluation are constructed through human interpretation. Recent work in environmental NLP has begun to address some of these limitations through the development of domain-specific language resources that extend beyond polarity-based sentiment analysis. For example, Grasso et al. (2024) introduce EcoVerse, an annotated Twitter dataset designed for eco-relevance classification, environmental impact analysis, and stance detection, highlighting the need for specialized annotation schemes to capture evaluative and ideological dimensions of ecological discourse. However, the examination of how AI-generated environmental representations are interpreted or evaluated by human readers is still an area that remains underexplored.

2. Research Gap and Study Aims

Despite growing interest in sentiment analysis and affective NLP, comparatively little attention has been paid to how humans evaluate AI-generated environmental discourse itself, particularly in terms of emotion, agency, and

responsibility. Existing studies have largely prioritized computational detection of sentiment or large-scale public opinion data (Du et al., 2019; Ibrohim et al., 2023), leaving underexplored the qualitative processes through which AI-generated representations are interpreted, contested, or reframed by human readers. Moreover, the emergence of generative AI introduces a new discourse agent whose outputs may downplay emotion or moral responsibility, potentially silencing the voices of more-than-human beings by privileging anthropocentric framings (Cook, 2015).

Educational contexts provide a productive yet underutilized site for examining such human-centered evaluation. When learners engage critically with AI-generated content, they not only respond emotionally but also articulate ethical judgements and evaluative stances that reveal how environmental meaning is negotiated. Addressing this gap, the present study adopts a qualitative discourse-analytic approach to examine how multilingual English as a Foreign Language (henceforth EFL) learners respond to AI-generated environmental imagery and descriptions. Focusing on sentiment, stance, and argumentation, the study aims to contribute to research on human-centered evaluation by highlighting affective and ethical dimensions of AI-generated environmental language that are often overlooked in computational approaches. Specifically, the present study is guided by the following three research questions:

1. How do human evaluators express sentiment when responding to AI-generated environmental imagery and descriptions?
2. What stance-taking and argumentative patterns emerge in human evaluators' written responses to AI-generated environmental representations, particularly in relation to agency and responsibility?
3. In what ways do human evaluators align with or challenge AI-generated environmental discourse with respect to emotion, moral evaluation, and the representation of human-environment relations?

3. Data and Methods

3.1 Context and Participants

The study was conducted between November 2025 and February 2026 in a secondary school in Nicosia, Cyprus. Participants were 81 multilingual adolescents (aged 15-17) from a range of L1 backgrounds, including Greek, Cypriot Greek, Bulgarian, Romanian, and Slovak, enrolled in five EFL classes. All participants demonstrated intermediate to upper-intermediate proficiency in English (CEFR B1-B2) and were accustomed to producing short written texts as part of regular classroom instruction. In connection with the scope of the study, participants functioned as

human evaluators of AI-generated environmental content. Their multilingual backgrounds provided a reflective and critical perspective on the interpretation of AI-generated imagery and text, making the setting suitable for examining human-centered evaluation of automated discourse.

During the first two weeks of the study, the preliminary phase, learners completed a set of short activities designed to introduce key concepts from ecolinguistics in an EFL context. These activities focused on word ecology and nature metaphors in English, the ecological reworking of metaphors, learners' personal relationships with nature, and cross-linguistic comparison of nature metaphors in Greek and English. This preparatory phase aimed to familiarize students with ecolinguistic perspectives and sensitize them to the role of language in shaping ecological meanings, thereby preparing them for the image-based study tasks that followed.

After completing the preliminary phase (Task 1), learners engaged in three further tasks, introduced sequentially to explore the three research questions (see Table 1). In some instances, tasks extended to two or three teaching periods (of 45 minutes each). Tasks were completed either individually or in pairs, depending on the task, allowing for both individual reflection and collaborative meaning-making in response to the image-based prompts.

TASK	FOCUS	DESCRIPTION	ANALYTICAL CONTRIBUTION
1	Ecolinguistic Awareness	Introduction to ecolinguistics through nature metaphors	Conceptual preparation (data not analyzed)
2	Seeing the Invisible	Learners described generated images	Sentiment (RQ1), initial stance
3	Voices of the Earth	Learners wrote short dialogues between human and non-human animals	Sentiment (RQ1), stance (RQ2), agency
4	Evaluation of AI Description	Learners evaluated AI-generated descriptions,	Stance & argument (RQ2), AI alignment/challenge (RQ3)

Table 1: Overview of the Four Tasks on Sentiment, Stance, and Argument

3.2 Data Materials

The materials consisted of four DALL·E-generated environmental images depicting contrasting ecological narratives: a polar bear stranded on ice, a polluted river, a thriving tropical forest, and an urban rooftop garden (see Figures 1-4 below). Figures 3 and 4 were also used as visual prompts in another study by the author. However, the present study is based on a different dataset, analytical framework, and research focus.



