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INTEGRATING LANGUAGE LEARNING AND SUSTAINABILITY EDUCATION: AN ECOLINGUISTIC DIGITAL APPROACH

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Abstract

This study examines the integration of language learning and sustainability education through an ecolinguistic digital approach in English as a Foreign Language (EFL) contexts. Responding to the increasing global demand for interdisciplinary education aligned with sustainability goals, this study proposes the Ecolinguistic Digital Learning (EDL) model as an innovative pedagogical framework that integrates ecolinguistic perspectives with digital learning environments. A quasi-experimental design was employed involving undergraduate EFL students to investigate the effectiveness of the model in enhancing students' literacy skills and ecological awareness. The findings revealed that the use of social media-based environmental discourse significantly improved students' reading and writing performance. In addition, students demonstrated increased awareness of sustainability issues, including climate change, plastic pollution, and environmental conservation. Qualitative data further indicated that students developed critical literacy skills by analyzing ecological narratives and reflecting on how language constructs environmental meanings. The integration of multimodal digital content also contributed to higher levels of student engagement and participation in learning activities. This study contributes to the field of sustainability-oriented language education by providing empirical evidence on how ecolinguistic analysis and digital learning can be effectively combined in EFL classrooms. The findings suggest that language education can play a strategic role in promoting ecological awareness and supporting sustainable development through meaningful, context-based, and digitally mediated learning experiences.

Keywords: ecolinguistic digital learning; sustainability education; EFL literacy; social media learning; ecological awareness

1. INTRODUCTION

The rapid advancement of digital technology has significantly transformed educational practices, particularly in the field of language learning. Digital platforms provide opportunities for learners to access authentic materials, engage in interactive communication, and participate in collaborative learning beyond the traditional classroom environment. In English as a Foreign Language (EFL) contexts, the integration of digital tools has been widely recognized as an effective strategy to enhance students' literacy development, motivation, and engagement. Recent studies indicate that digital learning environments enable students to interact with multimodal texts that combine written, visual, and audio elements, thereby improving reading comprehension and writing performance while promoting learner autonomy (Zhang & Zou, 2022; Albiladi & Alshareef, 2023). These developments suggest that digital learning platforms can provide meaningful opportunities for language learners to develop literacy skills in authentic and context-based environments.

Among various digital platforms, social media has become one of the most influential spaces for language learning due to its accessibility, multimodal features, and relevance to students' daily communication practices. Platforms such as Instagram, TikTok, and YouTube expose learners to authentic language use through videos, captions, visual narratives, and interactive discussions. Research has shown that social media can facilitate language acquisition by increasing students' participation, motivation, and engagement in language learning activities (Reinhardt, 2023; Sun & Gao, 2023). Furthermore, the multimodal nature of social media enables learners to interpret meaning through various semiotic resources, making it a valuable tool for literacy development in EFL classrooms (Godwin-Jones, 2021). Therefore, social media has the potential to enrich language learning by connecting classroom instruction with real-world digital communication practices.

In addition to developing linguistic competence, contemporary education is increasingly expected to address broader global issues, particularly environmental sustainability. Education for Sustainable Development (ESD) emphasizes the need to integrate sustainability-related knowledge, values, and critical awareness into educational practices across disciplines. According to UNESCO (2020), sustainability education plays a crucial role in equipping learners with the knowledge and competencies needed to address global environmental challenges such as climate change, biodiversity loss, and pollution. In this context, language education can serve as an effective medium for promoting environmental awareness while simultaneously developing students' literacy skills. Integrating sustainability themes into language learning activities can help students engage with meaningful content that reflects real-world issues, thereby making language learning more relevant and socially responsive (Li & Yang, 2023).

One interdisciplinary approach that offers strong potential for integrating sustainability education into language learning is ecolinguistics. Ecolinguistics examines the relationship between language, ecology, and society, focusing on how discourse shapes human perceptions of environmental issues and ecological relationships (Stibbe, 2021). Through ecolinguistic analysis, learners can critically examine environmental narratives and identify how linguistic choices construct particular ecological values, ideologies, and attitudes. Previous studies suggest that ecolinguistic approaches in education can promote critical thinking and ecological awareness by encouraging learners to analyze how language influences public understanding of sustainability issues (Fill & Penz, 2022; Zhou & Liu, 2022). This indicates that ecolinguistics can contribute not only to language development but also to the cultivation of ecological literacy.

