

Writing Short Stories Using Environment-Based Artificial Intelligence

Muhammad Ashar Kadir¹

Juanda^{2*}

¹² Faculty of Languages and Literature, Makassar State University, Indonesia

¹ muhammadashar@student.unm.ac.id

^{2*} Corresponding author: juanda@unm.ac.id

Abstract

This study aims to examine the use of Artificial Intelligence (AI) based on environmental context in the short story writing process by junior high school students. With the increasing use of AI technologies such as ChatGPT and similar technologies in education, there is a need to understand how AI integration can support literary creativity, particularly in addressing environmental themes. This study used a qualitative descriptive approach involving 30 eighth-grade students from two junior high schools in Makassar. Data were collected through observation of the writing process, in-depth interviews, and analysis of the resulting short story texts. The results showed that the use of environmental-based AI significantly improved the quality of narrative structure, the depth of ecological themes, and the richness of diction in students' short stories. These findings imply the need for a literature learning curriculum that integrates AI technology ethically and contextually, especially for environmental issues relevant to the lives of the younger generation. This study contributes theoretically by integrating short story writing instruction, AI literacy, and ecocritical perspectives to explain how student-AI interactions shape creativity, authorial agency, and ecological awareness. Practically, it provides a foundation for teachers to design critical AI-assisted literature learning through prompt guidelines, interaction logs, revision-process assessment, and the integration of students' local environmental experiences.

Keywords: *short stories, artificial intelligence, environment, literary learning, creativity*

Introduction

Literature learning at the junior high school (SMP) level is a crucial component in developing students' language skills and creative thinking. Within the context of the Independent Curriculum, writing short fiction texts, such as short stories, is a prioritized skill because it integrates critical thinking, emotional sensitivity, and linguistic creativity simultaneously.

The development of artificial intelligence (AI) technology in recent years has opened up new opportunities in creative learning processes, including literary writing. AI-based tools such as ChatGPT, Gemini, and various other large language models can now be used as creative partners in brainstorming, plot development, and even refining diction and style.

However, amidst these opportunities, there is a crucial issue that has not been widely studied, how can AI be utilized contextually based on environmental themes? Environmental issues, ranging from climate change, forest destruction, marine pollution, to biodiversity loss, are real issues close to students' lives, yet often absent from their creative literary production. Environmentally contextualized generative AI refers to the pedagogically guided use of general-purpose generative AI systems in which prompts,

learning materials, interaction activities, and assessment criteria are deliberately anchored in ecological issues, local environmental knowledge, and ecocritical perspectives to support students' creative writing. This is where this research is relevant, integrating AI as a catalyst and companion for writing environmental-themed short stories.

Several previous studies have examined the use of AI in writing learning in general. Warschauer et al. (2023) shows that generative AI brainstorming can significantly improve students' motivation and writing outcomes. Nisya et al. (2025) In a short story writing training program assisted by artificial intelligence for vocational school students, it was found that AI was able to help students generate ideas, develop plots, and build character in a more structured manner. Primary (2025) also proved that the use of Magic School AI media significantly improved the short story writing skills of eighth grade junior high school students. In the realm of climate education, Okeke (2026) demonstrate that AI-based language tools and digital storytelling can effectively bridge science, communication, and behavior change. However, specific studies on AI-assisted environmental short story writing at the junior high school level are still very limited, especially in the context of education in Indonesia.

On the other hand, studies on environmental literacy of junior high school students in Indonesia show worrying conditions (Ririn et al., 2021). In his study of junior high school students' environmental literacy, he also confirmed that most students possess adequate theoretical ecological knowledge but are weak in terms of concrete actions and practical concern for their surroundings. This situation demonstrates the urgency of a new, more contextual and creative learning approach to instilling ecological awareness.

Writing short stories with environmental themes is considered a potential learning strategy to bridge this gap. Siddiq et al. (2020) proves that the application of problem-based learning can improve the environmental literacy of junior high school students, especially on environmental pollution material. Miterianifa and Mawarni (2024) demonstrated that the implementation of an environmental literacy-based learning model has been proven to simultaneously increase students' knowledge and environmental awareness. By integrating this approach into Indonesian language learning through short story writing, it is hoped that synergy will occur between literary literacy competencies and ecological awareness.

The research gap lies in the limited integration of studies on AI-assisted writing, environmental education, and literary literacy. Previous research has generally examined the effectiveness of AI in supporting idea generation, plot development, characterization, and writing performance, while environmental education studies have mainly focused on improving ecological knowledge and awareness without investigating how environmental values are constructed through literary language and narrative strategies. Moreover, few studies have addressed student-AI interaction patterns, creative agency, authorship originality, cultural bias, and the incorporation of local ecological knowledge in short story writing, particularly among Indonesian junior high school students. The novelty of this study lies in integrating environmentally contextualized generative AI with both process- and product-oriented literary analysis by mapping student-AI interaction patterns and applying stylistic and ecocritical approaches to the resulting short stories. Thus, the study moves beyond treating AI merely as a writing tool and demonstrates how critically mediated AI use can strengthen students' creativity, authorial agency, local identity, and ecological awareness.

The use of AI in the educational context in Indonesia continues to experience rapid growth. According to the report (Tjahyanti, LPAS, Saputra, PS, & Santo Gitakarma, 2022). Schools in Indonesia are starting to utilize AI-based applications to automate feedback, select appropriate learning materials, and align the curriculum with student needs. Specifically, in the context of creative writing instruction, research conducted by (Fauzan et al., 2025). Research shows that utilizing AI tools like Wrizzle AI can significantly improve student productivity, idea quality, and story structure. These findings open up significant opportunities for adapting similar technology to short story learning at the junior high school level, with environmental context as the primary theme (Chen et al., 2022) in a review of two decades of AI in education asserts that AI technology has fundamentally changed the learning landscape. Long and Magerko (2020) defines AI literacy as a set of competencies that enable students to interact critically with AI systems.

Within the Merdeka Curriculum framework implemented at the junior high school level, Indonesian language instruction emphasizes strengthening the Pancasila-based student profile, including the dimensions of faith and devotion to God Almighty and global diversity. The environmental dimension, as part of these values, opens up space for the integration of ecological themes into various subjects, including Indonesian Nurgiantoro (2024) explains that fiction as a literary genre has great potential in developing students' emotional and critical sensitivity Kurniawan et al. (2024) also demonstrates the promising potential of AI to enhance creativity and literacy in Indonesian language learning. The application of environment-based AI to short story learning in junior high schools is thus not only pedagogically relevant but also aligns with the national curriculum policy, which prioritizes contextual and meaningful learning for students' real lives.

