Evaluating Cami AI Across SAMR Stages: Students' Achievement and Perceptions in EFL Writing Instruction

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Abstract
This research evaluates the impact of Cami, an AI-powered tool, integration across SAMR (Substitution, Augmentation, Modification, and Redefinition) stages (Cami AI-SAMR) in EFL (English as a Foreign Language) writing instruction. By examining student achievement and perceptions, it explores how AI technology redefines language learning and teaching in diverse educational settings. Through a mixed-method approach with an explanatory sequential research design, this study investigates the quantitative effects of Cami AI-SAMR implementation on student performance and gauges the qualitative responses of 126 EFL university students to its effectiveness and perceptions. The findings show that Cami AI-SAMR implementation significantly impacted EFL students' writing achievement. Then, the majority of students also had positive perceptions due to the Cami AI's efficacy in supporting EFL writing learning. These findings provide valuable insights into the transformative potential of Cami AI technology in enhancing EFL pedagogy through the SAMR framework, addressing the diverse needs of students, and reshaping the language education landscape. This research contributes to the ongoing discourse on AI integration in education and offers recommendations for optimizing AI-powered EFL instruction for better learning outcomes and experiences.

Keywords: artificial intelligence, Cami, EFL instruction, SAMR, writing

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The rapid growth of technology has shifted the era of traditional teaching into digital teaching where huge numbers of innovative technologies appear, including the emergence of artificial intelligence (AI) (Imamyartha et al., 2023; Haleem et al., 2022). AI is a branch of computer science and engineering that focuses on developing systems and machines that can do

activities that would normally need human intelligence (Bozkurt & Sharma, 2023; Tai, 2020). These tasks may include reasoning, learning, problem-solving, perception, natural language interpretation, and decision-making. Algorithms and data are used by AI systems to replicate human cognitive functions. AI is a wide field with numerous subfields and AI kinds. Generative AI is one of these types that focuses on creating content that is not explicitly replicated from previous instances, generally in the form of text, photos, audio, or other data (Yu & Guo, 2023). It entails creating fresh data that is similar to what a human would create. One of the newly introduced is Cami AI.

Cami, an AI-powered tool, was introduced in the middle of 2023 with a wide range of capabilities. This AI amalgamates several leading AI technologies, including ChatGPT, Whisper, and Stable Diffusion, resulting in remarkable functions such as grammar correction, writing criticism, image generation, and personalized conversation companionship (Cami, n.d.). These flexible functions are adaptable to support education, particularly in teaching and learning English as a Foreign Language (EFL), where Cami's capabilities align with the required skills. For instance, Cami's image generation feature acts as a visual stimulus, enhancing students' descriptive writing by offering concrete references, fostering creativity, and aiding in the development of detailed descriptions. Furthermore, Cami's dynamic capabilities resonate with the ongoing trend of AI technologies seeking to augment and refine teaching and learning experiences (Zang & Aslan, 2021).

One of the Cami AI features is the ability to provide personalized grammar correction and writing feedback. In addition, it can give suggestions for developing writing ideas and images based on the user's command. These features are relevant for supporting the teaching of EFL writing skills, which are characterized by improvements in vocabulary, grammar, and text structure (Ataizi & Aksak-Komür, 2021). Moreover, based on some current studies discussing EFL writing, many students need more personalized writing feedback to reduce their learning anxiety (Koenka & Anderman, 2019), quick feedback responses from teachers (Irwin, 2017) since some teachers hardly provide more details responses due to many students need their attention, and dialogic feedback to fulfill any students' curiosities (Mamoon-Al-Bashir et al., 2016). One study stated that EFL students had difficulties in writing descriptive text since they did not have images or were able to imagine the model of writing (Ismayanti & Kholiq, 2020; Rizqullah et al., 2023). Hence, Cami AI with its features may scaffold the aforementioned needs and challenges.

The benefits promoted by Cami AI attract EFL teachers to integrate it into their teaching and learning pedagogy in the classroom. However, numerous technology integration models have been introduced by scholars with each of their strengths and weaknesses. Cherner and Mitchell's (2020) study promoted the SAMR (Substitution, Augmentation, Modification, and Redefinition) technology integration model developed by Puentedura (2014) as the most practical framework for mediating EFL teachers' obstacles to integrating technology into teaching. This framework provides stages from the easiest way to insert technology to support EFL teaching, which is substituting the teaching material into more technology-based material (i.e., substituting paper-based material into an e-book), until the most sophisticated way of

technology integration into teaching that is redefining the function of a technology (i.e., using Google Maps to help students narrating a story and share it publicly through YouTube or social media). Due to its practicality, SAMR has provided a scaffold for educators to reimagine and reconfigure their teaching methodologies. Hence, SAMR can be employed to mediate Cami AI integration to support EFL teaching for better outcomes (Muslimin et al., 2023).