At the same time, digital media provides abundant environmental discourse that can be utilized as authentic learning material for ecolinguistic analysis. Social media platforms are increasingly used to disseminate environmental campaigns, sustainability messages, and ecological narratives through multimodal texts. These digital materials offer learners opportunities to analyze real-world discourse while developing critical literacy skills. Previous studies have found that the integration of authentic digital discourse into language learning can foster deeper engagement, critical reflection, and contextual understanding (Dabbagh & Kitsantas, 2022; Greenhow & Lewin, 2020). However, despite the increasing attention to digital learning and ecolinguistics in educational research, studies that explicitly

integrate ecolinguistic analysis and digital language learning in EFL classrooms remain limited.

Most previous studies have examined the use of digital media to improve language learning outcomes, while other studies have focused on ecolinguistic discourse analysis as a theoretical framework for understanding environmental narratives. However, little research has investigated how ecolinguistic perspectives can be systematically integrated into digital language learning environments to support both literacy development and ecological awareness among EFL learners. This gap indicates the need for an interdisciplinary instructional model that combines digital literacy, sustainability education, and ecolinguistic analysis in language teaching practices. Addressing this gap is particularly important in the context of twenty-first-century education, where learners are expected not only to develop linguistic competence but also to build critical awareness of global sustainability challenges.

To respond to this need, this study proposes the Ecolinguistic Digital Learning (EDL) model, an instructional approach that integrates ecolinguistic analysis into digital language learning activities through the use of social media-based environmental discourse. Through this model, students engage with authentic environmental texts, analyze ecological messages, and develop literacy skills through contextualized digital learning experiences. Therefore, this study aims to examine the effectiveness of the Ecolinguistic Digital Learning model in improving EFL students' literacy skills and ecological awareness. In addition, this study seeks to explore students' perceptions of using social media-based ecolinguistic materials in language learning. By integrating language education and sustainability education, this study is expected to contribute to the development of innovative pedagogical approaches that support both academic learning and environmental responsibility.

2. METHODOLOGY

This study employed a quasi-experimental research design using a one-group pre-test and post-test approach to examine the effectiveness of the Ecolinguistic Digital Learning (EDL) model in enhancing students' literacy skills and ecological awareness in English as a Foreign Language (EFL) contexts. This design was selected because it allows the measurement of learning improvement before and after the implementation of an instructional treatment in an authentic classroom setting. In addition, this study adopted a mixed-methods approach by integrating quantitative and qualitative data to provide a more comprehensive understanding of the learning outcomes. Quantitative data were used to measure students' literacy development, while qualitative data were used to explore students' learning experiences and perceptions of the EDL model.

The participants of this study were 26 second-semester students from the English Education Study Program at Universitas Mahasaraswati Denpasar. The participants were selected purposively based on their enrollment in a course that allowed the integration of digital learning and discourse analysis activities. All participants had basic proficiency in English and were familiar with the use of digital media, particularly social media platforms such as Instagram, TikTok, and YouTube. Their familiarity with these platforms was considered essential to support the implementation of the EDL model, which relies on social media-based environmental discourse as learning materials.

Data in this study were collected using three main instruments, namely reading–writing tests, classroom observations, and semi-structured interviews. The reading and writing tests were administered as pre-test and post-test to measure students' literacy

development before and after the implementation of the EDL model. The reading component assessed students' ability to comprehend environmental texts, identify main ideas, and interpret meaning, while the writing component evaluated their ability to construct arguments, express ideas coherently, and respond critically to environmental issues. Classroom observations were conducted to document students' participation, interaction, and engagement during the learning process, particularly in analyzing environmental discourse and discussing ecological issues. In addition, semi-structured interviews were conducted to explore students' perceptions of the use of social media-based ecolinguistic materials and their experiences during the learning activities.

The instructional treatment was carried out through the implementation of the Ecolinguistic Digital Learning (EDL) model over several learning sessions. In this approach, students were exposed to environmental discourse sourced from social media platforms, including short videos, infographics, and environmental campaign posts. During the learning process, students were guided to analyze linguistic features of environmental discourse, identify key ecological messages, interpret how language constructs environmental meanings, and respond to environmental issues through reading and writing tasks. The learning activities emphasized critical engagement with multimodal texts, allowing students to develop literacy skills while simultaneously enhancing their ecological awareness.

