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Development of a Dual-Layer Feedback System for EFL Writing: From the Perspective of Self-Regulated Learning

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Abstract: This study aims to develop a writing support system that utilizes large-scale language modeling (LLM) techniques to enhance self-regulated learning (SRL) for English as a foreign language (EFL) learners. We designed and implemented a support system utilizing GPT-4 to generate structured, dual-layer feedback that addresses language aspects and stages of forethought, performance, and self-reflection for SRL models. This integrated approach addresses gaps identified in traditional feedback methods by supporting immediate language improvement while promoting the development of self-regulation skills necessary for long-term writing proficiency.

Keywords: Writing skills, Self-regulated learning, AI-assisted feedback, EFL

1. Background

Writing is a one of the most challenging skills for learners of EFL. The writing process includes several stages: reading the task, understanding the task, planning, turning thoughts into language, evaluating, and revising. Each stage plays a different role in the writing process, and the learning strategies that students use change from one writing stage to another (De Larios et al., 2008). As students work through their writing task, students require to adjust their strategies to meet the specific thinking and language demands in each writing stage. EFL writing demands not only mastery of linguistic elements but also the development of sophisticated metacognitive abilities and the SRL skills to monitor and adjust their writing processes (Negari, 2011). For example, Zimmerman's (2002) SRL model identifies key processes that support effective writing, including forethought, performance, and self-reflection. When learners exhibit inadequate SRL skills, they demonstrate insufficient planning behaviors (Wang & Wen, 2002), and their revision strategies tend to focus predominantly on surface level issues (De Larios et al., 2008), ultimately leading to poor quality in their English writing.

Therefore, developing effective writing skills requires comprehensive feedback and support mechanisms that include both language aspects and SRL. However, teacher feedback practices in EFL contexts face several limitations. Ferris (2014) stated that teacher feedback, while authoritative, often prioritizes grammatical accuracy and surface-level errors rather than addressing higher-level issues such as content development, rhetorical effectiveness, and organizational coherence. This focus on language correction may lead learners to perceive that writing is primarily a language exercise rather than an overall skill-development process. Additionally, some studies have explored interventions to enhance SRL in EFL writing. For example, Teng and Zhang (2020) divided 80 undergraduate students into experimental and control groups, with the experimental group receiving five months of SRL strategy writing instruction. The results indicated that the experimental group outperformed much better than the control group in writing tests, employed SRL strategies including

metacognitive strategies more actively during writing, leading to improvements in their writing performance. However, as Lee and Mak (2018) pointed out, current EFL writing instruction still lacks a comprehensive support system for individual learner differences, and most existing interventions tend to focus on just a single aspect of self-regulation rather than providing systematic and comprehensive support.

The emergence of advanced LLMs offers new opportunities to address ongoing challenges in EFL writing. These technologies demonstrate capabilities relevant to writing support, including natural language understanding, contextual feedback generation, and adaptive responses to learner needs (Chen et al., 2025). However, most of the learners use LLMs such as ChatGPT only for information retrieval, writing structure guidance, and language correction. Prasad and Sane (2024) stated that learners are prone to use them in a way that leads to the neglect of SRL behaviors such as planning and reflecting. A review of 16 AI writing support systems revealed that most of these systems emphasize only linguistic accuracy, with minimal attention to improving process-oriented writing skills (Aldosemani et al., 2023). Similarly, Shi and Aryadoust (2024) found that nearly 65% of the studies assessed the effectiveness of the AI-based automated written feedback alone, and only very few studies combined SRL strategies, while most did not explore its potential to support SRL. Therefore, there is a need to design the LLM application that can support both SRL processes and language correction aspects throughout the EFL writing process. Our study addresses this limitation by integrating the SRL model into the writing feedback processes of LLM applications.

