

Designing and evaluating FURAP: An AI-assisted web-based platform for EFL writing instruction

Andika Guruh Saputra^{1*}, Nur Hidayanto Pancoro Setyo Putro², Ella Wulandari³, Lukluil Maknun⁴, Nurul Amalina⁵, Karina Septiani⁶

Email: andikaguruh.2025@student.uny.ac.id^{1*}

^{1,2,3,4,5,6}English Language Education Department, Universitas Negeri Yogyakarta, Indonesia

ABSTRACT

This study aimed to identify students' writing learning needs, design and develop the FURAP (Feedback, Understanding, Revision, Assistance, and Practice) platform, and investigate users' responses toward the developed platform. The study employed Design and Development Research (DDR) using descriptive qualitative and quantitative approaches, consisting of four stages: needs analysis, platform design, platform development, and limited evaluation. The research involved 83 eleventh-grade students and three English teachers from a public senior high school in Central Java, Indonesia, during the needs-analysis stage, while the limited evaluation involved 19 university students enrolled in an English Language Teaching Innovation course. Data were collected through a 43-item four-point Likert-scale questionnaire, semi-structured interviews, document analysis, and rubric-guided evaluation activities. The questionnaire was developed based on needs-analysis frameworks and reviewed for content relevance, with 11 writing-related items selected for detailed analysis. The findings revealed that students experienced difficulties in grammar, vocabulary, idea development, and writing guidance. They also expressed needs for structured writing support, detailed feedback, brainstorming assistance, and technology-assisted learning. Based on these findings, the FURAP platform was developed as an AI-assisted web-based writing environment integrating Brainstormer, Guide, Learn, Insight, Improve, and AI Mentor features to support descriptive-text learning. The limited evaluation indicated generally positive perceptions regarding usability, accessibility, instructional relevance, and writing support. However, these findings represent preliminary usability and instructional feedback rather than evidence of learning effectiveness, as classroom implementation and writing-performance measurement were not conducted. Future studies should evaluate the platform in authentic classroom settings with the intended target users.

ARTICLE INFO

Article history:

Received 15 March 2026

Revised 10 April 2026

Accepted 19 May 2026

KEYWORDS

AI-assisted writing; EFL writing; descriptive text; scaffolding; web-based platform

How to cite: Saputra, A. G., Putro, N. H. P. S., & Wulandari, E. (2026). Designing and validating FURAP: An AI-assisted web-based platform for EFL writing instruction. *Pedagogy: Journal of English Language Teaching*, 14(1), 161-187. <https://doi.org/10.32332/joelt.v14i1.13563>

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Introduction

Writing is widely recognized as one of the most demanding productive skills in English as a Foreign Language (EFL) learning. It requires learners to coordinate linguistic accuracy, vocabulary use, idea development, organization, genre awareness, and revision while producing meaningful written texts. Unlike receptive skills, writing requires students to transform ideas into coherent and socially recognizable forms of communication. Hyland (2003) emphasizes that writing is not a linear act of producing sentences, but a recursive process involving planning, drafting, revising, and editing. For secondary school EFL learners, these processes can be particularly challenging because they are still developing control over language forms while also learning how to organize ideas according to specific text types.

Previous studies have consistently reported that EFL learners continue to experience difficulties throughout the writing process. Han (2024) and Rahimi et al. (2024) found that students often struggle with grammar accuracy, vocabulary use, and idea development, while Yang et al. (2024) emphasized that insufficient feedback limits learners' writing strategies. In addition, many learners experience difficulties in organizing ideas and maintaining coherence during writing activities. Badger and White (2000) argue that effective writing instruction should support not only language accuracy but also idea development and writing processes. However, many AI-assisted writing tools still focus primarily on grammar correction or general feedback rather than providing integrated support for brainstorming, guided drafting, revision, and genre-based writing development. Although previous studies have demonstrated the potential of AI-assisted feedback, limited attention has been given to the design of pedagogically grounded web-based writing platforms that combine scaffolding, brainstorming support, and AI-assisted feedback within a unified learning environment, particularly for descriptive-text learning in secondary-school EFL contexts. This gap highlights the need for a platform that supports learners throughout multiple stages of the writing process rather than focusing solely on corrective feedback.

In Indonesian secondary school contexts, writing instruction is often guided by curriculum-based text types, including descriptive text. Descriptive writing requires students to identify a subject, select relevant details, organize descriptions logically, and use appropriate linguistic features to make the text clear and meaningful. However, many students experience difficulty in generating ideas, choosing suitable vocabulary, applying grammatical patterns, and revising their drafts independently. Preliminary needs analysis conducted at a public senior high school in Central Java revealed similar concerns. Students reported persistent difficulties related to grammar, vocabulary, idea development, and limited writing guidance during classroom activities. They also expressed the need for step-by-step support, brainstorming assistance, detailed feedback, and more interactive digital learning resources.

The need for guided support in writing instruction is closely related to scaffolding theory. Rooted in Vygotsky's sociocultural perspective, scaffolding enables learners to

accomplish tasks that they may not be able to complete independently by providing structured assistance, guided practice, feedback, and gradual transfer of responsibility. In writing instruction, scaffolding can help learners generate ideas, organize content, develop drafts, and revise their texts more systematically. Recent studies have shown that scaffolded instruction supports learners' confidence and progress in writing tasks by helping them move from teacher-supported performance toward more independent writing practices (Chairinkam and Yawiloeng, 2024; Hassen et al., 2024; Y. Zhang, 2024; Mekheimer, 2025). These principles are particularly relevant for secondary school EFL learners who need explicit guidance in both language use and text organization.

In addition to scaffolding, process writing and genre-based approaches provide important pedagogical foundations for writing instruction. Process writing emphasizes the importance of brainstorming, drafting, feedback, revision, and reflection, while genre-based pedagogy helps learners understand the communicative purpose, rhetorical structure, and linguistic features of particular text types. For descriptive-text learning, students need support not only in correcting grammatical errors but also in understanding how descriptive texts are organized and how language choices contribute to meaning. Integrating these approaches can provide learners with more comprehensive writing support because it connects writing as a process with writing as a socially situated genre-based activity.