Within the framework of the Merdeka Curriculum and the Pancasila Student Profile, writing environment-themed short stories can function as an integrative learning activity that develops several student competencies simultaneously. The process strengthens literacy by requiring students to read, interpret, and transform environmental information into coherent narratives; fosters creativity through the construction of characters, settings, conflicts, and imaginative solutions; and promotes critical reasoning as students evaluate ecological problems, identify their causes and consequences, and assess the accuracy and relevance of AI-generated suggestions. Moreover, by representing environmental damage from human and non-human perspectives, students are encouraged to develop empathy, responsibility, and ecological awareness toward their local surroundings. Thus, environmental short story writing is not merely a language exercise, but a contextual literary practice that connects linguistic competence, creative expression, critical reflection, and environmentally responsible character formation.

This study aims to fill this gap by examining: (1) how the AI-based short story writing process takes place among junior high school students; (2) to what extent AI contributes to the depth of environmental themes in short stories; and (3) what ethical and pedagogical challenges arise from the integration of AI in literature learning at the junior high school level. (Juanda, 2024) In the study of digital short story ecoliteracy in Indonesia, it is one of the important foundations of this research. (Rizam & Ayuanita, 2024) has also studied the ecology of web-based digital short stories and its implementation in language and literature learning. (Inderawati et al., nd) shows that transforming climate change information into short stories can improve digital literary literacy.

Method

This study employed a qualitative descriptive design to provide a detailed account of the processes through which students interacted with generative AI and the characteristics of the short stories they produced. The study focused on two interconnected dimensions: the writing process, including prompt construction, student–AI interaction, drafting, revision, and reflection; and the writing product, including narrative structure, characterization, diction, environmental-theme coherence, local ecological representation, and originality. A qualitative descriptive design was considered appropriate because the study did not seek to identify the essential structure of students' lived experiences, as required in phenomenological research. Instead, it aimed to systematically describe observable interaction patterns, students' explanations of their creative decisions, and the literary and ecological features of their completed short stories.

The data and data sources of this research consist of: (1) primary data in the form of 30 short story manuscripts written by students, transcripts of in-depth interviews with 30 eighth grade students from two junior high schools in Makassar City, and field notes from observations of the writing process; (2) secondary data in the form of curriculum documents and reflection notes of Indonesian language teachers. Subjects were selected purposively with the following criteria: having access to digital devices, having received basic learning in writing short stories, and being willing to participate in the entire research series. The data collection technique used three complementary methods: (a) participant observation during writing sessions to record student–AI interaction patterns; (b) in-depth semi-structured interviews with students and teachers; (c) document analysis of 30 short stories using a narrative assessment rubric that included plot integrity, depth of characterization, richness of diction, coherence of environmental themes, and originality.

The AI-assisted short story writing procedure was conducted in seven stages. First, students received an introduction to generative AI, including its functions, limitations, ethical use, and the importance of maintaining authorship and verifying AI-generated information. Second, students were guided in constructing effective prompts by specifying the environmental theme, setting, characters, conflict, narrative perspective, and intended ecological message. Third, students explored environmental issues relevant to their local and broader contexts, such as deforestation, marine pollution, climate change, biodiversity loss, and human–wildlife conflict, using both prior knowledge and teacher-provided materials. Fourth, students used AI-generated suggestions selectively to develop an initial short story draft, while retaining control over the narrative direction and creative decisions. Fifth, the drafts were revised through iterative student–AI interaction and teacher feedback, focusing on plot coherence, characterization, ecological diction, thematic consistency, local relevance, and originality. Sixth, students reflected on how AI influenced their ideas, language choices, creative agency, and understanding of environmental issues. Finally, the completed short stories were assessed using a narrative evaluation rubric covering plot integrity, characterization, diction, environmental-theme coherence, local ecological representation, originality, and the degree of student personalization.

The analysis was conducted through three stages: data reduction, data presentation, and conclusion drawing/verification (Matthew B. Miles, A. Michael Huberman, 2023). Specifically for the short story analysis, stylistic and ecocritical approaches were used simultaneously to uncover environmental representations in

students' linguistic choices and narrative strategies. Data validity was ensured through triangulation of sources and methods. This approach also emphasized the importance of developing children's creativity based on scientific evidence provides a cognitive framework for understanding how children learn through literature (Trites, 2014). Observation notes and interview transcripts were analyzed to identify recurring patterns in students' use of AI, including directive, dialogic, and passive interaction. The short story manuscripts were analyzed using a narrative assessment rubric and supported by stylistic and ecocritical interpretation. Findings from observations, interviews, teacher reflections, and textual analysis were compared through data-source and method triangulation to strengthen the credibility of the results.

Results

This research yielded 30 short stories written by eighth-grade students with the help of AI based on environmental contexts. The short story data were analyzed based on two main aspects: (1) environmental markers, including ecological diction, natural imagery, and representation of environmental issues; and (2) literary aspects, including point of view, conflict structure, and narrative strategies. The following presents representative short story excerpts from each environmental theme category found. Although only five excerpts are quoted in detail, the thematic classification and literary interpretation were based on the complete corpus of 30 short stories. The five excerpts represent the dominant characteristics identified within each environmental-theme category. For example, the excerpt coded C1 illustrates recurring patterns found in the eight stories on deforestation, including forest personification, exploitation-related diction, and non-human perspectives. Similarly, the excerpts coded C2–C5 were selected to illustrate recurrent linguistic and narrative features within the categories of pollution, climate change, biodiversity loss, and human–wildlife conflict. The frequency distribution presented in Table 1 was derived from the coding of all 30 stories, not only from the five quoted texts.

The excerpts presented in this section were taken from the final versions of the short stories after drafting and revision, rather than from students' initial unaided writing. Their relatively mature metaphors, ecological diction, and narrative structures emerged through varying degrees of AI assistance. AI frequently supplied initial lexical or descriptive alternatives, while students selected expressions, changed narrative perspectives, incorporated local settings and species, adjusted conflicts, and revised the text according to their intended ecological message. Students with directive and dialogic interaction patterns demonstrated greater control over this process by rejecting irrelevant suggestions and rewriting portions of the output, whereas students with passive interaction patterns retained more AI-generated wording. Consequently, the excerpts represent co-constructed texts whose authenticity lies primarily in the students' control over narrative direction, selection, contextualization, and revision, rather than in the independent production of every sentence.

