INTEGRATING GENERATIVE AI AND VISUAL LITERACY IN EFL WRITING INSTRUCTION: CASE STUDY

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ABSTRACT

This study investigates Indonesian EFL pre-service teachers' preferences and perspectives on using generative Artificial Intelligence (AI) and visual literacy (VL) to support writing instruction. This study employed a case study research design with descriptive and content analyses to examine students' perceptions of using AI tools across different stages of the writing process and how these tools improved their writing performance. Fifty-nine participants were purposively selected and enrolled in a Basic Writing course, with data collected through classroom observations, documentation, writing assignments, and questionnaires. The findings reveal diverse engagement patterns while some participants relied on AI throughout, others used it selectively, particularly during revising and editing to enhance mechanics, structure, and coherence. Generative AI functioned as a flexible and adaptive resource that complemented VL as multimodal support, enabling learners to integrate linguistic and visual elements more effectively. The writing performance results indicated that six participants showed strong sentence structure and paragraph coherence, suggesting that integrating visual literacy and generative AI improves writing accuracy while supporting vocabulary development. The study highlights both the potential and limitations of AI in promoting autonomy, creativity, and critical engagement in academic writing.

Keywords: Artificial intelligence, Basic writing course, EFL pre-service teachers, Visual literacy

A. INTRODUCTION

Writing competence has become increasingly essential for pre-service teachers in today's era, as it serves not only as a fundamental academic skill but also as a critical tool for professional communication, knowledge transfer, and effective classroom instruction (Wahyuningsih, 2025; Kusuma,2021). For pre-service teachers, possessing strong writing skills is particularly important because it enables them to model proper writing for their future students, design instructional materials, and convey knowledge clearly and accurately. However, composing quality writing for EFL pre-service teachers becomes more challenging. The EFL pre-service teachers must comprehend the writing not only for themselves but also for their future students (Kusuma, 2021; Faridah et al., 2018), with

students frequently struggling to generate ideas, apply varied vocabulary, construct sentences, and organize coherent paragraphs for high-quality writing (Syafryadin et al., 2021; Yu & Wilang, 2025). As one of the difficult language skills, writing does not deal only with putting words into text.

Previous studies have examined written discourse, grammar-focused instruction, process-oriented writing, and the use of digital and AI-assisted tools to support EFL writing development (Fitrawati & Safitri, 2021; Hanusova et al., 2020; Iskandar et al., 2022). These reviews indicate the need for a comprehensive analysis of writing courses, as conventional instructional strategies must evolve into contemporary methods that address diverse learner needs and contextual demands (Otto & López-Medina, 2021). This transformation also requires a shift from purely cognitive and contextual perspectives toward evidence-based writing practices that incorporate learners' viewpoints in course design (Cumming et al., 2018; Kasim et al., 2020). Despite the growing adoption of automated and AI-assisted tools, persistent writing challenges among pre-service teachers remain unresolved. Moreover, while such tools can support grammatical and syntactic accuracy, they often fail to capture punctuation, style, and contextual appropriateness, thus necessitating human judgment (Crossley et al., 2019). Although combining human evaluation with automated analysis has shown promise (Mahadini et al., 2021), empirical research on the systematic integration of these approaches to comprehensively support pre-service teachers' writing development remains limited.

To address this gap, the present study investigates an integrated learning model combining visual literacy and generative AI, representing a transformation from earlier methods such as the Picture Word Inductive Model (Rosyada et al., 2020). This learning model is a continuous transformation from the previous approach, where the learning method used a Picture Word Inductive Model. According to Donaghy and Xerri (2017), visualization is a new way to learn languages, particularly when learning a foreign language. Visualization has been shown to enhance language learning by supporting comprehension and engagement, while AI tools offer interactive support for idea generation, sentence construction, and writing coherence. In addition, technological advances and the development of AI in ELT also really support students in writing English. While AI tools offer interactive support for idea generation, sentence construction, and writing coherence recent advances in educational technology have further strengthened their role in English language teaching (ELT) (Dwivedi et al., 2023). Generative AI, in particular, provides immediate feedback, scaffolds language production, and enhances students' confidence in experimenting with new expressions (Kasneci et al., 2023). This study focuses on applying the visual literacy approach with the support of generative AI, the transformation approach that the learners need to achieve the learning goal. Thus, the integration of AI into ELT offers significant pedagogical value by enabling EFL students to overcome persistent barriers in academic writing and develop higher levels of autonomy and proficiency.

