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Designing an Eco-Literate ESP Syllabus: Integrating Sustainability and Environmental Awareness into English for Fisheries Students

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Abstract
This study proposes an eco-literate ESP syllabus tailored for Fisheries Department students by integrating sustainability principles and environmental awareness into English instruction. Using the ESP course design model of Dudley-Evans and St. John (1998), the paper outlines a systematic process involving needs analysis, syllabus planning, material adaptation, and evaluation. The needs analysis highlights learners' communicative demands in sustainability-focused contexts such as marine conservation, sustainable aquaculture, and the blue economy. The syllabus adopts content-based and task-based approaches, utilizing authentic environmental materials (e.g., research articles, policy documents, sustainability reports). Each unit centers on eco-related discourse, marine ecology vocabulary, and critical reflection on environmental ethics across reading, writing, and speaking tasks. Existing studies seldom address how environmental ethics, marine-related sustainability content, and SDG-oriented competencies can be systematically embedded into ESP courses targeting discipline-specific communication needs. This study fills that gap by proposing a structured eco-literate ESP syllabus that connects language learning with environmental responsibility in the fisheries context.

Keywords:
English for Specific Purposes (ESP); Eco-literacy; Sustainable Development; Fisheries Education; Environmental Awareness

A. INTRODUCTION

Global environmental challenges and the urgent agenda of the Sustainable Development Goals (SDGs) have reframed what counts as discipline-relevant knowledge in higher education. Nowhere is this more apparent than in fisheries education, where graduates must combine technical competence with ecological awareness to manage marine resources sustainably. Fisheries professionals operate at the intersection of biology, technology, policy, and community livelihoods; therefore, their communicative competence in English as the lingua franca of science, policy, and international collaboration is not merely a linguistic matter but a professional one. At the same time, the expansion of aquaculture and fisheries production worldwide has heightened the need for practitioners who can read, discuss, and implement sustainability measures grounded in global evidence and local realities.

English for Specific Purposes (ESP) offers a pragmatic route to align language instruction with these domain demands. Classic ESP frameworks emphasize that course design must begin with a rigorous needs analysis, proceed through targeted syllabus planning, and culminate in materials and assessment that reflect learners' real-world tasks (Dudley-Evans & St. John, 1998). Applying this established model to fisheries education implies designing syllabi that foreground professional genres (e.g., technical reports, policy briefs, stakeholder presentations) and sustainability content (e.g., ecosystem-based management, blue economy policy, circular waste systems). Such integration ensures that linguistic forms are taught in service of authentic communicative purposes rather than as isolated grammar or vocabulary lists.

Concurrently, the pedagogical construct of eco-literacy (or ecological literacy) provides a robust conceptual anchor for embedding environmental knowledge, values, and action into ESP curricula. Eco-literacy involves not only understanding ecological concepts but also applying them through problem-solving, reflective inquiry, and action-oriented tasks of pedagogical moves that align well with content-based and task-based ESP approaches. Recent syntheses of eco-literacy research stress experiential and contextualized learning as high-impact strategies for cultivating environmental competence, especially when learners engage with authentic datasets, community problems, or field activities. Embedding these practices into an ESP syllabus can therefore foster learners' ability to interpret scientific texts, communicate conservation plans, and participate in stakeholder dialogues with environmental credibility.

Recent scholars also argues for explicitly mapping ESP syllabi onto the SDG agenda, particularly SDG 14 (Life **Below** Water) and SDG 13 (Climate Action). Developing an "eco-literate ESP" syllabus for fisheries students thus serves dual aims: (1) to equip graduates with the discourse competencies required by modern fisheries practice (technical reporting, grant writing, international collaboration), and (2) to cultivate the environmental dispositions and literacies necessary for sustainable resource stewardship. Recent empirical and conceptual work on sustainability-oriented ESP supports this synthesis, showing that needs-based, content-driven syllabi increase both relevance and transfer to workplace tasks.