Theme L1: Forest Damage and Deforestation (Short Story Code: C1)

"I am a meranti tree that has stood for three hundred years in the heart of the Kalimantan forest. My roots pierce the earth, holding stories from a time when this forest still breathed freely. Now, the sound of chainsaws cuts through the dawn, and every morning I watch my brothers and sisters fall one by one. The once fertile soil is now

stripped away, leaving a gaping red wound like a wound in the earth's bosom."

Environmental markers: meranti trees (local species name), Kalimantan forests (specific geographical context), roots penetrating the earth (ecological imagery), the sound of chainsaws (exploitation marker), peeling soil (environmental degradation). Narrative strategies: first-person perspective of a non-human entity (tree), personification of the forest as a speaking subject. Ecocritical function: building readers' ecological empathy towards deforestation.

Theme L2: River and Sea Pollution (Short Story Code: C2)

"Mr. Rahmat has been fishing in the same estuary for the past twenty years. But now his nets bring home more plastic bags and detergent foam than milkfish. The once turquoise water is now a deep gray, smelling like rotting ink spilled from a factory upstream. The remaining fish swim wearily, their scales gleaming strangely in the sun, as if carrying poison with every movement."

Environmental markers: estuary, plastic bags, detergent foam, milkfish (local species), thick gray water, factory in the upper river (source of pollutants). Narrative strategy: third-person narrative with an empathetic perspective on local fishermen and the condition of the aquatic ecosystem. Ecocritical function: critique of industrial waste and its impact on traditional fishing communities.

Theme L3: Climate Change and Natural Disasters (Short Story Code: C3)

"The year is 2047. Makassar is half of what it was. The pier where my grandfather used to sell fish is now submerged two meters below sea level. Every time I dive and see the reflection of that old building underwater, I remember my grandfather's stories about the rainy season that used to be predictable, about the South wind that faithfully came every June. Now, there are no more seasons—only scorching heat alternating with floods that come without warning."

Environmental markers: sea level rise, Makassar City (specific locality), South wind (local weather wisdom), seasonal changes (temporal-climatic diction), non-cyclical flooding. Narrative strategy: nonlinear flow with proleptic (future projection) as an opening, intergenerational narrative. Ecocritical function: building intergenerational awareness about the impact of climate change in the coastal areas of Sulawesi.

Theme L4: Loss of Biodiversity (Short Story Code: C4)

"The little anoa wandered unsteadily along the thinning forest edge. He was searching for his mother, who had not returned three days earlier. The maleo birds, which usually sang loudly in the morning, were now silent; only the sound of bulldozers broke the silence. The black ebony trees where they had taken shelter had been cut down. Here, on this land of Sulawesi, a world was slowly disappearing without anyone noticing."

Environmental markers: anoa (a mammal endemic to Sulawesi), maleo bird (a typical species of Sulawesi), black ebony tree (endemic flora), Sulawesi soil (locality of endemism), bulldozer (symbol of exploitation). Narrative strategy: modern fable with endemic animal protagonists, empathetic third-person point of view. Ecocritical function: promoting awareness of the conservation of endangered endemic species of Sulawesi.

Theme L5: Human-Wildlife Conflict (Short Story Code: C5)

"Daeng, don't cut down that tree,' Mother pleaded, her voice trembling. 'That's the owl's nest that we've been guarding for generations.' But Daeng Rewa just laughed. To him, the tree was wood, and wood was money. Two days later, the tree fell. That night, the whole village couldn't sleep because of a strange sound coming from the forest, whether it was the wind or the cries of something that no longer had a home."

Environmental markers: trees as habitat (local wisdom), owls (wild species), Makassar dialect "Daeng" (cultural-ecological identity marker), contrasting values of wood as a commodity vs. sacred habitat. Narrative strategies: dialogue between characters (protagonist-antagonist conflict), lexical contrast between economic values and ecological-cultural values. Ecocritical function: elevating local wisdom as the basis of environmental ethics that confront economic exploitation.

The five excerpts above demonstrate that students' short stories written with the aid of environmental AI successfully developed rich, locally specific, and narratively integrated ecological markers. The ecological vocabulary used was not merely decorative, but served as a thematic support that strengthened each short story's ecocritical message. These findings confirm that environmental AI not only assisted students with technical writing but also served as a catalyst for the internalization of ecological awareness expressed through meaningful linguistic choices (Firnanda et al., 2025). In the EcoEduLitera SDGs study, it was also emphasized that literary works can be an effective medium for environmental education. (Kaur, nd) further demonstrates that AI, literature, and environmental awareness can synergize productively in contemporary ecological discourse.

Interpretation of results should not be included in this section, unless the research required combination of both findings and discussion in one section. Title of a table should be put above the table, as seen on Table 1, while title of image, picture, or chart should be put below the picture.

Discussion

The greater productivity of the dialogic interaction pattern can be explained by the sustained cognitive engagement required during repeated exchanges with AI. Students who interacted dialogically did not treat AI output as a finished text but as provisional material that needed to be questioned, compared, rejected, and reformulated. This iterative process encouraged students to clarify their narrative intentions, evaluate the relevance of environmental information, and make deliberate decisions regarding plot, perspective, diction, and ecological message. Thus, the value of dialogic interaction lies not in the quantity of AI-generated suggestions, but in the intellectual negotiation that occurs between the student's creative intention and the

alternatives produced by the system. By contrast, passive interaction reduces this negotiation and positions students primarily as recipients, which may explain the lower originality and thematic depth found in such texts.

These findings also suggest that generative AI influences creativity through both expansion and constraint. On the one hand, AI expands students' creative possibilities by offering alternative plots, non-human perspectives, ecological vocabulary, and unfamiliar environmental contexts. Such affordances can help students move beyond predictable story structures and develop more complex representations of human-nature relationships. On the other hand, AI-generated language may standardize expression, introduce culturally distant ecological images, or weaken authorial individuality when students accept its suggestions without critical revision. Creativity in AI-assisted writing should therefore not be understood as the automatic production of more sophisticated language. It emerges from students' capacity to transform technological suggestions through selection, rejection, localization, and personalization. The most meaningful creative contribution remains the student's ability to determine what the story should communicate and how ecological issues should be represented.

From a literary perspective, the findings indicate that AI can support students in exploring narrative forms that are often difficult to develop through conventional writing instruction. Non-human focalization, layered ecological conflict, symbolic imagery, and nonlinear narration allow students to represent environmental problems not merely as factual topics but as emotionally and ethically complex experiences. The resulting short stories show that ecological awareness can be strengthened when students imagine the consequences of environmental destruction from the perspectives of rivers, forests, animals, coastal communities, and future generations. In this sense, AI-assisted writing can contribute to literary learning by connecting narrative technique with ethical reflection, provided that students retain control over the meaning and direction of the story.

