

Understanding the Eco-poetics Pedagogy of Preservice English as a Second Language Teachers: A Case Study Using Robert Frost's *Fire and Ice*

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Article information	Abstract
Article history: Received: 5 Sep 2023 Accepted: 7 Apr 2025 Available online: 11 Apr 2025	<p><i>The prevalence of ecological and environmental hazards that adversely impact human lives necessitates the intensification of ecological literacy for the populace. This deepening of people's knowledge of environmental science for disaster risk reduction and mitigation can be realized through literary pedagogy centering on ecocriticism. Hence, this qualitative study utilizing a case study approach aims to describe the pedagogy of eco-poetics as performed by a group of preservice teachers of English as a Second Language (ESL). By examining the insights they gained from a critical analysis of Robert Frost's poem "Fire and Ice", scientific constructs can be identified that can be translated into learning opportunities, learning tasks and assessment tools that can promote ecological literacy. The qualitative data gathered from the participants' analysis of eco-poetry reveal their scientific constructs in three major themes: risk perception, risk analysis, and risk reduction and mitigation. These served as their abstractions and realizations from the ecocritical interpretation of the provided poem. These generated insights dealing with consequences of human action, nature's retribution, earth's destruction, and valuing the environment for sustainability and resilience derived from their transactional reading of the poem are considered by the participants to be the core of teaching eco-poetics to promote ecological literacy. Also, the data gathered from the transcript of the conducted Focus Group Discussion (FGD) with the participants reveal their preference for collaborative viewing and representing activities in designing learning opportunities, and on reflective writing and performance tasks in assessing intended learning outcomes to inculcate ecological literacy among their future students. Moreover, the framework developed by the researcher exemplifies the preservice teachers' pedagogy of eco-poetics.</i></p>
Keywords: Ecocriticism Eco-poetics Literary pedagogy Preservice teachers	

INTRODUCTION

Environmental hazards and ecological threats have been increasingly prevalent in society posing significant risks to human health and well-being (Santhakumari, 2020). Climate change and other environmental challenges continuously intensify social, economic, and political inequalities that affect vulnerable populations. Considering these challenges, the need to

promote environmental awareness among the general populace has become critical. This promotion of environmental awareness can strengthen people's knowledge, skills, attitudes, and values necessary for them to understand and address these challenges for sustainability (Paradewari, 2018).

Achieving these goals, however, requires technological solutions and educational transformations that foster environmental awareness among the general public (Tabuenca et al., 2023). Ecocriticism, a critical approach to literary study, examines the relationship between literature, culture, and the environment which offers a promising framework for promoting environmental awareness through education and literacy (Mishra, 2016).

Literary pedagogy centering on ecocriticism can help deepen people's knowledge of environmental science and its implications for disaster risk reduction and mitigation. By examining the environmental themes and representations in prose and poetry, students can enhance their critical thinking and analytical skills while expressing empathy for environmental issues (Sunassee et al., 2021). Ecocritical pedagogy can foster interdisciplinary learning by integrating environmental science into humanities by studying prose and poetry to provide a more holistic understanding of environmental challenges and solutions (Myren-Svelstad, 2020).

The teaching of poetry can be a powerful tool for promoting scientific literacy among students. Aesthetic teaching of poetry provides an opportunity for students to explore scientific concepts creatively and imaginatively. This exploration can deepen their understanding and appreciation of science (Barbosa et al., 2014). By connecting scientific content with poetry, students can strengthen their understanding of the natural world and its complexities.

Numerous studies demonstrated the use of poetry in enhancing students' critical thinking skills and scientific literacy. Donald and Barker (2016) for instance found that poetry can help students to make connections between everyday life and science resulting in a more meaningful learning experience. Similarly, Anabaraonye et al. (2018) used poetry to promote climate change literacy which can inspire students to take action to address environmental issues.

The aesthetic teaching of poetry can also foster students' emotional connection with scientific concepts. By tapping into their emotions and imagination, poetry can inspire students to explore scientific ideas personally and meaningfully which can lead to a greater appreciation of science and its role in society (Calderón Moya-Méndez & Zwart, 2022).

As aesthetic texts, poetry offers a unique opportunity to bridge language, culture, and science in English as a Second Language (ESL) education. Poetry can evoke emotions, imagination, and sensory experiences that can deepen students' understanding of environmental issues and promote empathy and engagement with the natural world (Frye et al., 2011). Interdisciplinary teaching that integrates science and poetry can also provide a holistic learning experience that connects language learning with other domains of knowledge (Furlan, 2007).

Within the context of ESL teaching, there has been a growing interest in integrating interdisciplinary approaches and aesthetic texts to enhance students' engagement and critical

thinking (Cai & Sankaran, 2015). Educators are actively exploring the integration of multimodal texts as a means to connect students with the broader world to examine the diverse human experiences, and address contemporary global issues (Midgette et al., 2023). The utilization of multimodal texts, including e-pictures and YouTube videos, has been identified as instrumental in cultivating critical thinking skills and enhancing students' awareness. Moreover, teachers assume a pivotal role in instilling positive traits, such as grit and academic engagement, among English as a Foreign Language (EFL) students (Qiao, 2022). Recognizing the significance of interdisciplinary instruction, it has been acknowledged as an effective method to elevate critical thinking and facilitate higher-level instruction in middle school education (Norins, 2023).