Needs Analysis and Task Alignment (ESP Foundations) Needs analysis continues to serve as the foundation of ESP course development, ensuring that instruction directly corresponds to learners' professional and communicative requirements. Empirical studies across disciplines consistently demonstrate that courses built on systematic target-situation and learning-centered needs analyses produce higher task relevance and stronger learner motivation (Dudley-Evans & St. John, 1998; Dou, 2023). Contemporary research further emphasizes that a comprehensive needs analysis should encompass stakeholder interviews, genre analysis, and workplace observations to accurately capture authentic language use in professional contexts. This process enables curriculum designers to align linguistic instruction with actual communicative practices in specific domains.

Content-Based and Task-Based Learning for Professional Application Evidence from ESP research reveals that both content-based instruction (CBI) and task-based learning (TBL) significantly enhance the transfer of language skills to workplace communication genres such as technical reports, presentations, and policy documents (Dou, 2023). Authentic tasks like drafting environmental policy briefs or planning community outreach programs help students internalize disciplinary discourse conventions and strengthen their pragmatic competence. Accordingly, organizing ESP syllabus units around real-world fisheries communication tasks (e.g., writing environmental impact reports or conducting stakeholder consultations) ensures professional relevance and learning engagement.

Eco-Literacy and Experiential Learning Findings from eco-literacy research indicate that experiential and problem-based approaches—including fieldwork, project-based learning, and environmental data analysis—are more effective in cultivating ecological knowledge and positive environmental attitudes than traditional lecture methods (Murti, 2025; Kazazoğlu et al., 2025). In language classrooms, eco-themed writing, discussion, and project activities also enrich vocabulary acquisition and discourse competence while fostering environmental responsibility. These insights justify embedding contextual field experiences and local case studies within ESP courses to promote both linguistic and eco-literate growth.

Disciplinary Texts, Corpora, and Authentic Materials The use of corpus-informed pedagogy and genre-based analysis enables instructors to model authentic linguistic patterns, such as collocations, rhetorical structures, and lexical frequency—typical of fisheries discourse (Durrant, 2025). Research shows that constructing small, specialized corpora from policy documents and technical reports allows learners to better recognize and reproduce discipline-specific writing conventions. Consequently, the incorporation of authentic resources (e.g., FAO publications,

sustainability reports, and fisheries policy briefs) provides valuable exposure to real professional communication.

Assessment for Applied Competence and Reflective Practice Formative assessment remains essential for measuring both linguistic accuracy and professional communicative performance. Approaches combining genre-based rubrics, peer feedback, and reflective portfolios have proven effective in evaluating learners' applied competence within ESP settings. When assessment rubrics are explicitly linked to sustainability outcomes, such as clarity in environmental recommendations or appropriateness for diverse stakeholders as they reinforce the authenticity of instruction and heighten student motivation.

Existing studies seldom address how environmental ethics, marine-related sustainability content, and SDG-oriented competencies can be systematically embedded into ESP courses targeting discipline-specific communication needs. This study fills that gap by proposing a structured eco-literate ESP syllabus that connects language learning with environmental responsibility in the fisheries context.

This study therefore proposes a design model for an eco-literate ESP syllabus tailored to fisheries departments. Grounded in ESP course design principles, informed by international fisheries trends and sustainability imperatives, and guided by eco-literacy pedagogy, the model outlines (a) a framework for needs analysis specific to fisheries sustainability tasks, (b) unitized syllabus content that integrates discipline-specific texts and practices, and (c) assessment and instructional strategies that emphasize applied competence and reflective action. By situating English instruction within the real cognitive and ethical demands of sustainable fisheries, the proposed syllabus aims to produce graduates who are not only linguistically proficient but also capable of contributing to resilient, equitable, and environmentally responsible fisheries management.

B. METHODS

This study adopted a qualitative library research and developmental design grounded in the R&D framework for ESP syllabus development (Graves, 2000; Dudley-Evans & St. John, 1998). It aimed to design an eco-literate ESP syllabus that merges English language learning with sustainability and environmental awareness for Fisheries Department students. Drawing on Hutchinson and Waters's (1987) model, the process involved needs analysis, syllabus design, material development, and evaluation, enhanced by content-based instruction (CBI) and task-based learning (TBL) principles to promote authentic, eco-oriented learning (Coyle et al., 2010; Dou, 2023).

