Integrating English Language Teaching and Environmental Studies Through A Project-Based Digital Storytelling

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Abstract

This mixed-methods case study examined students' perceptions of an eight-week project-based digital storytelling activity that integrated English language learning with environmental studies. Forty-two undergraduate students at a private university in Indonesia completed a 13-item questionnaire comprising six five-point Likert-scale items and seven open-ended questions; 16 students subsequently participated in semi-structured interviews. Quantitative responses were summarized descriptively, whereas open-ended and interview data were analyzed thematically and integrated during interpretation. Students retrospectively reported a modest increase in environmental awareness, from a mean of 4.05 before the project to 4.29 after it, together with strong engagement (M = 4.19) and motivation to take environmental action (M = 3.93). Most participants regarded digital storytelling as valuable for English learning, particularly for speaking and writing, and described gains in creativity, critical thinking, collaboration, and digital skills. The principal challenges were unequal group participation, scheduling, technical demands, and limited instructional clarity. Students addressed these difficulties through self-directed learning, negotiation, task redistribution, and adaptation. The findings extend project-based learning outcome research by showing how multimodal narrative production can connect affective engagement with local environmental issues to perceived linguistic, collaborative, and digital learning. However, because the awareness ratings were collected retrospectively and the study relied primarily on self-report, the findings indicate perceived change rather than measured causal effects.

1. Introduction

Environmental problems increasingly require educational responses that connect disciplinary learning with students' everyday lives. English language teaching (ELT) can contribute to this goal when language is used not only as an

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object of study but also as a means of investigating, discussing, and communicating real-world concerns. In Indonesia, environmental themes have been incorporated into English lessons through reading, discussion, presentation, and project work, enabling learners to develop language skills while engaging with issues such as pollution, climate change, waste, and conservation (Hasrina et al., 2024; Masitoh et al., 2025; Nurhaliza et al., 2024; Vasiljević, 2025). Such integration is especially relevant in higher education, where students are expected to communicate across modes, collaborate, solve problems, and make informed decisions about social and environmental challenges.

Project-based learning (PjBL) provides a suitable structure for this interdisciplinary work because students learn through sustained engagement with an authentic question or product rather than through isolated exercises. PjBL positions learners as active investigators and creators, while the teacher organizes resources, scaffolds inquiry, and monitors progress (Almulla, 2020; Wolk, 2022). A review of PjBL in higher education grouped reported outcomes into cognitive, affective, behavioral, and artifact-performance domains (Guo et al., 2020). These domains are useful for examining interdisciplinary ELT projects because they accommodate knowledge development, learner perceptions, participation and transferable skills, and the quality of a final product. Recent work also indicates that sustainability-oriented PjBL can support self-directed learning, collaboration, and digital literacy in EFL contexts (Dinata et al., 2026; Zunaidah, 2024).

Digital storytelling (DST) adds a multimodal dimension to PjBL. A digital story normally combines spoken or written language with images, video, sound, movement, and other semiotic resources. From a social constructivist perspective, knowledge is developed through participation, negotiation, and the collaborative production of meaning. From a multiliteracies perspective, communication extends beyond alphabetic text and requires learners to select and coordinate multiple modes for particular audiences and purposes (Nabhan & Habók, 2026). DST therefore offers an authentic setting in which students research a topic, shape a narrative, write a script, rehearse language, make visual and audio choices, and revise a shared product. Empirical studies have associated DST with willingness to communicate, speaking development, creative thinking, digital skills, and collaborative learning (Shen et al., 2024; Yang et al., 2022; Yu & Wang, 2025). Its visual and emotional affordances may also help learners engage affectively with a topic, although such effects depend on the design of the task and the support provided (Chen et al., 2026).