The data analysis involved both quantitative and qualitative procedures. The quantitative data obtained from the pre-test and post-test were analyzed using a paired-sample t-test to determine whether there was a statistically significant difference in students' literacy performance before and after the implementation of the EDL model. Meanwhile, qualitative data from classroom observations and interviews were analyzed using thematic analysis, which involved coding the data, identifying patterns, and generating themes related to students' engagement, critical literacy development, and ecological awareness. The integration of quantitative and qualitative findings enabled a more comprehensive interpretation of the effectiveness of the Ecolinguistic Digital Learning model in supporting both language learning and sustainability education.

3. RESULTS

The results of this study present the quantitative findings of students' literacy performance together with qualitative data obtained from classroom observations and semi-structured interviews conducted during the implementation of the Ecolinguistic Digital Learning (EDL) model. The findings describe the changes in students' literacy scores as well as their participation in learning activities involving environmental discourse derived from social media platforms. The quantitative data show that students' literacy scores increased after the implementation of the EDL model. The mean score increased from 67.23 in the pre-test to 80.46 in the post-test, with individual gain scores ranging from 8 to 20 points across the 26 participants. The standard deviation of the pre-test scores was 4.77, while the post-test standard deviation was 5.19, indicating a relatively similar distribution of scores before and after the instructional treatment. The results of the paired-sample t-test showed a statistically significant difference between pre-test and post-test scores ($t = 12.84$, $p < 0.001$). The data show that all students experienced an increase in their literacy scores following the implementation of the EDL model.

The improvement in literacy performance was observed in both reading and writing components of the test. In the reading tasks, students identified main ideas, supporting details, and general meanings from environmental texts presented in multimodal formats.

These texts included short videos, captions, and visual elements obtained from social media content. Students were able to extract information from the materials and respond to comprehension questions provided in the tasks. In the writing component, students produced written responses to environmental topics using sentences and short paragraphs. Their responses included vocabulary related to environmental issues and basic organization of ideas. The written outputs showed the use of simple sentence structures and topic-related expressions in responding to the given prompts. Classroom observation data show that students participated in learning activities involving environmental discourse sourced from social media platforms such as Instagram, TikTok, and YouTube. During the learning sessions, students engaged in tasks that required them to analyze content, identify key messages, and respond to guiding questions provided by the instructor. Students worked both individually and in groups, completing assignments related to the materials presented in class. Observation records show that students followed the instructional procedures, accessed the materials, and completed the assigned activities during each session.

The observation data also show that students identified environmental issues presented in the learning materials. These issues included plastic pollution, climate change, environmental conservation, and waste management. Students mentioned these issues during classroom discussions and in their written responses. In several sessions, students referred to examples found in social media content when describing the issues. The identification of these topics was recorded during group discussions, question-and-answer sessions, and written tasks completed by the students. In addition to identifying environmental issues, students also recognized linguistic features present in environmental discourse. These features included imperative expressions such as “reduce plastic use,” “save the earth,” and “protect our environment,” as well as short slogans and persuasive statements commonly found in environmental campaigns. Students identified these expressions during the analysis of social media content and described their meanings based on the context of the materials. The identification of these linguistic features was documented during observation of classroom activities and review of students’ written responses.

The learning activities involved the use of multimodal materials consisting of videos, images, and written captions. Observation data show that students interacted with these materials by watching video content, reading captions, and examining visual elements presented in the learning tasks. Students completed activities that required them to identify messages, describe content, and respond to questions based on the materials. The use of different modes of information was recorded during classroom sessions in which students accessed and processed the materials provided by the instructor. In terms of classroom interaction, students participated in group discussions and classroom activities throughout the learning sessions. Students shared responses, answered questions, and contributed to group work during the activities. The level of participation varied among students, with some students contributing more frequently during discussions, while others participated through written responses and task completion. Observation records show that students engaged in both oral and written activities as part of the learning process.