The participants comprised 25 fisheries students, 2 subject lecturers, and four ESP instructors from Indonesian universities. These stakeholders provided input through questionnaires, interviews, and document analysis, identifying key linguistic and environmental competencies required for fisheries communication. The data collection were gathered through: (1) a questionnaire to assess linguistic and sustainability needs, (2) semi-structured interviews exploring pedagogical challenges and curriculum gaps, and (3) document analysis of FAO reports, UNESCO's ESD framework, and national ESP syllabi.

The syllabus design followed five systematic phases: (1) identifying needs and priorities; (2) formulating integrated linguistic and sustainability objectives; (3) designing a 16-week thematic syllabus focused on eco-friendly fisheries topics; (4) selecting and adapting authentic materials from fisheries and sustainability sources; and (5) conducting expert validation by specialists in ESP, fisheries, and sustainability education.

Data were analyzed using a mixed-method interpretive approach quantitative data were summarized descriptively, while qualitative responses were thematically coded. Triangulation of data sources, peer debriefing, and expert validation ensured trustworthiness. Ethical procedures were observed through informed consent, anonymity, and institutional approval.
Overall, this methodological framework facilitated the systematic creation of an eco-literate ESP syllabus that is pedagogically robust, contextually relevant, and aligned with the linguistic and environmental needs of fisheries students.

C. RESULT & DISCUSSION

Results of Needs Analysis

The initial phase of syllabus development focused on identifying students' linguistic and professional needs in relation to sustainability in fisheries education. The triangulated results from questionnaires (n=25), lecturer interviews (n=2), and document analysis yielded several key findings.

First, students and lecturers unanimously emphasized the importance of integrating environmental and sustainability issues into the English classroom. Approximately 87.5% of student respondents agreed that learning English through environmental topics would increase both motivation and professional relevance. They expressed particular interest in themes such as *marine conservation, sustainable aquaculture, waste management*, and *climate change impacts on fisheries*. This aligns with UNESCO's (2023) findings that environmental relevance enhances learners' engagement in higher education language courses.

Second, the priority language skills identified were (1) *reading and interpreting technical texts*, (2) *writing reports and proposals*, and (3) *oral presentations* related to environmental issues. Lecturers noted that students often struggled with reading research papers and policy documents due to limited exposure to discipline-specific vocabulary. They also emphasized the need for writing skills to communicate project outcomes clearly to policymakers and international stakeholders.

Third, the linguistic weaknesses observed included: (a) limited use of academic and environmental vocabulary, (b) frequent grammatical inaccuracy in describing processes, and (c) difficulties in organizing extended writing. These findings confirm earlier studies in ESP and EAP contexts indicating that writing and vocabulary constitute the main linguistic barriers for technical students (Durrant, 2025; Dudley-Evans & St. John, 1998).

As in beyond any doubt, both students and lecturers agreed that the ESP course should not only improve linguistic competence but also promote environmental values and awareness. This preference supports the integration of *eco-literacy* principles into syllabus design, reflecting the increasing global demand for education that builds responsible citizenship (Kazazoğlu et al., 2025; Murti, 2025).

Syllabus Design Outcomes

Based on the results above, a 16-week eco-literate ESP syllabus was designed. The final syllabus consisted of 16 thematic units, each connecting fisheries-related content with sustainability principles. The structure followed Graves's (2000) and Nation & Macalister's (2010) course design framework, adapted for environmental literacy.