While there is a growing body of research on AI applications in education, particularly those focused on EFL instruction, the potential of Cami, a generative AI tool, within the SAMR framework for EFL writing remains unexplored. Alamar and Amin (2023) demonstrated the effectiveness of AI-powered paraphrasing tools (APTs) for EFL students' achievement. Mohamed (2023) highlighted the positive response of instructors towards ChatGPT but cautioned against its potential drawbacks for critical thinking and research skills, as well as creating biased information. Aladini (2023) found AI dictionary applications to be beneficial for writing skills and logical thinking. However, a comprehensive search using Harzing's Publish or Perish revealed a gap in research on integrating Cami specifically within the SAMR framework for EFL writing instruction. This lack of exploration underscores the importance of the present study, which investigates how Cami redefines the EFL writing landscape and informs pedagogical adaptations for the digital age. Henceforth, this study reveals discussion by answering the following research problems:

1. How does the integration of Cami's AI capabilities through the SAMR stages in EFL instruction affect the students' writing achievement?
2. How do students perceive the usability, effectiveness, and challenges of integrating Cami within the SAMR framework in EFL writing instruction?

Literature Review

In the digital age, the field of education has witnessed a transformative wave led by the integration of AI and technology. The realm of English as a Foreign Language (EFL) instruction, an arena deeply rooted in linguistic acquisition, is no exception to this paradigm shift. This literature review explores the multifaceted dimensions of AI integration in EFL education, focusing on the pivotal role of Cami and the guiding framework of SAMR (Substitution, Augmentation, Modification, Redefinition) in reshaping student achievement and perceptions.

AI Integration in EFL Instruction

The integration of AI technology into language learning has emerged as a powerful force in modern education. AI-driven platforms, such as chatbots and virtual language teachers, have rapidly evolved to offer personalized, interactive, and efficient language learning experiences (Imamyartha et al., 2023; Kohnke et al., 2023). Such integration not only automates repetitive language tasks but also adapts to individual learner needs, enhancing the overall quality of language instruction (Tapalova & Zhiyenbayeva, 2022). These AI tools use natural language processing and machine learning capabilities to provide real-time feedback, language correction, and even dynamic, context-aware conversations (Wang et al., 2023). EFL teaching AI-based

benefited students to leverage their EFL learning outcome, including the attempts to increase their writing ability (Aladini, 2023; Alamar & Amin, 2023).

Cami AI: A Versatile AI in EFL Writing Skills Learning

Cami, a dynamic and versatile AI platform designed to function as an adaptable language partner, is at the forefront of this AI-driven language instruction. Cami allows users to customize AI responses, allowing for a variety of interactions ranging from peer-like conversations to mentorship (Sharma et al., 2022). Cami's distinct feature set includes the incorporation of multiple AI engines, including GPT-4, GPT-3.5, Stable Diffusion, and Whisper, allowing it to generate text, images, and even voice-based interactions. Its incorporation into EFL instruction has the potential to tailor language learning experiences to learners' diverse linguistic and emotional needs. Each student in the writing class can operate Cami as a personal writing mentor who can give writing feedback, explain grammar to support writing a composition, provide direct answers through chatting, and develop images to guide ideas for writing. Navidinia's (2019) study showed that the group that wrote the descriptive text with the help of images could write with fewer errors and more vocabulary than those who did not. Hence, the present study aimed to investigate the use of Cami AI, which can generate images and provide language feedback to aid EFL students' writing production as well as understanding the students' perceptions toward it.

The SAMR Framework in Education

The SAMR framework, introduced by Puentedura (2014), provides a structured model for understanding the role of technology role in education. It hierarchically divides the technology integration into four layers: Substitution, Augmentation, Modification, and Redefinition. Substitution is understood as the simplest stage of technology integration by substituting traditional teaching with more tech-based teaching. The augmentation stage shows how the teacher maximizes the function of technology. The modification layer is reached when the teacher can modify the original function of technology to restructure a task or process. Lastly, the redefinition stage is indicated by the teacher's ability to completely transform the task or process in ways that were previously unthinkable. SAMR is recognized for its capacity to guide educators in the meaningful and progressive incorporation of technology into pedagogy (Hamilton et al., 2016; Muslimin et al., 2023). In the context of EFL writing instruction, the SAMR model helps EFL writing teachers navigate the integration of AI, ensuring that it enhances traditional teaching methods rather than merely substituting them.