Previous Indonesian studies have demonstrated the value of environmental content and PjBL in secondary and university English education. Students have used environmental topics to develop climate literacy, higher-order thinking, language production, and multimodal communication (Masitoh et al., 2025; Ramdani & Ichsan, 2023; Widyaningrum et al., 2022). Nevertheless, much of this work has treated environmental issues primarily as lesson content for reading,

discussion, or presentation. Less attention has been given to how university students perceive the combined environmental, linguistic, affective, collaborative, and technological outcomes of producing a complete digital story about problems in their own communities. There is also a need to examine the practical tensions of this approach, including unequal participation, technical access, time demands, and uncertainty about language learning.

The present study addresses this gap by examining a project in which undergraduate students collaboratively created an educational video about one or two environmental issues observed in their surroundings. Its contribution lies in connecting the PjBL outcome domains with a multimodal, locally situated DST task and in considering both perceived benefits and implementation challenges. Rather than treating the finished video only as a product, the study examines how researching, scripting, filming, editing, and negotiating group responsibilities shaped students' experiences of environmental and English learning.

2. Method

The study employed a mixed-methods case study design to examine students' experiences in one bounded English course at a private university in Indonesia. The manuscript reports an eight-week study period, and the questionnaire and interviews were conducted after the digital storytelling project had been completed. A case study was appropriate because the inquiry focused on a specific class, instructional activity, and institutional context (Cohen et al., 2018; Yin, 2017). The quantitative component described patterns in students' ratings, whereas the qualitative component elaborated how students understood the project, the difficulties they experienced, and the strategies they used. The two strands were integrated during interpretation by comparing the quantitative patterns with themes and representative participant accounts.

The participants were 42 undergraduate students enrolled in an English course at a private university in Indonesia. They were selected purposively because they had completed the same digital storytelling project and could report directly on the experience. The original manuscript does not provide the participants' age range, year of study, gender distribution, English proficiency, academic program, or previous experience with digital storytelling; these characteristics require author confirmation before publication.

Students worked in groups to create an educational video addressing one or two environmental issues found in their surroundings. The project involved group formation, topic selection, information gathering, storyboard development, script writing, video production, editing, and submission. These stages required students to use English to research and communicate environmental information while coordinating creative, technical, and interpersonal tasks.

Data were collected through a questionnaire and semi-structured interviews. The questionnaire contained 13 items: six five-point Likert-scale items and seven

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open-ended questions. It examined three dimensions: environmental awareness and engagement, English language learning experiences, and challenges and problem-solving strategies. The questionnaire was administered after the project so that students could reflect on the complete experience. Consequently, the 'before project' and 'after project' awareness ratings were collected retrospectively in the same post-project questionnaire and should not be interpreted as a prospective pretest-posttest measure.

Sixteen students participated in semi-structured interviews lasting 10–17 minutes. The interviews were recorded on a mobile phone and followed the same general topics as the questionnaire while allowing students to elaborate on their responses. The criteria for selecting the 16 interviewees, the interview language, the transcription procedure, and any translation or transcript-checking process were not reported in the original manuscript and require author confirmation. The original manuscript does not report questionnaire development, expert review, pilot testing, scale anchors, reliability evidence, or the full interview protocol. These details should be supplied by the authors so that readers can evaluate instrument quality and procedural transparency.

The six Likert-scale items were analyzed using means, standard deviations, medians, modes, frequencies, and percentages. The analysis was descriptive; no inferential statistical test was reported. Open-ended questionnaire responses and interview transcripts were analyzed thematically following the general approach described by Braun and Clarke (2022). The reported procedure involved coding relevant statements, grouping recurring codes into categories, and developing themes concerning environmental awareness, motivation, language learning, creativity, critical thinking, collaboration, technical learning, challenges, and problem-solving strategies. Quantitative and qualitative findings were then compared, with interview and open-ended responses used to explain or qualify patterns in the ratings.

The number and roles of coders, procedures for resolving differences, reflexive practices, member checking, peer review, or other trustworthiness strategies were not reported. These items require author confirmation and should be added if they were part of the original study. Information concerning institutional ethics approval or exemption, informed consent, voluntary participation, confidentiality, anonymization, and data storage was not included in the original manuscript. These procedures must be confirmed by the authors and described before publication. No ethical approval or consent procedure has been inferred or added in this revision.