The rapid development of educational technology and Artificial Intelligence (AI) has also created broader opportunities for more interactive writing instruction (Anggoro, 2023; Cheng, 2025). Within the framework of Technology-Enhanced Language Learning (TELL), digital technologies may facilitate learner engagement and autonomous learning (Hasumi & Chiu, 2024). Song and Song (2023) found that AI-assisted learning tools supported students' motivation and idea generation, while Escalante et al. (2023) reported positive responses toward AI-generated feedback because of its immediacy and accessibility. Shi and Aryadoust (2024) further concluded that AI-assisted feedback systems have considerable potential for supporting revision practices in EFL writing contexts. From a pedagogical perspective, AI can support writing instruction by providing timely feedback, facilitating revision activities, promoting learner autonomy, and complementing teachers' feedback practices throughout the writing process. Nevertheless, many existing AI writing tools still emphasize corrective feedback without integrating pedagogical scaffolding, guided writing activities, and process-oriented writing support (Chairinkam & Yawiloeng, 2024).

This limitation points to an important research gap. Previous studies on AI-assisted writing have mainly examined feedback effectiveness, learner perceptions, or writing performance outcomes, whereas fewer studies have focused on the systematic design and development of AI-assisted writing platforms grounded in established pedagogical theories. In particular, research that integrates scaffolding principles, process writing, genre-based instruction, brainstorming support, and AI-assisted feedback within a single web-based learning environment remains limited, especially in Indonesian secondary school EFL contexts. Addressing this gap is important because students need more than

automated correction; they need structured support that helps them plan, draft, revise, and reflect on their writing.

To address these issues, this study aims to design and develop FURAP (Feedback, Understanding, Revision, Assistance, and Practice), a newly developed AI-assisted web-based writing platform intended to support descriptive-text learning for eleventh-grade EFL students. The platform is designed by integrating scaffolding, brainstorming activities, guided writing support, AI-assisted feedback, and revision assistance within a single learning environment to provide pedagogically grounded support throughout the writing process. Based on the objectives of this Design and Development Research (DDR) study, the research questions are formulated as follows:

1. What are the writing learning needs of eleventh grade EFL students at a public senior high school in Central Java, Indonesia?
2. How is the FURAP web-based writing platform designed and developed based on students' learning needs?
3. How do the evaluation participants respond to the developed FURAP platform during the limited evaluation stage?

This study contributes to the existing literature by developing FURAP as a pedagogically grounded AI-assisted writing platform that integrates scaffolding support, guided writing processes, genre-based instruction, and AI-assisted feedback within a unified digital learning environment. Unlike many conventional AI writing tools that mainly emphasize correction-oriented feedback, FURAP was designed to support learners throughout the stages of brainstorming, drafting, revising, and reflection. The study also contributes to EFL writing pedagogy by providing product design and preliminary evaluation evidence on how AI technologies may support more process-oriented writing instruction in secondary school EFL contexts. However, the contribution should be understood as evidence of platform design and initial user response, rather than evidence of FURAP's effectiveness in improving students' writing performance.

Literature Review

EFL Writing Challenges in Descriptive Text Learning

Writing is one of the most challenging skills in English as a Foreign Language (EFL) learning because learners must simultaneously manage grammar, vocabulary, organization, coherence, and idea development while producing meaningful texts. In descriptive-text writing, students are additionally required to organize details systematically and use appropriate language features to describe people, places, objects, or phenomena. Previous studies have shown that many EFL learners continue to experience difficulties in generating ideas, organizing information, maintaining coherence, and applying appropriate language structures during writing activities (Han, 2024; Hasumi & Chiu, 2024; Rahimi et al., 2024; Yang et al., 2024). These challenges indicate that writing difficulties are not limited to linguistic accuracy but also involve the broader process of developing and organizing ideas into coherent texts.

Therefore, EFL writing instruction requires scaffolding that supports learners across multiple stages of the writing process. Scaffolding involves temporary assistance provided by a more knowledgeable other to help learners complete tasks that they may not yet be able to accomplish independently (Wood et al., 1976). In writing instruction, this support can operate through several mechanisms, including contingent support, guided practice, feedback, fading, and transfer of responsibility (Van De Pol et al., 2010). Contingent support enables teachers or digital tools to provide assistance according to learners' immediate writing needs, such as helping them generate ideas, select appropriate vocabulary, or organize descriptive details. Guided practice helps learners move through the writing process step by step, from brainstorming and outlining to drafting and revising. Feedback allows learners to identify strengths and weaknesses in their writing and make informed revisions. Fading gradually reduces the amount of support as learners become more capable, while the transfer of responsibility encourages students to take greater control over their own writing decisions. These scaffolding mechanisms are particularly important in descriptive-text learning because students need support not only in correcting language errors but also in developing ideas, structuring descriptions, and revising texts more independently.

Scaffolding and Process-Genre Writing Pedagogy

Scaffolding refers to structured assistance provided to learners while completing tasks that may initially exceed their current level of competence (Vygotsky, 1978). In writing instruction, scaffolding may take the form of guided practice, prompts, feedback, and gradual support throughout the writing process. Chairinkam and Yawiloeng (2024) and Hassen et al. (2024) found that scaffolded instruction supported students' writing confidence and writing development through guided assistance and feedback. In addition to scaffolding, the process-genre approach provides a useful pedagogical basis for descriptive-text instruction because it combines attention to writing processes with explicit awareness of genre features. Badger and White (2000) explain that this approach integrates stages of writing, such as planning, drafting, revising, and editing, with an understanding of communicative purpose, rhetorical structure, and language features. In descriptive-text learning, the process-genre approach helps learners generate ideas, organize descriptive details, understand the social purpose of description, and use appropriate linguistic features to describe people, places, objects, or phenomena. Together, these perspectives suggest that effective writing instruction should support learners not only during revision but also during brainstorming, drafting, organizing, and reflection activities.

AI-Assisted Writing Feedback in EFL Contexts

The increasing use of Artificial Intelligence (AI) in language education has created new opportunities for supporting writing instruction. Within Technology-Enhanced Language Learning (TELL), digital technologies are used to facilitate learner engagement, interaction, and learning support (Hasumi & Chiu, 2024; R. Zhang & Zou, 2020). One application of AI

in EFL writing is AI-assisted feedback, which provides automated responses to learners' written texts. Previous studies have reported that AI-assisted feedback may support learners' motivation, revision practices, writing quality, and self-regulated learning (Al-Othman, 2024; Escalante et al., 2023; Mekheimer, 2025; Song & Song, 2023; Tran, 2025). Godwin-Jones (2022) further argued that intelligent writing technologies may function as learning partners that assist learners during writing development.

