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A systematic review on integrating environmental sustainability in English Language Teaching: strategies for Sustainable Development Goals

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The study explores the integration of environmental sustainability in English Language Teaching (ELT) curriculum. Through a systematic review of 56 peer reviewed articles, conference publications and case studies between 2018 and 2024, the study presents the sustainability practices in English Language Teaching by examining the current practices, methods, and challenges. Data were collected from Scopus, Web of Science and Education Resources Information Center (ERIC) using search engines such as Google, Google Scholar and Semantic Scholar. Findings reveal that empirical studies dominate the research landscape, highlighting innovative approaches such as Eco-ELT, Environmental Education (EE) and Content and Language Integrated Learning (CLIL). However, challenges such as limited resources, alignment issues between sustainability and language-learning objectives, and inadequate teacher training persist. The research identifies key strategies such as interdisciplinary curriculum design, project-based learning, and the use of authentic environmental texts to enhance both language proficiency and environmental awareness. The study underscores the importance of developing open educational resources, specialized teacher training, and eco-literacy frameworks to overcome these barriers. Finally, the research calls for further interdisciplinary studies and policy support to enhance sustainability integration in language education.

KEYWORDS

systematic review, environmental sustainability, English Language Teaching (ELT), Eco-ELT, CLIL, eco-literacy, interdisciplinary learning, Sustainable Development Goals (SDGs)

1 Introduction

Integrating environmental sustainability into English Language Teaching (ELT) is increasingly recognized as a vital component of education, aiming to foster global citizenship and environmental awareness among students. ELT serves as a foundational platform for fostering cross-cultural communication and understanding, thus offering a unique opportunity to instill environmental consciousness and action among learners. By integrating environmental themes into language teaching materials and activities, educators can imbue language learning with real-world relevance, connecting linguistic skills with urgent global issues. This approach not only enriches language acquisition

but also cultivates ecological literacy, empowering learners to comprehend, discuss, and address environmental challenges effectively.

Integrating environmental sustainability into ELT aligns with the broader goals of Education for Sustainable Development (ESD) as outlined by UNESCO. By cultivating key sustainability concepts, ESD aims to develop ways to craft a more sustainable future for learners. Language learning programs integrating environmental concepts such as climate change or loss of biodiversity and resource conservation approaches provide active support to ESD goals. Through authentic environmental texts, multimedia resources, and project-based learning activities, students engage in meaningful language use while deepening their understanding of environmental issues and their interconnectedness with global societies.

English Language Teaching (ELT) offers numerous benefits for both students and educators in integrating environmental sustainability. Firstly, it enhances nature empathy and refines language skills such as writing (Saiful and Yunianti, 2025). Secondly, it develops students' ecological views (Saiful, 2025) and finally, it helps students to feel more connected to nature which is an essential emotional trait necessary for environmental sustainability (Saiful and Shein, 2025). Teaching language skills through authentic materials has more importance as students are exposed to the knowledge beyond the four walls of the classroom. Integrating real-world materials such as environmental texts, videos and resources into pedagogical content not only engages the learners in meaningful learning activities but also promote deeper understanding and better retention of language concepts (Sánchez Auñón and Férrez Mora, 2024).

The integration of environmental sustainability in English Language Teaching results in interdisciplinary learning as it brings together language learning with Science, Geography, Social Science, and other subjects. This inter-connected learning method aids students in making links between language development and environmental ideas toward global knowledge. Environmental language creates the power to transform meaningful advancement inside their community and promote a holistic understanding of the world. When students explore environmental issues, they analyze arguments and evaluate solutions which helps them to develop critical thinking. This empowers them to become active agents of change and contribute actively to environmental conservation efforts. Moreover, by integrating environmental sustainability into ELT, a sense of global citizenship and intercultural competence can be cultivated. By learning about environmental issues from different cultural perspectives, students develop empathy and understanding for diverse viewpoints, fostering mutual respect and cooperation across cultural boundaries.

Several studies investigated the concept of environmental themes in English as a Second Language (ESL) and English as a Foreign Language (EFL), very few studies have discussed the integration of environmental sustainability into ELT (Mohamed and Halim, 2023; Raphael and Nandan, 2024). The need for conducting this systematic review lies in the timely intersection of global environmental issues and the transformative potential of English Language Teaching (ELT) interfaces with current teaching norms. Although, sustainability education has been gaining ground in the STEM (Science, Technology, Engineering,

and Mathematics) fields, its integration to language education is relatively underexplored despite the advantage ELT has in providing cross-cultural communication and global citizenship. The 2030 Agenda for Sustainable Development emphasizes the need for accelerated progress in SDGs 4 (Quality Education) and 13 (Climate Action), making this review critical. Compiling comprehensive reviews of 2018–2024 empirical research, this study identifies gaps, barriers and actionable strategies to align ELT with sustainability. Without such consolidation, the efforts to align language education with sustainability remains fragmented, thereby lowering the potential of scalable solutions.

This study offers a novel contribution by providing a comprehensive and systematic synthesis of the core approaches to integrating sustainability in ELT, including Eco-ELT, Environmental Education (EE), Content and Language Integrated Learning (CLIL) and project-based learning across diverse global contexts, showing the significant differences between these that have not often been addressed by previous research. It goes beyond mere conceptual descriptions (e.g., Eco-ELT) by providing empirical data on its effectiveness and challenges, and identifying potential systemic barriers – including disciplinary silos and assessment pressures that hinder the implementation. Unlike other reviews that only targeted classroom approaches (Yu et al., 2024) or teacher perceptions without a geographical focus (Mercer et al., 2023), the current review synthesizes both to provide a unified evidence base for the development of unified frameworks to bridge practice and policy. Moreover, this systematic review was conducted following the principles outlined by Page et al. (2021), which emphasize a pre-defined, transparent, and replicable protocol to identify, select, and critically appraise all relevant research on a specific topic to answer formulated research questions.