3. Results

Table 1 summarizes the six Likert-scale items. Students retrospectively rated their environmental awareness at M = 4.05 (SD = 0.54) before the project and M = 4.29 (SD = 0.46) after it, a difference of 0.24 points. Because both judgments were

collected after the project, this pattern represents perceived change rather than an independently measured pretest-posttest gain. Motivation to take environmental action was also high (M = 3.93, SD = 0.68), and engagement with the digital-story content received the highest mean (M = 4.19, SD = 0.45). The value of DST for English learning was rated positively (M = 3.76, SD = 0.43), whereas preference for DST over traditional methods was more moderate (M = 3.38, SD = 0.58).

Table 1. Descriptive Statistics for Environmental Awareness, Engagement, and Perceived Value

Question	Mean (M)	SD	Median	Mode
Awareness before project	4.05	0.54	4.0	4
Awareness after project	4.29	0.46	4.0	4
Motivation to take action	3.93	0.68	4.0	4
Engagement with content	4.19	0.45	4.0	4
Value of DST in English class	3.76	0.43	4.0	4
Preference: digital vs. traditional methods	3.38	0.58	3.0	3

Thirty-one students (73.8%) reported high motivation to contribute to reducing environmental problems, while 11 (26.2%) reported moderate motivation. Forty-one students (97.6%) indicated high engagement with the content. The environmental issues most frequently identified as single themes were pollution (33.3%), wildlife conservation (14.3%), and renewable energy (14.3%). Sixteen students referred to more than one issue, suggesting that some participants viewed environmental problems as interconnected rather than isolated.

The qualitative data localized these concerns in students' everyday surroundings. One participant explained, 'I think Bandung is hotter now compared to before. I think it is because of global warming.' Another stated, 'I become aware about the illegal animal trades in my city because we went to a market that sells lots of animals.' Intended and reported actions ranged from avoiding littering and using reusable containers to using public transportation and challenging exotic-pet ownership. Student 7, for example, reported, 'I have, at the very least, told off my family members who keep exotic animals. I also report content(s) on social media when it features exotic animals being kept as pets.' These accounts elaborate the high motivation rating by showing that students connected environmental learning with specific behavioral commitments and advocacy.

Most participants (76.2%) considered the digital storytelling project an effective method for learning English. When asked to compare it with a traditional grammar-based approach, 42.9% preferred DST, while half considered the two approaches equally beneficial. This pattern indicates that students generally viewed DST as a complement to, rather than a complete replacement for, explicit language instruction.

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Speaking was the language area most frequently identified as improved (76.2%). Writing appeared in 21.4% of responses, sometimes together with speaking, because students had to develop a script before recording. Participants linked speaking practice to rehearsal, acting, narration, and repeated recording. Student 10 summarized this relationship: 'I think I develop speaking and writing skills because we have to write the script first before making the video.' Vocabulary and grammar were also mentioned, but less frequently.

Creativity and critical thinking emerged as central nonlinguistic outcomes. Students had to choose an issue, evaluate information, design a storyline, decide how to represent the problem visually, and revise the product when their first ideas or recordings were unsuccessful. Visual graphics were mentioned in 97.6% of responses as an effective storytelling element, either alone or in combination with other features. Emotional appeal was identified in 50% of responses when combined with other elements. These patterns suggest that students understood the persuasiveness of a digital story as dependent on the coordination of language, images, sound, and affective framing.

The project also required digital and collaborative learning. Participants learned to use recording and editing tools, searched online for technical guidance, and negotiated roles within their groups. These experiences align with the artifact-performance and behavioral domains of PjBL because students had to produce a public-facing video while managing communication, division of labor, and technical decisions. The most frequently reported difficulties concerned unequal group contribution (approximately 30%), time management and scheduling (approximately 25%), technical problems (approximately 20%), and logistical problems (approximately 10%). The approximate percentages were reported in the original analysis and should be interpreted descriptively. Participants also described the project as time-consuming, technically demanding, difficult to coordinate, and occasionally unclear in its language-learning focus.