Relevance of SAMR and Cami AI in EFL Writing Learning

The synergy between the SAMR framework and Cami's AI capabilities is particularly relevant to EFL writing learning. The framework facilitates the gradual and systematic integration of technology, offering a structured approach to adapting teaching methods (Cherner & Mitchell, 2020; Puentedura, 2014). This aligns seamlessly with the adaptability of Cami, as it traverses the SAMR stages, offering a range of AI-based EFL writing activities, from basic substitution to redefinition. The integration of Cami within the SAMR framework empowers EFL teachers to progressively explore the potential of Cami AI, ensuring that it enhances

students' writing skills at any SAMR stage (Canbay, 2020). Then, in the present study, the details of Cami AI integration into EFL writing teaching through the SAMR framework (Cami AI-SAMR) are presented in the methodology section.

Methodology

This research aimed to investigate the impact of Cami AI integration in EFL instruction guided by the SAMR (Substitution, Augmentation, Modification, Redefinition) framework on the students' EFL writing achievement and perceptions. To meet the goal of the study, it employed a mixed-method approach with an explanatory sequential research design. It brought the discussion of the topic by combining both quantitative and qualitative data (Dawadi et al., 2021).

According to Creswell (2016), qualitative research focuses on examining and understanding complex social phenomena using methods such as interviews and content analysis. On the other hand, quantitative research includes activities such as collecting and interpreting numerical data through structured surveys and statistical analysis. Therefore, combining qualitative and quantitative data allows researchers to better understand the research problem and enables data triangulation, enhancing the validity and depth of the research findings (Youngs & Piggot-Irvine, 2012). While quantitative data reveals the prevalence of attitudes, qualitative data reveals these feelings' underlying reasons and complexities (Creswell & Plano Clark, 2017). Then, the qualitative data were used to explain the quantitative data and it reflected the essence of the explanatory sequential research approach (Othman et al., 2020).

The selection of SAMR as an AI integration framework, compared to other technological frameworks such as PICRAT, TPACK, RAT, etc., was based on the research conducted by Cherner and Mitchell (2020). Their study revealed that SAMR surpasses other frameworks for several reasons, including its aesthetic appeal, practical integration into teaching pedagogy resulting in teachers' preference for its use, popularity among researchers leading to its validation, and theoretical functionality for evaluating teachers' digital literacy competence. Hence, the present study employed the SAMR framework as a medium for Cami AI to empower EFL teaching pedagogy.

Participants

The participants of this research were 126 students who studied EFL in a Writing Class in an English education department at a public university in West Nusa Tenggara, Indonesia. They were selected purposively due to feasibility and willingness to participate factors. From this total number, ten participants joined the qualitative research by participating in the interview voluntarily without any incentive. Before joining the research, all participants claimed their consent by clicking the agreement option to join this research, and their responses were used for the scientific work of this research.

Research Procedure

To reach the objectives of this study to investigate both the perception and the impact of Cami AI-based EFL writing instruction within SAMR framework implementation, the researcher went through the research procedure as shown in Table 1.

Table 1

The Research Procedure

Steps		Activities	
1	EFL writing pre-test		
2	Treatment	Cami AI-based EFL writing instruction within the SAMR framework	
		Substitution	Students learned the function/features of Cami AI from the website and installed it into their gadgets as a WhatsApp add-on application. Students received the EFL writing prompt on WhatsApp and transmitted it to Cami AI (substituting paper-based prompt for e-prompt through Cami AI). Students substitute the printed dictionary into an AI-based dictionary by giving a prompt (/language [the target language for translation]) or directly typing the prompt (please translate "….")
		Augmentation	Students developed descriptive writing outlines in Cami AI and asked for idea suggestions and feedback for the vocabulary and grammar used. Students practice creating images using Cami AI by giving prompts (/imagine [the character/image wants to be generated]).
		Modification	Students ask for a guide to write good descriptive text by chatting with Cami AI as a personal teacher. Then, students requested feedback and grammar checking by giving prompts (please check the grammar and give feedback on the following text "…."). Students also can ask for feedback by recording the voice command. Students shared their experience of using Cami AI with classmates and learned from others how to operate efficiently Cami AI to support descriptive text writing.
		Redefinition	Students created images as their basis to compose new descriptive writing text. Students composed their descriptive text based on new images generated by Cami AI. Students asked for feedback for both image and descriptive text they developed from Cami AI. Cami AI checked the appropriateness between both. Students transmitted their composition to Class WhatsApp.