By examining this integrated approach, the study explores how pre-service teachers can engage with authentic, real-world issues, such as topics aligned with the Indonesian Sustainable Development Goals (SDGs), to enhance both content development and writing proficiency. This study pictured how appropriate tools and human judgment collaboratively reviewed students' writing quality. However, this study also found that concise writing instruction as guidelines for students is required. This research addresses a critical gap in existing literature by investigating the combined effects of visual literacy and AI in EFL

writing instruction, contributing to the preparation of pre-service teachers who are capable of overcoming persistent writing challenges and effectively fostering writing skills in their future students. This study will discover how the transformation of the visual literacy approach and utilization of generative AI will help students engage with real-life issues that can assist them in generating ideas and developing their expressions, writing what they see, and seeing what they have written influences readers.

Based on the above description, this study is administered to answer the following questions:
1. What are the EFL pre-service teachers' perceptions of using integrated visual literacy and generative AI?
2. What evidence of writing performance do EFL pre-service teachers demonstrate through the integration of visual literacy and generative AI?

B. METHOD

This research selected a case study research design with descriptive and content analyses to answer the research questions. The model collects and analyses data through several instruments and then describes the data coherently (Roell, 2019). A case study design on integrated visual-based writing instruction and generative AI to solve the barriers. This study designated a sequence of instructions to practice and evaluate the implementation of integrated visual literacy and generative AI in the Basic Writing course to reach the course objectives. The course's final goals covered developing structured sentences and a coherent paragraph. The study provides updated writing content, such as mechanics, sentence structure types, paragraph genres, and composition. Meanwhile, students experience a new approach to integrated visual literacy and generative AI to generate ideas and develop their writing during the writing process. The approach provides students with several animated short films related to the SDGs' themes, attached with sequential writing instructions. The writing instructions consist of a seven-step-by-step guideline, including the utilization of generative AI as the writing support.

This study purposively involved 59 EFL pre-service teachers from private university in Jakarta, Indonesia as the sample, who joined the Basic Writing course from August to December 2024. The sample joined the course in 13 weeks, where they experienced a new path of the Visual Literacy Approach with AI support. Referring to Burazer and Skela (2021), the intervention comprised 12 blended learning (online class and offline class) with discussion and practices and ended with one meeting for course evaluation. During the 12 meetings, this course delivered materials through the Learning Management System (LMS) or WhatsApp group, then discussed the materials in blended classrooms (six online and six offline meetings). From the 59 participants, six students were purposively selected after ranking their writing performance scores to represent high, medium, and low achievement levels. These selected participants were analyzed in greater depth to identify which writing indicators were most affected by the implementation of Visual Literacy and Generative AI and to provide evidence of EFL pre-service teachers' writing performance resulting from this integration.

To ensure comprehensive data collection, the study employed four instruments: classroom observation, documentation, writing assignments, and questionnaires. These instruments were designed to capture both the process and outcomes of learning, providing a balanced perspective on students' engagement and writing performance. Observation is the careful recording of ongoing phenomena through sensory experience and written notes (Surani et

al., 2025). Observation was employed to monitor students' participation and engagement during the writing course sessions. This instrument allowed the researcher to record how students interacted with the instructional materials, particularly the digital images and short videos related to Sustainable Development Goals (SDGs). Through observation, the researcher noted students' responses to visual stimuli, their level of collaboration during activities, and their strategies in completing writing assignment within the given time. In this study, documentation served as a supporting instrument to record and organize the instructional materials and procedures used throughout the writing course. Several kinds of documentation were employed. First, instructional documentation included a clear and concise set of written instructions applied from meetings three to twelve. Second, multimedia documentation was provided in the form of digital images and short videos related to Sustainable Development Goals (SDGs) in Indonesia, such as digital technology in ELT, no poverty, zero hunger, gender equality, and quality education. Third, reference documentation was drawn from established standards, namely the Visual Literacy Standards Task Force (2012), as well as supporting academic sources (Rosyada et al., 2022). Altogether, these different kinds of documentation ensured transparency, consistency, and validity in implementing the visual literacy approach within the writing course.