Table 1. Overview of the Eco-Literate ESP Syllabus for Fisheries Students

Week	Thematic Focus	Communicative Skills	Sustainability Integration
1	Introduction to English for Sustainable Fisheries	Reading comprehension; vocabulary building	Understanding SDG 14 and global environmental issues
2	Sustainable Aquaculture Practices	Report writing; cause–effect structures	Eco-friendly fish farming and pollution control
3	Marine Conservation and Biodiversity	Oral presentation; passive voice	Coral reef and mangrove preservation
4	Climate Change and Fisheries	Data description; graph interpretation	Ocean acidification and adaptation measures
5	Eco-Friendly Fishing Gear	Technical explanation; modal verbs	Bycatch reduction and responsible fishing
6	Waste Management in Fish Processing	Process writing; sequencing	Circular economy in seafood industries

Week	Thematic Focus	Communicative Skills	Sustainability Integration
7	Blue Economy and Marine Resources	Academic summarizing; nominalization	Sustainable resource utilization
8	Water Quality Monitoring	Data reporting; comparison forms	Maintaining ecosystem balance
9	Fishery Policy and SDGs	Essay writing; formal connectors	Policy alignment with sustainable development
10	Eco-Tourism in Coastal Areas	Persuasive speaking; promotional writing	Community-based marine tourism
11	Plastic Pollution and Ocean Health	Argumentative writing; discourse markers	Marine waste management campaigns
12	Sustainable Fish Feed and Nutrition	Technical report; passive constructions	Organic and plant-based feeds
13	Renewable Energy in Aquaculture	Proposal writing; future tenses	Solar and biogas systems in fish farms
14	Community Empowerment	Descriptive narrative; past tenses	Local leadership and environmental education
15	Digitalization in Sustainable Fisheries	Reading comprehension; ICT vocabulary	Smart technologies for sustainability
16	Ethics and Environmental Responsibility	Reflective essay; conditionals	Ethical fisheries and environmental stewardship

Each unit integrates linguistic objectives (grammar, vocabulary, discourse functions) with sustainability learning outcomes, reinforcing the dual goal of communicative competence and environmental consciousness. The syllabus is both content-based and task-based: learners engage with authentic materials (FAO reports, policy briefs, and research abstracts), and each week culminates in a performance task such as a report, presentation, or campaign design.

Expert Validation and Feedback

Three experts evaluated the syllabus: an ESP curriculum designer, a fisheries science lecturer, and a sustainability education researcher. Their evaluation focused on content relevance, pedagogical coherence, linguistic accuracy, and eco-literacy integration. Content Relevance: Experts affirmed that the thematic units were appropriate for Fisheries undergraduates and reflected real professional contexts, aligning with current national and global sustainability issues. Pedagogical Coherence: They noted that the combination of task-based and content-based approaches promotes active learning and professional communication skills. Linguistic Accuracy: Feedback recommended ensuring progressive grammatical scaffolding across units, from basic descriptive skills to academic and policy discourse. Eco-Literacy Integration: Validators highlighted the syllabus's innovative contribution connecting language learning with environmental ethics and SDG-based action. Minor revisions were made to adjust the complexity of reading materials and include locally relevant examples (e.g., mangrove rehabilitation projects in East Java).

Discussion

The findings of this study highlight several key insights into the integration of sustainability and eco-literacy in ESP syllabus design are as follows:

1. Linking Language Learning and Environmental Literacy

The results affirm that language learning and sustainability education can be effectively combined through contextualized ESP instruction. As previous studies suggest, learning that connects disciplinary knowledge with global challenges enhances motivation, cognitive engagement, and critical thinking (Kazazoğlu et al., 2025; Murti, 2025; Elkasovic, S. & Colakovac, 2023; Comas, 2022). By embedding environmental issues such as marine pollution and blue

economy concepts into communicative tasks, learners develop both domain-specific language skills and eco-conscious perspectives. This aligns with the broader educational paradigm of Education for Sustainable Development (ESD) advocated by UNESCO (2023), which emphasizes transforming learning into a means for promoting responsible environmental behavior.