2 Literature review

The integration of environmental sustainability and English Language Teaching (ELT) has transformed from a niche fixation to an urgent pedagogical necessity, in response to the world's ecological emergencies and the United Nations' Sustainable Development Goals (SDGs). This inter disciplinary approach relocates language learning as a critical vehicle for promoting ecological literacy, critical global citizenship and transformative professional activism. An increasing amount of literature addresses the theory, practice, and challenges faced in integration which constitutes an emerging and vibrant sub-area.

Research on theoretical frameworks in English Language Teaching (ELT) and sustainability has gained significant attention over recent years due to the increasing global emphasis of education in relation to environmental, social, and economic problems. In recent years, the treatment of ELT has moved from traditional grammar-based practice to multi-level strategies that embed sustainability skills and knowledge in English learning as a step toward a more holistic education aligned with the United Nations SDGs (Roy and Mitra, 2025; Yu et al., 2024; Lloret-Catala and Alcantud-Diaz, 2023). This evolution underscores the relevance for enabling learners with language skills among other competences such as critical thinking, intercultural awareness

and environmental responsibility they need in order to promote sustainable global citizenship (Vasiljević, 2025; Zunaidah, 2024).

The early research (2015–2020) on exploring environmental themes was investigated by how ecological themes were integrated to ELT. Researchers such as Finardi (2015) proposed technology-based models such as inverted CLIL, others like Saiful (2020), Dewi (2018) developed Eco-ELT, and Ecohumanism using literature to foster environmental awareness. One of the highlights of this period was undoubtedly making the first interdisciplinary connection. However, many of these early models were theoretical and limited in size; lacking empirical evidence and validation.

The second phase i.e., the emergent Phase (2022–2023) saw a significant shift toward transformative and interdisciplinary pedagogies. During this period, the research expanded by involving critical viewpoints, such as eco-critical language awareness (Micalay-Hurtado and Poole, 2022) and ecolinguistics (Römhild, 2023). Innovations included teacher training using MOOCs focused on Sustainable Development Goals (SDGs) and ecological criticism courses for the construction of pedagogical content knowledge (Saiful and Setyorini, 2022). The advantage of this phase was the rigorous understanding of theoretical underpinnings and increased tendencies toward empowering the teachers. A notable weakness was the tendency to continue qualitative or small case-studies use which restricted generalizability, evident in studies of teacher perceptions under specific circumstances such as that of Turkey (Arslan and Curle, 2024).

The advanced phase (2024–2025) of research focused on refined, contextualized theory and practical applications. Models such as Narrative Language Ecology (Eslit, 2025) position ethics at the heart of ELT. At the practical level, research supports the use of literary texts to develop pre-service teachers' awareness with respect to SDGs (Arikan and Zorba, 2024) and for the integration of sustainability into English language and literature classroom curricula (Cordova, 2024). The main strength is the shift toward holistic, value-based and culturally-responsive integration, but an important threat still remains the lack of large-scale empirical studies and longitudinal data to validate the impact of these innovations on learners' competences and sustainable behavior over time.

The literature supports the significance of incorporating sustainability into ELT via innovative pedagogies that can develop language and ecological consciousness concurrently. Yet in the field there exists a fundamental tension between sophisticated theoretical models, on the one hand, and teacher readiness and systemic support on the ground realities, on the other. The present systematic review thus strives to collate these international initiatives, reveal continuing disparities between policy and practice, as well as consolidate evidence on successful approaches and strategies for bridging this gap so that ELT can convincingly contribute toward sustainable futures.

3 Objectives of the study

1. To explore the integration of environmental sustainability in ELT curriculum.

2. To examine the current practices in integrating environmental sustainability in ELT.
3. To identify the challenges and barriers in integrating the environmental sustainability in ELT.

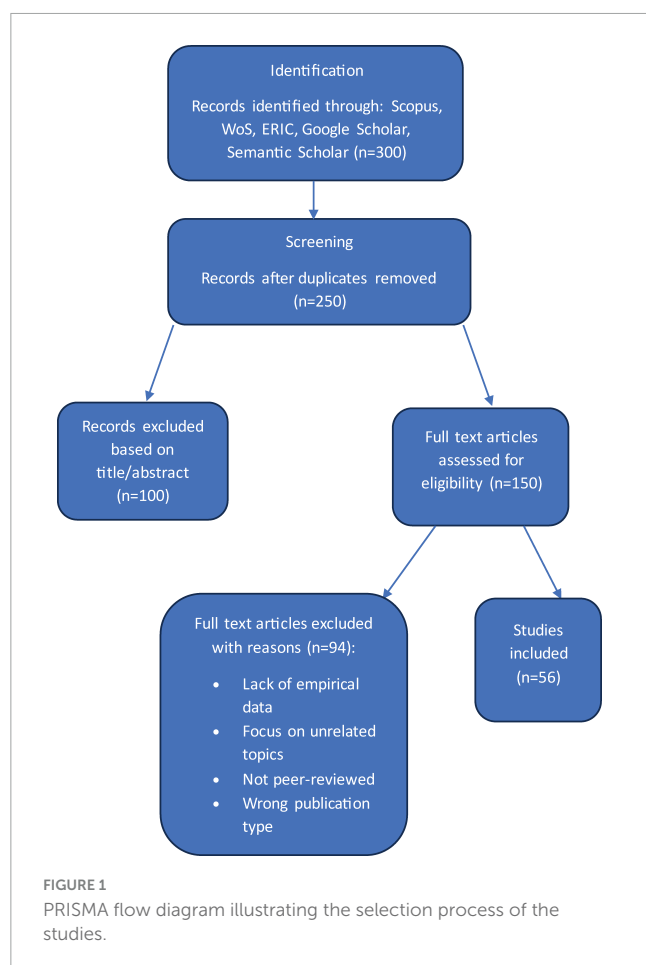
4 Research questions

1. To what extent environmental sustainability is included in ELT curriculum?
2. What are the methods used in the current practices to integrate environmental sustainability in ELT?
3. What are the challenges and barriers to integrate environmental sustainability in ELT?