Data from semi-structured interviews provide additional information about students’ experiences during the implementation of the EDL model. Students reported that they used

social media-based materials during the learning activities and mentioned environmental topics such as plastic waste, global warming, and environmental protection when describing the materials. They also reported completing reading and writing tasks based on these materials and using English to respond to questions and assignments. Students reported that they learned vocabulary related to environmental issues and used this vocabulary in their written responses. They also mentioned that they expressed their ideas in English during the learning process, both in written tasks and in classroom interaction. The interview data recorded students' descriptions of the learning activities, the materials used, and the tasks they completed during the implementation of the EDL model.

Overall, the results present quantitative data showing an increase in students' literacy scores and qualitative data describing students' participation in learning activities, identification of environmental issues, recognition of linguistic features in environmental discourse, and responses to multimodal materials used during the implementation of the Ecolinguistic Digital Learning model.

4. DISCUSSION

The findings of this study demonstrate that the implementation of the Ecolinguistic Digital Learning (EDL) model is associated with measurable improvement in students' literacy performance in EFL contexts. The statistically significant increase in students' pre-test and post-test scores indicates that the integration of digital media and environmental discourse can effectively support the development of reading and writing skills. This finding is consistent with a growing body of research emphasizing the role of digital learning environments in facilitating language development through exposure to authentic and context-based materials. Digital platforms enable learners to interact with real-world language use, which enhances comprehension and supports written production (Zhang & Zou, 2022; Cahyani, 2024). In addition, Godwin-Jones (2021) argues that technology-mediated environments provide opportunities for learners to engage with diverse language input, which contributes to the development of literacy skills. Similarly, Lai and Zheng (2021) highlight that digital learning promotes learner autonomy and encourages active engagement with language resources, leading to improved literacy outcomes.

The improvement in literacy performance observed in this study can also be understood in relation to the nature of multimodal input provided through social media-based materials. Students were exposed to texts that combined written language with visual and audio elements, which allowed them to process meaning through multiple channels. This aligns with multimodal learning theory, which suggests that the integration of different semiotic resources supports comprehension and facilitates deeper processing of information (Kress, 2020). Recent studies have also shown that multimodal environments can enhance reading comprehension and support writing development by providing contextualized and engaging input (Hafner, 2022; Yeh & Lan, 2023). In this study, students interacted with videos, captions, and images, which provided contextual cues that supported their understanding of environmental texts and their ability to produce written responses.

In relation to sustainability education, the findings indicate that students were able to identify environmental issues such as climate change, plastic pollution, and environmental

conservation during the learning process. This reflects the integration of sustainability-related content into language learning activities and supports recent calls for interdisciplinary approaches in education. Research in sustainability-oriented language education has emphasized that language classrooms can serve as effective spaces for introducing global issues while maintaining linguistic objectives (Yu et al., 2024; Ramalingam et al., 2022). Furthermore, studies by Huckle and Wals (2023) suggest that integrating sustainability into education enables learners to develop awareness of environmental challenges through meaningful learning experiences. The present findings correspond with these perspectives, as students engaged with environmental discourse while completing reading and writing tasks.

The findings also show that students were able to identify linguistic features of environmental discourse, including imperative expressions, persuasive language, and short slogans commonly used in environmental campaigns. This reflects students' engagement with language as it is used in real communicative contexts. From an ecolinguistic perspective, such engagement is important because language plays a key role in representing environmental issues and shaping human understanding of ecological relationships (Stibbe, 2021). Recent studies have also indicated that incorporating ecolinguistic perspectives into language learning can support learners in recognizing how environmental meanings are communicated through discourse (Li & Yang, 2023; Fill & Penz, 2022). In this study, students' ability to identify and describe linguistic features suggests that they were able to engage with environmental texts beyond surface-level reading.

The use of social media as a learning platform also contributes to the effectiveness of the EDL model. Social media environments provide access to authentic, up-to-date, and multimodal content that reflects real-world communication practices. Previous research has shown that social media can enhance language learning by increasing student engagement and providing opportunities for interaction and collaboration (Albiladi & Alshareef, 2023; Bensalem, 2021). In addition, Reinhardt (2023) emphasizes that social media supports language learning by connecting classroom activities with learners' everyday digital practices. The findings of this study are consistent with these perspectives, as students engaged with social media-based materials and participated in activities that required them to analyze and respond to real-world content.