3	EFL writing post-test
4	Cami's AI – SAMR questionnaire administration
5	Conducting interview
6	Data analysis, data presentation, and data discussion

Instruments

The instruments applied to gather the data were the Cami's AI-SAMR questionnaire that comprised the participants' demographic data and questions related to Cami AI-SAMR implementation, documentation of the participants' writing course scores (pre- and post-treatment test scores), and interview guidelines containing reflective questions of Cami's AI-SAMR implementation. Toward the end of the Cami AI-SAMR questionnaire, participants were asked for their agreement to participate in the interview. This form helped the researcher identify participants who were willing to join the interview.

The pre- and post-tests were conducted to evaluate the EFL students' writing achievement before and after the implementation of the Cami AI-SAMR activities. The pre-test assessed the students' baseline writing skills, while the post-test measured the impact of the Cami AI-SAMR intervention on their writing proficiency. Specifically, the pre-test included prompts for descriptive writing tasks, vocabulary usage, grammar, and overall writing coherence. The criteria for comparison between the pre-test and post-test scores were based on the student's performance in these specific writing tasks, with a focus on improvements in content quality, language accuracy, and overall writing effectiveness. These details were considered essential in assessing the effectiveness of the Cami AI-SAMR intervention in enhancing the EFL students' writing outcomes.

Data Collection and Analysis

The quantitative data were obtained by administering Cami's AI-SAMR questionnaire online developed by Google Forms through link-sharing and the documentation of the participants' writing scores in the pre-test and post-test. Both of the quantitative data were analyzed statistically using the SPSS 24 version to comprehend the significance of Cami's AI-SAMR treatment toward the participants' EFL learning achievement. Then, the qualitative data were gathered by interviewing the participants who already stated their willingness to join the interview. From the submitted agreement form, it was known that ten participants were willing to voluntarily join the interview. So, the interview participants' selection was based on the willingness that was stated in the survey (Knapik, 2006). These qualitative data were analyzed thematically following inductive theme development steps proposed by Naeem et al. (2023). The themes were derived through an inductive process, allowing patterns and insights to emerge directly from the data collected during the interviews with the participants. The themes were not predetermined based on existing literature but were identified through a systematic and iterative process of coding the data. This approach ensured that the themes were grounded in the participants' responses and experiences. Based on the coding process from the interview transcription, the developed themes were the participants' perceptions of Cami's AI efficacy, Cami's AI operation challenges, Cami's AI learning experience along with the SAMR

framework, and Cami's AI usability. Finally, the qualitative data were used to explain the obtained quantitative data for maintaining the validity of this research.

Ethical Considerations

The research adhered to ethical considerations by following research ethics guidelines proposed by Yaw et al. (2023). These considerations included providing informed consent, which participants filled out during data collection; maintaining participant confidentiality by assigning pseudonyms for anonymity; promoting voluntary participation; ensuring no harm to participants, as approved by the ethics committee at the university where the research was conducted; and ensuring transparency in the presentation of research results. These steps were taken to prevent any coercion, even perceived, in their involvement in the study.

Findings

The purpose of this study was to look into the impact of Cami's AI integration in EFL instruction, as guided by the SAMR framework, on students' EFL writing (achievement) and perceptions. Hence, the presentation of the findings is based on the data to meet this research objective.

The Impact of Cami's AI Integration in EFL Instruction, as Guided by the SAMR Framework, on Students' EFL Writing Achievement

The EFL students joined two tests during the research implementation, pre-test and post-test. The pre-test was conducted before the treatment, implementation of Cami's AI-SAMR activities, in EFL writing class, and the post-test was done after the treatment. Those tests resulted in test scores, which were then analyzed statistically using the SPSS 24 version with the results shown in Tables 2 and 3.

Table 2

Descriptive Analysis of Students' Pre-test and Post-test Scores

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre-test	70.7063	126	10.92671	.97343
	Post-test	77.1825	126	8.21355	.73172

Table 2 shows that there was an increasing average test score of 6.472. This result indicates that there was an impact of Cami's AI-SAMR activities to leverage EFL students' writing achievement.