Figure 1: Polar Bear Stranded on Ice



Figure 2: Polluted River



Figure 3: Tropical Forest



Figure 4: Rooftop Urban Garden

These images were generated by DALL·E (OpenAI) and the following prompt: Can you generate an image of a _____? Tasks

progressed from description to emotional evaluation, stance-taking, and critical reflection. In Task 2, learners described the generated images using the prompt ‘Can you describe this image?’, which was also the prompt used with ChatGPT 5.2 to generate the descriptions which learners later evaluated in Task 4 (see Extract 6). In Task 3, learners wrote short dialogues from the perspective of humans and non-human animals in response to a whale soundtrack, encouraging empathy and voice. In Task 4, learners evaluated AI-generated descriptions of images they had not previously encountered in Task 2, identifying points of agreement, disagreement, and omission. Overall, the tasks elicited affective and evaluative language and supported creative, critical engagement with environmental issues in the EFL classroom.

3.3 Data Collection Tasks

Data were collected during regular EFL lessons across multiple sessions through classroom tasks based on visual or audio prompts. Learners worked individually or in pairs, producing written descriptions, emotional and stance-based responses, empathic dialogues, and evaluations of AI-generated image descriptions. All responses were collected in class, anonymized, and organized by task format before being analyzed as qualitative discourse data. In Tasks 2 and 4, learners worked in pairs and each pair received only one of the four images. The images were therefore not presented sequentially or simultaneously to the same participants. In Task 2, pairs described their assigned image, while in Task 4 they evaluated an AI-generated description of a different image. This design limited opportunities for direct comparison across contrasting ecological visuals and reduced the likelihood that responses were shaped by prior image exposure or responses from other groups. In Task 4, learners received the same instruction used to generate the ChatGPT 5.2 output: ‘Can you describe this image?’

3.4 Analytical Framework

Data were analyzed using qualitative discourse analysis, informed by research on evaluation, affect, and stance in discourse (Hunston & Thompson, 2000; Martin & White, 2005) and interpreted within an ecolinguistic framework focused on care, harm, agency, and the more-than-human world (Stibbe, 2021). Learners’ written responses

were analyzed as whole texts, with closer attention to salient discourse segments. The coding process combined deductive and inductive approaches: initial categories were derived from the research questions and the study's conceptual framework (e.g. sentiment, stance, responsibility, and ecolinguistic positioning), while additional patterns and subcategories emerged through close reading of the learners' responses. For RQ1, the focus was on emotional expression; for RQ2, on stance, moral evaluation, and responsibility; and for RQ3, on how learners aligned with or challenged AI-generated descriptions. Across all analyses, attention was also given to broader ecolinguistic framings, such as anthropocentric versus ecocentric positioning and care versus catastrophe narratives. The aim was to identify salient discourse patterns and interpretive tendencies rather than quantify linguistic features or assess grammatical accuracy.

4. Results

4.1 Sentiment in Learners' Responses to Environmental Imagery

Learners' responses to the environmental images revealed a range of emotional evaluations, including negative, positive, and mixed sentiment, reflecting the affective contrast embedded in the visual prompts. Negative sentiment was particularly salient in responses to the polar bear imagery (Extract 1 and Figure 1).

1) I feel anger, disgust and responsible and hopeless

2) The emotions are obviously negative

3) The emotions in the image is isolated on ice cap without any help, trying to save her life. The ice is melting while the ice time past. We feel responsible ^{disgust and} for this situation while is humans fault as we constantly destroy everything. We also feel sadness because we know that is not easy to change this situation. as a result polar bears ~~are~~ will die.

Extract 1: Describe Figure 1

Negative sentiment was expressed in responses to crisis-oriented imagery through clustered emotions, empathy for non-human suffering, and explicit moral judgement, often linked to human responsibility. By contrast, positive sentiment appeared in responses to care-oriented images (as in Figure 3), where learners emphasized calmness, balance, and emotional restoration through sensory descriptions of intact natural environments (see Extract 2).

3) This image evokes calmness because of the lush greenery, soft sunlight, and gently flowing stream. The natural setting feels peaceful and balanced, with birds moving freely through the forest, which suggests harmony and life without urgency. This emotion is helpful because it encourages relaxation, reduces stress, and creates a sense of mental clarity, as if inviting the viewer to slow down and breathe in a tranquil, restorative environment.

Extract 2: Describe Figure 3

Interestingly, numerous responses regarding the same image expressed mixed or ambivalent sentiment, combining appreciation with concern for future loss (see Extract 3).

3) This image makes me feel happy but also sad at the same time. Happy because there are still places like this on earth, untouched and beautiful, and sad at the same time because ~~probably~~ they probably will not continue existing in the future. ~~The~~ Humanity's selfishness and greed are destroying places like this ~~continuously~~ continuously. Big companies and governments also are very responsible because of their factories and ~~power~~ bad use of power.

