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Integrating Sustainability into English Language Teaching: A Quantitative Analysis of Outcomes

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Abstract

This research paper presents a quantitative analysis of the effectiveness of integrating sustainability themes into English Language Teaching (ELT). Acknowledging the growing importance of environmental consciousness, the study aims to evaluate how sustainability-focused ELT affects students' language proficiency and environmental awareness. Using data from various educational institutions that have adopted sustainability in their ELT curricula, the research employs statistical analysis methods to assess learning outcomes. The study's findings are anticipated to offer valuable insights into the dual benefits of ELT in fostering both language skills and environmental stewardship (Smith & Johnson, 2022).



KEYWORDS

Sustainability, English
language teaching,
quantitative analysis,
environmental awareness,
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Abstract

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Introduction

In the current global scenario, the intersection of education and sustainability has received an extraordinary level of attention, marking a significant shift in educational paradigms. This phenomenon is especially pertinent in the realm of English Language Teaching (ELT). Given its extensive international influence, ELT serves not only as a tool for communication but also as a conduit for disseminating global ideologies, including sustainability concepts. The growing inclination towards integrating sustainability into ELT mirrors a larger movement towards more inclusive and responsible educational frameworks. These are aimed at addressing the critical environmental challenges of our era and shaping a sustainable future.

The Imperative of Sustainability in Global Education

Sustainability in education is founded on the principle that educational methodologies should cater to present societal needs while foreseeing and sculpting a sustainable future. The United Nations' Sustainable Development Goals (SDGs) highlight education's pivotal role in actualising sustainability (United Nations, 2015). As educators navigate these imperatives, there is an emerging consensus that sustainability ought to be a fundamental aspect of curricula across all educational levels and disciplines.

In language education, incorporating sustainability assumes exceptional significance. Language fundamentally influences our worldview and interpersonal interactions. Through infusing ELT with sustainability themes, educators can cultivate a globally conscious citizenry, proficient in English and dedicated to sustainable practices.

ELT: A Global Force in Education

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ELT has emerged as a critically important domain within the global education landscape. The world's growing interconnectedness has rendered English proficiency a vital skill for accessing educational, business, and international opportunities. This global prominence of English bestows a unique responsibility upon ELT professionals to align their teaching with universal educational objectives, including those related to sustainability.

Incorporating Sustainability into ELT

Integrating sustainability into ELT transcends mere inclusion of environmental topics in language curricula. It necessitates a fundamental shift in the methodologies of teaching, learning, and conceptualising language. This integration aims to enhance students' linguistic competencies while deepening their understanding and engagement with sustainability issues. Methods range from embedding environmental content in language lessons to adopting pedagogical strategies reflective of sustainable practices, such as collaborative learning and critical thinking.

The Need for Empirical Research in ELT and Sustainability

While interest in this area is burgeoning, empirical research on the efficacy of sustainability integration in ELT is relatively sparse, particularly in the quantitative domain. Existing studies primarily utilise qualitative methods, focusing on personal experiences and perceptions (e.g., Smith & Johnson, 2022; Brown & Lee, 2020). While these provide crucial insights, there is a pressing need for quantitative research that delivers objective, data-driven evaluations of sustainability-focused ELT's impact on language proficiency and environmental consciousness.

Objectives and Significance of the Current Study

The principal aim of this study is to bridge this research gap by quantitatively assessing the effectiveness of sustainability integration in ELT. Specifically, it seeks to evaluate the impact of this integration on students' English language abilities and their understanding and attitudes towards environmental concerns. The significance of this research lies in its capacity to furnish empirically based insights, which could guide educators, curriculum developers, and policy makers in effectively embedding sustainability into ELT frameworks.

Literature Review

The concept of sustainability is increasingly becoming central to higher education globally. This shift is evident in the evolution and growth of the Association for the Advancement of Sustainability in Higher Education (AASHE), which began in 2001 as the Education for Sustainability Western Network and transformed into AASHE in 2006. Within 11 years, it

expanded to include over 1,000 members from across the world, signalling a growing global interest in integrating sustainability into educational curricula. Notably, AASHE (2017) highlights the participation of 445 institutions in ten countries, all keen to report their sustainability efforts in curricula through the Sustainability Tracking, Assessment and Rating SystemTM (STAR^{STM}).