5 Methodology

A systematic review of the literature was conducted to discuss the integration of environmental sustainability in English Language Teaching (ELT) between 2018 and 2024. The research articles for the study were chosen based on the theme of the study. For this, educational data bases including Scopus, Web of Science and Education Resources Information Center (ERIC) and search engines such as Google, Google Scholar and Semantic Scholar were used. The search was carried out using keywords and phrases including “English Language Teaching and sustainability,” “integrating environmental sustainability into English Language Teaching” (ELT) “English Language teaching and environmental awareness” and “English as a Second Language (ESL) and Sustainable Development Goals” to select the studies that focused on environmental themes. Boolean operators (AND, OR) were used to refine the relevant results. For example, the study used the combination of phrases like “Sustainability OR Environmental Education” or “Sustainability AND English Language Teaching” to find the articles related to the theme of the study. Thus, the data extracted were organized and coded based on the location and type of studies.

The study included English language peer reviewed articles, conference publications and case studies focusing on integrating environmental sustainability in English Language Teaching, published between 2018 and 2024. Non-peer reviewed articles, book chapters, editorials and opinion pieces were excluded from the study. The study followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines for the selection of articles. Initially, a total of 300 articles were retrieved from the data base. After removing the duplicates ($n = 50$), a set of 250 articles were selected. The researchers independently screened the titles and abstracts of the 250 articles to evaluate the theme relevant to the study. This examination resulted in selecting 150 articles to the next stage. After conducting a rigorous full-text review of these 150 articles, 94 articles were excluded that do not meet the standards such as lack of empirical data and focus on unrelated topics. This process resulted in selecting 56 studies that met the specific inclusion criteria and theme of the study. Figure 1 shows the selection process of the studies for the systematic review.



To ensure the reliability and validity, the researchers independently coded a subset of 15 studies from the total of 56 studies. Any discrepancies occurred were settled through mutual consensus, and the final codebook was then applied for the entire data set.

6 Data analysis

Data extracted from the selected sources were organized based on the theme, year of publication, location and types of studies. The studies were then coded based on the type of studies, region and theme. These codes were grouped into descriptive themes aligned with the research questions. The data was analyzed using quantitative and qualitative techniques. Quantitative analysis was done to identify the types of studies in ELT curriculum between 2018 and 2024. For this, frequency analysis was used. Microsoft excel was used for the quantitative frequency analysis as the volume of studies ($N = 56$) were manageable for the researchers. As a result, the studies that include primary or original data through surveys, interviews, classroom observations were categorized as Empirical Studies, studies that propose new conceptual framework, models or theories were categorized as Theoretical Studies, studies that systematically appraise, and synthesize existing research literature were categorized as Reviews and studies that focused on an in-depth analysis of specific programs were categorized as Case Studies. Next, qualitative

analysis was carried out in order to identify the integration of environmental sustainability in English language teaching materials across worldwide curriculum. Finally, to identify the themes pertinent to the research questions, a thematic synthesis approach was employed. These themes encompassed current practices in integrating environmental sustainability, methods used in the current practices and challenges faced in integrating environmental sustainability in ELT. The thematic analysis helped to understand the innovative methods in the pedagogies as well as to identify the gaps within the current knowledge base. The synthesis of information sought to address the research questions by assessing the efficacy of diverse methodologies, recognizing common challenges and effective solutions, and emphasizing areas necessitating further investigation.

7 Results

7.1 Types of studies

The line chart in [Figure 2](#) illustrates the types of studies conducted on integrating environmental sustainability in English Language Teaching (ELT) curriculum between 2018 and 2024. A total of 56 studies has integrated environmental sustainability in ELT curriculum.

As shown in [Figure 2](#), out of four different types of studies, empirical studies were the most common type of study conducted with a record of 29 studies followed by Theoretical Studies (14), Reviews (7) and Case Studies (6). Overall, the chart shows a decreasing number of studies as we move from empirical studies to case studies.

7.2 Incorporation of environmental themes in English language teaching materials across worldwide curriculum

[Figure 3](#) shows the integration of environmental sustainability in ELT curriculum across the continents between 2018 and 2024. Asia leads significantly with 44% integration, indicating a strong emphasis on integration of environmental sustainability in ELT curriculum, followed by North America (18%), Europe (18%), South America (16%), Africa (2%), and Australia 2%).

The data presented above suggests that Asian countries were more active in integrating environmental sustainability in their ELT curricula over the given period, while African and Australian regions had the least integration. Further, North America, South America, and Europe made moderate efforts in this direction.