To investigate students' writing improvement, the participants completed writing assignments after twelve meetings using visual literacy-based writing instruction. Each assignment was accompanied by a short movie with the theme Quality Education, and students were required to complete the task within a limited time of 90 minutes. Upon submission, the lecturers evaluated the students' writing using eight proportional components: vocabulary, word classes, synonyms, sentence structure, mechanics, organization, idea development, and paragraph coherence as seen in table 1.

Table 1. Writing Evaluation Components

Course Goals	Writing Components	Scores
Participants can understand and implement: - Grammatical Rules - Syntactic Constructions - Contextual Use	Vocabulary & Word classes	10
	Synonyms	10
	Structured Sentences	25
	Mechanics	5
	Paragraph Organization	10
	Idea Development	25
	Paragraph Coherence	15
TOTAL SCORE		100

Meanwhile, a set of questionnaires were designed to capture students' experiences with the implementation of the visual literacy and generative AI approach in writing instruction. The questionnaires consisted of 5 close-ended statements with a 1 to 4 scale for each item and three open-ended questions with dimensions relating to virtual literacy and generative AI. Experts' judgment of statistics and English writing have validated both instruments.

Table 2. Visual literacy (VL) Instruction Questionnaires & Generative AI Questions

Visual literacy writing instruction stateme	Generative AI
VL Instructions help me generating ideas more easily.	
VL Instructions remind me using appropriat mechanics.	Three Open-ended questions
VL Instructions help me construing structured sentenc	
VL Instructions help me organizing a paragraph.	
VL Instructions help me developing a coherent paragr	

As part of qualitative studies, this design validated the instruments through triangulation, which involved expert judgments of a senior statistician and a written English expert. The triangulation was also validated based on small group interviews. This design involved participants from two classes, but all participants were treated as one single subject or one group. Then, this study evaluated distinctive participants with content analysis to explain the results (Yin, 2014).

Writing performance data from six purposively selected participants were analyzed using a rubric-based descriptive approach, in which scores served as illustrative evidence to support qualitative interpretations rather than statistical generalization. The analysis was based on eight proportional components: vocabulary, word classes, synonyms, sentence structure, mechanics, organization, idea development, and paragraph coherence. To achieve this, the study employed a twofold data analysis approach. First, a descriptive analysis was conducted to examine students' overall writing performance and questionnaire responses, focusing on patterns, trends, and general improvements throughout the learning period (Creswell, 2018; Fraenkel & Wallen, 2019). Second, a content analysis was applied to explore selected findings in greater depth, particularly students' salient preferences, perspectives, and writing outcomes (Fraenkel & Wallen, 2019). This process enabled the researcher to identify recurring themes and interpret how the integration of visual literacy and generative AI influenced students' writing development. The results of both analyses were organized into tables and charts to provide a clear and systematic presentation of findings (Miles et al., 2014). To ensure validity and depth of interpretation, the discussion incorporated detailed explanations supported by previous studies and relevant theoretical frameworks, thereby offering a comprehensive understanding of the research outcomes.

C. FINDINGS AND DISCUSSION

This study explored EFL pre-service teachers' perceptions of using integrated visual literacy and generative AI, as well as the evidence of writing performance demonstrated through this integration. The findings were divided into two subsections based on the research questions. Based on the research questions, this study considered specific data from the collected data, which referred to visual literacy and AI questions. The two subsections describe and comprehend the findings with descriptive and content analyses and then discuss the findings with relevant prior studies. Thus, this study provides a comprehensive interpretation and new insight for readers.

1. EFL Pre-Service Teachers' Perceptions of Integrated Visual Literacy and Generative AI

Generally, the study discovered satisfaction in all participants, who most "strongly agree" and "agree" to the integrated AI and visual-based writing instruction. The EFL pre-service teachers expressed that the integration helped them generate ideas, remind them using writing mechanics, constructing sentences, developing ideas, and organizing a coherent paragraph. Table 3 displays the expressions of the EFL pre-service teachers in detail on the visual literacy writing instructions questionnaire.