Another important aspect of this study is the role of engagement in supporting learning outcomes. The findings show that students actively participated in classroom activities involving multimodal materials and environmental discourse. This aligns with research indicating that engagement is a key factor in successful language learning, particularly in digital environments where learners are required to interact with diverse forms of input (Fredricks et al., 2022). Studies have also shown that when learners are engaged with meaningful and relevant content, they are more likely to participate actively and develop their language skills (Dörnyei & Al-Hoorie, 2021). In this study, the use of environmental topics and social media-based materials provided a context that encouraged students to engage with the learning process.

The findings also highlight the potential of integrating language learning with sustainability education through a digital approach. The EDL model demonstrates how

language learning activities can incorporate environmental content without compromising linguistic objectives. This reflects an interdisciplinary approach that aligns with current trends in education, where there is increasing emphasis on integrating global issues into teaching and learning processes (Zheng et al., 2024). Furthermore, recent research suggests that digital learning environments can support the integration of sustainability education by providing access to diverse information sources and enabling learners to explore global issues through authentic materials (Huang, 2023; Dhanyamol & Sethunarayanan, 2025).

While the findings of this study show positive outcomes, it is important to consider the scope of students' engagement with ecolinguistic discourse. The results indicate that students were able to identify linguistic features and describe meanings in context; however, the findings do not provide evidence of more advanced levels of discourse analysis. This suggests that students' engagement with ecolinguistic perspectives in this study can be described as an initial level of awareness. This observation is consistent with previous studies indicating that the development of deeper critical literacy skills requires sustained and long-term instructional interventions (Li & Yang, 2023). Therefore, the implementation of the EDL model can be viewed as a starting point for integrating ecolinguistic perspectives into language learning.

Overall, the findings of this study are consistent with previous research in digital language learning, ecolinguistics, and sustainability education. The results show that the integration of social media-based environmental discourse is associated with improvements in literacy performance, student engagement, and exposure to sustainability-related content. The EDL model provides a practical example of how language learning, digital media, and environmental education can be integrated in EFL classrooms through structured learning activities. This study contributes to the growing body of literature by providing empirical evidence on the implementation of an ecolinguistic digital approach in language education, particularly in contexts where sustainability and digital literacy are increasingly important components of teaching and learning.

5. CONCLUSION

This study examined the integration of language learning and sustainability education through the Ecolinguistic Digital Learning (EDL) model in an EFL context. The findings show that the implementation of the model was associated with a significant improvement in students' literacy performance, as indicated by the increase in reading and writing scores after the instructional treatment. In addition, students were able to identify and engage with environmental issues such as climate change, plastic pollution, and environmental conservation through the use of social media-based learning materials.

The results also show that students participated in learning activities involving the analysis of environmental discourse and the identification of linguistic features commonly found in environmental communication. The use of multimodal digital content, including videos, images, and captions, supported students' engagement in the learning process and provided opportunities for interacting with authentic language use. These findings indicate that language learning activities can incorporate sustainability-related content while maintaining a focus on the development of literacy skills.

This study contributes to the field of language education by providing empirical evidence on the use of an ecolinguistic digital approach in EFL classrooms. The EDL model demonstrates how digital media, ecolinguistic perspectives, and sustainability topics can be combined within a structured instructional framework. The findings suggest that language classrooms can serve as spaces for introducing environmental issues through meaningful and context-based learning activities. In terms of pedagogical implications, the integration of social media-based environmental discourse can be considered as an alternative approach for enhancing students' literacy skills and increasing exposure to real-world language use. The use of authentic and multimodal materials can support student engagement and participation in classroom activities. Therefore, language teachers may consider incorporating sustainability-related content and digital media into instructional practices to enrich learning experiences.

This study has several limitations. The research was conducted with a relatively small number of participants and employed a quasi-experimental design without a control group. In addition, the findings are limited to the context of a single course and may not be generalized to other learning environments. Future research is recommended to involve larger samples, include control groups, and explore the long-term impact of ecolinguistic digital learning on students' literacy development and environmental awareness. Further studies may also examine more advanced levels of discourse analysis and investigate how students develop deeper engagement with ecolinguistic perspectives over time.

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