Unequal participation placed a substantial burden on some students. Student 15 reported taking responsibility for acting, editing, narration, script writing, and directing because a group member did not submit a voice-over on time. Scheduling was also difficult because students had other assignments and different timetables. Technical problems included slow computers, unstable internet access, unfamiliar editing software, noisy filming locations, and limited device quality. One participant also questioned the absence of explicit grammar teaching: 'I sometimes feel that I do not know what I am learning, because there is no grammar teaching or exercise at all.' This comment qualifies the generally positive evaluation of DST and highlights the need to make language objectives more visible.

Students responded through self-directed learning, communication, task redistribution, and adaptation. Some watched online tutorials to learn editing techniques. Others divided scenes according to each member's technical resources, recorded replacement dialogue for noisy footage, or assumed additional

responsibilities to keep the project on schedule. These strategies demonstrate persistence and practical problem-solving, but they also show that successful completion sometimes depended on individual students absorbing an inequitable workload.

4. Discussion

The findings indicate that students perceived a modest increase in environmental awareness and reported strong engagement with environmental content. This interpretation must remain cautious because the awareness ratings were retrospective and no independent pre-project measure was administered. Even so, the quantitative pattern and qualitative accounts converge in showing that students connected broad environmental concepts with pollution, heat, waste, wildlife trade, and transportation in Bandung and their home communities. This local anchoring is important because environmental education becomes more meaningful when learners can observe, research, and communicate problems that affect their own surroundings (Hasrina et al., 2024; Masitoh et al., 2025).

DST may have supported this engagement through a combination of inquiry, narrative construction, and multimodal representation. Students did not simply receive information; they selected a problem, researched it, decided how to sequence evidence, and attempted to persuade an audience through language, images, and emotion. From a social constructivist perspective, these activities require learners to negotiate meaning with peers and to externalize understanding in a shared artifact. From a multiliteracies perspective, students must coordinate several modes and consider how each contributes to meaning (Nabhan & Habók, 2026; Yu & Wang, 2025). The strong emphasis on visual graphics and emotional appeal therefore helps explain why students found the content engaging. The present study did not directly measure emotional processes, but prior DST research suggests that narrative and scaffolding can support affective awareness and participation (Chen et al., 2026; Shen et al., 2024).

The reported motivation to reduce littering, use reusable containers or public transport, and challenge exotic-pet ownership also corresponds to the affective and behavioral outcome domains identified by Guo et al. (2020). These accounts should not be read as verified long-term behavior change, because they were self-reported immediately after the project. Nevertheless, they demonstrate that students framed environmental knowledge in relation to personal responsibility and possible action. This supports the argument that environmental English education can move beyond vocabulary and comprehension toward civic and sustainability-oriented engagement (Ferkache, 2024; Vasiljević, 2025; Zunaidah, 2024).

Students most frequently perceived improvement in speaking, followed by writing. The task structure helps explain this result: students researched a topic, wrote a script, rehearsed dialogue or narration, recorded performances, and sometimes repeated recordings. These activities created a communicative purpose

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for speaking and writing and required language to be revised in relation to an intended audience. Similar DST research has associated multimodal production with speaking, creative thinking, willingness to communicate, and digital collaboration (Shen et al., 2024; Yang et al., 2022; Yu & Wang, 2025). However, the present study measured perceptions rather than language performance, so the results do not establish objective proficiency gains.

The students' moderate preference for DST over traditional instruction is also pedagogically important. Half of the participants viewed digital and traditional approaches as equally beneficial, and one participant was uncertain about what language had been learned because the project did not include explicit grammar exercises. This indicates that authentic project work should not make language learning invisible. Clear language objectives, modeling, formative feedback, and reflection can help students recognize how script development, pronunciation practice, vocabulary selection, and grammatical revision contribute to English development. In this sense, DST is most defensible as a complementary approach that integrates purposeful communication with focused language support.