The pedagogical implication is that AI should be integrated into literature classrooms as a dialogic and reflective tool rather than as an automatic text generator. Teachers need to design activities that require students to explain why they accept or reject AI suggestions, compare generated representations with local ecological realities, document revisions, and justify their narrative choices. Assessment should consequently emphasize the writing process, including prompt quality, critical evaluation, contextual adaptation, revision, and personalization, in addition to the linguistic quality of the final text. Such an approach shifts the teacher's role from providing all narrative ideas to facilitating creative judgment, ethical authorship, and critical AI literacy.

More broadly, the study demonstrates that AI-assisted literary writing is most educationally valuable when it strengthens rather than replaces student agency. The dialogic pattern offers a productive model because it positions AI as a conversational resource while preserving the student as the principal interpreter and author. Consequently, the effectiveness of AI in literature learning should not be measured solely through polished language or structural complexity, but through the extent to which students remain intellectually, emotionally, and ethically involved in constructing their narratives. The resulting thirty short stories demonstrate a rich diversity of environmental themes. Thematically, the short stories can be grouped into five main categories, as shown in the following table.

The thematic distribution illustrated in Figure 1 should not be interpreted merely as a frequency comparison, but as an indication of the ecological issues most readily available within students' narrative repertoires. The predominance of deforestation may

reflect several interconnected influences, including students' prior environmental knowledge, exposure to forest-loss narratives in school materials and mass media, the visibility of deforestation as a national environmental issue, and the tendency of generative AI to produce familiar environmental scenarios when responding to broad ecological prompts. Therefore, the distribution cannot be attributed solely to AI intervention. Pedagogically, this finding suggests that AI-assisted writing is shaped by an interaction among technological suggestions, students' existing knowledge, media exposure, and teacher-provided learning contexts. Teachers should consequently encourage students to question why certain environmental topics appear more frequently, compare AI-generated ideas with local ecological realities, and explore less visible issues such as urban waste, coastal degradation, water scarcity, and environmental injustice. Such reflection can prevent thematic homogenization and transform the visualization of theme distribution into a tool for developing critical ecological literacy.

Table 1 Distribution of Environmental Themes in Students' Short Stories

No	Code	Environmental Theme	Number of Short Stories	Percentage (%)
1	L1	Forest destruction and deforestation	8	26.7
2	L2	River and sea pollution	7	23.3
3	L3	Climate change and natural disasters	6	20.0
4	L4	Loss of biodiversity	5	16.7
5	L5	Human and wildlife conflict	4	13.3

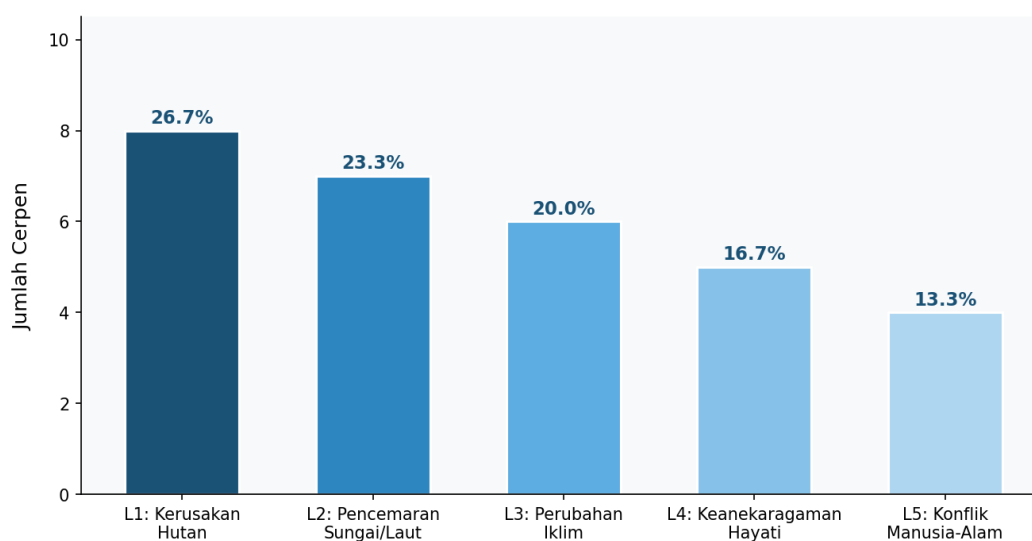


Figure 1 Distribution of Environmental Themes in Students' Short Stories (n = 30)

AI-Based Short Story Writing Process

The directive pattern was identified when students entered the interaction with a relatively clear narrative plan, provided detailed instructions, and used AI primarily to generate or refine specific story components. These students retained strong control over the narrative direction and extensively edited the output to match their intended environmental message. The dialogic pattern was characterized by sustained exchanges in which students asked follow-up questions, requested alternatives, challenged inaccurate or culturally irrelevant suggestions, and gradually developed the story

through exploration, negotiation, and personalization. In contrast, the passive pattern was identified when students used general prompts, accepted most of the initial AI output, conducted only one or two interaction rounds, and made minimal revisions or contextual adaptations. These distinctions indicate different levels of creative agency rather than merely different frequencies of AI use.

Descriptive analysis indicated that directive and dialogic interaction patterns were generally accompanied by stronger narrative quality, whereas passive interaction was more frequently associated with limited revision, originality, and thematic depth. Students with directive and dialogic interaction patterns produced short stories with higher narrative scores, while students with passive patterns tended to produce less original and thematically shallow short stories. This finding confirms the argument Warschauer et al. (2023) that student agency remains a determining factor in quality even when AI is used as an aid.