However, little attention has been paid to how preservice ESL teachers design instructions using ecopoetry to promote scientific knowledge in literature classes. Notably, there is a dearth of studies that delve into the sources of teaching knowledge specifically tailored for literature teachers in ESL classrooms (Mohamad Ghazali et al., 2022). Existing research points to the theory of language education, the nature of the subject, and identified challenges in literature teaching as primary sources of teaching knowledge for ESL literature teachers (Nugraeni & Paidi, 2021). Empirical evidence also suggests that instructional designs and programs have demonstrated efficacy in enhancing both students' and teachers' scientific literacy. These proven designs encompass diverse methodologies such as discussion methods, connecting science learning with culture through personal science writing, effective argumentation on energy-related environmental issues, and literacy-infused and inquiry-based science learning (Mpofu & De Jager, 2018). These studies primarily focus on in-service teachers within the framework of Content and Language Integrated Learning (CLIL) to attain scientific literacy. Given the aforementioned gaps in the existing literature, there is a compelling need for research that centers on the integration of ecopoetry into literature classes for preservice ESL teachers to explore the potential of ecopoetry as a pedagogical tool in promoting scientific knowledge among preservice ESL teachers, filling a crucial void in the current educational research landscape.

Hence, there is a need to explore the potential of ecopoetry as aesthetic texts and interdisciplinary teaching approaches in preservice ESL teachers' training in capacitating the future generation of teachers to design learning opportunities that promote environmental awareness for sustainability. By incorporating poetry and science into their curricula, preservice teachers can foster a more engaging, interdisciplinary, and culturally responsive learning environment that promotes ecological literacy and sustainability among ESL students. Further exploration of promoting environmental awareness through ecopoetry is needed to identify best practices for integrating aesthetic texts and interdisciplinary teaching into ESL teacher education.

This study focuses on Robert Frost's "Fire and Ice" as the main text for analysis to model how a single ecopoem can be used to explore environmental themes in the ESL classroom. The poem was selected because it presents deep and meaningful ideas about the destruction caused by human actions, using metaphor and symbolism. Its short but powerful structure makes it a practical and effective tool for helping students understand both environmental messages and language features. This focused approach allows for deeper analysis and provides a useful model for other teachers who wish to connect language learning with ecological awareness.

Theoretical framework

This study is rooted in Rosenblatt's (1994) transactional model of reading, wherein meaning or constructs emerge through the dynamic interaction between the reader and the text. The participants in this study, preservice ESL teachers, engage in a transactional experience with an ecopoem as a textual entity, seeking to derive constructs motivated by their informational needs. The ecopoem functions as a stimulus, provoking thoughts and ideas from the readers who, in turn, make sense of the text by immersing themselves in every word, attending to sounds, inferring patterns, and so forth. Consequently, they participate in a transactional reading process, generating constructs as a result.

The aesthetic or poetic aspects of the ecopoem play a crucial role in this transactional experience. The ecopoem functions as more than a conveyer of information; it acts as a rich stimulus, inviting readers to investigate the nuances of language and form. The rhythm, imagery, and linguistic choices within the ecopoem create a sensory and emotional vicarious experience that resonates with the participants. By attending to every word, the preservice ESL teachers actively participate in shaping their understanding of the ecopoem.

These constructs are shaped through a set of guiding questions designed to prompt the readers' analytical efforts in comprehending the ecopoem. Given that the focus of the ecopoem analysis revolves around ecocriticism—a literary theory emphasizing ecological concepts and realizations within the literature—the constructs produced by preservice ESL teachers are classified as scientific constructs. Wilson (2001) characterizes these as abstractive constructs, referring to the ideas constructed by readers during their analytical engagement with the ecopoem. The process involves selecting, limiting, and ordering ideas to align with the ecopoem, resulting in scientific constructs that center on ecological concepts and abstractions.

The synergy between aesthetic or poetic elements and scientific constructs is pivotal in enhancing the ecological awareness of preservice ESL teachers. The aesthetic dimensions of the ecopoem draw the readers' attention to how language and nature intersect. The vivid imagery and emotional resonance inherent in the poetic aspects create a deeper connection with the ecological themes fostering a more profound engagement.

This transactional dynamic between the readers and the text emphasizes the active role of preservice ESL teachers in extracting meaning from their literacy experience. As they engage in this transaction with the ecopoem, they become active participants, shaping their understanding of the text and, in turn, contributing to the construction of ecological concepts and abstractions that constitute their scientific constructs.

Objectives of the study

This case study attempted to capture the pedagogy of ecopoetics of preservice ESL teachers by identifying the scientific constructs they utilized in analyzing Robert Frost's poem "Fire and Ice" and examining how these constructs contribute to their analysis of this literary genre. The study then explored the insights gained by preservice ESL teachers in the analysis of ecopoetry

while integrating their scientific constructs. This research also investigated the learning tasks and assessment tools considered by preservice ESL teachers in translating their gained insights from their analysis of ecopoetry into designing learning opportunities that promote environmental awareness in ESL classrooms.

METHODOLOGY

Research design

This case study made use of the qualitative approach to research in examining the pedagogy of ecopoetics of preservice ESL teachers. Data was collected from two sources: the responses of the participants in the literary analysis worksheet and the transcripts from the conducted Focus Group Discussion (FGD). The literary analysis worksheet comprises a poem centered on the theme of environmental destruction. It is accompanied by a set of guiding questions in English. These questions serve as a framework for the participants to conduct an ecocritical analysis of the featured literary work within the worksheet.