Table 3. EFL Pre-service Teachers' General Expressions

Statements	Strongly Agree	Agree	Disagree	Strongly Disagree	Total
Generating ideas	29	29	1	0	59
Reminding use mechanics	25	32	2	0	59
Constructing sentences	20	39	0	0	59
Developing ideas	17	41	1	0	59
Organizing a coherent paragraph	18	40	1	0	59

Based on the data in Table 3, students' perceptions of the integration of Visual Literacy and Generative AI can be organized into three interrelated themes: generative AI as a flexible assistant, functional specialization and multimodal support.

A Flexible Assistant

The data from Table 3 reflect the perceptions of 59 EFL pre-service teachers toward various aspects of writing instruction supported by the implemented approach. Overall, the responses show a predominantly positive orientation, with the majority selecting Agree or Strongly Agree across all statements, and only minimal disagreement reported. This indicates that the approach was perceived as highly effective in helping students overcome writer's block and brainstorm relevant content. Similarly, in constructing sentences, 39 respondents agreed and 20 strongly agreed, reflecting that the majority found the approach supportive in scaffolding sentence formation, which is crucial for developing fluency and grammatical accuracy in EFL contexts. The finding reveal that that generative AI helped students generate ideas, locate relevant sources, translate information, organize content, and improve language and style, while also supporting overall writing clarity and coherence. These perceptions align with Cummings et.al. (2024), who found that AI can facilitate idea generation and scaffold students' critical thinking, allowing learners to develop their own voices. In EFL writing instruction, artificial intelligence facilitates critical thinking by assisting learners in structuring ideas and language more effectively. AI contributed improving sentence structure, paraphrasing, and overall fluency, which supports Wang's (2025) findings that AI can enhance efficiency while presenting potential risks to authenticity.

For reminding the use of mechanics, 32 respondents agreed and 25 strongly agreed, suggesting that pre-service teachers valued the approach not only for creativity but also for accuracy in aspects such as punctuation, spelling, and capitalization. Meanwhile, developing ideas and organizing coherent paragraphs also received overwhelmingly positive responses, with 41 and 40 participants agreeing respectively, and only one respondent in each case showing disagreement. This implies that the integrated instruction contributed to students'

ability to elaborate ideas meaningfully and structure them cohesively into paragraphs. The absence of any Strongly Disagree responses across all categories and the very limited number of Disagree responses (only 5 in total across all items) reinforce the strong acceptance of the approach. Collectively, these findings indicate that the pre-service teachers not only perceived the visual literacy and generative AI integration as beneficial but also recognized its role in supporting both the micro-aspects of writing (mechanics, sentences) and the macro-aspects (idea development, coherence, and paragraph organization).

Moreover, students also perceived AI as helpful in producing polished, reader-ready texts, improving technical accuracy and presentation. This aligns with Losi et al. (2024) and Tica and Krsmanović (2024), who found that AI can accelerate writing and enhance precision. Overall these findings indicate that EFL pre-service teachers generally prefer and perceive AI as a supportive tool for writing, especially when integrated with visual literacy and guided instruction. However, the benefits of AI are moderated by learners' proficiency, critical engagement, and contextual factors, which limits the generalizability of the results. The study contributes theoretically by framing AI as a multimodal tool within a process-oriented perspective on academic writing, illustrating how technology can complement human agency and support effective EFL learning when applied thoughtfully. This is supported by previous research findings from Yu and Wilang (2025), which indicate that AI systems employ similar principles to enhance engagement, save time, personalize learning experiences, and redirect human effort toward more valuable educational tasks.