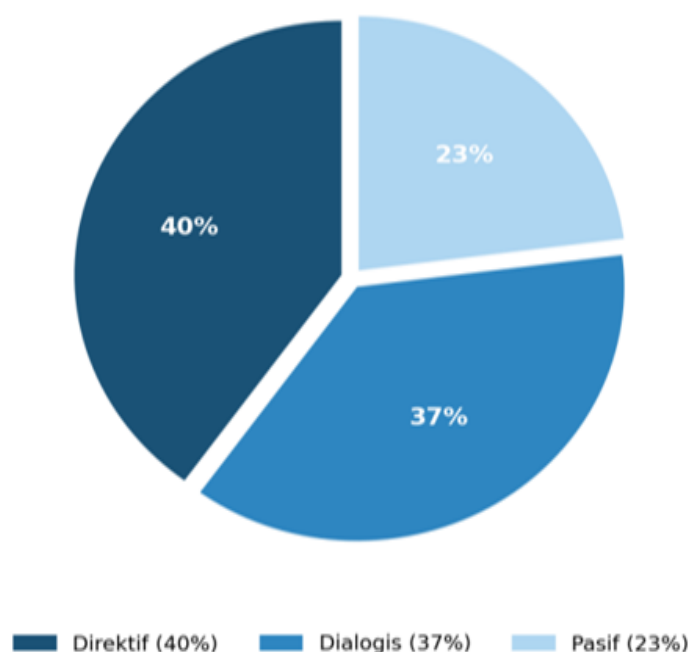


Figure 2 Distribution of Student-AI Interaction Patterns (n = 30)

Furthermore, a thorough analysis of the interaction process reveals three important subphases within the directive and dialogic patterns. The first subphase is the exploration phase, in which students use AI to gain an initial understanding of the environmental issue to be addressed. The second subphase is the negotiation phase, in which students critically evaluate AI suggestions and select elements that align with their creative vision. The third subphase is the personalization phase, in which students add their own authentic experiences, perspectives, and voices to the narrative. These three subphases demonstrate that an effective AI-based writing process is not a passive-receptive one, but rather an active-reflective one that demands a high level of cognitive engagement from students.

This finding is in line with the research results Nisya et al. (2025) which found that students who actively managed their interactions with AI by providing specific instructions, rejecting inappropriate suggestions, and revising repeatedly produced significantly higher-quality work than students who passively engaged with AI. The key

determinant of quality was not simply the availability of technology, but rather the students' ability to use it strategically and critically.

It should also be noted that the distribution of these three interaction patterns is not random, but rather correlated with certain contextual variables. Meanwhile, the passive pattern was more common among students who were using AI as a writing partner for the first time, so they did not yet have sufficient confidence to evaluate and reject irrelevant AI suggestions. This finding underscores the importance of intensive initial scaffolding from teachers before students are given full autonomy in interacting with AI, in line with Vygotsky's principle of the ZPD, which emphasizes cognitive readiness as a prerequisite for independent learning (Widodo, 2016). In the literature review in vocational education, it also emphasized the importance of peer support and teacher guidance in increasing reading and writing engagement.

Furthermore, analysis of the duration and intensity of interactions revealed an interesting pattern: students with a dialogic pattern engaged in an average of 7–12 rounds of interaction (prompt-response-revise) before producing the first draft of their short story, while students with a directive pattern required 4–6 rounds, and students with a passive pattern only 1–2 rounds. The lengthy iteration process in the dialogic pattern reflects the students' high cognitive engagement in continuously managing and directing the AI output. This strengthens the argument Zhai et al. (2021) that the quality of AI-based learning outcomes is not determined by the speed or ease of access to technology, but rather by the depth of the thinking processes that occur during the interaction.

The findings regarding the three subphases exploration, negotiation, and personalization also have important implications for instructional design. The exploration subphase demonstrates that AI is effective as a tool for expanding students' ecological horizons, which were previously limited to limited local knowledge. The negotiation subphase demonstrates active critical thinking: students consciously question the accuracy of the AI-provided ecological descriptions, compare them with their own knowledge and experience, and select elements that are most relevant to the context of the story they are constructing. The personalization subphase is crucial, as this is where students' true writerly identities emerge as they inject personal voices, perspectives, and experiences that AI cannot provide into the narrative. Together, these three subphases form a creative cycle that, when properly facilitated by teachers, can be a more effective model for teaching writing than conventional approaches that rely entirely on individual student initiative.

Linguistic Analysis of Representative Short Stories

A stylistic analysis of representative short stories from each theme category revealed interesting patterns of language use. Lexically, the AI-assisted short stories exhibited a significantly higher ecological vocabulary richness than the control short stories written without AI assistance.

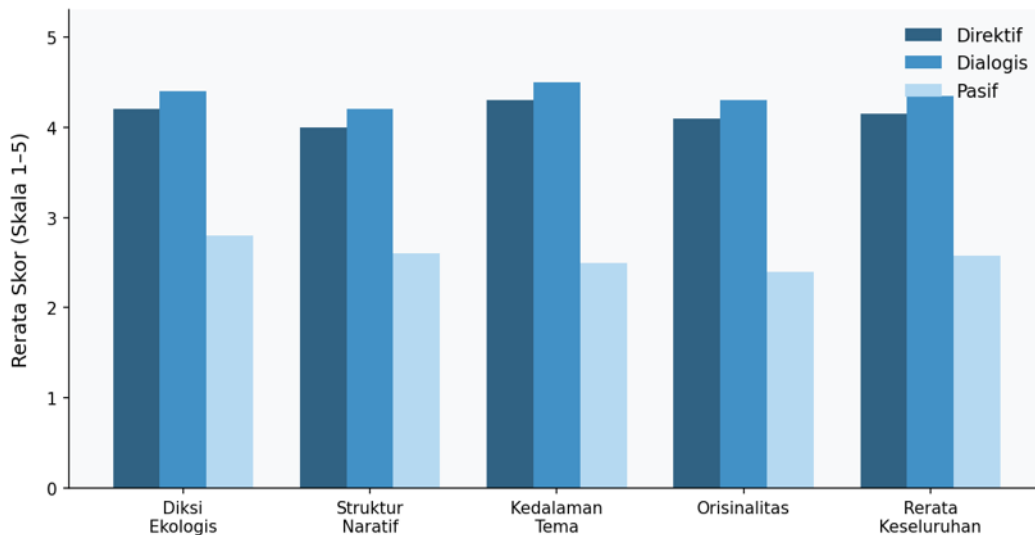


Figure 3 Narrative Quality Scores Based on Student-AI Interaction Patterns (Scale 1–5)

In more detail, lexical analysis showed that the average number of specific ecological vocabulary such as names of local flora and fauna species, environmental technical terms, and diction reflecting the emotional relationship between humans and nature in AI-assisted short stories was 3.7 times greater than in short stories written without AI assistance. This lexical richness serves not only as a marker of linguistic competence but also as a reflection of the depth of ecological understanding that students have successfully internalized through the writing process.

In terms of narrative strategy, the short stories generated with the help of AI demonstrated a greater diversity of narrative perspectives. Several students successfully wrote from the perspective of non-human beings an orangutan losing its habitat, a river recounting its suffering due to industrial waste, or an ancient tree witnessing the changes in the surrounding forest.