Extract 3: Describe Figure 3

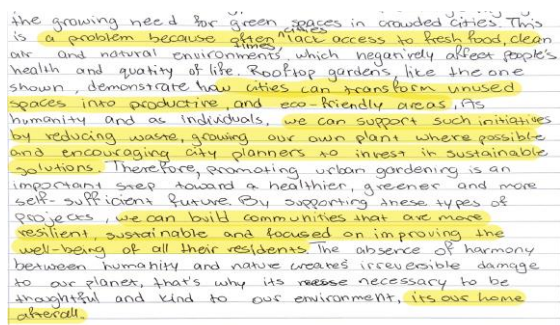
As noted in this extract, the image made the learner feel 'happy but also sad at the same time', celebrating the existence of untouched natural spaces while simultaneously expressing anxiety about their destruction due to 'humanity's selfishness and greed'. Such ambivalence illustrates how learners negotiate hope and despair within the same response, often transitioning from emotional evaluation to ethical critique.

4.2 Stance and Argumentation in Learners' Environmental Discourse

Across responses, participants demonstrated recurring stance-taking patterns that moved from emotional reaction to moral judgement and proposed action. A common argumentative sequence was observed: identification of an environmental problem, attribution of responsibility, and articulation of a normative response or call for action. Interestingly, this structure appeared across both crisis- (Extract 1) and care-oriented (Extract 4) imagery, suggesting a stable evaluative framework rather than image-specific reactions.

Stance was linguistically realized through moral evaluation (e.g. explicit judgements of harm or neglect), modality (e.g. expressions of obligation or necessity), and collective positioning (e.g. inclusive references to 'we' or 'humanity'). Responsibility was predominantly attributed to humans, with participants framing environmental degradation as the result of collective choices rather than natural processes. Even in responses

to positive imagery, participants frequently extended their evaluations to include ethical obligations to preserve or replicate such environments. This is clearly indicated in Extract 4, after students were asked to describe Figure 4.



The growing need for green spaces in crowded cities is a problem because often, lack access to fresh food, clean air and natural environments which negatively affect people's health and quality of life. Rooftop gardens, like the one shown, demonstrate how cities can transform unused spaces into productive and eco-friendly areas. As humanity and as individuals, we can support such initiatives by reducing waste, growing our own plants where possible and encouraging city planners to invest in sustainable solutions. Therefore, promoting urban gardening is an important step toward a healthier, greener and more self-sufficient future. By supporting these types of projects, we can build communities that are more resilient, sustainable and focused on improving the well-being of all their residents. The absence of harmony between humanity and nature creates irreversible damage to our planet, that's why it's more necessary to be thoughtful and kind to our environment. It's our home after all.

Extract 4: Interpreting Underlying Human-Nature Narratives

This writing shows clear stance-taking through moral evaluation, modality, and the attribution of responsibility. The student explicitly frames the issue as a problem affecting people's health and quality of life, while also presenting urban transformation as a shared ethical responsibility. The closing statement, 'it's our home after all,' further personalizes environmental responsibility and highlights human connection with the wider world. As this example shows, a problem-responsibility-action pattern appeared in responses to both crisis-oriented and care-oriented images, with learners moving from description to ethical judgement and calls for change.

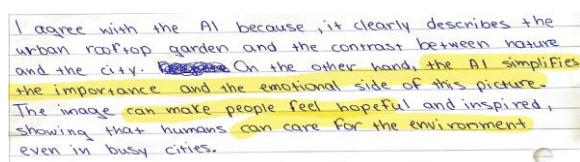
4.3 Evaluation of AI-Generated Environmental Descriptions

Learners' evaluations of AI-generated image descriptions showed both agreement with and resistance to automated environmental writing, especially in relation to emotional depth, agency, and moral responsibility. In the following example, a student responded to the following AI-generated description of the Urban Garden (Extract 5 and Extract 6):

The image shows a large rooftop garden located on top of a tall building in a modern city. Wooden garden beds filled with green plants, vegetables, and herbs are arranged in neat rows. Several people are working in the garden, watering plants and taking care of the crops. Tall glass buildings surround the rooftop, showing a contrast between nature and the urban environment. The

space looks organized, clean, and productive. The image suggests that nature and city life can exist together through planned and sustainable actions.

Extract 5: Chat GPT 5.2 Generated Text using prompt 'Can you describe this image?' (see Figure 4)



I agree with the AI because, it clearly describes the urban rooftop garden and the contrast between nature and the city. ~~Because~~ On the other hand, the AI simplifies the importance and the emotional side of this picture. The image can make people feel hopeful and inspired, showing that humans can care for the environment even in busy cities.