However, AI-assisted feedback should be distinguished from AI-assisted writing platforms. AI-assisted feedback primarily refers to the use of AI to provide comments, corrections, or suggestions on learners' written texts. In contrast, an AI-assisted writing platform offers broader pedagogical support by integrating learning guidance, writing activities, scaffolding, feedback interpretation, revision assistance, and opportunities for reflection within a structured digital environment. This distinction is important because writing development requires more than correction-oriented feedback; it also involves support for idea generation, text organization, drafting, revising, and learner decision-making. Therefore, FURAP is positioned not merely as an AI feedback tool, but as a platform-design study that explores how AI can be embedded within a pedagogically grounded writing environment.

Design Principles for AI-Assisted Writing Platforms

Previous studies have demonstrated that AI-assisted writing tools effectively improve grammatical accuracy, vocabulary, and writing quality through automated feedback; however, most existing systems remain correction-oriented, providing support primarily after learners complete their texts (Shi & Aryadoust, 2024; Ding & Zou, 2024). Recent reviews further indicate that AI applications largely function as automated evaluators rather than pedagogical partners that support the entire writing process (Bo et al., 2025). From a process-writing perspective, writing is a recursive activity involving planning, drafting, revising, and reflection (Flower & Hayes, 1981). Accordingly, learners require continuous scaffolding throughout these stages, consistent with Sociocultural Theory, which emphasizes guided support within learners' Zone of Proximal Development (Vygotsky, 1978). Likewise, genre-based pedagogy highlights the importance of explicit guidance in rhetorical structure and language features before independent writing (Hyland, 2007), suggesting that AI should function as an instructional scaffold rather than merely an automated proofreader.

Beyond linguistic correction, AI-assisted writing environments should foster cognitive, metacognitive, and self-regulated learning by supporting learners in planning, monitoring, evaluating, and revising their writing (Zimmerman, 2000). Such support aligns with formative assessment principles, which emphasize timely feedback to improve learning during the writing process (Black & Wiliam, 2009), while reducing unnecessary cognitive load so that learners can devote greater attention to higher-order writing skills (Sweller, 2011). Despite these pedagogical recommendations, few studies have developed AI-assisted platforms that integrate brainstorming, genre-based instruction, scaffolded

drafting, formative feedback, and reflective revision within a unified learning environment, particularly for descriptive-text instruction in Indonesian secondary-school EFL contexts. This gap provides the theoretical and pedagogical rationale for developing FURAP as a web-based AI-assisted writing platform that supports learners across the entire writing process rather than limiting AI assistance to post-writing error correction.

Methods

Research Design

This study employed Design and Development Research (DDR) as the primary research framework. According to Richey and Klein (2007), DDR focuses on the systematic design, development, and evaluation of instructional products intended to address educational problems within specific learning contexts. The study adopted Type 1 DDR because it emphasized product design and development rather than theory generation. DDR was considered appropriate because the main objective of this study was to develop and conduct a limited evaluation of FURAP, an AI-assisted web-based writing platform, based on identified learner needs. Compared with ADDIE, which mainly offers a procedural instructional design framework, and Design-Based Research (DBR), which typically emphasizes iterative classroom implementation and theory refinement, DDR provides a more suitable framework for guiding the needs analysis, design, development, and preliminary evaluation of educational products (Richey & Klein, 2007). Therefore, this study combined descriptive qualitative and quantitative approaches to investigate students' writing learning needs and inform the development of FURAP for descriptive-text instruction.

The study was conducted at a public senior high school in Central Java, Indonesia, within the context of eleventh-grade EFL learning. English instruction in the school followed the Merdeka Curriculum, particularly the English learning outcomes for Phase F, in which students are expected to use spoken, written, and visual texts for communication across different purposes, audiences, and contexts. The curriculum also positions various text types, including descriptive texts, as important references for English learning at the senior high school level (Badan Standar, Kurikulum, dan Asesmen Pendidikan, 2024). Descriptive text was selected in this study because it represented one of the foundational genres in the school's English writing instruction. The DDR procedures consisted of four stages: needs analysis, platform design, platform development, and limited evaluation. The needs analysis stage identified students' writing difficulties and instructional needs through questionnaires and interviews; the design stage planned the platform features and instructional components; the development stage constructed the FURAP prototype using Gemini Canvas as an AI-assisted web development environment; and the limited evaluation stage obtained preliminary feedback on usability, accessibility, instructional relevance, and AI-assisted writing support.

Table 1. Research Stages

Stage	Activities	Output
Needs Analysis	Questionnaire and interview	Students’ writing needs
Design	Feature and interface planning	Prototype design
Development	Platform construction using Gemini Canvas	FURAP prototype
Evaluation	User testing and feedback collection	Revision recommendations

The developed platform integrated several features, including Brainstormer, Guide, Learn, Insight, and Improve, to support brainstorming, guided writing, AI-assisted feedback, and revision activities. Brainstormer supported idea generation during pre-writing activities, while Guide provided scaffolding for organizing descriptive texts. Learn contained instructional materials and descriptive-text examples. Insight functioned as an AI-assisted feedback feature focusing on grammar, vocabulary, and organization, whereas improve supported revision activities based on feedback results.

Participants

The study involved two groups of participants corresponding to the stages of the Design and Development Research (DDR) process. The first group participated in the needs analysis stage and consisted of 83 eleventh-grade students and three English teachers from a public senior high school in Central Java, Indonesia. The students were selected purposively because they were actively studying descriptive-text materials within the EFL curriculum. Their participation was intended to provide information about students’ writing difficulties, learning needs, and expectations regarding AI-assisted writing support. The three English teachers were involved in semi-structured interviews to provide pedagogical insights into writing instruction, classroom feedback practices, students’ writing challenges, and the potential integration of technology in EFL learning.