From an ecocritical perspective, the students' short stories indicate a gradual movement beyond anthropocentric representation toward a broader ecological worldview. In anthropocentric narratives, nature is commonly positioned as a passive setting, economic resource, or object whose value is determined primarily by human needs. By contrast, several AI-assisted stories reposition trees, rivers, forests, and endangered animals as experiencing subjects with voices, vulnerabilities, and narrative agency. The use of non-human focalization allows environmental destruction to be represented not only through its consequences for human communities but also through the suffering, displacement, and loss experienced by ecosystems and other species. This narrative shift reflects a form of ecological decentering because human interests are no longer treated as the sole measure of environmental value. Nevertheless, the presence of non-human narrators does not automatically guarantee an ecocentric perspective; its significance depends on whether the narrative genuinely recognizes ecological interdependence or merely personifies nature to communicate a human moral lesson. Therefore, AI-assisted literary learning should encourage students to critically examine relationships among humans, non-human beings, local communities, and ecosystems rather than simply using environmental elements as decorative settings. This use of non-human perspectives aligns with the principles of ecocriticism, which emphasize the importance of decentralizing human perspectives (anthropocentrism) in ecological discourse. Ririn et al. (2021) noted that the ability to empathize with non-human

perspectives is one of the highest indicators of environmental literacy that is often overlooked in conventional assessment instruments.

The narrative structure aspect also experienced significant improvements. The AI-assisted short stories demonstrated a more complex use of conflict, with most successfully constructing multiple layers of conflict: human versus nature conflict, interpersonal conflict triggered by differing ecological interests, and the inner conflict of characters facing the dilemma of economic interests and environmental responsibility. The complexity of these conflicts reflects a more mature understanding of the socio-ecological dimensions of environmental issues, an understanding that emerged from the creative dialogue between students and the AI.

Table 2 Analysis of Linguistic Features of Representative Short Stories

Code	Theme	Environmental Theme	Narrative Strategy	Ecocritical Function
L1	Deforestation	Wild nature diction; personification of the forest	First person point of view	Ecological empathy
L2	Marine pollution	Metaphor of destruction; symbolism of water	Multi-perspective narrative	Industry criticism
L3	Climate change	Temporal diction; weather imagery	Nonlinear flow	Intergenerational awareness
L4	Biodiversity	Species name; sensory description	Modern fable	Species conservation
L5	Human-nature conflict	Lexical contrast; local dialect	Protagonist vs. antagonist conflict	Local wisdom

Table 2 above shows that each representative short story develops different linguistic and narrative strategies according to its ecological theme, but all converge on a coherent ecocritical function. The stylistic features identified in the five representative stories should be interpreted as products of human-AI co-construction rather than attributed exclusively to either the students or the AI. Because the final texts were produced through prompting, selection, revision, and personalization, the presence of personification, complex metaphor, non-human focalization, and nonlinear narration does not by itself reveal who initially proposed each device. The analysis therefore distinguishes between stylistic features observable in the final stories and creative decisions that can be traced through observation records, prompt histories, successive drafts, or students' explanations. Where such process evidence was unavailable, claims regarding the origin of a stylistic choice were made cautiously.

In C1, the personification of the forest transforms nature from a passive background and economic commodity into a speaking and experiencing subject. This feature supports an ecocritical reading by encouraging empathy with non-human life. However, the available final text alone does not establish whether the personification was initially suggested by AI, independently developed by the student, or progressively shaped through revision. Its pedagogical significance therefore lies in how the student retained, adapted, and integrated the device into a coherent environmental narrative rather than in attributing its invention to a single source.

C2 employs shifting perspectives and metaphors of environmental destruction to represent marine pollution as a conflict involving ecosystems, fishing communities, industry, and environmental advocacy. The comparison of polluted water to dark ink demonstrates stylistic complexity, but such maturity should be understood within the assisted writing context. AI may have expanded the range of descriptive and narrative

alternatives available, while the student's contribution is reflected in the selection, contextualization, sequencing, and revision of those alternatives. Without a complete textual audit trail, the metaphor and multi-perspective structure cannot be presented as exclusively student-generated.

Stronger process evidence is available for C3. Observation records indicate that AI initially suggested a conventional chronological plot, but the student rejected this option and selected a nonlinear structure beginning with a future image of a submerged coastal city. In this case, the stylistic decision can be more confidently associated with student agency because the interaction record documents evaluation, rejection, and reformulation of the AI suggestion. The significance of the nonlinear plot lies not merely in its formal complexity but in the student's deliberate use of temporal disruption to communicate the urgency and intergenerational consequences of climate change.

In C4 and C5, endemic species, local settings, and Makassar expressions indicate the localization of environmental narratives. Nevertheless, the presence of local elements does not automatically prove that AI stimulated local knowledge or that the details originated entirely from students. A more defensible interpretation is that students incorporated, retained, or revised these cultural and ecological references during the assisted writing process. Their authorial contribution is most visible in the extent to which global or generic AI suggestions were adapted to Sulawesi's ecological conditions, local vocabulary, and community values. These stories therefore illustrate the potential of AI-assisted writing to support local ecological expression, while also demonstrating the need for process documentation before assigning the origin of specific stylistic features. This synthesis between AI technology and local wisdom indicates that, when properly facilitated, environment-based AI can actually be a catalyst for revitalizing expressions of local identity in students' literary works, rather than the other way around.

Ethical and Pedagogical Challenges

Despite its pedagogical potential, AI-assisted short story writing requires concrete safeguards against undisclosed AI-generated work, cognitive dependency, and the loss of students' personal voices. To prevent AI-related plagiarism, teachers should require students to disclose how AI was used and submit their initial ideas, prompts, AI responses, first drafts, revision histories, and final texts as evidence of the writing process. Short oral explanations may also be used to confirm that students understand and can justify their choices of plot, characterization, imagery, and environmental message. Assessment should therefore focus not only on the linguistic quality of the final story but also on the student's ability to select, reject, verify, reorganize, and transform AI-generated material. Rather than relying solely on AI-detection software, which may not accurately determine authorship, teachers should evaluate process documentation and the consistency between students' classroom writing, explanations, and submitted work.

Cognitive dependency can be reduced through gradual scaffolding. During the initial stages, teachers may model critical prompting and revision, but AI assistance should subsequently be limited at selected points so that students independently generate the central idea, narrative conflict, character motivation, and first version of key scenes. Students should also be required to compare their own ideas with AI suggestions and explain why particular suggestions were accepted or rejected. This approach positions AI as a source of alternatives rather than as a substitute for imagination. For students showing passive interaction patterns, teachers can impose

additional revision requirements, such as rewriting AI-generated paragraphs in their own language, changing the narrative perspective, or developing an alternative ending without AI assistance.