Extract 6: Evaluation of AI-Generated Description

In their responses to Task 4, learners generally accepted the factual content of the AI-generated texts but consistently noted the absence of emotional engagement, explicit responsibility, and attention to human – non-human relationships. They often challenged these omissions by supplementing AI-generated interpretations with affective language, explicit blame, or ethical commentary. In doing so, they repositioned animals and ecosystems as sentient and morally significant entities rather than passive and secondary elements. This pattern suggests that human evaluators actively compensated for what they perceived as affective or ethical gaps in AI-generated environmental discourse. Overall, the findings suggest that human evaluators engage critically with AI-generated content, using sentiment and stance as evaluative lenses through which automated anthropocentric representations are assessed, reframed, or resisted.

5. Discussion

The findings of this study demonstrate that AI-generated environmental imagery can function as a powerful pedagogical and analytical prompt for eliciting affective, ethical, and evaluative written discourse in the EFL classroom. Across tasks, learners moved beyond surface-level description to provide emotional responses, moral evaluations, and assign responsibility in relation to ecological issues. As regards ecolinguistic concerns, learners' written discourse revealed a consistent tendency to highlight human accountability and to reposition non-human

animals and ecosystems as morally salient entities rather than secondary and passive beings. This suggests that image-based tasks can provide a productive site for observing how emerging environmental voices are articulated through learners' developing EFL skills.

This positioning relates directly to the notion of AI critical literacy, as students were encouraged to question the apparent neutrality of AI-generated environmental discourse and to reflect on what was emphasized, omitted, or depersonalized. By engaging critically with AI outputs, learners demonstrated an emerging awareness of how automated systems can shape environmental meaning, emotional engagement, and responsibility attribution, rather than simply reflecting objective reality.

It is important to note that in Task 2, both learners and ChatGPT responded to the same prompt 'Can you describe this image?' Under these comparable conditions, learners often produced more affectively and ethically loaded responses than the model, introducing emotional language, responsibility, and moral evaluation beyond neutral visual description. Yet, this should be interpreted cautiously, as different model versions may generate different kinds of output. Consider, for example, the text generated by Theophrastus 5.2, a H4rmony-instructed assistant that operates through ecosophical guidance, describing Figure 4 with the same prompt:

Theophrastus 5.2: 'Can you describe this image?'

The image depicts a vibrant rooftop urban garden set amid a dense cluster of modern skyscrapers, where several people are tending to neatly arranged raised beds filled with a rich diversity of vegetables, herbs, and flowering plants. The wooden decking and planters create a warm, human-scale environment that contrasts with the surrounding glass and steel architecture, while watering cans and gardening tools suggest ongoing care and cultivation. From an ecolinguistic perspective, this scene visually communicates an alternative "story we live by," one that repositions humans not as dominators of urban space but as participants in ecological systems, integrating food production and biodiversity into the built environment. It embodies a

narrative of reconnection, resilience, and local sustainability, aligning with the kind of life-affirming discourse advocated in ecolinguistic frameworks, where urban spaces are reimagined as sites of coexistence between human activity and ecological flourishing.

Theophrastus 5.2 produced a more interpretive and affectively loaded description than ChatGPT 5.2, which resembles students' writing as it highlights reconnection between humans and plants as participants in a larger ecological system. This suggests that AI models may vary not only in descriptive detail but also in the extent to which they introduce ethical, relational, and ideologically framed meanings.

6. Conclusion

The study demonstrates the value of educational settings as sites for human-centered evaluation of generative systems. When participants are invited to engage reflectively with AI outputs, they produce evaluative discourse that reveals interpretive strategies, ethical orientations, and expectations that may not be captured only through automated analysis. Despite the limited scope of the study and its context-specific sample, it offers insights into how human judgement can inform the assessment of AI-generated environmental language. By accentuating affective and ethical dimensions of evaluation, the findings highlight the importance of integrating qualitative human perspectives into the development and evaluation of generative language systems, particularly in domains with significant social and environmental implications. Moreover, the comparison between ChatGPT 5.2 and Theophrastus 5.2 further suggests that AI-generated environmental discourse should not be treated as homogeneous, since different models may yield different affective, relational, and evaluative framings depending on how they have been developed and fine-tuned.

7. Limitations and Ethical Considerations

This study is limited by its qualitative scope and focus on a single educational context. Hence, its findings may not be generalizable to other populations or contexts. In addition, the analysis is restricted to written responses and does not capture evaluative processes that may emerge in other modes of interaction. As regards the ethical considerations of the study, informed consent was obtained in line with institutional guidelines, and all data were anonymized prior to analysis. AI-generated content was used solely as an object of critical reflection and image generation, and tasks were designed to promote evaluative engagement rather than endorsement,

particularly with respect to environmental responsibility and the representation of non-human entities. Consequently, the study utilized AI as a pedagogical prompt for critical interpretation and discussion.

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