The poem “Fire and Ice” by Robert Frost was chosen as the main text for analysis. This poem was selected because it clearly expresses environmental concerns through figurative language and symbolism. Although using more poems could lead to more varied results, focusing on one allows for a deeper exploration of its themes and classroom applications. This approach also aims to provide a clear model for teachers who want to use ecopoetry to combine language learning with ecological thinking.

The participants’ analysis of ecopoetry provided rich text data for determining the scientific constructs and the insights they gained from analyzing an ecopoem. Meanwhile, the FGD transcript captured how the participants designed learning opportunities and assessed intended learning outcomes to promote environmental awareness. The qualitative design used in the study facilitated an in-depth examination of the participants’ experiences and perspectives on ecopoetics as a potent tool for promoting environmental awareness in ESL classrooms.

Participants

The participants in this study were composed of the incidental sample of 17 third-year preservice ESL teachers from the Batangas State University JPLPC-Malvar Campus, Batangas, the Philippines enrolled in the academic year 2020-2021. These participants who had provided their consent to participate in the study were selected because they had completed literature and teaching courses that provided them with a theoretical understanding and practical applications of literary studies including ecocritical criticisms.

Their completed literature and teaching courses provided them with the necessary knowledge and skills to engage in critical analysis of ecopoetry and develop their pedagogy of ecopoetics. Their expertise in these areas was evident in the text data generated from their analysis of

ecopoetry revealing their scientific constructs and insights on environmental issues. Also, their participation in the FGD demonstrated their ability to design learning opportunities and assess intended learning outcomes related to environmental awareness.

Research instruments

Literary Analysis Worksheet. This worksheet was designed to facilitate participants' analysis of Robert Frost's (1874-1963) ecopoem, "Fire and Ice", published in 1920, by applying ecocritical criticism. This poem was deemed appropriate for the study since it implicitly addresses environmental issues by serving as a metaphor for the impact of human actions on the environment (Wazed Kabir & Jamil, 2020).

Frost's "Fire and Ice" functions as a compelling catalyst, prompting preservice ESL teachers to formulate scientific constructs by enabling them to symbolically extract implicit ecological concepts from the text. This process involves an immersive exploration of the poem, where readers engage with each word, attend to sounds, infer patterns, and more, all of which are offered by the ecopoem. Focused on the symbolic portrayal of the world's destruction through fire and ice, the poem lends itself to ecocritical analysis, allowing for the generation of abstractions and realizations centered on ecological concepts.

Notably, Frost's poem avoids explicit detailing of ecological issues, positioning itself as a powerful text for deconstructing ecological concepts through symbolic analysis. Embracing the principle of undecidability and emphasizing multiple interpretations of the text, the poem implicitly conveys environmental concepts through transactional reading. In contrast to poems explicitly addressing ecological themes, where the constructs are already provided, the implicit nature of "Fire and Ice" proves advantageous for symbolical analysis. This approach enables preservice ESL teachers to generate more reliable scientific constructs as they actively make sense of the poem.

Through symbolical analysis and the association of fire and ice as elements of destruction, readers can develop an ecocritical interpretation of the poem. This process, occurring during the transactional engagement with the ecopoem, involves the exertion of analytical efforts to discern its underlying ecological meanings. This symbolic analysis then contributes to the formation of realizations and abstractions, constituting the scientific constructs of preservice ESL teachers as they interact with and derive ecological insights from the poem.

The purpose of the worksheet was to elicit the participants' scientific constructs through the transactional reading. The literary analysis worksheet deals with the poem's exploration of global destruction, prompting the participants to identify the underlying causes, whether natural or man-made, and examine the effects of these calamities on humanity while proposing strategies for mitigation. The first question in the worksheet delves into the symbolic representation of natural calamities or man-made disasters, framed through the metaphors of Fire and Ice. This prompts an exploration of how these symbols relate to contemporary environmental problems and issues that may lead to catastrophic events. It encourages readers to draw connections between the poetic imagery and real-world challenges. The second question

directs attention to the underlying causes or reasons for the occurrence of the calamities or disasters represented in the poem. By exploring the symbolic connections in-depth, the analysis seeks to unravel the factors contributing to the depicted apocalyptic scenarios. Meanwhile, the third question extends the analysis to the consequences of calamities or disasters on humanity. It prompts reflection on the potential harm and adversity that may befall mankind in the face of these symbolic cataclysms. Additionally, it encourages consideration of how individuals might prepare for and mitigate the harmful effects. The final question focuses on proactive measures to mitigate or lessen the adverse effects brought about by calamities or disasters. It encourages critical thinking about possible solutions and strategies to alleviate the impact on humanity. By reflecting on their personal experiences connected to the poem's theme, the participants gain a deeper understanding of the poem's message.

With the participants' responses to the ecocritical-centered guide questions in the worksheet, the researcher gathered data on the participants' abstractions and realizations of environmental concepts which served as their scientific constructs in making sense of this literary text. The literary analysis worksheet also underwent content validation by a panel of experts in the field of English language and literature teaching and science education. The provided feedback by these experts was used to refine the worksheet, ensuring that the expected responses were within the scope of ecocritical analysis. This process strengthened the validity of the data gathered from the worksheet ensuring the relevance to the study's objectives.