Asia, in particular Indonesia, Malaysia and Japan dominates research on sustainability and this stems from the strong policy mandates (e.g., national curricula mandates for environmental education), pedagogical practice that draw on local culture and the pressing requirement to combat regional environmental threats such as deforestation and plastic waste. This is in stark contrast to Europe and North America, where research is active but is typically part of a broader transnational collaboration (e.g., Germany-US Going Green initiative) rather than localized studies. In African and Australian regions, progress is limited by resource constraints and

Types of Studies Conducted on Integrating Environmental Sustainability in ELT between 2018-2024

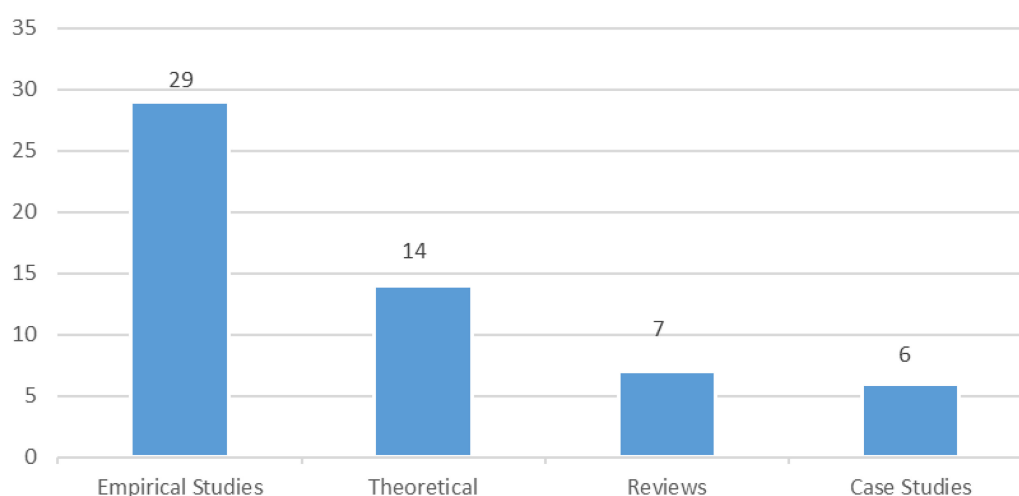


FIGURE 2

Types of studies conducted on integrating environmental sustainability in English Language Teaching (ELT) Curriculum between 2018 and 2024.

Integration of Environmental Sustainability in ELT Curriculum between 2018-2024

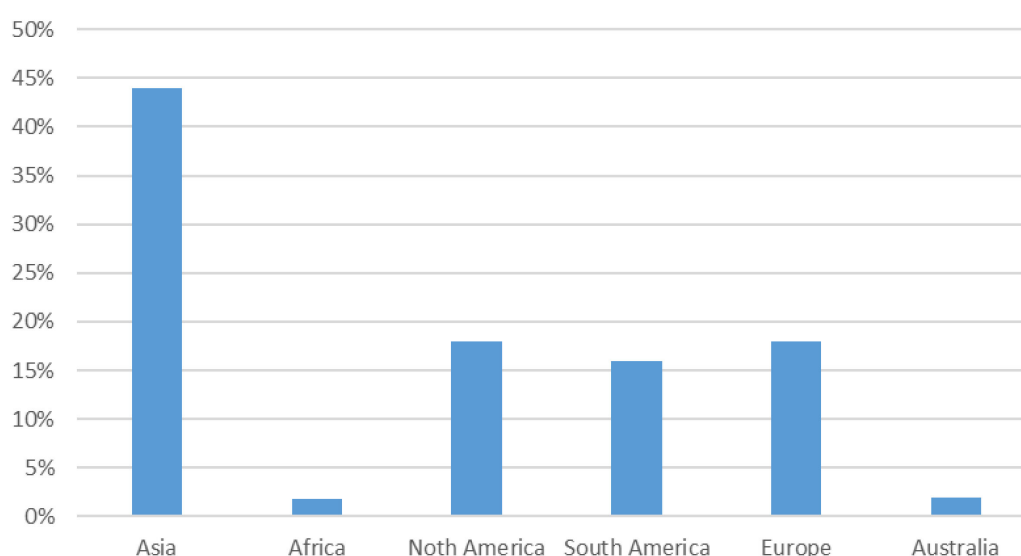


FIGURE 3

Integration of environmental sustainability in ELT curriculum between 2018–2024.

differing curricular priorities. Table 1 shows a complete overview of the geographical distribution of studies among these continents between 2018 and 2024.

Several studies focused on integrating environmental consciousness in ELT in Asia, between 2018 and 2024 (Chan and Miguel, 2022; Nur et al., 2022). The study conducted by Rantung et al. (2023) focused on incorporating environmental themes into language teaching materials by analyzing song lyrics from Indonesian rock bands like KePal-SPI, Navicula,

and Burgerkill. The study highlighted how these lyrics address ecological problems and advocate for nature conservation, making them valuable resources for language learners to develop Eco literacy alongside language competency. In line with the same, Setyowati et al. (2022) aimed to assess students' environmental attitude, writing performance on environmental topics, and their opinions on writing about environmental issues in an EFL writing course. The results revealed that students performed well in writing essays on environmental topics, and felt that writing about

environmental issues increases their ecological awareness and critical thinking skills. Many studies incorporated the concepts like Green ELT, Eco-ELT, Environmental Education (EE) and Project Based Learning to address the environmental issues in ELT (Raphael and Nandan, 2024; Artini et al., 2018; Saiful, 2020). By integrating ecological content, such as human-nature relations and environmental preservation into teaching materials, educators can enhance students' understanding of environmental issues while improving language skills (Febriyanti and Hidayat, 2023; Satriyani et al., 2020; Paramanathan and Syed-Abdullah, 2022).