Meanwhile, this study accumulated the responses to the open-ended questionnaire to explore the students' perceptions of using generative AI in their writing. Among 59 participants, most applied two to five AI applications. Nonetheless, one participant still did not mention the name of the AI. The following figure 1. presents the details of each participant and the use of AI in their writing phases.
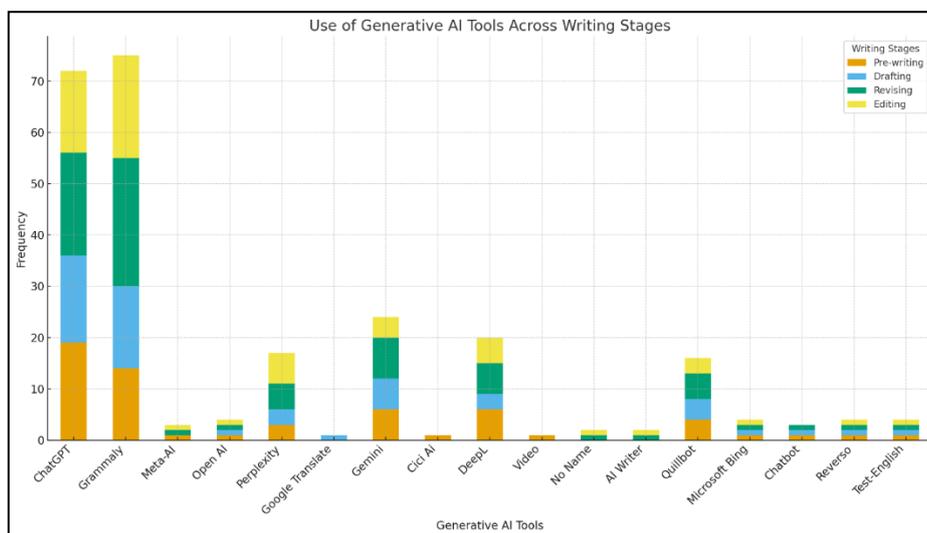

Figure 1. EFL Pre-service Teachers' Preferences of AI and Writing Phases

According to the data in the chart indicates clear patterns in students' preferences and perceptions of generative AI tools in their writing process. Among the tools, Grammarly (75 uses) and ChatGPT (72 uses) emerged as the most dominant, together accounting for more than 70% of total usage. It perceived that generative AI as a flexible, all-in-one tool that could be applied across multiple dimensions of writing particularly effective in the pre-

writing and drafting phases for generating ideas, expanding content, and constructing sentences. By contrast, Grammarly was primarily relied upon in the revising and editing phases, where its specialized functions in correcting grammar, mechanics, and sentence structure helped ensure accuracy and clarity. This complementary pattern highlights students' ability to strategically assign roles to AI tools. Ultimately, these findings reinforce the perception of AI not as a single-purpose aid but as a flexible and adaptive resource that can support different stages of writing according to students' needs. EFL students perceive generative AI tools as flexible and adaptable resources that support various dimensions of the writing process(Suryani & Fithriani, 2024). This complementary usage demonstrates that students exercise agency in strategically assigning roles to AI tools based on their perceived strengths, supporting findings from Sarıca and Gençoğlu (2025), who emphasized learners' active engagement with AI to enhance self-directed writing processes.

Functional Specialization

Students adopt generative AI tools according to their specialized functions at different stages of the writing process. ChatGPT was most frequently used in the pre-writing and drafting stages, reflecting its role as a generative tool for brainstorming ideas, expanding content, and constructing sentences. Conversely, Grammarly dominated the revising and editing stages, where its corrective and polishing functions supported grammar accuracy, mechanics, and clarity. Secondary tools, such as DeepL (20 uses) and Gemini (24 uses), were employed moderately, serving specialized functions in translation and rephrasing to support drafting and revising. Meanwhile, occasional reliance on peripheral tools such as Meta-AI, OpenAI (basic), Perplexity, Reverso, and Test-English suggests that they lacked clear functional advantages or overlapped with more dominant platforms. Overall, the findings demonstrate that students strategically select AI tools based on their functional specialization, matching tool strengths to stage-specific writing needs.

The findings reveal that students adopt generative AI tools according to their specialized functions, strategically aligning tool strengths with their writing needs. This aligns with findings by Losi et al. (2024), who reported that EFL learners tend to select AI tools based on task-specific affordances rather than as general-purpose writing aids. Such strategic selection reflects students' awareness of each tool's strengths and limitations and their ability to tailor tool usage to their writing goals. Overall, students' perceptions position generative AI as both flexible and functionally specialized, with learners leveraging multiple platforms to scaffold creativity, accuracy, and efficiency across the writing process. These findings reinforce the notion that AI is not a monolithic solution but a set of complementary resources that students integrate according to their individual needs and preferences. Theoretically, this underscores the importance of adopting a multimodal and stage-aware framework in EFL writing instruction, emphasizing both agency and critical engagement with technology, rather than passive reliance on AI. These patterns demonstrate that students perceive AI as a set of complementary resources rather than a single-purpose tool, selecting platforms deliberately to meet distinct writing objectives. This strategic use aligns with previous research highlighting learners' agency in tailoring AI support to their tasks, optimizing efficiency while maintaining control over content creation and revision (Sarıca & Gençoğlu, 2025; Losi et al., 2024).