Interview Guide. This guide was constructed to facilitate an FGD with the participants to solicit their reflections on how they translated the insights they gained in the ecocritical analysis of the poem into a meaningful learning experience for their future students. The interview guide prompted the participants' insights on how they could incorporate ecocritical analysis of literary texts into their future teaching practice.

The first question in the interview guide inquires about personal connections and ecological themes within the poem, encouraging participants to share specific instances or emotions that align with the content. This provides a foundation for learning tasks that resonate with students' existing knowledge of environmental concepts. Meanwhile, the second question delves into how personal experiences contribute to the understanding of the poem, exploring the potential impact of experiential learning on ecological literacy. This exploration aids in shaping learning tasks that leverage real-life encounters, fostering a more profound connection between students and ecological issues.

The third question prompts the participants to reflect on the learning and insights gained through the integration of personal experiences with the poem. By identifying newfound perspectives or deeper connections to ecological concepts, the participants can design learning tasks that promote critical thinking and enhance environmental awareness. Shifting towards future-oriented considerations, the fourth question focuses on teaching strategies for ecological literacy. The participants are encouraged to outline specific classroom activities, discussions, or assignments that will enhance students' understanding of ecological themes. This detailed discussion provides valuable guidance for the practical implementation of learning tasks in educational settings.

The final question is centered on the assessment of ecological literacy. The participants are prompted to discuss how they plan to assess students' learning and insight into ecological concepts following the implementation of teaching strategies. This exploration unveils the assessment tools deemed suitable for measuring desired outcomes, offering empirical information for designing assessments aligned with pedagogical goals and learning tasks.

Through this guide, the researcher gathered data on the participants' perspectives on teaching ecopoetry and their ability to use their knowledge to promote environmental awareness among their future students. The interview guide was validated by a panel of experts in the field of English language and literature teaching and educational management. The suggestions provided by these experts were used in enhancing the interview guide to ensure that the questions were appropriate and would be able to reflect on the participants' teaching practices of ecopoetry. This content validation helped strengthen the reliability and validity of the data gathered from the interview guide.

Data collection

Document analysis. The participants were provided with a copy of the poem "Fire and Ice" and the ecocritical analysis worksheet. The participants were asked to read and analyze the poem using the worksheet which consisted of questions that guided them in identifying ecological concepts in the poem and their relationship with their environment. The participants were also asked to provide insights they gained from their interpretations of the poem. The accomplished worksheets were collected and analyzed by the researcher to identify the participants' scientific constructs and gained insights which were then used to develop the themes of the study.

Focus Group Discussion. The researcher facilitated an FGD with the participants. Through discussions, these participants were asked for their insights on how they could incorporate ecopoetry and ecocritical analysis into their future teaching practice. Their responses were transcribed for analysis.

Data analysis

Thematic Analysis. Thematic analysis was used to interpret the participants' responses on the literary analysis worksheet, and the transcript generated from the facilitated FGD. In examining the text data obtained from the literary analysis worksheet, their responses to the ecocritical-centered questions were analyzed to identify the participants' knowledge of environmental issues which served as their scientific constructs. Their responses were read and re-read several times to identify emerging themes. The themes that emerged from the text data were then reviewed to ensure that they represented a meaningful aspect of the participants' understanding of the analyzed ecopoetry. In the FGD meanwhile, the generated text data from the transcript were analyzed for themes related to the participants' teaching practices for ecopoetry in promoting environmental awareness. These themes were then reviewed to ensure that they accurately captured the participants' pedagogy of ecopoetry. Moreover, the identified themes were used to develop a framework in order to understand the participants' pedagogy of ecopoetry for promoting environmental awareness.

RESULTS

Scientific constructs revealed in the analysis of ecopoetry

The participants' analysis of ecopoetry served as an essential tool in revealing their scientific constructs and understanding of environmental concepts. In this study, the researcher utilized literary analysis worksheets to gather text data on preservice ESL teachers' abstractions and realizations as gained insights into the sense-making of ecopoetry. Through a thematic analysis, the scientific constructs and environmental knowledge of the participants were disclosed.

Table 1
Preservice ESL teachers' scientific constructs

Themes	Sub-themes	Exemplar Texts
Risk Perception	Natural Hazard	changes in climate and weather patterns... harming... Earth [P3, P17] Pandemic... virus strain... [becomes] transmissible to humans... resistant to antibiotic treatment [P1]
	Man-made Hazard	[adverse effects of] actions for recreation living, or necessity done by people [P12, P3] continuous depletion of natural resources, Amazon deforestation... coal-fired power plants... [have] lead to world's destruction [P10, P17, P1]
Risk Analysis	Natural Cause	climate change... ice melting... increase in water level... [P13] fire in forestry, tsunami, typhoons, floods, and even viruses... economic losses... bring massive suffering to mankind... [P9, P2, P10, P17, P4]
	Man-made Cause	human beings [have] huge participation... calamities destructive... land and air polluted destroying natural resources [P2, P17, P1, P14, P15, P7, P5, P9, P16, P11] People being so reckless [P11, P13, P9, P6, P8, P13] ...earth...devastated [P4]
Risk Reduction/ Mitigation		come up with an emergency plan [P8, P13] ...be prepared by being informed [P3] ...be aware of hazards, risks, and potential emergencies [P12, P1]
	Preventive Measures	Preparedness [P5, P4, P17, P2] ...emergency response, recovery, and reconstruction reduce immediate losses... environmental damages [P11, P16, P6, P14] Mitigate the effects of calamities [by being] aware of our surroundings [P2, P9, P7, P16, P13] ...supporting the reforestation projects [P1, P15, P11] ...advocating strengthening the conservation [P10, P5]
	Immediate Response	act of listening... working together... resolve climate change and save mankind [P13]

Legend: [P] followed by a number represents the participant number assigned to each individual in the study.