Studies from North America and South America collectively indicated a growing recognition of the need to embed environmental themes in ELT to cultivate a more ecologically conscious and critically literate student body. For instance, Silva and Cristovão's (2019) investigation into ELT textbooks approved by PNLD 2015 (Programa Nacional do Livro Didático), a national program in Brazil that provides free textbooks to students in public schools underscored the predominance of rational perspectives on environmental issues than the socio-economic and cultural dimensions of environmental issues. Moreover, the study highlighted that the textbook contents ($n = 142$) come from institutional sources [for e.g., public and private organizations, non-governmental organizations (NGOs), government entities] rather than journalistic sources (for e.g., blogs, news, magazines, and other dynamic and interactive platforms). The use of inner circle sources may distance students from peripheral viewpoints and limit the development of historical view point of environmental concern. Similarly, a literature review by Albuquerque Junior et al. (2021) emphasized the importance of integrating professional and environmental education in high school technical courses, advocating for a teaching practice that intertwines socio-environmental responsibility with citizenship training. The study by Cristovão et al. (2022) on Brazilian EFL textbooks revealed that while the materials of the textbook incorporate external content to enhance eco-awareness, they often fall short of fostering critical environmental literacy necessary for motivating sustainable actions in students' daily lives. Moreover, Porto's (2024) empirical study in Argentina highlighted the use of creative arts and community engagement to develop students as ecological citizens, leveraging the UN Sustainable Development Goals to address environmental issues in the English classroom. The study used various materials such as Instagram videos, infographics and project videos. The results indicated that using the UN sustainable development as a framework for environmental education can address the environmental issues thereby promoting the language education. These findings are in consistent with the previous research that integrating environmental sustainability (Hasrina et al., 2024).

While the African and Australian curriculum focused more on the theoretical part of the sustainability, European schools increasingly integrated the environmental themes through various innovative approaches, reflecting a growing recognition of the importance of sustainability in education (High Court and Bryant, 2022; Konstanze, 2018). One notable example is the "Going Green—Education for Sustainability" project, a German-American blended learning initiative that engaged students in both Germany and the US in collaborative activities to develop green action plans and share them with their communities. This project not only enhanced interactional and communicative competencies

but also promoted learner agency and community-based actions, challenging stereotypes about sustainable development in both cultures (Joannis and Kohl, 2020). Furthermore, the use of evocative representation in media texts was employed by Kononova (2021) to identify and discuss relevant environmental topics, such as green energy and climate change, thereby expanding students' educational horizons and involving them in global environmental discussions.

A major drawback in these studies was that there have been less studies on incorporating authentic environmental texts and resources into ELT. To develop language skills and awareness of environmental issues, authentic environmental texts can be used which can foster critical thinking and global citizenship among students. Therefore, integrating authentic environmental texts and resources in English language teaching materials is recommended to enhance students' language proficiency and environmental literacy.

7.3 Current practices in integrating environmental sustainability in ELT

Due to the urgent need to address global environmental degradation, current practices in integrating environmental sustainability in English Language Teaching (ELT) are gaining attention. Putri (2018) used Collaborative Digital Storytelling (DST) as a practice to explore the integration of environmental education in English Language Teaching. The study involved 155 student teachers at one of the private institutions in Bali, Indonesia to address the local environmental issues and propose solutions. The research utilized DST where student teachers created digital stories about their local environment, specifically Subak. The data from the study demonstrated how digital storytelling platforms can investigate multiple local environmental variables ranging from economic control to political structures and societal systems. The study indicated that digital stories created by student teachers can serve as authentic materials for environmental education, contributing to a powerful campaign against environmental destruction. The DST showcases a practical approach to incorporate environmental sustainability in ELT. However, the study reported that participants faced challenges such as technical issues, different opinions and imagination on ideas to be included in the stories and lack of knowledge of the local environment.

A new concept called Eco-ELT was introduced by Saiful (2020) which integrates Ecocriticism into English Language Teaching (ELT) to promote environmental awareness. It emphasizes the importance of English teachers becoming "green" moral agents by using literature to teach English skills and instill virtues of loving nature in students. Eco-ELT involves designing eco-lesson plans, selecting appropriate literary works with environmental themes, and creating eco-teaching materials. The methods used in this approach included exchanging group findings, playing a short story video about animals and habitats, discussing answers and recommendations for animal and habitat protection with students, and providing instructions for group discussions and answering specific questions related to the content. This innovative approach not only teaches English but also raises awareness

TABLE 1 Geographical distribution and focus of selected studies between 2018 and 2024.

Region	Percentage of studies	Key countries/areas	Common research focus
Asia	44%	Indonesia, Malaysia, Japan, Bangladesh	Action-oriented pedagogy: Eco-ELT, project-based learning, analyzing local texts (e.g., song lyrics), and integrating EE into national curricula.
Europe	18%	Germany, United Kingdom, Spain, Turkey	Collaborative and critical approaches: Transnational projects (e.g., blended learning), critical analysis of materials, and CLIL.
North America	18%	United States, Canada	Project-based learning and analysis: Textbook/content analysis, technology integration, and SDG-focused modules.
South America	16%	Brazil, Argentina	Critical discourse and community engagement: Critical analysis of textbook narratives and community-based pedagogical projects.
Africa	2%	Morocco, Kenya	Contextual challenges: Evaluating textbook inclusion and exploring resource-related barriers to implementation.
Australia	2%	Australia	Theoretical critique: Analysis of environmental representations and tropes in teaching materials.

about environmental issues, making it a current practice in integrating environmental sustainability into ELT (Bulan et al., 2024). Moreover, Eco-ELT endeavors to utilize literary works including poetry, prose, films and novels to provide an opportunity to address ecological issues within a learning environment.

Using Eco-ELT approach, Pratolo et al. (2024) conducted a study to identify how an ELT textbook chapter emphasizes individual responsibility for environmental issues, focusing on personal actions like waste management and recycling. The study utilized Critical Discourse Analysis (CDA) to investigate the environmental narratives in the text book for Grade 11. A detailed linguistic analysis was carried to examine how the eco-lexicons, grammatical structures, and discursive strategies, such as the use of evaluative adjectives, modal verbs, and passive constructions, contribute to the framing of environmental issues. The results revealed that although the textbook intends to encourage environmental consciousness, it constrains students' understanding of the wider and interconnected scope of environmental matters. The study emphasized the importance of including a broader perspective of environmental narratives in ELT using Eco-ELT. Thus, Eco-ELT encourages interdisciplinary learning across the curriculum by integrating language learning with environmental education. As this approach uses mixed methods, it helps the students to make connections between subjects, and thus develop a more comprehensive grasp of both language and environmental literacy. For educators, Eco-ELT is an opportunity to learn innovative teaching ways and to upgrade their professional skills.