The second group participated in the limited evaluation stage and consisted of 19 university students enrolled in an English Language Teaching Innovation course. These participants were selected purposively because they had relevant familiarity with EFL writing pedagogy, educational technology, and instructional innovation. During the evaluation stage, they conducted usability testing, instructional simulation, and microteaching role-play activities by positioning themselves as eleventh-grade EFL learners. The evaluation focused on four aspects: usability, accessibility, instructional relevance, and AI-assisted writing support. Therefore, this stage was intended to obtain preliminary user feedback on the FURAP platform before broader classroom implementation, rather than to measure its effectiveness in improving students’ writing performance.

Table 1. Summary of Research Participants

Research Stage	Participant Group	Number of Participants	Selection Criteria	Role in the Study
Needs analysis	Eleventh-grade EFL students	83	Students who were studying descriptive-text materials in the EFL curriculum	Provided data on writing difficulties, learning needs, and expectations for AI-assisted writing support
Needs analysis	English teachers	3	Teachers involved in EFL writing instruction at the research school	Provided interview data on writing instruction, feedback practices, students' writing challenges, and technology integration
Limited evaluation	University students enrolled in an English Language Teaching Innovation course	19	Students with familiarity with EFL pedagogy, educational technology, and instructional innovation	Conducted usability testing, instructional simulation, and microteaching role-play to provide preliminary feedback on the platform

Participation in the study was voluntary, and informed consent was obtained before data collection. Participants were informed about the purpose of the study, the nature of their involvement, confidentiality procedures, and their right to withdraw from the study. Participants' identities were anonymized throughout the research process, and research permission was obtained from the school and relevant academic institutions.

Data Collection

Data were collected through questionnaires, semi-structured interviews, document analysis, and evaluation feedback. In the needs-analysis stage, a researcher-developed questionnaire based on Hutchinson & Waters (1987) needs-analysis framework was used to identify students' necessities, lacks, and wants in English learning. The questionnaire consisted of 43 items using a four-point Likert scale ranging from 1 (Strongly Disagree) to 4 (Strongly Agree) and covered four English language skills. The writing section, which served as the primary basis for FURAP development, consisted of 11 items examining students' writing abilities, writing difficulties, and learning preferences. Sample items included "I have difficulty generating and developing ideas for writing," "I need step-by-step writing guidance," and "I need detailed and constructive feedback." To ensure content relevance and clarity, the questionnaire was reviewed by two experts in EFL writing pedagogy and educational technology, focusing on item clarity, alignment with the needs-analysis dimensions, relevance to the research objectives, appropriateness for eleventh-

grade EFL learners, and coverage of writing-related needs. Several items were revised based on expert feedback to improve wording, reduce ambiguity, and strengthen alignment with the necessities, lacks, and wants dimensions. Semi-structured interviews were also conducted with three English teachers and selected students to explore writing difficulties, classroom feedback practices, instructional needs, learning preferences, and expectations regarding technology-assisted writing support. In addition, curriculum documents, instructional materials, learning activities, assessment practices, and technology-related documents were analyzed to contextualize the platform design.

During the limited evaluation stage, the developed FURAP platform was evaluated through classroom-based instructional simulations and microteaching activities involving university students enrolled in an English Language Teaching Innovation course. Participants explored the platform by completing simulated descriptive-writing tasks and then provided feedback through oral feedback sessions, follow-up discussions, and open-ended reflections. The evaluation focused on usability, accessibility, instructional relevance, and AI-assisted writing support. Guiding questions were used to prompt participants' reflections on ease of navigation, feature clarity, relevance to descriptive-text writing instruction, and the usefulness of AI-assisted functions for idea generation, writing guidance, feedback, and revision. The qualitative data obtained from interviews, discussions, reflections, document analysis, and evaluation feedback were analyzed thematically through coding, categorization, and theme development. Methodological triangulation was employed by comparing evidence from questionnaires, teacher and student interviews, document analysis, instructional simulations, participant discussions, and evaluation feedback to enhance the credibility of the findings.

Data Analysis

The collected data were analyzed using descriptive quantitative and qualitative thematic analysis techniques. Questionnaire data were analyzed using percentages to identify dominant trends related to students' writing difficulties, learning needs, and technology preferences. Qualitative data obtained from teacher interviews, student interviews, document analysis, open-ended responses, and evaluation feedback were analyzed thematically through data reduction, coding, categorization, and theme generation. The analysis focused on identifying recurring patterns related to writing challenges, scaffolding needs, feedback practices, and technology-assisted learning.

During the limited evaluation stage, feedback collected through the evaluation rubric was analyzed descriptively to examine users' perceptions regarding usability, accessibility, instructional relevance, and AI-assisted writing support. The findings from quantitative and qualitative analyses were subsequently triangulated and used to inform platform revisions and further development of the FURAP prototype.

Results

Needs Analysis

The needs analysis stage was conducted to identify students' writing difficulties, instructional needs, and perceptions regarding technology-assisted writing learning. Data were collected through questionnaires administered to 83 eleventh-grade students at a public senior high school in Central Java, Indonesia, supported by semi-structured interviews with three English teachers and several students. The findings revealed persistent challenges related to grammar, vocabulary, idea development, feedback, and instructional guidance, indicating the need for a more structured and interactive writing learning environment. These findings also became the basis for designing the main features of the FURAP platform, including Brainstormer, Guide, Learn, Insight, and Improve.

Students' Current Writing Abilities

The questionnaire results indicated that students still experienced difficulties in several fundamental aspects of writing. The data are presented in Table 2.

Table 2. Students' Current Writing Abilities

Aspect	Percentage
Students can use grammar and sentence structures correctly in writing	51.9%
Students can organize ideas logically in writing	49.4%
Students can write different types of texts appropriately	45.7%

The findings indicate that students' perceived abilities varied across different writing aspects. Slightly more than half of the students reported that they were able to use grammar and sentence structures correctly in writing (51.9%). However, lower percentages were found in idea organization (49.4%) and the ability to write different text types appropriately (45.7%), suggesting that many students still lacked confidence in organizing and developing written texts effectively. These findings support the need for more structured writing guidance and process-oriented instructional support during writing activities.

Interview findings also supported these results. Teacher 1 explained that students frequently struggled to elaborate ideas coherently, even after classroom explanations had been provided.

"Students are usually still confused when developing ideas during writing activities. They often know the topic, but do not know how to continue the paragraph development."

Teacher 2 additionally stated:

"Most students focus too much on grammar, causing their written ideas to become very limited."