The findings highlight students' engagement with multimodal supports, such as visual prompts, videos, and paraphrasing tools (e.g., Quillbot, DeepL). While these were used less frequently, their presence indicates that students value variety and creativity in their writing

process, though they remain supplementary to the core text-based AI assistants. Overall, the patterns reveal that students perceive generative AI as a valuable stage-specific learning aid. ChatGPT is associated with creativity and flexibility, while Grammarly is viewed as reliable and corrective. This aligns with the research findings of Putri et al. (2025) which demonstrate that students overall have favorable perceptions of ChatGPT, considering it easy to use, convenient, and beneficial for enhancing their motivation, confidence, and learning efficiency. The combination of these tools demonstrates students' agency in tailoring their own writing process, perceiving AI not as a replacement but as a supportive partner in achieving both coherence and accuracy in their writing. The findings indicate that EFL students engage with a variety of multimodal supports, including visual prompts, videos, and paraphrasing tools like QuillBot and DeepL. While these tools were used less frequently than core text-based AI assistants, their presence suggests that students value diversity and creativity in their writing process. This aligns with Nelson et al. (2025), who found that students in Ecuador appreciated the flexibility and creativity offered by generative AI in academic writing. Students perceive generative AI not as a replacement but as a supportive partner in achieving both coherence and accuracy in their writing. ChatGPT is associated with creativity and flexibility, while Grammarly is viewed as reliable and corrective. Similarly, Sarıca and Gençoğlu (2025) reported that EFL students found AI tools like ChatGPT and Grammarly beneficial for enhancing writing skills and self-directed learning.

Multimodal Support

The integration of multimodal supports reflects a broader trend toward multiliteracies in EFL education. Students are developing skills to navigate and create meaning across various modes of communication, including text, visuals, and digital tools. This shift is supported by Sarıca and Gençoğlu (2025), who emphasized the importance of AI literacy and ethical guidelines in fostering responsible AI use while maximizing its benefits. In conclusion, the use of multimodal supports in EFL writing, facilitated by generative AI tools, enhances students' writing experiences by providing diverse resources that cater to different aspects of the writing process. This approach not only improves writing skills but also promotes critical thinking and creativity, essential components of effective EFL education. The preferences were further reinforced by participants' arguments in the open-ended responses, which explained their reasons for using generative AI in their writing

> *"Each phase of writing is important. I use AI and visuals to generate ideas in drafting, check structure in revising, refine language in editing, and prepare for publishing. It helps me balance creativity and critical thinking.".* (P4).

Participant 4 shows a balanced view of the writing process, seeing each phase as essential. They use AI and visual resources to support idea generation in drafting, while in revision they rely on AI feedback but keep final control of decisions. In editing, AI is valued for correcting errors and refining clarity, and in publishing it helps summarize and share work. Overall, the participant highlights a balance between creativity, critical thinking, and AI support.

> *"AI supports my writing in many ways. It gives me ideas, outlines, and background information that help me organize my thoughts better. During drafting, AI provides sentence starters and makes my writing flow more smoothly. In revision, it helps me rearrange ideas and avoid repetition. Finally, AI corrects my mistakes in editing and makes my writing clearer.It helps with formatting, summaries, and titles".* (P8).

Participant 8 highlights AI's practical role in supporting both the creative and technical aspects of writing. They see AI as helpful in generating ideas, outlines, and sentence starters, which improve flow during drafting. In revision and editing, AI is valued for reorganizing ideas, avoiding repetition, correcting mistakes, and improving clarity. Additionally, the participant notes its usefulness for formatting, summaries, and titles, showing that AI also supports the presentation and finalization of writing.

> *"AI helps writing in all phases, designing ideas, drafting, revising, editing, and preparing for publication."(*P29).