Table 1 presents the preservice ESL teachers' scientific constructs in three main themes: risk perception, risk analysis, and risk reduction and mitigation. Risk perception as the first emerging theme encompasses the prevailing natural and man-made hazards observed by the participants. The preservice ESL teachers classified changes in climate and weather patterns, depletion of

natural resources, and deforestation as natural hazards, meanwhile, they deemed human destructive actions for recreational living, continuous depletion of natural resources, and the various types of pollution as man-made hazards. The preservice ESL teachers' ability to perceive both natural and man-made risks as environmental hazards can help them in extracting issues dealing with the harmful effects of the continuous destruction of the environment to mankind. This scientific construct can initiate them to devise ways on increasing the awareness of their students on the danger posed by these hazards.

Risk analysis which emphasizes the causes of natural and man-made hazards emerged as the second theme in the analysis of the participants' responses in the literary worksheet. The preservice ESL teachers recognized climate change, forest fires, tsunamis, typhoons, and floods as natural causes of calamities, while human beings' actions as the main cause of man-made calamities. This recognition of the causes of ecological hazards by preservice ESL teachers signifies their ability to rationalize and logically trace the root cause of their perceived environmental hazards. Tracing the causes of their perceived environmental hazards enabled them to be critical thinkers which is an essential trait that they can emulate in their future students when dealing with ecopoetry.

Risk reduction and mitigation which involves preventive measures, preparedness, immediate response, recovery, and reconstruction served as the third emerging theme. The preservice ESL teachers realized the need for an emergency plan, information dissemination, and increased awareness of environmental hazards as preventive measures for environmental problems. They believed that preparedness and having a well-planned emergency response for recovery and reconstruction can reduce the losses and damages brought by the different environmental problems. The preservice ESL teachers also advocated the importance of cooperation and collaboration by supporting reforestation projects in mitigating the effects of calamities brought by environmental hazards. Integrating this knowledge on risk reduction and mitigation in ESL classes can provide students with the necessary skills to minimize the impact of environmental hazards and work towards a sustainable future.

Insights gained in associating the scientific constructs in the analysis of ecopoetry

Analyzing ecopoetry through the lens of scientific constructs can provide valuable insights into how scientific knowledge and environmental issues are interconnected in literature. Within this context, this study examined the insights gained by the preservice ESL teachers while associating their scientific constructs in analyzing ecopoetry.

Table 2
Insights gained by preservice ESL teachers in analyzing an ecopoem

Theme 1. Nature's Retribution

I learned that we will never know when a calamity or disaster will come but it will surely come. ^[P2]

I have learned that natural calamities choose no one. ^[P5]

I realize that these natural calamities or man-made disasters serve as a warning for everyone that people tend to become worst and more immoral. ^[P1]

This kind of poem becomes an eye-opener because it talks about the distinction between two things that might destroy the world. ^[P16]

Theme 2. Earth's Destruction

I've learned that hatred and desire could lead to the world's destruction which is why it is apparent in the poem. ^[P8]

The learning that I gain after relating my experience with the poem is that hatred and desire can lead to the world's destruction. ^[P15]

The poet made us perceive the harsh truth about life as he makes me realize that the impact of too much ambition of man can lead to our downfall itself. ^[P10]

I comprehended that the world has an agent to destroy itself and we are guests. ^[P17]

I realized how badly disasters and calamities can affect people. ^[P3]

Theme 3. Results of Human Actions

This poem makes me realize how important [is] the role of everyone to the betterment of the world, yet it also makes me reflect on how selfish humans can become. ^[P9]

Humans are talented at destroying, and I want to believe that we are also capable of fixing things. ^[P4]

Theme 4. Valuing the Environment for Sustainability and Resilience

I have now learned to value more our environment and choose C.P.P. (Care, Protect, and Preserved). ^[P11]

Learning to value everything is a must. ^[P12]

I have understood that life is short indeed and that we should cherish every fire that provides warmth that our family has. ^[P13]

The learning I gain while reading the poem and relate [-ing] it to my experience is the importance of our mother earth in the time of this tragedy sometimes, we forgot the essentials of the environment and its role. ^[P7]

Legend: [P] followed by a number represents the participant number assigned to each individual in the study.

Table 2 presents the insights gained by the preservice ESL teachers in analyzing the ecopoem. The participants' responses were organized into four themes: nature's retribution, earth's destruction, causes of human actions, and valuing the environment for sustainability and resilience.

The theme of nature's retribution highlights the participants' understanding of the inevitability of natural disasters and the indiscriminate effects of these disasters on people. This insight of the participants indicates a realization of the urgent need to prioritize disaster preparedness and mitigation strategies to protect lives and minimize damage. This realization can initiate them in designing classroom activities enabling their students to be aware and prepared for natural disasters.