These findings indicate that students required not only grammar support but also instructional guidance that could assist them more systematically during brainstorming, idea organization, drafting, and revision. Based on these needs, the Brainstormer and Guide features in FURAP were designed to support idea generation and structured paragraph

development, while the Insight and Improve features were intended to provide AI-assisted feedback and revision support throughout the writing process.

Students’ Writing Difficulties

The questionnaire findings revealed several dominant writing difficulties experienced by students. In this section, students were allowed to select more than one writing difficulty based on their personal learning experiences. The data are presented in Table 3 below:

Table 3. Students’ Writing Difficulties	
Writing Difficulties	Percentage
Students frequently make grammatical mistakes during writing	90.1%
Students experience vocabulary limitations while writing	88.9%
Students rarely practice writing regularly	76.5%
Students experience difficulties in generating and developing ideas	66.7%

The findings show that grammar became the most dominant writing difficulty experienced by students (90.1%), followed closely by vocabulary limitations (88.9%). In addition, a considerable number of students reported that they rarely practiced writing regularly (76.5%) and experienced difficulties in generating and developing ideas during writing activities (66.7%). These findings indicate that students required support not only in language accuracy, but also in brainstorming, writing practice, and idea organization throughout the writing process. The interview findings further confirmed these challenges. Student 1 explained:

“Sometimes I know what I want to write, but I feel confused about how to start the sentence.”

Another student stated:

“I am often afraid of making grammar mistakes, so I prefer writing only a little instead of trying to explain more.”

One of the teachers also acknowledged students’ dependence on translation tools because of vocabulary difficulties.

“Students often immediately open Google Translate because they feel that their vocabulary is insufficient.”

The interview excerpts were translated from Indonesian into English by the researcher and edited slightly for clarity. These findings became an important foundation in designing the FURAP platform features. The Brainstormer feature was developed to support idea generation and writing preparation, while Guide was intended to assist students in organizing descriptive texts more systematically. In addition, the Insight and Improve features were designed to provide AI-assisted grammar feedback, vocabulary support, and revision guidance throughout the writing process.

Students’ Learning Needs and Expectations

The questionnaire findings demonstrated strong student demand for structured guidance, detailed feedback, and technology-assisted learning support. The data are presented in Table 4.

Table 4. Students’ Learning Needs and Expectations

Students’ Needs and Expectations	Percentage
Students need step-by-step writing guidance	97.5%
Students need detailed and constructive feedback	96.3%
Students prefer interesting and relatable writing topics	95.1%
Students are interested in using AI/digital tools to support writing	82.7%

The findings indicate that students perceived structured writing guidance and detailed feedback as important needs during writing activities. High percentages were also found in students’ preferences toward interesting writing topics and the integration of AI or digital tools within writing instruction. These results suggest that students expected more interactive and guided writing learning environments supported by technology-assisted learning systems. Interview findings additionally revealed that students perceived current writing instruction as insufficiently interactive and lacking structured support. Student 2 stated:

“Usually, we are directly asked to write without receiving step-by-step guidance.”

Another student explained:

“Teacher feedback is usually only scores or short comments, so I do not know which parts should be improved.”

Teacher 3 also acknowledged the limitations of current classroom feedback practices:

“Providing detailed feedback for all students is quite difficult because of limited classroom time.”

The interview excerpts were translated from Indonesian into English by the researcher and edited slightly for clarity. These findings informed the design of several FURAP features. The Guide feature was designed to provide step-by-step writing assistance, while Learn was intended to support students through instructional explanations and descriptive-text examples. In addition, the Insight feature was developed to provide more detailed AI-assisted feedback, and Brainstormer was designed to support idea generation and topic exploration during writing activities. These findings descriptively indicate the need for a more scaffolded and technology-assisted writing learning environment for EFL students.

Design and Development of the FURAP Platform

The findings from the needs analysis served as the pedagogical foundation for designing and developing the FURAP platform. Students’ difficulties related to grammar, vocabulary, idea development, and feedback directly informed the development of the platform’s instructional features.

Table 5. Design Matrix of FURAP Development

Identified Need	Theoretical Basis	FURAP Feature	Pedagogical Support	Evaluation Evidence
Students experienced difficulty generating and developing ideas for writing.	Scaffolding Theory (Vygotsky, 1978); Process Writing Theory (Hyland, 2003)	Brainstormer	Provides guided prompts and brainstorming assistance to support idea generation and prewriting activities.	Users perceived the feature as helpful for generating and expanding writing ideas.
Students required step-by-step guidance during writing activities.	Scaffolding Theory (Vygotsky, 1978); Process Genre Approach (Badger & White, 2000)	Guide	Provides structured support for planning, drafting, and organizing written texts.	Users reported that the feature improved task clarity and facilitated the writing process.
Students needed support in understanding descriptive-text structure and language features.	Process Genre Approach (Badger & White, 2000)	Learn	Provides instructional materials on text structure, communicative purpose, and language features.	Users perceived the materials as relevant and supportive of writing activities.
Students required detailed and constructive feedback.	Formative Feedback Theory (Black & Wiliam, 1998)	Insight	Provides AI-assisted formative feedback on content, organization, grammar, and language use.	Users reported that the feedback helped identify weaknesses and areas for improvement.
Students needed assistance during revision activities.	Process Writing Theory (Hyland, 2003); Formative Feedback Theory (Black & Wiliam, 1998)	Improve	Provides revision support based on feedback to help refine written drafts.	Users perceived the feature as useful for improving draft quality.
Students preferred technology-assisted and interactive learning environments.	Technology-Enhanced Language Learning (Hasumi & Chiu, 2024)	Integrated Web-Based Platform	Provides an accessible and interactive digital environment that integrates all writing-support features.	Users reported positive perceptions regarding usability, accessibility, and instructional relevance.

The design matrix illustrates how findings from the need analysis informed the selection of theoretical foundations, platform features, and intended pedagogical support during the development of FURAP. The researcher designed the platform as part of an English Language Teaching Innovation project through several stages of planning, feature development, revision, and limited evaluation. The design decisions were based on students’ learning needs, scaffolding principles, Process Writing Theory, and Genre-Based Approaches in EFL writing instruction.