Participant 29 views AI as a broad, integrated support system that contributes to all phases of writing. By mentioning idea design, drafting, revising, editing, and publishing, the participant positions AI as a constant companion in the writing process, highlighting its versatility and perceived value across both creative and corrective stages. The combination of visual literacy and AI contributes most strongly to structural and organizational aspects of writing, enhancing mechanical accuracy and coherence, while vocabulary development may require additional targeted scaffolding. This aligns with prior studies indicating that AI tools like ChatGPT and Grammarly can improve sentence-level accuracy and textual organization (Wang, 2025; Losi et al., 2024), whereas lexical sophistication often depends on learners' prior knowledge and explicit instruction (Sarıca & Gençoğlu, 2025). Therefore, while AI and visual literacy serve as effective supports for structural proficiency, educators may need to complement these tools with exercises specifically aimed at vocabulary enrichment to achieve balanced writing development.

According to the findings, generating ideas in the English language as the most resilient barrier in English writing can be much easier through visual literacy writing instruction, where students are facilitated by digital visuals attached to sequence writing instruction and the use of AI. This result is relevant to a prior study in the northwest United States, where Non-Native English-speaking students learned to write (Yahia & Egbert, 2023). That study discovered the essential use of explicit instruction and sufficient practices. Therefore, this study implemented several writing practices in every meeting. This study revealed that sequential writing instruction could not stand alone. Students should practice the writing instruction and utilize AI to support their final writing

2. Evidence of EFL Pre-Service Teachers' Writing Performance

The analysis of writing performance focused on six purposively selected EFL pre-service teachers representing high, medium, and low achievement levels to capture variation in writing proficiency and enable a closer examination of how the integration of Visual Literacy and Generative AI influenced specific aspects of writing. The writing performances of these six participants provide an illustrative overview of how a visual literacy approach combined with generative AI supports writing development, as presented in Table 4 and discussed in the following analysis.

Table 4. Writing Evidences

Stu.	Vocabulary & Word Classes	Synonyms	Sentence Structure	Coherent Paragraph	Total Score
4	10	5	15	40	70
6	10	10	25	45	90
8	10	10	25	50	95
13	10	10	25	45	90
14	8	8	25	45	86
29	0	5	25	30	60

The data of Table 4 reveal strong outcomes in sentence structure and coherent paragraph development, with most participants scoring between 25 and 50 points in these areas. For example, Participants 6, 8, 13, and 14 all achieved high scores (≥ 86 total), reflecting their ability to construct sentences effectively and organize ideas into coherent paragraphs. Participant 8 stands out with the highest score (95), suggesting that AI and visual supports were especially effective in enhancing both idea development and cohesion. In contrast, the areas of vocabulary, word classes, and synonyms show more variation. Most participants achieved moderate scores (8–10), but Participant 29 scored particularly low in vocabulary (0), which significantly affected their overall performance (60). This suggests that while AI and visual literacy approaches strongly support structural and organizational aspects of writing, they may be less effective in fostering lexical diversity for some learners.

Overall, the evidence demonstrates that integrating visual literacy and generative AI contributes substantially to improving sentence-level accuracy and paragraph coherence, while also supporting vocabulary and synonym use to varying degrees. This implies that students benefit most from AI in the mechanical and structural dimensions of writing, though additional scaffolding may be needed to enhance vocabulary development.

Based on the overall analysis of each writing phase, the use of AI in writing provides various benefits for students on the one hand and eliminates various writing obstacles for students on the other hand (Wulyani et al., 2024). This AI support answers students' expectations in writing, namely in generating ideas, getting relevant sources of information, organizing ideas, translating the meaning of texts, compiling structured sentences, and ultimately uniting these sentences into one coherent paragraph. In this study, the AI supports contribute to formulating a framework for using AI in the Basic Writing course in line with the UNESCO AI competency framework for students. In this way, this study uncovered the EFL pre-service teachers' voices on how they were dealing with the advanced technology of AI and visual-based learning approaches, while sustaining their critical thinking and human sensitivity.