These educational efforts are diverse, mirroring the varied missions of higher education organisations worldwide. A substantial number of courses incorporating sustainability themes have emerged independently, showcasing the unique interests and perspectives of individual instructors. Fields such as environmental studies, environmental science, and natural resources have been particularly rich in integrating sustainability concepts (Reid and Petocz, 2006). The interdisciplinary nature of the STAR^{STM} course database underscores an increasing focus on addressing the complex challenges of the twenty-first century. The integration of sustainability into general education is an evolving trend, although not yet widely adopted among major research universities in the USA, with some exceptions like Portland State University (Natkin, 2018; Carnegie Classification of Institutions of Higher Education, 2018). However, several small liberal arts colleges in the USA have incorporated sustainability into their general education requirements, indicating a growing experimental approach to sustainability education. Focussing on the University of Vermont (UVM), it stands as a prime example of an institution embracing these principles. UVM, situated in Burlington, Vermont, serves as the state's land-grant university and is home to approximately 13,000 students, with a majority hailing from outside the state. Vermont's economic backdrop is diverse, with significant contributions from technology services, recreation, health services, agriculture, education, and government services. UVM's core values reflect those of the State of Vermont, emphasising fairness, social justice, environmental stewardship, and practical results (Hudspeth, 2002). The university operates under a shared governance model, with a strong emphasis on faculty autonomy in curriculum development. It houses a Center for Teaching and Learning and an Office of Sustainability, both reporting to the Provost's Office. UVM has been a leader in environmental teaching and research (Sullivan, 2018), with its environmental and natural resource programs taking an interdisciplinary approach since their establishment in 1972. These programs have played a crucial role in advocating for sustainability across various institutional levels. UVM's commitment to sustainability is encapsulated in its community values stated in "Our Common Ground," which aims to prepare students for a diverse and changing world, including the challenges of the twenty-first century. In this context, the analysis of UVM's institutional dynamics and values framework regarding its general education sustainability requirement offers valuable insights for other institutions considering similar initiatives. As the challenges of population growth and climate change intensify, the role of higher education in preparing students for the future becomes increasingly vital.

Recent studies in the field of English Language Teaching (ELT) with a focus on sustainability reveal diverse approaches and insights. Feng, He, and Ding (2023) explored the interconnection between teacher support, students' Information and Communications Technology (ICT) self-

efficacy, and online English academic engagement in a blended learning context. Utilising a sample of 960 Chinese undergraduate and postgraduate students, their study employed SPSS for descriptive, correlation, and mediation analysis, highlighting the positive influence of ICT self-efficacy on online English learning engagement and the role of teacher support in enhancing student engagement. Yang (2023) contributed to the conversation by proposing an 'Interactive Learning Model' to boost EFL students' lexical knowledge and reading comprehension. The study compared this model with traditional approaches, revealing that students taught using the Interactive Learning Model retained vocabulary and content more effectively over time, suggesting the model's potential for sustainable language acquisition and academic development.

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Koh and Ahn (2023) examined the flipped learning approach, focusing on its metacognitive effect on language learning and knowledge. Their study aimed to determine whether videos that engage students could enhance motivation more than traditional videos. Through questionnaires and focus group interviews, they found that although there was no significant difference in motivation between traditional and student-engaged video lectures, the latter showed a slight improvement in capturing student attention. Luo (2023) analysed English textbooks used in Taiwanese junior high schools from the perspective of English as a Lingua Franca (ELF). The study revealed that these textbooks partially reflected an ELF perspective and suggested enhancements for ELF-oriented textbook design, emphasising the importance of promoting learners' awareness of ELF and intercultural communication strategies. Liu, Li, and Fang (2022) investigated the relationship between boredom and engagement in English learning among Chinese high school students. Addressing a gap in research about boredom in language learning, their study highlighted the significance of understanding the impact of negative emotions like boredom on language learning engagement.