The learning flow of the platform was intentionally designed based on process writing stages and genre-based writing instruction. Learners begin with brainstorming activities before proceeding to guided writing and drafting stages. After completing their drafts, students receive AI-assisted feedback and revision suggestions intended to support reflective revision and writing development. The sequence was designed to provide a more structured and less intimidating writing process for learners who previously experienced difficulties in starting, organizing, and revising descriptive texts.

Genre Texts

The Genre Texts feature functions as a learning section that helps students understand descriptive texts and their characteristics within genre-based writing instruction. This feature provides explanations about text structures, communicative purposes, and language features related to descriptive-text writing, while additional genres are presented only as supplementary references. It is intended to strengthen students' genre awareness and support them in producing more organized and appropriate descriptive texts. The feature also supports scaffolding by providing guided examples before students begin independent writing activities.

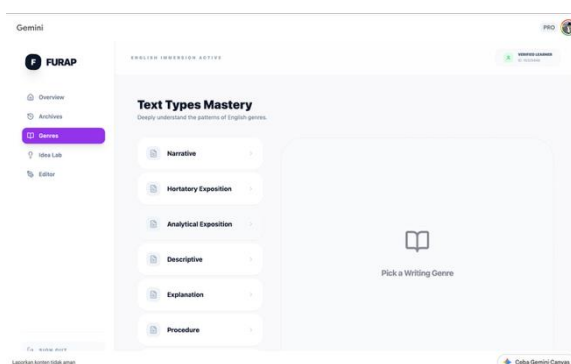


Figure 1. Features (Genres Text)

Idea Laboratory

The Idea Laboratory feature functions as a brainstorming space that helps students generate and explore writing ideas before starting the drafting process. This feature provides topic inspirations, visual prompts, and interactive idea suggestions to stimulate creativity and reduce students' difficulties in beginning their writing. It is intended to support learners in developing ideas more confidently and systematically during pre-writing activities. In relation to process writing pedagogy, this feature mainly supports brainstorming and planning stages before drafting activities begin.

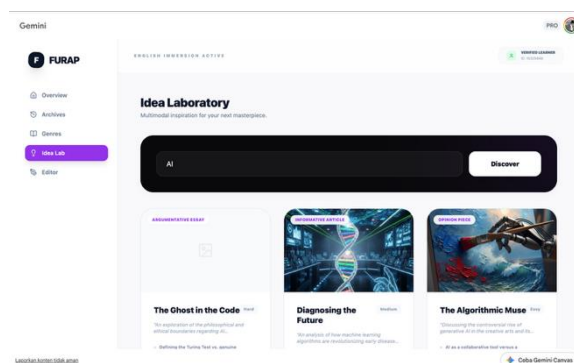


Figure 2. Features (Idea Laboratory)

The development process was conducted iteratively using Gemini Canvas through prompt-based refinement focusing on usability, instructional flow, and feature functionality. Multiple revisions were conducted through peer discussion, instructional simulation, and limited evaluation feedback to improve interface organization, accessibility, and instructional clarity. The final platform was intentionally designed to appear visually interactive, accessible, and student-friendly in order to provide a more supportive and less intimidating writing environment for learners.

AI Mentor

The AI Mentor feature functions as an interactive writing assistant designed to provide scaffolding and guidance throughout the writing process. Unlike generative AI tools that may produce complete paragraphs or full essays, AI Mentor was designed as a process-support feature that helps learners think, plan, revise, and make writing decisions independently. The feature allows students to ask for assistance when they experience specific difficulties, such as generating ideas, organizing information, expanding details, improving clarity, or revising drafts. In response, AI Mentor provides guiding questions, reflective prompts, step-by-step suggestions, and focused feedback rather than ready-to-submit text.

To prevent complete text generation, the prompt design of AI Mentor was structured around pedagogical constraints. The system was instructed not to write full paragraphs, complete descriptive texts, or final versions of students' assignments. Instead, it was directed to respond through questions, hints, short explanations, revision options, and strategy-based guidance. For example, when students ask for help developing ideas, AI Mentor provides brainstorming prompts and guiding questions. When students ask for help revising a sentence, it may explain what needs improvement and offer limited alternatives, but it does not rewrite the entire text on behalf of the learner. This design ensures that students remain responsible for selecting ideas, constructing sentences, and revising their own writing.

The design of AI Mentor was informed by scaffolding principles, self-regulated learning, and process-oriented writing pedagogy. Its purpose is to support learners during moments of difficulty while preserving student ownership of the writing process. By

encouraging students to reflect on their ideas, evaluate their drafts, and make their own revision decisions, AI Mentor promotes learner autonomy rather than dependence on AI-generated output. The guidance was also aligned with the instructional materials available in FURAP, including genre definitions, generic structures, and language features of descriptive texts, so that the feedback remained relevant to the learning objectives of descriptive-text writing.

Table 6. Examples of AI Mentor Interactions

Student Difficulty	Example Student Prompt	AI Mentor Response Type
Idea generation	"I am having difficulty developing ideas for my descriptive text. What steps can I take to expand this topic?"	Guiding questions and brainstorming prompts
Organization	"I do not know how to organize my description. What should I write first?"	Suggestions related to generic structure and text organization
Draft development	"My paragraph feels too short. How can I add more details?"	Guidance for elaboration and supporting details
Revision	"Can you help me identify parts that need improvement?"	Reflective feedback and revision suggestions
Language use	"How can I make this sentence clearer?"	Language improvement suggestions without rewriting the entire text

AI Mentor was designed to provide guidance and feedback rather than generate complete texts for students. The AI guidance was further aligned with the instructional materials available in FURAP, including genre definitions, generic structures, and language features of descriptive texts. These pedagogical resources served as the basis for the AI's feedback and recommendations, ensuring that the guidance remained relevant to the genre-specific learning objectives of descriptive-text writing.

Writing Evaluation/Feedback

The Writing Evaluation/Feedback feature functions as an AI-assisted assessment tool that provides structured feedback on students' descriptive writing. The feedback is generated through a combination of rubric-based criteria and predefined instructional prompts. The assessment criteria were adapted from the descriptive-writing assessment rubric routinely used by English teachers at the research site. Rather than developing a new assessment rubric, the study adopted the existing classroom criteria because they reflected the school's instructional objectives and assessment practices for descriptive-text writing. The criteria included grammar accuracy, vocabulary use, organization, coherence, and idea development, and served as the basis for determining the aspects of students' writing to be reviewed.