Content and Language Integrated Learning (CLIL) has been increasingly recognized as another effective method for integrating Sustainable Development Goals (SDGs) in English Language Teaching (Yu et al., 2024). By combining language development with content provision, CLIL represents an effective model for addressing environmental issues, including those that center around sustainability, in the language classroom. CLIL facilitates language acquisition and content understanding by allowing the students to immerse themselves deeply in complex issues such as sustainability through the utilization of authentic linguistic resources. This dual focus fosters higher language proficiency and better retention of the content compared to the conventional

teaching (Shykun, 2023; Dzulkurnain et al., 2024). Kaur et al. (2024) conducted a study to examine the effectiveness of CLIL in enhancing environmental knowledge and student engagement compared to traditional teaching methods, involving 100 middle school students. The students were divided into two groups i.e., CLIL and control groups. An Environmental Knowledge Test was used to assess the students' knowledge on environmental issues including climate change, biodiversity and sustainability. The assessment was conducted for both groups prior to and subsequent to the eight-week intervention in order to evaluate any changes in knowledge acquisition. During the intervention period, students in the CLIL group were exposed to the activities such as reading environmental texts, discussing ecological issues and working on projects that combined language acquisition with environmental themes. On the other hand, the control group experienced the traditional teaching method to learn the environmental themes. The findings indicated that learners who were taught through the CLIL approach performed significantly better in environmental knowledge, with their average post-test mean being 81.9, in contrast to that of the traditional group whose mean was 66.2. This demonstrates that as CLIL based instruction is interdisciplinary, it is more effective in enhancing students' understanding of environmental issues. This pedagogical approach not only enhances linguistic abilities but also develops critical thinking skills and intercultural awareness by making it a suitable technique for teaching SDGs in ELT classroom.

Several studies highlighted the importance of integrating environmental education (EE) into language teaching to raise awareness about environmental concerns and promote green pedagogy in ELT (La Rosa-Ponce and Abreus-González, 2022; Afrin and Saha, 2023). Nur et al. (2022) conducted a study that utilized a video data analysis (VDA) approach to analyze recorded talks of university lecturers and environmentalists discussing environmental education imperatives and efforts in handling plastic waste. The researchers conducted a thematic analysis based on the VDA findings, which led to suggestions such as including environmental issues in language curriculum, providing environmentally-relevant materials, offering environmental language teacher professional development, and accelerating

environmental literacy programs at all education levels. Project-based learning has been proposed to bridge this gap by merging content with language instruction, thereby enhancing both language skills and environmental awareness (Özcan and Gürsoy, 2024).

Focusing on two programs, Language for Engineering and Language in Context Sustainability module, Kaur et al. (2022) conducted a study to discuss the experience of embedding sustainability into the mainstream curriculum at the University of Leeds, UK. The programme was designed for pre-sessional postgraduate and undergraduate international students to develop academic and sustainability literacies through subject-specific lexis expansion and criticality skill development. The study used teaching specialized vocabulary to discuss the sustainability topics to develop critical thinking skills related to sustainability. The results suggested that integrating sustainability into the mainstream curriculum can significantly enhance students' academic and sustainability literacies. These findings are in line with the previous research that suggested CLIL as a robust framework for integrating Sustainable Development Goals (SDGs) in ELT (Mambu, 2022).

Rudenko (2023) in his paper titled "Embedding sustainability into English environment: a holistic approach" discussed the need for a more holistic approach to integrating sustainability into English Language Teaching (ELT). The study highlighted that current practices often treat sustainability as discrete environmental issues, neglecting social justice aspects. The results revealed that sustainability topics in English textbooks are limited, with a dominant neutral sentiment that may hinder educational impact. Practical suggestions included incorporating Sustainable Development Goals (SDGs) into existing materials, adding discussion questions, expanding grammar and vocabulary activities related to the environment, and promoting individual responsibility through activities like calculating carbon footprints.

Mohamed and Halim (2023) focused on integrating ecological education content into ELT textbooks, specifically addressing environmental themes like knowledge, awareness, attitudes, and behaviors. By using a content analysis design, the research evaluated the extent to which Saudi ELT textbooks incorporate environmental education. The results indicated that the integration of environmental education in the textbooks helped the learners to enhance the basic ecological knowledge, awareness, attitudes, and behaviors. These findings further emphasize the necessity to integrate interdisciplinary methods to integrate sustainability in ELT.

A systematic study conducted by Yu et al. (2024) reviewed studies on integrating sustainability into English Language Teaching (ELT) to address global environmental challenges through language learning. The study found the current practices such as interdisciplinary curriculum designs, innovative classroom activities, specialized teacher training, and novel assessment methods. These approaches enhance language proficiency while raising students' awareness of sustainability issues. Despite challenges like limited resources and alignment issues between sustainability topics and language-learning objectives, strategies such as developing open educational resources and professional development programs show promise in overcoming these obstacles. The paper emphasized the importance of embedding sustainability in ELT to cultivate responsible global citizens and

suggests the need for ongoing innovation, research, and policy support in this area.

As presented in the literature review, some of the suggested methods for improving students' awareness of the Environment through ELT are: integration of Environmental Education (EE) content, use of conceptual content analysis, focusing on environmental education themes and linking awareness to action (Corpuz et al., 2022). Additionally, Eco-ELT serves as a platform to disseminate critical environmental issues and the urgency of preserving nature. Therefore, designing eco-lesson plans that integrate English language learning objectives, selection of eco-teaching materials and incorporation ecological activities are some recent practices to ensure that students not only develop language skills but also cultivate environmental awareness and a sense of responsibility toward nature. Moreover, including principles of CLIL can be adapted to teach SDGs by promoting critical thinking, cultural awareness, and moral development through English language instruction. By combining language learning with content instruction, CLIL offers a dynamic platform for addressing global issues, such as sustainability, within the language classroom.