The project further developed perceived creativity, critical thinking, collaboration, and digital skills. These outcomes align with cognitive, behavioral, and artifact-performance dimensions of PjBL (Guo et al., 2020) and with recent evidence that sustainability-oriented projects can promote self-directed and collaborative learning (Dinata et al., 2026). Students exercised agency when they searched for information, learned software independently, revised unsuccessful recordings, and redistributed tasks. At the same time, agency was unevenly distributed: some students' learning opportunities were accompanied by excessive responsibility when peers contributed less. The development of twenty-first-century competencies therefore depends not only on assigning a complex project but also on structuring participation fairly.

The reported challenges show that the benefits of PjBL and DST are not automatic. Unequal contribution, scheduling, technology, location, and creative planning made the project demanding. These difficulties can stimulate problem-solving, but they can also reduce motivation, obscure language objectives, and disadvantage students with limited devices or technical experience. PjBL requires sustained teacher monitoring, explicit milestones, and support for collaborative decision-making (Almulla, 2020; Wolk, 2022).

Several practical implications follow. First, the project should be divided into assessable stages—topic proposal, source evaluation, storyboard, script, rehearsal, rough cut, peer feedback, and final submission—so that difficulties can be identified early. Second, teachers should provide models and criteria for both environmental content and English use. Third, individual accountability should accompany group assessment through role records, progress logs, peer evaluation, or brief individual reflections. Fourth, basic editing workshops and flexible low-technology production options can reduce access barriers. Finally, environmental

action claims should be followed by later reflection or observation if the instructional goal includes sustained behavioral change.

The study also illustrates an interdisciplinary model of sustainable ELT. Environmental issues supplied an authentic communicative purpose, while English and multimodal resources enabled students to investigate and publicize those issues. This reciprocal relationship is the principal pedagogical contribution of the study: environmental content was not an addition to language practice, and language was not merely a vehicle for memorizing environmental facts. Instead, students used language and media to construct, negotiate, and circulate locally relevant environmental meanings.

The study has several limitations. It involved one English class at one private university, so the findings are context-specific. The sample was purposive, and important participant characteristics were not reported. The questionnaire was administered only after the project; therefore, the before-and-after awareness ratings were retrospective. The study relied mainly on self-reported perceptions and did not include independent measures of English proficiency, environmental knowledge, the quality of the digital stories, or sustained environmental behavior. Instrument validation, reliability, interview-subsample selection, coding roles, trustworthiness procedures, and ethical procedures were also not reported in sufficient detail. Finally, the study examined one project, which may not represent students' experiences across different project types or longer periods. These limitations restrict causal inference and generalization but do not negate the value of the detailed classroom perceptions reported here.

5. Conclusion

This study examined how university students perceived a project-based digital storytelling activity that integrated English learning with environmental studies. Students reported a modest retrospective increase in environmental awareness, high engagement with local environmental issues, and motivation to take action. They also viewed the project as valuable for speaking, writing, creativity, critical thinking, collaboration, and digital learning. These outcomes can be understood through the cognitive, affective, behavioral, and artifact-performance dimensions of PjBL and through the multimodal meaning-making required in digital storytelling.

The project also exposed substantial implementation challenges. Unequal participation, time and scheduling pressures, technical demands, logistical constraints, and limited language-focused guidance complicated the learning process. Students responded with self-directed technical learning, negotiation, adaptation, and task redistribution, although some assumed disproportionate workloads. The findings therefore support DST as a promising complementary approach for interdisciplinary ELT, not as a stand-alone substitute for explicit language instruction or carefully structured collaboration. Because the evidence is

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based mainly on retrospective self-report from one class, the study demonstrates perceived benefits and challenges rather than causal effects.

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