To ensure that the AI-generated feedback remained aligned with these criteria, the instructional prompts were explicitly designed to evaluate each writing aspect separately. Instead of generating general comments, the AI was instructed to provide criterion-specific

formative feedback by identifying strengths, pointing out areas for improvement, and offering revision-oriented suggestions corresponding to each assessment category. The researcher reviewed and refined the prompts iteratively during the platform development process to maintain consistency between the AI-generated feedback and the intended pedagogical focus of the assessment criteria.

The predefined prompts were used to guide the AI in producing feedback that aligned with the rubric and the learning objectives of descriptive-text writing. In other words, the AI did not generate feedback freely or independently from the instructional framework. Instead, it was prompted to identify strengths, point out areas for improvement, and provide revision-oriented suggestions based on the rubric categories. This design was intended to make the feedback more focused, pedagogically relevant, and useful for students' revision activities.

However, the feature was not designed to replace teacher assessment or teacher feedback. Teacher mediation remains necessary because AI-generated feedback may occasionally be inaccurate, repetitive, overly general, or insufficiently contextualized to students' proficiency levels, classroom experiences, and specific learning needs. Therefore, the Writing Evaluation/Feedback feature is intended to complement teacher judgment by providing preliminary and formative feedback that can support revision, reflection, and classroom writing instruction.



Figure 6. Features (Writing Evaluation/Feedback)

Users' Responses toward the FURAP Platform

Overall, participants perceived the FURAP platform as useful, accessible, and sufficiently interactive for supporting writing-learning activities. The evaluation findings indicated that the platform facilitated idea generation, paragraph organization, and systematic revision

throughout the writing process. Participants also reported that the AI-assisted features provided timely guidance that helped them improve both the content and organization of their descriptive texts.

Thematic analysis further revealed four recurring themes: usability, accessibility, instructional relevance, and AI-assisted writing support. Participants described the platform as easy to navigate and well aligned with classroom writing activities. They also emphasized that the integrated AI features supported brainstorming, drafting, and revision, making the writing process more structured and engaging than conventional writing instruction. These findings mainly emerged from open-ended responses and classroom simulation activities conducted during the limited evaluation stage.

One participant stated:

"The platform interface was quite easy to understand, and the writing steps felt clearer compared to conventional writing activities."

Another participant explained:

"The navigation was simple, so I did not feel confused when moving between different features."

The interview excerpts were translated from Indonesian into English by the researcher and edited slightly for clarity. Among all features, the Insight and Improve features received particularly positive responses from several participants. Users perceived that the AI-assisted feedback helped identify grammar, vocabulary, and sentence clarity issues more specifically compared to conventional classroom feedback practices.

One participant stated:

"The feedback from the Insight feature was more detailed because it not only showed the mistakes but also provided suggestions for improvement."

Another participant explained:

"The Improve feature helped revise sentences that felt unclear."

Participants also responded positively to the Brainstormer and Guide features because they helped users organize ideas and follow writing stages more systematically during the writing process.

"The Guide feature was helpful because the writing process was divided into several easier steps."

Another participant explained:

"The Brainstormer feature helped generate ideas when I was confused about where to start."

Participants additionally perceived the platform interface as visually interactive, approachable, and less intimidating compared to conventional writing activities.

"The design felt more relaxed and not overly formal, making it more comfortable to use."

However, some participants reported that several AI-generated feedback responses occasionally appeared too general or repetitive, particularly when responding to similar sentence structures. This limitation indicated that the AI feedback system still required further refinement to provide more contextualized, pedagogically specific, and varied writing suggestions. During the revision process, the feedback prompts were refined to generate more specific responses, feedback categories were organized according to key

writing aspects (e.g., grammar, vocabulary, organization, and idea development), and the system was adjusted to emphasize revision-oriented feedback rather than generating complete rewritten texts. These modifications were intended to improve instructional clarity, response specificity, and alignment with the learning objectives. Nevertheless, because the evaluation stage involved only limited testing with university students, the findings mainly reflect preliminary user perceptions and usability feedback rather than long-term instructional effectiveness for the intended eleventh-grade EFL learners.

Discussion

The findings indicate that students still experienced considerable difficulties related to grammar, vocabulary, and idea development during writing activities. These findings are consistent with previous studies reporting that EFL learners frequently struggle with language accuracy and idea organization in writing tasks (Han, 2024; Rahimi et al., 2024; C. Wang & Sun, 2020; X. Wang & Ganapathy, 2025; Y. Wang, 2024). The interview findings additionally showed that students often felt anxious about making grammatical mistakes, which limited their confidence in developing ideas more extensively. These conditions are important within EFL writing pedagogy because students' difficulties were not limited to grammar accuracy, but also involved brainstorming, organization, drafting, and revision processes. Therefore, the findings strengthened the need for a more scaffolded and process-oriented writing environment capable of supporting learners throughout multiple stages of writing development.

Another important finding concerns students' strong need for structured writing guidance and detailed feedback. The results demonstrated that students required step-by-step instructional support throughout the writing process (Yang et al., 2024; Y. Zhang, 2024). These findings support Hassen et al. (2024), who emphasized that scaffolded writing instruction helps learners progress more systematically during writing tasks. Similarly, (Chairinkam & Yawiloeng, 2024) explained that guided support assists students in generating and organizing ideas more confidently. Within descriptive-text instruction, these findings are closely related to process-genre pedagogy because learners require support in understanding text structure, organizing descriptions, developing ideas, and applying appropriate language features during writing activities.

To address these instructional needs, the FURAP platform integrated several features, including Brainstormer, Guide, Insight, and Improve. From a pedagogical perspective, the Brainstormer feature was designed to support idea generation during the pre-writing stage, while Guide functioned as a scaffolding tool that assisted learners in organizing descriptive texts more systematically. In addition, the Insight feature provided AI-assisted feedback on grammar, vocabulary, coherence, and organization, whereas Improve supported reflective revision and sentence refinement activities through formative feedback and revision guidance (Rahimi et al., 2024; Shi & Aryadoust, 2024; Mekheimer, 2025). The positive responses toward these features during the limited evaluation stage suggest that learners perceived structured writing guidance and AI-assisted feedback as

helpful in supporting their writing processes, consistent with previous studies reporting favorable learner perceptions of AI-assisted writing feedback and revision support (Escalante et al., 2023; Song & Song, 2023). These findings also demonstrate how the results of the needs analysis directly informed the pedagogical design of the platform features.