2.. From Prescriptive Grammar to Meaningful Sustainability Communication

Traditional ESP syllabi often focus narrowly on grammar and technical terminology. However, this study demonstrates that functional and communicative language use, such as describing sustainability practices or proposing eco-friendly solutions which provides a more meaningful and purpose-driven learning experience. This echoes Durrant's (2025) argument that language instruction should be "contextually anchored in authentic discourse practices that reflect societal and environmental realities." By shifting focus from accuracy alone to eco-linguistic competence, learners are empowered to communicate persuasively and ethically about sustainability issues in fisheries contexts.

3. The Role of Task-Based Learning in Sustainable ESP

Task-based learning (TBL) proved particularly effective for this syllabus because it encourages problem-solving and collaboration around real environmental challenges. Each task (e.g., drafting a marine conservation proposal or creating a plastic reduction campaign) allowed students to use English as a tool for *action-oriented communication*. This approach resonates with the experiential learning model in eco-literacy education (Kazazoğlu et al., 2025) and aligns with Dewey's philosophy that learning occurs through doing. Furthermore, integrating authentic tasks ensures learners' communicative output mirrors the demands of professional fisheries settings, addressing the transfer gap often identified in ESP studies (Dou, 2023).

4. Implications for ESP Curriculum Design

The eco-literate syllabus contributes to ESP theory and practice in several ways: (1). Pedagogical Innovation: It expands ESP from occupational communication toward sustainability education, bridging linguistic and ecological domains. (2). Curriculum Alignment: It aligns English instruction with the SDG framework, particularly Goals 13 and 14, fostering cross-disciplinary awareness. And (3). Professional Relevance: It prepares students for environmentally responsible roles in fisheries sectors, equipping them to contribute to Indonesia's Blue Economy agenda (FAO, 2022; Jurkovic, 2025).

These contributions indicate that ESP syllabus design should no longer treat sustainability as an "add-on" but as an essential dimension of professional English learning in scientific and technical disciplines.

This study has designed and conceptually validated an eco-literate ESP syllabus that integrates sustainability principles, environmental awareness, and professional communication skills for Fisheries Department students. Anchored in the frameworks of English for Specific Purposes (ESP) (Dudley-Evans & St. John, 1998), eco-literacy education (Kazazoğlu et al., 2025; Murti, 2025), and Education for Sustainable Development (ESD) (UNESCO, 2023), the syllabus represents an innovative response to the changing demands of higher education in the era of sustainable development. The needs analysis confirmed that students and lecturers alike perceive environmental issues, such as marine conservation, sustainable aquaculture, waste management, and blue economy practices as highly relevant to their academic and professional lives. Moreover, the analysis revealed a strong desire for English learning that connects directly to the realities of fisheries and environmental responsibility. Responding to this need, the 16-week eco-literate syllabus integrates linguistic, cognitive, and environmental learning outcomes, moving beyond grammar and vocabulary mastery to foster *eco-conscious communicative competence.*

The validation results demonstrated that the syllabus is contextually appropriate, pedagogically coherent, and thematically relevant. It also aligns with the Sustainable Development Goals (SDG 13: Climate Action; SDG 14: Life Below Water) by embedding

environmental and ethical dimensions into the learning process. In this respect, the study contributes to the growing body of research supporting cross-disciplinary integration of sustainability into ESP curricula, where language learning becomes a transformative practice rather than a purely instrumental one.

Ultimately, the designed syllabus not only enhances English proficiency but also prepares students to become environmentally responsible professionals capable of articulating and implementing sustainable fisheries practices. It emphasizes that language education should not be divorced from the ecological challenges shaping our collective future.

D. CONCLUSION

This study underscores that teaching English for Specific Purposes in the 21st century must transcend linguistic boundaries to address the ethical and ecological dimensions of professional communication. Designing an eco-literate ESP syllabus for fisheries education demonstrates that language learning can be a catalyst for sustainable development and environmental stewardship. As learners gain the ability to express, negotiate, and advocate for sustainable practices in English, they simultaneously develop as responsible global citizens committed to protecting the planet's marine ecosystems. Ultimately, integrating sustainability into ESP instruction redefines language education as a means of transformative action—empowering students not only to speak and write effectively but also to *think, act, and communicate sustainably* in a world that depends on ecological balance.

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