Another theme that emerged in the text data is the earth's destruction. This theme centers on the idea that human actions and desires can lead to the world's destruction. The participants' interpretations reveal the poem's capacity to make people conscious of their actions that lead to the destruction of the environment. This consciousness of human actions and desires as potent agents of the earth's destructions can be capitalized by preservice ESL teachers in teaching poetry to remind students of the harm and damage they unconsciously impose on the environment making them conscious of the results of their desires and actions.

The third theme focusing on the results of human actions delves into the complexities of human nature and its impact on the environment. The participants' insights highlight the dual nature of human agency which illustrates that people can either contribute to environmental degradation or drive environmental activism. The participants' recognition of people's capacity for destruction

and innovation necessitates a pedagogy of ecopoetry that considers human motivations, behavior, and attitudes in responding to numerous environmental issues.

The fourth theme dealing with valuing the environment for sustainability and resilience emphasizes the participants' appreciation of environmental conservation. The participants' insight demonstrates the potential of ecopoetry to initiate a shift in perspective toward the conservation of the environment. This shift in perspective exemplifies that the use of ecopoetry in the classroom can help raise environmental consciousness and foster an appreciation for environmental conservation. The challenge for ESL teachers is to use literary texts to instill ecological consciousness in their students and encourage them to become proactive and responsible environmental citizens to promote a sustainable future.

Translating insights on ecopoetry into classroom learning opportunities

Preservice ESL teachers' perspectives in designing classroom activities and assessment tools that capitalize on the use of ecopoetry for instilling ecological consciousness and promoting environmental advocacy were also explored in this study. Results on this are presented in Table 3.

Table 3
Preservice ESL teachers' classroom opportunities in teaching ecopoetry

Themes	Sub-themes	Exemplar Texts
Learning Tasks	Collaborative Viewing	analyzing video presentation ^[P11] comprehending real life images ^[P2, P8, P16] showing photos [of] calamities ^[P5] asking questions and soliciting opinions ^[P6]
	Representing Activities	performing a role-play ^[P13, P17] illustrating the theme ^[P2] making a short skit or performing a song ^[P4, P3, P9] debating on different views and opinions ^[P5] writing acrostics and making word puzzles ^[P12] delivering a speech on preserving the beauty of nature ^[P10] simulating the spokesperson of the Department of Environment and Natural Resources ^[P10]
Assessment Tools	Reflective Writing	writing a reflection or essay ^[P16, P11] assigning reflection paper or reaction paper ^{[P5, [P2, P1]} assessing the students' affective domain ^[P4] making journal entries reflecting their insights ^[P13]
	Performance Tasks	doing self-report ^[P14, P3, P17] delivering oral presentations ^[P10, P14, P3] performing role-plays ^[P8, P15, P9, P10] conducting interviews ^[P10] conducting an oral reading of an essay ^[P10, P6] delivering a testimonial ^[P7] reading a self-made acrostic poem ^[P12]

Legend: [P] followed by a number represents the participant number assigned to each individual in the study.

The preservice ESL teachers identified various learning tasks that can be employed to teach ecopoetry in the classroom. These learning tasks that can be facilitated in promoting environmental awareness by using ecopoetry in ESL classrooms comprise of collaborative viewing and representing activities. Collaborative viewing of videos, real-life images, and photos of environmental calamities was considered as a relevant task for developing students' understanding of ecopoetry. The participants also suggested that students can perform representing activities such as role-playing, illustrating themes, making a short skit, performing a song, debating different views and opinions, and writing acrostic poems as stimulating learning tasks in making the students aware of environmental issues while analyzing ecopoetry. These tasks focusing on perspective-taking can help in enhancing students' critical thinking and creativity while developing their sense of responsibility toward environmental conservation for sustainability.

The preservice ESL teachers also identified various assessment tools that can be used to assess students' understanding of ecopoetry. These assessment tools constitute reflective writing and performance tasks. Reflective writing covering reflection papers and journal entries is seen as important in assessing students' affective domain. Meanwhile, performance tasks such as self-reporting, delivering oral presentations, performing role-plays, conducting interviews, and reading a self-made acrostic poem were deemed appropriate in looking into students' cognitive and psychomotor attainment in understanding environmental issues using ecopoetry. These learning tasks and assessment tools can provide an opportunity for the preservice ESL teachers to examine students' understanding of ecopoetry and their attitudes towards environmental conservation.

DISCUSSIONS

Based on the results of the study, the researcher was able to capture the preservice ESL teachers' pedagogy of ecopoetry. This pedagogy centering on the promotion of environmental awareness using ecopoetry in ESL classrooms is illustrated in the paradigm in Figure 1.