The findings additionally revealed positive responses toward AI-assisted feedback systems integrated within the platform. Participants perceived the Insight and Improve features as useful because they provided more detailed feedback compared to conventional classroom feedback practices (Godwin-Jones, 2022; Tran, 2025). These findings align with (Escalante et al., 2023), who found that learners generally respond positively toward AI-generated feedback because of its immediacy and accessibility. Al-Othman (2024) and (Mekheimer, 2025) similarly concluded that AI-assisted feedback systems possess considerable potential for supporting revision practices in EFL writing contexts. However, the findings of the present study should be interpreted cautiously because the evaluation mainly examined user perceptions and preliminary usability rather than actual improvement in students' writing performance.

In addition, students demonstrated positive attitudes toward technology-assisted learning environments. The findings showed that students were interested in integrating AI and digital tools into writing instruction. These findings reflect the growing relevance of Technology-Enhanced Language Learning (TELL) within contemporary EFL classrooms (Felcida & Parameswaran, 2024; Hasumi & Chiu, 2024; R. Zhang & Zou, 2020). Nevertheless, the integration of AI-assisted writing systems also presents several challenges related to feedback accuracy, overreliance on AI-generated suggestions, ethical use, and the continued importance of teacher mediation during writing instruction. Some participants additionally reported that several AI-generated feedback responses occasionally appeared repetitive or overly general (Luo, 2025). Therefore, AI-assisted platforms should be positioned as supportive instructional tools rather than replacements for teachers' pedagogical roles within EFL writing classrooms.

Nevertheless, several limitations should be acknowledged. First, although the AI Mentor feature was designed to provide guidance and formative feedback, some participants reported that certain AI-generated responses occasionally appeared too general or repetitive. This indicates that further refinement is required to improve the contextual accuracy and pedagogical specificity of the feedback provided. Second, the platform was intentionally designed to encourage learner autonomy and self-regulated writing; however, the possibility of learner overreliance on AI assistance remains a potential concern that requires further investigation. Third, the role of teacher mediation remains important because AI-generated guidance should complement rather than replace teacher feedback and instructional support during writing activities. Finally, the limited evaluation involved university students rather than the intended target users of eleventh-grade EFL learners. Therefore, the findings primarily reflect preliminary perceptions of usability and instructional relevance, and direct implementation with secondary-school learners is still required to examine the platform's suitability in authentic classroom contexts. These

limitations suggest important directions for future development, evaluation, and classroom implementation of the FURAP platform.

Overall, the findings from the need analysis, platform development, and limited evaluation collectively contribute to EFL writing pedagogy by highlighting the importance of integrating scaffolding, process-oriented writing support, genre awareness, and AI-assisted feedback within a unified digital learning environment. The development of FURAP demonstrates how instructional needs, pedagogical theory, and technology integration can be combined to support learners throughout multiple stages of the writing process rather than focusing solely on corrective feedback.

Conclusion

This study identified that eleventh-grade EFL students at a public senior high school in Central Java, Indonesia, experienced considerable difficulties in writing, particularly related to grammar accuracy, vocabulary limitations, idea development, and limited writing practice. The findings also revealed that students perceived structured writing guidance, detailed feedback, and more interactive technology-assisted learning environments as important needs during writing instruction.

Based on these instructional needs, the FURAP platform was designed and developed as an AI-assisted web-based writing environment integrating several major features, including Brainstormer, Guide, Learn, Insight, and Improve. The platform was intentionally designed to support students throughout different stages of descriptive-text writing activities, ranging from brainstorming and guided drafting to AI-assisted feedback and revision. Compared with many AI writing tools that mainly emphasize correction-oriented feedback, FURAP attempted to integrate scaffolding support, process writing stages, genre-based instruction, and reflective revision within a unified digital learning environment.

The limited evaluation findings indicated that users generally responded positively toward the developed platform. Participants perceived the platform as accessible, interactive, and potentially helpful for supporting writing activities. In particular, the Insight and Improve features were perceived positively because they provided more detailed feedback and revision support compared to conventional classroom feedback practices. However, these findings should be interpreted cautiously because the evaluation stage involved only limited usability and instructional testing with university students rather than direct classroom implementation with the intended eleventh-grade learners. Therefore, the study does not claim that the platform has been proven effective in improving students' writing performance.

Overall, the findings suggest that the integration of scaffolding, guided writing support, and AI-assisted feedback within web-based learning environments may support more structured and engaging EFL writing experiences. Nevertheless, the study remains context-specific and limited to needs analysis, platform development, and preliminary evaluation findings. Further studies involving broader classroom implementation, direct

testing with secondary school learners, and writing-performance measurement are still needed to examine the long-term pedagogical potential and effectiveness of the platform in EFL writing instruction.

Acknowledgment

The researcher would like to express sincere gratitude to all participants who contributed to this study, including the students and teachers at a public senior high school in Central Java, Indonesia, and the evaluators who participated in the platform testing process. The researcher also extends appreciation to the school and related academic institutions for their support and permission during the research process.

Conflicts of Interest

The authors declare that there are no conflicts of interest related to the research, authorship, and publication of this article.

CRedit Authorship Contribution Statement

Andika Guruh Saputra: Conceptualization, Methodology, Software, Investigation, Formal Analysis, Data Curation, Writing – Original Draft, Visualization, and Project Administration. Responsible for designing the study, developing the FURAP platform, conducting data collection and analysis, and preparing the original manuscript.

Nur Hidayanto Pancoro Setyo Putro: Conceptualization, Methodology, and Supervision. Contributed to strengthening the research concept, refining the research methodology, and supervising the overall research process.

Ella Wulandari: Conceptualization, Methodology, and Supervision. Contributed to the development of the research concept and methodology and provided academic supervision throughout the study.

Lukluil Maknun: Investigation and Data Curation. Assisted in collecting research data and organizing the research data for reporting and analysis.

Nurul Amalina: Validation. Verified that the writing assessment rubric integrated into the FURAP platform was appropriate and aligned with classroom assessment standards for descriptive writing instruction.

Karina Septiani: Conceptualization. Contributed to the conceptual development and brainstorming of the FURAP platform, particularly in designing its instructional features and overall platform concept.

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