However, Zhai et al. (2024) cautioned that overreliance on AI may discourage independent ideation and lead to surface-level engagement, suggesting that careful pedagogical guidance is needed to prevent dependence. Nevertheless, Moya et al. (2024) warned that excessive use of AI could mask students' actual writing ability and raise academic integrity concerns, highlighting a limitation of relying solely on AI for writing support. Meanwhile, Amirjalili et al. (2024) argued that frequent reliance on AI may produce formulaic writing and limit distinctive authorial voices. Similarly, while students appreciated AI's assistance in providing feedback on grammar, clarity, and argumentation, Alzubi (2024) and Kasneci et

al. (2023) highlighted that AI may overlook higher-order concerns such as coherence and logical reasoning, indicating the need for learners to critically evaluate AI-generated content. Generative AI, when combined with visual literacy, as a flexible, multimodal as supportive tool rather than a replacement for human instruction. Students' strategic use of AI tools demonstrates their agency in selecting tools according to functional specialization, reflecting a sophisticated understanding of AI affordances. the integration of visual literacy with AI significantly enhances structural and organizational aspects of writing, including sentence-level accuracy, paragraph coherence, and overall text clarity.

However, vocabulary development and lexical diversity showed more variability, suggesting that AI and visual supports alone may not be sufficient for enhancing lexical sophistication. This implies that teachers should complement AI-supported writing with targeted vocabulary instruction and explicit scaffolding to ensure balanced language development (Wang, 2025; Sarıca & Gençoğlu, 2025). The findings underscore the importance of critical engagement and AI literacy. While AI supports efficiency, creativity, and accuracy, overreliance can limit independent ideation and may mask students' authentic writing abilities (Firat, 2023). Integrating AI literacy training into writing instruction can help students develop evaluative skills, enabling them to critically assess AI-generated suggestions, maintain their authorial voice, and engage ethically with digital tools.

The generative AI and visual literacy approach provide multimodal AI supports foster creativity, critical thinking, and multiliteracy skills, as students engaged not only with text-based AI but also with visual prompts, videos, and paraphrasing tools. This reflects broader trends in EFL education toward multimodal learning, where students learn to navigate, interpret, and produce meaning across various modes of communication (Nelson et al., 2025). Teachers should therefore design writing activities that leverage multiple modalities to encourage diverse cognitive and linguistic engagement. should be implemented as supportive, flexible, and ethically guided tools, tailored to learners' proficiency, goals, and contextual factors, ensuring both improved writing performance and the development of autonomous, critical, and creative learners. This suggests that educators should incorporate AI as part of a structured, multimodal curriculum, allowing learners to explore and adapt tools according to their individual writing needs (Sarıca & Gençoğlu, 2025; Losi et al., 2024).

D. CONCLUSION

In conclusion, EFL pre-service teachers perceived the integration of visual literacy and generative AI as a supportive and flexible approach to writing instruction. Generative AI functioned as a flexible assistant with functionally specialized roles across different stages of the writing process, while multimodal supports enhanced idea generation, organization, and overall writing clarity. This study underscores that the use of AI in writing provides various benefits for students while helping to overcome common writing obstacles. Moreover, the study highlights EFL pre-service teachers' perspectives on engaging with advanced AI and visual-based learning approaches while sustaining their critical thinking and human sensitivity. Furthermore, analysis of six purposively selected EFL pre-service teachers indicates that the integration of Visual Literacy and Generative AI meaningfully supports writing development, particularly in sentence structure and paragraph coherence. The rubric-based evidence suggests that AI-assisted and visually supported instruction is most effective in strengthening structural and organizational aspects of writing, while

vocabulary development shows more variable outcomes and requires additional pedagogical scaffolding.

This study is limited by its focus on a single cohort of EFL pre-service teachers in a specific context, which restricts the generalizability of the findings, as learners in other regions, disciplines, or proficiency levels may perceive AI and visual literacy differently. The reliance on self-reported perceptions and performance scores may also not fully capture students' long-term development or cognitive engagement with AI tools. Furthermore, the study mainly examined widely used platforms such as ChatGPT and Grammarly, leaving unexplored how other AI systems with distinct affordances might influence writing. While the integration of AI and visual literacy improved sentence structure and coherence, its weaker impact on vocabulary highlights the need for targeted interventions. Future research should expand to more diverse contexts, adopt longitudinal or experimental designs, compare a wider range of AI tools, and explore how AI literacy instruction and ethical guidelines can support balanced, independent, and responsible use of AI in EFL writing.

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