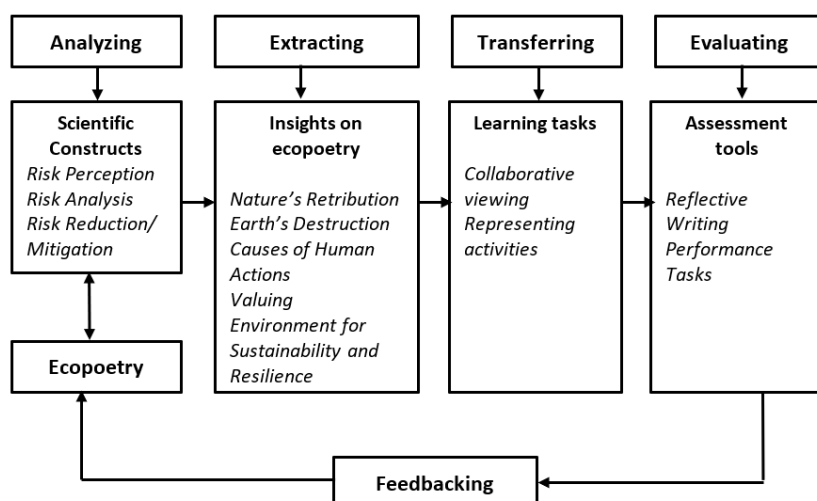


Figure 1 Pre-service ESL teachers' pedagogy of ecopoetry

The paradigm outlines the preservice ESL teachers' pedagogy of ecopoetry which covers analyzing, extracting, transferring, evaluating, and feedbacking. The teaching of ecopoetry starts with the preservice teachers' analysis of an ecopoem to be used as a literary text in ESL teaching. Preservice teachers negotiate meaning or interact with the ecopoem by integrating their knowledge of environmental issues and their personal experiences with different environmental problems. These knowledge and experiences served as their scientific constructs. The scientific constructs reveal their critical skills for risk perception, risk analysis, and risk reduction and mitigation. The preservice ESL teachers' capacity for perceiving the risk of environmental hazards demonstrates their potential for integrating ecological literacy in ESL classes which is beneficial for their students. Al-Jamal and Al-Omari (2014) noted that integrating environmental issues and ecological themes into language learning is essential in enhancing students' awareness and understanding of the natural environment which can encourage these students to take action toward environmental protection. Likewise, Lustyantje (2015) stressed the importance of promoting environmental education in language learning to foster positive attitudes and behavior toward environmental sustainability among students.

Another scientific construct enabling the preservice teachers to make sense of the ecopoem is their ability for risk analysis. This ability enabled them to trace the causes of natural and man-made hazards. Understanding the causes of environmental hazards is crucial in promoting ecological literacy in ESL classes. The recognition of natural and man-made causes of calamities by preservice ESL teachers leads them to a deeper understanding of ecological concepts and the interconnectedness of environmental issues. Putri (2018) contends that incorporating environmental education in language teaching is important in enhancing students' understanding of global issues, promoting critical thinking, and increasing awareness of their role in environmental sustainability. Moreover, Micalay-Hurtado and Poole (2022) stress the potential of incorporating eco-literature in language classes to develop students' ecological awareness, empathy, and positive attitudes toward environmental protection.

Risk reduction and mitigation also served as a scientific construct permitting the preservice teachers to comprehend the ecopoem. Preservice ESL teachers' recognition of the importance of preventive measures, preparedness, and immediate response for risk reduction and mitigation can help them in designing classroom activities that can guide their students to conceptualize ways to reduce the impact of environmental hazards for sustainability. Damico (2020) argues that educating students on environmental protection and disaster management can lead to greater ecological awareness promoting behavioral changes for sustainable living. Through facilitating collaborative learning and active engagement in environmental projects, students can develop a sense of responsibility and accountability towards the environment.

After the analyzing phase, the pedagogy of ecopoetry continues with the extracting phase. In this phase, preservice teachers gain environmental insights enabling them to connect poetry with science. These environmental insights may comprise their awareness of nature's retribution, the earth's destruction, causes of human actions, and valuing the environment for sustainability and resilience. ESL teachers can capitalize on their knowledge of nature's retribution in raising students' awareness about natural calamities while developing the latter's language proficiency. In particular, teachers can use ecopoetry to help ESL students understand the inevitability of

natural disasters and their adverse effects on people. By discussing the themes and messages of ecopoems, ESL students can develop their vocabulary, critical thinking, and communication skills while also gaining knowledge about the environment for disaster preparedness (Putri, 2018). Meanwhile, preservice teachers' awareness of the earth's destruction may elicit critical reflection among teachers and students on the potential harm that human actions and desires caused the environment. Similarly, Goulah (2017) found that students' interpretations of poems about environmental issues elicit critical reflection on the role that people play in environmental degradation. The catastrophic consequences of human actions, such as ambition and hatred, indicate a growing awareness of the urgency of adopting sustainable and responsible environmental practices.

Another insight gained by preservice teachers is the duality of the results of human actions which can either contribute to environmental degradation or drive environmental activism. Awareness of this dual nature of human agency can strengthen people's understanding of their relationship with the environment. As noted by Stibbe (2004), understanding the complex relationship between humans and the environment is critical to addressing environmental challenges effectively. By exploring the complexities of human nature and its impact on the environment, preservice ESL teachers can promote a deeper understanding of the root causes of environmental issues among students. The preservice ESL teachers also exhibit their insight on valuing the environment's sustainability and resilience. This insight underscores the importance of instilling ecological consciousness as well as the significance of literary texts in promoting environmental advocacy. Incorporating literary texts with environmental advocacy can foster an appreciation for environmental conservation. This challenges ESL teachers to use literary texts such as ecopoetry to instill ecological consciousness among students and inspire them to become proactive and responsible environmental citizens, promoting a sustainable future (McGuire, 2015).