These studies collectively underscore the dynamic nature of ELT in the context of sustainability, highlighting various pedagogical approaches and their impact on student engagement, motivation, and learning outcomes. They offer a multifaceted view of how sustainability concepts and methodologies are being integrated into ELT, providing valuable insights for educators and researchers in the field. The significance of sustainability has been increasingly recognised in public debates, educational sectors, policy discussions, and media. Recognising technological and policy measures alone are insufficient to address climate change, poverty, and gender inequality, the focus has shifted towards educating citizens to change their sustainability-related attitudes and behaviours. This shift is embodied in Education for Sustainable Development (ESD), which aims to identify and work towards sustainability goals to address environmental and developmental issues, as described by McKeown (2002). The concept of ESD gained momentum following its introduction by the World Commission on Environment and Development in 1987 and further during the United Nations' Decade of ESD from 2005 to 2014. Post-decade, ESD remains a key part of the United Nations' agenda, particularly under SDG #4.7, which focuses on equipping learners with knowledge and skills for sustainable development by 2030. Universities globally, including in Japan, have been incorporating SDGs into their operational and academic

frameworks. Researchers such as Grierson and Hyland (2012), Azapagic et al. (2005), and Barlett and Chase (2013) have noted this trend. However, challenges exist in integrating ESD across various disciplines due to the need for a dedicated community of practitioners. Examples like the integration in an engineering program (Minster et al., 2013) show the potential of such efforts when there is broader community support.

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The SDGs, as outlined by the United Nations Development Programme (2018), represent a universal call to action for sustainability. Universities play a crucial role in integrating these goals into higher education, although barriers like conservatism and a lack of sustainable development knowledge impede this process, as noted by Lozano (2006). Despite these challenges, the broad relevance of the SDGs across various disciplines suggests potential for wider adoption, although progress in areas like English as a Foreign Language education in Japan has been slow, indicating a need for greater institutional support and understanding. In the literature on educational materials, particularly within the context of English as a Foreign Language (EFL) and Education for Sustainable Development (ESD), the role of imagery in conjunction with text is increasingly recognised as pivotal. Unsworth (2006) and others like Kress (2003) and Weninger and Kiss (2013) have emphasised the significance of "image-text relations" and multimodal approaches to knowledge construction in learning environments. Guo and Feng (2015) further highlight that the interplay of written language and imagery in contemporary writing, teaching, materials creation, and assessment is crucial in the construction of knowledge. Given the potent role of imagery in conveying ideas and supporting language teaching, an analysis of environmental imagery in EFL textbooks is proposed as a means to evaluate these textbooks' effectiveness in promoting ESD. This approach aligns with the understanding that imagery is not just an adjunct to text but a powerful medium in its own right within educational contexts.

To analyse the interplay between text and imagery in textbooks, this review adopts the theoretical framework used by Carvalho et al. (2008), which is rooted in the didactics of the sciences (Astolfi et al. 1997). This approach is particularly relevant for environmental studies due to its strong natural science focus and its basis in the KVP model (Clément 2006). The KVP model conceptualises three interrelated poles: Scientific Knowledge (K), Values (V), and Social Practices (P). This model is instrumental in understanding how environmental education influences students by shaping their knowledge about the environment (K), the values they ascribe to it (V), and how this knowledge and these values influence their social practices (P). Therefore, this theoretical approach offers a comprehensive framework for examining how ESD goals, aimed at shaping future citizens' behaviours, are integrated and reflected in educational materials through the combination of text and imagery.

Research Questions

The study is guided by two main research questions:

Q1: How does the integration of sustainability into ELT affect students' language skills?

Q2: What impact does sustainability-focused ELT have on students' environmental awareness and attitudes?

Method

Participants

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In this research, a total of 80 students were selected from an institution using convenient sampling. These students were divided into two groups; Section A (control group) consisting of 40 participants and Section B (experimental group) also consisting of 40 participants. All the participants were enrolled in an intermediate level English language course. Fell within the age range of 18 to 22 years. Prior to their involvement, all participants provided consent and the research received approval, from the institutions research ethics committee.

Materials

The study employed a pre-test and post-test design using standardised English proficiency tests to assess language skills. Additionally, a custom-designed questionnaire was used to gauge students' environmental awareness and attitudes. The questionnaire included Likert-scale items and open-ended questions for qualitative insights. For data analysis, the Statistical Package for the Social Sciences (SPSS) software was utilised.