2. Research Purpose

This research aims to develop and evaluate a comprehensive learning support system for EFL writing that leverages OpenAI API to generate structured feedback based on SRL model. The system will provide dual-layer support: language feedback and metacognitive development through specific prompts targeting the three phases of SRL:

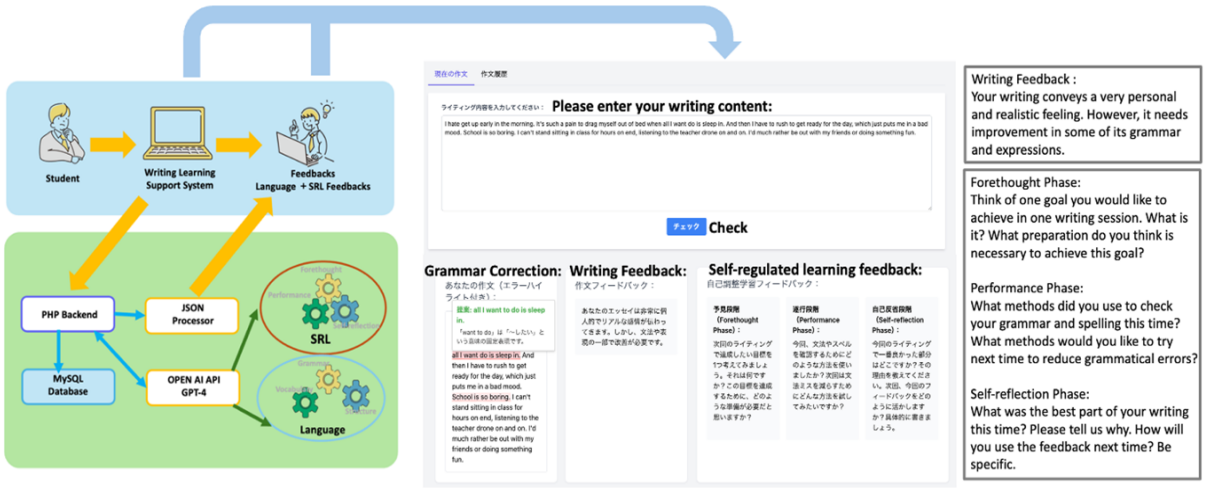

Figure 1. The interface and technical architecture of EFL writing support system.

3. System Design and Implementation

The technical architecture of our EFL writing support system is illustrated in Figure 1. EFL students access the system through a web browser interface to submit their writing and receive personalized feedback. The system connects to GPT-4 via the OpenAI API, using carefully structured prompts to generate language and SRL feedback. The primary interface features an intuitive writing submission area for English compositions. Upon submission, the system processes the text through GPT-4 with prompts designed to elicit both language and metacognitive feedback aligned with CEFR A1 (Breakthrough) - A2 (Waystage) level

standards. Feedback is displayed across three integrated panels. The Grammar Correction panel highlights specific grammatical, lexical, and structural issues using indirect feedback strategies that encourage active engagement in the revision process. The Writing Feedback panel provides a holistic assessment, balancing positive reinforcement with constructive improvement suggestions for improvement. The SRL feedback panel addresses the three phases of the SRL model. The Forethought Phase generates metacognitive prompts for specific, achievable goals and preparation strategies. The Performance Phase elicits reflection on monitoring strategies used during writing, addressing observed deficiencies in self-monitoring among lower-performing EFL writers (De Larios et al., 2008). The Self-Reflection Phase fosters encourages evaluation of completed work and formulation of concrete improvement plans. The writing history comparison interface displays previous submissions alongside current writing, enabling students to identify patterns in their writing development and supporting effective self-reflection.

4. Conclusion

This study demonstrates the potential of integrating LLM techniques with structured SRL support to address the challenges in EFL writing instruction by designing a system that provides language feedback and metacognitive scaffolding across all stages of the writing process. As this study is in its preliminary stages, future work should examine the learning effectiveness of the system on the development of performance and SRL in writing..

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