Preserving personal voice requires learning tasks that connect stories with students' lived experiences, local language, memories, emotions, and environmental surroundings. Teachers can ask students to incorporate personally observed ecological problems, locally recognized places, community expressions, or reflections that cannot be generated meaningfully without individual experience. A brief author's statement should accompany each story, explaining the student's creative intention, personal contribution, major revisions, and the specific role played by AI. Through these measures, originality is understood not merely as producing every word without assistance, but as maintaining meaningful control over the story's perspective, values, emotional tone, and final narrative form. Thus, teacher mediation is essential for ensuring that AI strengthens critical authorship rather than encouraging textual imitation or creative dependency.

This finding is in line with warnings (Holmes et al., 2023). The integration of AI into education without a well-thought-out pedagogical design risks reinforcing the literacy gap and undermining students' learning autonomy. Therefore, the role of teachers as critical mediators between students and AI technology is crucial.

The issue of originality was the most debated issue among the teachers interviewed. Some teachers worried that AI-generated short stories could not be considered authentic student work. However, this view requires more nuanced criticism. Warschauer et al. (2023) argues that the question of originality in the AI era is no longer about who produces the words, but rather about who controls the creative process, determines the narrative direction, and embeds values and perspectives in the text. Within this framework, students who actively direct, edit, and personalize AI output are still authentic authors in the broader sense.

Regarding the bias of AI content towards Global North contexts (Rudolph et al., 2023). Generative AI is trained primarily using data from the internet, which is dominated by English-language content and focused on Western contexts. As a result, when students ask the AI to describe a polluted forest or river, it tends to produce descriptions more suited to the Amazon or Rhine than to Kalimantan or the Citarum. This challenge can actually be a pedagogical opportunity: teachers can leverage AI bias as a point of critical reflection, inviting students to compare the AI's representations with the local ecological realities they know firsthand (Nur, 2024). In his study on the use of ChatGPT as an assistant in the creative process of Indonesian literature, he emphasized that AI still requires direction and critical assessment from users. (Ade Nurul Izatti G. Yotolembah et al., 2024) also found that the use of digital media such as Wattpad in learning to write short stories on the environment can encourage student involvement and creativity. Busse (2013) reminds us that high learning motivation, including writing motivation, needs to be maintained and developed sustainably through a contextual and meaningful learning approach.

The broader implications of these findings highlight the need for professional development that equips Indonesian language teachers with practical strategies for AI-assisted literary instruction. Teachers should first provide students with structured prompt guidelines that specify the environmental theme, local setting, characters, conflict, narrative perspective, and intended ecological message, while emphasizing that AI suggestions must be critically evaluated rather than accepted automatically. Students should also be required to maintain an AI interaction log containing their prompts,

selected AI responses, rejected suggestions, and reasons for revision. This documentation allows teachers to assess the development of ideas and distinguish students' creative decisions from AI-generated contributions. Assessment should therefore include the quality of the writing process, particularly students' ability to revise, reorganize, verify, localize, and personalize AI output, rather than focusing only on the linguistic sophistication of the final story. To preserve personal voice and ecological relevance, teachers should encourage students to incorporate environmental problems they have directly observed, local place names, endemic flora and fauna, community expressions, cultural memories, and personal experiences into their narratives. Through these strategies, teacher facilitation can ensure that AI functions as a reflective creative partner while students retain control over the meaning, values, and distinctive voice of their short stories.

Conclusion

This study indicates that environmentally contextualized generative AI can support junior high school students in writing environment-themed short stories, particularly by expanding ecological vocabulary, facilitating the development of environmental themes, and offering alternatives for narrative structure, characterization, and perspective. The findings also suggest that the educational value of AI depends on how students interact with it. Directive and dialogic interaction patterns were generally associated with more substantial revision, stronger personalization, and greater narrative control than passive interaction. However, these findings represent qualitative tendencies rather than statistically tested effects. AI should therefore not be regarded as either inherently beneficial or inherently threatening to creativity. It can function as a productive creative resource when students engage with it critically and dialogically, disclose its contribution, and receive consistent teacher guidance.

Pedagogically, AI-assisted literary learning requires the integration of literary competence, ecological literacy, and critical AI literacy. Students need explicit instruction in constructing focused prompts, evaluating the accuracy and relevance of AI output, rejecting inappropriate suggestions, preserving personal voice, and incorporating local ecological knowledge into their stories. Ethical reflection should also become part of the writing process, particularly regarding originality, authorship, transparency, cultural bias, and responsibility for the final text. Teachers should consequently assess not only the linguistic quality of the completed story but also the students' prompt development, interaction logs, revision decisions, contextual adaptation, and explanation of their individual contributions.

This study recommends several practical follow-up actions. Indonesian language teachers need professional development in AI-assisted writing pedagogy, including prompt design, critical evaluation, gradual scaffolding, and strategies for preventing dependency. Schools should develop assessment rubrics for AI-assisted literary works that balance narrative quality with originality, revision effort, ethical disclosure, ecological relevance, and student personalization. Further research should involve broader and more diverse participants, preserve complete prompt histories and successive drafts, and employ comparative or mixed-method designs to examine more precisely how AI assistance, teacher mediation, prior environmental knowledge, and students' creative agency interact during the writing process.