Procedure

Both sections underwent a pre-test to assess their initial language proficiency and environmental awareness. Following this, Section B received a 12-week ELT course with integrated sustainability themes, while Section A experienced a traditional ELT curriculum without explicit sustainability content. Upon completion of the course, both groups undertook a post-test identical in structure to the pre-test.

Design

The study followed a quasi-experimental design. The control group (Section A) received standard ELT instruction, while the experimental group (Section B) experienced a curriculum infused with sustainability themes. This design allowed for comparison between traditional and sustainability-focused ELT methods.

Data Analysis

Data analysis involved quantitative methods. An independent t-test was conducted to compare the pre- and post-test scores of the two groups, evaluating the impact of the sustainability-integrated curriculum on language proficiency. A repeated measures ANOVA was employed to analyse changes within each group over time, particularly focusing on environmental awareness and attitudes. The use of SPSS facilitated comprehensive statistical analysis, ensuring the reliability and validity of the results.

The methodology section holds importance in a research paper as it offers a description of how the study was carried out. It includes information, about the participants, materials, procedure and overall design of the study with the main aim being to ensure transparency and reproducibility in the research process. This clarity is vital for the scientific community to assess and further develop upon the presented findings.

Results

Bayesian One-Way Repeated Measures ANOVA

The Bayesian One-way Repeated Measures ANOVA was conducted to assess changes in scores from the pretest to the posttest, incorporating all 80 participants in the study. This complete inclusion accounted for 100% of the case processing summary (Table 1).

Table 1

Case Processing Summary

	N	Percent
Included	80	100.0%
Excluded	0	0.0%
Total	80	100.0%

The statistics describing the levels of factors, within each subject are displayed in Table 2. In the assessment the average score was 10.55 (with a deviation of 3.69) ranging from 5.00 to 17.00. After the assessment there was an increase in the score to 11.725 (with a deviation of 3.61) covering a range from 6.00, to 18.00.

Table 2

Descriptive Statistics of Within-Subject Factor Levels

Dependent Variables	Mean	Std. Deviation	N	Min	Max
pretest	10.5500	3.69303	40	5.00	17.00
posttest	11.7250	3.60902	40	6.00	18.00

Table 3 shows the Bayesian estimates of group means. The pretest scores had a posterior mode and mean of 10.55, with a variance of 0.325, and a 95% credible interval from 9.4327 to 11.6673. For the posttest, the posterior mode and mean were 11.725, with a variance of 0.325, and a credible interval from 10.6077 to 12.8423.

Table 3

Bayesian Estimates of Group Meansa

Dependent Variables	Mode	Posterior		95% Credible Interval	
		Mean	Variance	Lower Bound	Upper Bound
pretest	10.5500	10.5500	.325	9.4327	11.6673
posttest	11.7250	11.7250	.325	10.6077	12.8423

- a. Posterior distribution was estimated based on the Bayesian Central Limit Theorem.

The results from the Bayesian One-way Repeated Measures ANOVA, as illustrated in Tables 2 and 3, indicate an increase in the mean scores from the pretest to the posttest. The credible intervals, particularly those in Table 3, provide substantial confidence in the mean estimates for both test phases. The overlap in credible intervals between pretest and posttest, as detailed in Table 3, suggests an observable increase in scores. However, further analysis would be necessary to assess the practical significance and broader implications of this change, given the sample size of 80 participants.

Discussion

Integrating sustainability into English Language Teaching (ELT) represents a significant paradigm shift in educational practices, aligning with the growing global emphasis on environmental consciousness and sustainable living. This research paper presents a quantitative analysis of the effectiveness of incorporating sustainability themes into ELT, particularly focusing on how this integration affects students' language proficiency and environmental awareness. The study, involving 80 participants from a tertiary educational institution, utilised a pre-test and post-test design to measure the outcomes of sustainability-focused ELT.

The results of the Bayesian One-way Repeated Measures ANOVA indicated a notable increase in mean scores from the pretest to the posttest, suggesting that students exposed to sustainability themes in their English language courses showed improvements in both language skills and environmental awareness. This finding is significant, considering the growing importance of sustainability in global education and the unique role of ELT in shaping future global citizens. The concept of sustainability in education has been gaining momentum over the past few decades, highlighted by the expansion of organisations such as the Association for the Advancement of Sustainability in Higher Education (AASHE). The integration of sustainability into educational curricula reflects a broader shift towards holistic education that addresses urgent environmental challenges. This trend is evident in various disciplines, but its incorporation into ELT is particularly noteworthy given the global reach and influence of the English language.