7.4 Challenges and barriers in integrating environmental sustainability into English Language Teaching (ELT)

Several studies highlighted the barriers and challenges in Integrating environmental sustainability in English Language Teaching (Özcan and Gürsoy, 2024; Chan and Miguel, 2022). The study conducted by Ag-Ahmad and Lidadun (2020) investigated the environmental aspects influencing successful English Language Teaching (ELT) in low enrolment schools in rural Sabah, Malaysia. The research investigated how seven primary school teachers with more than five years of teaching experience approached the concept of environmental sustainability. The study used an exploratory qualitative method (semi-structured interviews) to extract data regarding elements that influence ELT practices. The analysis revealed that key environmental aspects such as exposure to the target language, motivation, and clear goals significantly impact students' success in acquiring a second language. However, teachers expressed a tension between their beliefs about effective practices and the limitations imposed by contextual barriers. Major barriers identified included changes in education policy, insufficient financial support, lack of infrastructure, and inadequate monitoring of school activities. These challenges collectively impact the ability of teachers to deliver successful English language education in rural areas, emphasizing the need for systemic support and improvements.

Several other barriers restrict the proper inclusion of sustainable development materials in English language instruction. Şanal et al. (2023) carried out a qualitative descriptive study evaluated the perspectives of middle school English language curriculum on inclusion of sustainable development through interviews with students as well as teachers and academicians. Teachers and students reported several constraints against optimal foreign language teaching, including insufficient integration of economic and social dimensions of sustainability, psychological issues like ecophobia, and lack of resources, that hinder effective

incorporation of environmental sustainability into English Language Teaching.

Nakamura and Fujimoto (2024) analyzed the motivation behind teachers of English to integrate United Nations Sustainable Development Goals (SDGs) into their instructional methods. The study applied Social Cognitive Career Theory to examine self-efficacy and outcome expectations as its foundation. Forty English teachers together with a school leader shared their experiences through semi-structured interviews and classroom observations which provided deep qualitative understanding on SDGs. Key findings indicated that teachers' personal beliefs, achievement of teaching goals, and supportive school management significantly enhance their self-efficacy and motivation to implement SDGs in their English curriculum. The study pointed out that student disengagement with SDG remained a challenge and further research is needed to find learning approaches that capture student interest.

Parry and Metzger (2023) conducted a study discussing the barriers of sustainability from a teacher's perspective, highlighting challenges in integrating sustainability education into classroom practice. Common obstacles included disciplinary silos, high-stakes assessments, and inadequate professional learning opportunities for educators. These barriers hinder the implementation of multidisciplinary, learner-centered education for sustainability. Teachers play a crucial role in translating international policies on sustainability education into effective teaching practices, but they often feel unprepared to develop the competencies needed for fostering sustainable pathways for learners.

The study conducted by Mercer et al. (2023) highlighted the challenges faced by ELT teachers in teaching environmental issues in their classes. Some barriers identified included lack of suitable resources and materials, time constraints within the curriculum, and the need to balance linguistic and environmental teaching goals. Additionally, the study revealed that the teachers encountered resistance from students or colleagues who do not prioritize environmental education. These challenges highlight the complexity of simultaneously addressing language and environmental objectives in ELT settings, emphasizing the importance of adequate support and resources for educators in this endeavor.

Yu et al. (2024) identified the challenges and barriers such as limited resources, alignment issues between sustainability topics and language-learning objectives, and the need for specialized teacher training. They opined that such kind of barriers can hinder effective incorporation of sustainability into ELT. However, strategies like developing open educational resources and professional development programs have shown promise in overcoming these obstacles in their study. These findings emphasize the importance of addressing these challenges to empower students to achieve the Sustainable Development Goals through language learning.

8 Discussion

The in-depth literature review shows that integrating environmental sustainability into English Language Teaching (ELT) is a dynamic and globally relevant trend, although it is

characterized by diverse approaches and recurring challenges. This discussion synthesizes the presentation of these findings to get an overview of the current practices, regional differences and the existing challenges and barriers that prevent the implementation.

Current practices in integrating environmental sustainability into English Language Teaching (ELT) encompass multiple creative learning methods and a variety of innovative approaches to enhance both language proficiency and environmental awareness. As highlighted in the review, various pedagogical approaches and learning materials are used for the integration from 2018 to 2024. One effective method is the interdisciplinary curriculum design using Eco-ELT (Saiful, 2020; Bulan et al., 2024). Pratolo et al. (2024), which combines language learning with environmental education, thereby fostering informed and responsible global citizens. Similarly, the use of Content and Language Integrated Learning (CLIL) strategies has been successfully adapted for the teaching of sustainability content, evidencing successfulness in terms of enhancing environmental knowledge and language skills compared to the traditional methods (Finardi, 2015; Yu et al., 2024; Kaur et al., 2024). These approaches are implemented using project-based learning (Campoy-Cubillo, 2025) and digital tools such as Collaborative Digital Storytelling (Putri, 2018) where environmental issues are embedded within the language curriculum, syllabus, and textbook development, providing students with environmentally-relevant materials and resources (Jodoin, 2020).

At the regional level, these integrations vary. Practical, material-based integration is frequently prioritized in Asian countries where studies have investigated and produced contents such as song lyrics (Rantung et al., 2023) and school textbooks (Pratolo et al., 2024) to enhance eco-literacy. Research in the United States, particularly in Brazil, has taken a critical stance in scrutinizing textbook content for its over-reliance on institutional sources and its failure to address the socio-economic aspects of environmental issues contributing to a shallow development of environmental critical literacy (Silva and Cristovão, 2019; Cristovão et al., 2022). European projects, including the German-American "Going Green" (Joannis and Kohl, 2020) emphasize the importance of cross-cultural collaboration and learner agency by focusing on sustainability as a platform for linguistic- and intercultural competence.