References

- Golinkoff, R. M., & Hirsh-Pasek, K. (2016). *Becoming brilliant: What science tells us about raising successful children*. American Psychological Association.
- Kress, G. (2010). *Multimodality: A social semiotic approach to contemporary communication*. Routledge.
- Matthew B. Miles, A. Michael Huberman, J.S. (2023). *Qualitative Data Analysis A Methods Sourcebook. Experiencing Citizenship: Concepts and Models for Service-Learning in Political Science*, 109–118.
- Nikolajeva, M. (2014). Reading for learning: Cognitive approaches to children's literature. John Benjamins. <https://doi.org/10.1075/clcc.3>
- Nurgiantoro, B. (2024). Theory of Fiction Studies: Culture. *Theory of Fiction Studies*, 1–516. <https://ugmpress.ugm.ac.id/id/product/budaya/teori-pengkajian-fiksi>
- Holmes, W., Bialik, M., & Fadel, C. (2023). Artificial Intelligence in Education. In *Lecture Notes in Networks and Systems* (Vol. 478). https://doi.org/10.1007/978-981-19-2940-3_16
- Kaur, J. (nd). *The Digital Canopy: AI, Literature, and Environmental Consciousness in The Overstory Abstract: Keywords*:(Vol. 0, Number Aihle 2025). Atlantis Press International BV. <https://doi.org/10.2991/978-94-6239-618-0>
- Trites, R. (2014). Maria Nikolajeva Reading for Learning: Cognitive Approaches to Children's Literature. *Barnboken*, 37, 1–4. <https://doi.org/10.14811/clr.v37i0.189>
- Busse, V. (2013). Foreign Language Learning Motivation in Higher Education: A Longitudinal Study on Motivational Changes and their Causes Vera Busse, Pembroke College Department of Education, University of Oxford. Time, 000.
- Chen, X., Zou, D., Xie, H., Cheng, G., & Liu, C. (2022). Two Decades of Artificial Intelligence in Education: Contributors, Collaborations, Research Topics, Challenges, and Future Directions. *Educational Technology and Society*, 25(1), 28–47.
- Juanda. (2024). Ecoliteracy digital short stories among students in Indonesia Juanda. *Journal of Turkish Science Education*, 2, 254–270. <https://doi.org/10.36681/>
- Long, D., & Magerko, B. (2020). What is AI Literacy? Competencies and Design Considerations. *Conference on Human Factors in Computing Systems - Proceedings*, 1–16. <https://doi.org/10.1145/3313831.3376727>
- Okeke, O. J., I. (2026). AI-Driven Language Tools And Digital Storytelling In Climate Education: Bridging Science, Communication, And. *Gouni Journal of Interdisciplinary Research (GJIR)*, 5(1), 92–106.
- Rudolph, J., Tan, S., & Tan, S. (2023). ChatGPT: Bullshit speaker or the end of traditional assessments in higher education? *Journal of Applied Learning and Teaching*, 6(1), 342–363. <https://doi.org/10.37074/jalt.2023.6.1.9>
- Warschauer, M., Tseng, W., Yim, S., Webster, T., Jacob, S., Du, Q., & Tate, T. (2023). The Affordances and Contradictions of AI-Generated Text for Second Language Writers. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.4404380>
- Widodo, HP (2016). Engaging Students in Literature Circles: Vocational English Reading Programs. *Asia-Pacific Education Researcher*, 25(2), 347–359. <https://doi.org/10.1007/s40299-015-0269-7>
- Zhai, X., Chu, A Review of Artificial Intelligence (AI) in Education from 2010 to 2020. *Complexity*, 2021. <https://doi.org/10.1155/2021/8812542>
- Pratama, I. (2025). Utilization of Magic School AI media in improving short story writing skills in eighth grade students of SMP Negeri 1 Melaya. In *Ganesha University of Education* (Vol. 53, Number 1). <http://publications.lib.chalmers.se/records/fulltext/245180/245180.pdf%0Ahttp>

- s://hdl.handle.net/20.500.12380/245180%0Ahttp://dx.doi.org/10.1016/j.jsames.2011.03.003%0Ahttps://doi.org/10.1016/j.gr.2017.08.001%0Ahttp://dx.doi.org/10.1016/j.precamres.2014.12
- Ade Nurul Izatti G. Yotolembah, Hasnur Ruslan, & Nur Halifah. (2024). The Use of Wattpad Media in Environmental-Themed Short Story Writing Learning Based on the Case Method for PBSI Students of the Faculty of Teacher Training and Education, Tadulako University. *Onoma Journal: Education, Language, and Literature*, 10(4), 4149–4163. <https://doi.org/10.30605/onoma.v10i4.4600>
- Fauzan, A., Rani, A., & Wahyuni, S. (2025). Utilizing Wrizzle AI as an Assistive Tool in the Creative Process of Writing Short Stories for High School Students. *Lokabasa*, 16(April), 1–9. <https://ejournal.upi.edu/index.php/lokabasa/article/view/80271>
- Firnanda, A., Alatas, A., Purnomo, A., Putikadyanto, A., Agama, I., & Negeri, IN (2025). ENTITA: Journal of Social Science and Social Sciences Education EcoEduLitera SDGs: Environmental Education in the Literary Work of the Madurese Folktale Ki Ageng Tarub. <http://doi.org/10.19105/ejpis.v1i.19137>
- Hindra Kurniawan, Adiguna Sasama WU, & Tambunan, RW (2024). The Potential of AI in Enhancing Creativity and Literacy in Indonesian Language Learning. *JAMI: Journal of Young Indonesian Experts*, 5(1), 10–17. <https://doi.org/10.46510/jami.v5i1.285>
- Inderawati, R., Pratiwi, W., Putri, E., Ratna, T., & Dari, W. (nd). Rita Inderawati, Sakdiawati, Weni Pratiwi, Ermalati Putri, Tita Ratna Wulan Dari, Fiftinova. 13, 53–66.
- Miterianifa, M., & Mawarni, M.F. (2024). Application of Environmental Literacy Learning Model in Increasing Environmental Knowledge and Awareness. *Journal of Science and Science Education*, 7(1), 68–73. <https://doi.org/10.24246/juses.v7i1p68-73>
- Nisya, RK, Sutrisna, D., & Pamungkas, T. (2025). Artificial Intelligence-Assisted Short Story Writing Training for Kartika Vocational School Students in Cirebon City. *Dharma Bhakti Ekuitas Journal*, 9(2), 155–170. <https://doi.org/10.52250/p3m.v9i2.785>
- Nur, S. (2024). Utilizing ChatGPT as an Assistant in the Creative Process of Indonesian Literature. *Jurnal Cerdik: Jurnal Pendidikan Dan Pengajar*, 4(1), 63–75. <https://doi.org/10.21776/ub.jcerdik.2024.004.01.07>
- Ririn, S., Fenny, R., & Joko, S. (2021). Analysis of Junior High School Students' Environmental Literacy. *JPPS (Journal of Science Education Research)*, 10(02), 1976–1982.
- Rizam, MM, & Ayuanita, K. (2024). A Study of Web-Based Digital Short Story Ecology and Its Implementation in Language and Literature Learning. *GHANCARAN: Journal of Indonesian Language and Literature Education*, (November), 451–462. <https://doi.org/10.19105/ghancaran.vi.17362>
- Siddiq, MN, Supriatno, B., & Saefudin, S. (2020). The effect of implementing problem-based learning on junior high school students' environmental literacy on environmental pollution. *Assimilation: Indonesian Journal of Biology Education*, 3(1), 18–24. <https://doi.org/10.17509/aijbe.v3i1.23369>
- Tjahyanti, LPAS, Saputra, PS, & Santo Gitakarma, M. (2022). The role of artificial intelligence (AI) to support learning during the Covid-19 pandemic. *Komteks*, 1(1), 15–21.