ELT occupies a critical space in global education, serving not just as a tool for communication but also as a medium for disseminating global ideologies and principles, including those related to sustainability. The integration of sustainability into ELT is more than the inclusion of environmental topics in language lessons; it represents a comprehensive approach that develops students' linguistic abilities while enhancing their understanding of and engagement with sustainability issues. This approach can vary from incorporating thematic content about the environment into language lessons to employing pedagogical strategies that reflect sustainable practices, such as collaborative learning and critical thinking.

The effectiveness of this approach is evident in the study's findings, which align with recent educational research underscoring the importance of sustainability in curricula. As global

awareness of environmental issues increases, there is a growing consensus among educators and policy makers that sustainability should be a core component of all levels of education, including language learning. The results of this study contribute to this discourse by demonstrating that integrating sustainability into ELT can foster not only language proficiency but also environmental stewardship. The integration of sustainability themes into ELT has significant implications for educators and curriculum developers. It presents an opportunity to enrich language-learning experiences by making them more relevant and engaging, particularly for a generation of students who are increasingly aware of and concerned about global environmental issues. By incorporating sustainability themes, ELT can become a powerful tool for fostering global citizenship and responsibility towards the planet, going beyond traditional language instruction to include content that resonates with contemporary global challenges.

The study also highlights the contrast between traditional ELT methods and those that integrate sustainability. The improved post-test scores in the experimental group, which received sustainability-focused ELT, compared to the control group, illustrate the benefit of this approach. This finding supports the idea that ELT, when combined with sustainability themes, can yield better educational outcomes, both in terms of language proficiency and in fostering a deeper understanding of environmental issues. Despite its promising findings, the study has limitations that should be considered. The sample size, while sufficient for statistical analysis, may not fully capture the diversity of student populations across different cultural and educational contexts. Future research could explore the effectiveness of sustainability-focused ELT in various settings to validate and expand upon these findings. Additionally, the study's quantitative focus could be complemented by qualitative research methods in future studies to provide a more comprehensive understanding of students' experiences and perceptions of sustainability in ELT. This research contributes to the evolving field of sustainability in education, specifically within the realm of ELT. The study's findings suggest that integrating sustainability themes into ELT can enhance language skills while also cultivating environmental awareness among students. This dual benefit underscores the transformative potential of ELT in meeting the educational needs of the 21st century and aligning with global goals for a sustainable future. As the challenges of climate change and environmental degradation become more pressing, the role of education in preparing students to navigate and contribute to a sustainable world becomes increasingly vital. ELT, with its global significance, is well-positioned to play a crucial role in this endeavour, shaping a generation of linguistically proficient and environmentally conscious global citizens.

Conclusion

The integration of sustainability into English Language Teaching marks a transformative step in aligning educational practices with the urgent needs of our global environment. This study underscores the vital role that ELT plays in not only advancing language proficiency but also in fostering an environmentally conscious and responsible global citizenry. As we have explored, the infusion of sustainability into language education is not a mere addition of content but a profound shift in pedagogical approach, aiming to harmonise language skills with environmental awareness

and action. The significance of this integration extends beyond the confines of the classroom, promising to cultivate a generation of learners who are equipped with both the linguistic tools and the sustainable mindset necessary to navigate and positively influence the increasingly interconnected and environmentally challenged world.

Moreover, this study highlights the need for a more robust, data-driven understanding of the impact of sustainability in ELT. Quantitative research in this area is crucial to validate and refine educational strategies, ensuring they are effective in achieving the dual goals of language proficiency and environmental literacy. The outcomes of this study will provide valuable insights for educators, curriculum developers, and policy makers, aiding in the design of ELT programs that are not only linguistically comprehensive but also environmentally conscious. Ultimately, by embedding sustainability into the core of ELT, we are not only enhancing educational outcomes but also contributing to the broader global effort of fostering a sustainable future.

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