While these advancements are noteworthy, challenges such as limited resources and alignment issues between sustainability topics and language-learning objectives persist. The most frequently cited challenge is the inherent tension between disciplinary goals. Educators face challenges in reconciling the language learning goals with multi-dimensional interdisciplinary features of sustainability education (Mercer et al., 2023; Yu et al., 2024). This often results in superficial treatment of environmental themes in the text books (Silva and Cristovão, 2019).

Literature evidence reveals how multiple barriers and obstacles hamper the implementations of environmental sustainability concepts in actions within the English Language Teaching (ELT) programs. The main difficulty resides in the combination of sustainability study topics with language skills development, as unlike most study topics in standard ELT curricula, sustainability requires interdisciplinary study, while standard ELT curricula give priority to linguistic instruction over environmental learning. Additionally, many educators feel unprepared to

teach sustainability concepts effectively, often due to inadequate professional development opportunities and a lack of resources tailored to combining language and environmental education (Parry and Metzger, 2023; Nakamura and Fujimoto, 2024). This sense of unpreparedness is compounded by institutional barriers such as disciplinary silos and a focus on high-stakes assessments, which limit the flexibility needed to incorporate multidisciplinary content into language classes (Şanal et al., 2023; Mercer et al., 2023). Despite the high potential, the integration of sustainability into ELT is hindered by the structural disadvantages that higher education has from institutional fragmentation and economic globalization, which hinder interdisciplinarity and divert sustainability teaching from basic content to supplementary needs. Given the fact that the adoption of sustainable practices requires expensive investments in modern resources and training, particularly for young students, many institutions are unable to afford such expenses and thus cannot embrace the use of such practices thus posing a barrier to those institutions (Ag-Ahmad and Lidadun, 2020).

Despite these obstacles, some ELT educators are motivated to integrate environmental issues into their teaching, employing specific strategies and materials to address both linguistic and environmental goals (Sánchez Auñón and Férrez Mora, 2024). However, their progress is hampered by multiple barriers such as resistance to change and lack of sound systems to support. Institutions should produce shared e-content, train teachers with updated methods, and make learning environments that value creative thinking and mixed methods teaching. In addition to the specialized teacher training programs and job opportunities for educators, educators require exhaustive training to incorporate sustainability at their core instructional practices. Moreover, the incorporation of environmental themes in ELT textbooks has been shown to minimally address learners' ecological knowledge, awareness, attitudes, and behaviors, suggesting a need for more comprehensive content (Micalay-Hurtado and Poole, 2022; Arslan and Curle, 2024). The application of deep learning algorithms to assess and evaluate students' natural factors in English teaching further enhances the quality of education by providing intelligent and smart teaching assessment schemes.

However, strategies like developing open educational resources and promoting environmental literacy programs at all educational levels show promise in overcoming these obstacles. The historical background and current issues associated with Environmental Education underscore the urgent need for a practical framework to guide teachers in effectively integrating these concepts into English-as-a-Foreign Language classrooms, thereby addressing the global environmental degradation crisis.

9 Suggestions and future recommendations

Integrating environmental issues in language education enhance learners' ecological consciousness and metacognitive skills. For this, strategies such as Content and Language Integrated Learning (CLIL) paired with green pedagogy are suggested. Fundamental elements for promoting sustainable practices in language instruction involve the incorporation

of environmental education (EE) into language curriculum material and the development of syllabi and textbooks in conjunction with teacher education programs in environmental literacy. The electronic materials developed from the local context based on the theme of environmental sustainability are found highly effective in contributing the development of learners' environmental mindset and responsibilities along with academic results at the primary educational institutions. Moreover, creating contextual thematic electronic teaching materials can effectively improve learners' environmental care attitudes, responsibility, and learning outcomes in elementary schools.

Teachers play a crucial role in integrating environmental issues alongside linguistic goals, employing specific strategies, motivations, resources, and facing challenges in ELT classrooms. Practical frameworks are needed to guide teachers in effectively combining environmental education with language proficiency skills, emphasizing the adoption of an environmentally-responsive pedagogy in ELT classrooms. Additionally, there is a call for the inclusion of environmental issues in language curriculum, syllabi, and textbooks, along with providing relevant materials, teacher professional development, and accelerating environmental literacy programs at all education levels.

Future research in integrating environmental sustainability into English Language Teaching (ELT) may focus on developing interdisciplinary curricula that effectively merge language skills and sustainability concepts. To evaluate the effectiveness of various pedagogical strategies such as interdisciplinary curriculum designs and innovative classroom activities for promoting language proficiency and environmental awareness, more number of empirical studies are needed.

Additionally, researchers may explore the integration of environmental themes in EFL textbooks, assessing their current content and proposing enhancements to foster eco-awareness. Furthermore, the development of eco-literacy frameworks tailored for ELT can empower educators to cultivate critical thinking and creativity regarding environmental issues. Research in line with the same will help to get more information on designing sustainability inclusive frameworks in ELT. Finally, establishing a cohesive Eco-ELT framework that encompasses diverse approaches and models will facilitate a unified movement toward sustainability in language education.

10 Conclusion

The study indicated that integrating environmental sustainability into English Language Teaching holds immense potential for fostering ecological literacy and promoting sustainable behavior among learners. To empower the young learners to address the local and global environmental issues, an ESD based language course incorporating environmental themes and action-oriented classroom activities are suggested. Finally, incorporating environmental themes and sustainable practices into language education can have a positive impact on educators, learners, and textbook developers, despite the challenges involved.

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