The next phase in the pedagogy of ecopoetry is to transfer the insights gained from analyzing the ecopoem and integrating scientific constructs into learning tasks. Collaborative viewing and representing activities are examples of learning tasks that can enhance students' learning achievement while becoming conscious of the environment. The transition from ecopoem analysis to learning tasks is pivotal in solidifying ecological literacy. When tasked with collaborative viewing, specific video presentations can be chosen to complement the eco-poems covered in the course syllabus. For instance, if the course explores ecopoems that emphasize the impact of climate change on wildlife, a corresponding video presentation could focus on real-world examples of conservation efforts or the consequences of environmental degradation. This targeted alignment ensures the integration of visual and literary stimuli, reinforcing the participants' understanding of ecological concepts. Asking precise questions and soliciting opinions are also integral components of this pedagogical approach. To illustrate, if an eco-poem addresses issues related to deforestation, questions could be tailored to provoke thoughtful reflections and discussions. For instance: "In what ways does the imagery in the poem convey the urgency of addressing deforestation? How might collaborative efforts contribute to combating deforestation and promoting sustainable practices?" By providing specific examples linked with the poems discussed in class, the learning experience becomes more targeted. These questions prompt preservice ESL teachers to probe the ecological themes explored in the ecopoems and foster a deeper connection between their literary and scientific constructs.

Drawing on Darko and Wang's (2021) insights, collaborative learning emerges as a key strategy. The choice of collaborative viewing and representing activities aligns with the collaborative learning approach, aiming to improve students' learning outcomes while enhancing critical thinking and problem-solving skills. Through collaborative engagement with both ecopoems and complementary visual materials, preservice ESL teachers can collectively explore, analyze, and construct meaning, contributing to a more holistic and enriched understanding of ecological concepts.

In the evaluating phase of the pedagogy of ecopoetry, assessment tools such as reflective writing and performance tasks are useful to measure students' understanding of the insights gained from analyzing the ecopoem. Reflective writing enables students to express their thoughts and feelings about the ecopoem, which can provide insights into their level of understanding. This writing task can be refined to align with specific ecopoems covered in the course. For instance, if the class explores ecopoems emphasizing the interconnectedness of humans and nature, a reflective writing assignment could prompt students to articulate how the imagery in a specific ecopoem has deepened their understanding of the symbiotic relationship between humans and the environment or discuss how their personal experiences align with or differ from the themes presented in the ecopoem. Through tailoring reflective writing prompts to the nuances of the ecopoems studied, educators gain deeper insights into students' connections and interpretations of the ecological themes.

Performance tasks, on the other hand, provide opportunities for the students to demonstrate their understanding of the ecopoem. These tasks can be more precisely linked to ecopoetic concepts. For example, if the course explores ecopoems that address environmental activism, a performance task might involve designing and presenting a visual representation (e.g., artwork, infographic, or multimedia presentation) that captures the essence of an ecopoem and its call for environmental action, or creating a spoken-word performance inspired by a specific ecopoem incorporating themes of sustainability and ecological responsibility. These performance tasks not only evaluate understanding but also encourage creative expression, reinforcing the integration of ecopoetic concepts into students' artistic and communicative endeavors.

According to Amua-Sekyi (2016), assessment tools are crucial in evaluating students' learning outcomes and identifying areas that need improvement. It is then suggested that the assessment tools themselves need to be aligned with the nuances of ecopoetry. This alignment contributes to a more comprehensive and focused evaluation, allowing educators to pinpoint specific strengths and areas requiring further development in students' understanding of ecopoetic insights.

The last phase of the pedagogy centering on ecopoetics is feedbacking. Pre-service teachers evaluate the effectiveness of their teaching approach and identify areas that need improvement. This feedback is essential in improving teaching practices and enhancing student learning outcomes. According to Zhengdong et al. (2021), feedback is one of the most effective ways of improving learning outcomes.

This pedagogy of ecopoetics is believed to be important in developing students' environmental literacy which enhances their understanding of environmental issues. By integrating science into the teaching of literature, ESL teachers can provide students with a deeper understanding of environmental problems and issues that can encourage them to take action toward sustainability (Myren-Svelstad, 2020).

CONCLUSION

The framework developed by the researcher illustrates the pre-service ESL teachers' pedagogy of ecopoetry. Preservice ESL teachers utilize their scientific constructs, specifically their knowledge of risk perception, risk analysis, and risk reduction in analyzing Robert Frost's "Fire and Ice". This approach allows them to gain insights into nature's retribution, the earth's destruction, the causes of human action, and the value of the environment for sustainability and resilience. To instill ecological literacy in their future students, the pre-service ESL teachers plan to provide learning tasks and opportunities that focus on collaborative viewing and representing activities. They can assess their students' learning through reflective writing and performance tasks.

Based on the findings of this study, ESL in-service and pre-service teachers may collaborate with science teachers and other subject experts to design learning opportunities that enrich students' scientific constructs through the teaching of ecopoetics. Supplementary materials on ecopoetics may be developed to promote scientific literacy, with a focus on ecology among basic education students. The framework developed by the researcher can be subjected to validation by experts and practitioners and considered when implementing curricular activities in pre-service ESL teacher training. A case study or phenomenological research can be conducted to further explore how the teaching of ecopoetry can be facilitated in both basic and tertiary education.

ACKNOWLEDGEMENTS

The author acknowledges the use of AI-assisted tools, including OpenAI's ChatGPT and Grammarly by Grammarly Inc., in refining several sentences and paragraphs in this article. These tools were used to improve clarity, coherence, and academic tone. However, all ideas, interpretations, and conclusions remain the original work and responsibility of the author.

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