Table 3

T-Test Analysis of Students' Pre-test and Post-test

Paired Differences	t	df	Sig. (2-tailed)

		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre-test – Post-test	-6.47619	13.50065	1.20273	-8.85655	-4.09583	-5.385	125	.000

Then, Table 3 supports the findings explained in Table 2. The statistical calculation of the tests showed that there was a significant influence on the implementation of Cami's AI-SAMR on EFL students' writing achievement. It was seen from the Sig. a score of 0.000, meaning that there was a significant influence of the treatment on the dependent variable (EFL students' writing achievement), and there was a difference in scores between the Pre-Test and Post-Test.

The EFL Students' Perception of Cami's AI-SAMR Integration in EFL Writing Instruction

The EFL students' perceptions on the implementation of Cami AI-SAMR activity to support EFL writing learning were depicted from EFL students' responses in both questionnaire administration and the interview. The quantitative result of the questionnaire administration is prescribed in Figure 1.

Figure 1

The EFL Students' Perception of Cami AI-SAMR Implementation to Support EFL Writing Learning

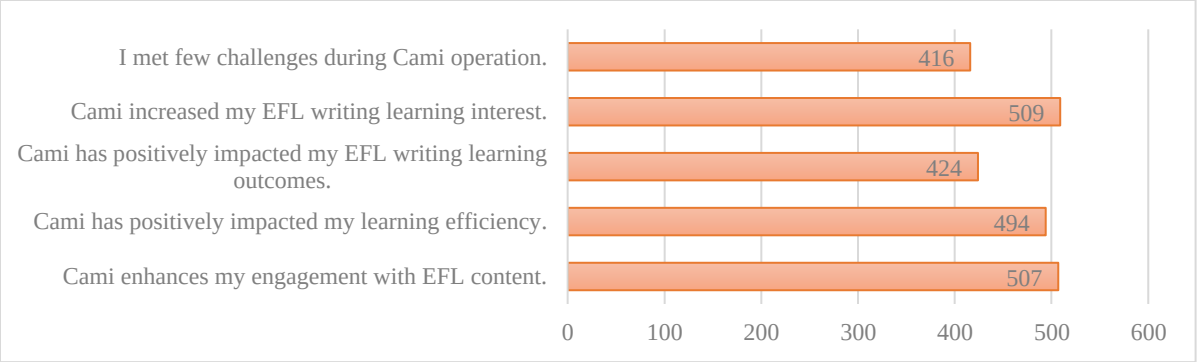

Figure 1 contains information on the questionnaire items asked of the EFL students and the total scores from each questionnaire item. From the prompt, the highest total score of a questionnaire item is 630. Hence, this figure depicts data that the majority of participants admitted Cami AI-SAMR implementation successfully leveraged their writing learning engagement and improved their writing learning efficiency. However, some scores lower than those positive perceptions appear to the ability of Cami AI-SAMR implementation to impact the writing outcome. This fact may be correlated to some challenges that the participants met during the writing practice using Cami AI. Furthermore, through responding to the open-ended question in the Cami AI-SAMR questionnaire, some participants stated some challenges they met during the Cami AI-SAMR implementation.

> I think writing in a small space like in a handphone is quite demanding. The screen is too small and I prefer writing my descriptive on paper. P17

> Since Cami's operation is separated from WAG [WhatsApp Group], it requires me to go from one site to another site in WA [WhatsApp]. It was a little bit confusing. P38

> Without the internet, Cami will not be helpful. P63

> The free Cami version only generates five images a day. However, I redesigned it many times. P101

So, from those excerpts, participants found that conformity of writing medium, internet access, connectivity between Cami and WhatsApp, and the limited feature of Cami AI free version were the issues to challenge the participants during the implementation.

To compare the participants' responses to the questionnaire, some participants who joined the interview stated that Cami AI's inability to generate precise images following the simple prompt meeting the participants' wants became one of the challenges. Also, some students said that Cami AI could not keep up with prompts that were previously stated by the participant. These challenges appear in the following excerpts.

> I found that Cami AI was sometimes not able to generate images that were as realistic or detailed as I would have liked. This made it difficult to write a descriptive text that was as vivid and accurate as I wanted it to be. P2

> I also found that Cami AI was sometimes not able to understand my instructions perfectly. This led to Cami AI generating images that were not quite what I was expecting. I had to spend some time adjusting my instructions and trying different things to get Cami AI to generate the image that I wanted. P7

> I also found that Cami AI was sometimes not able to keep up with my train of thought when I was writing. I would often have to repeat myself or rephrase my sentences to get Cami AI to understand what I was trying to say. P10

Similar to the quantitative results shown in Figure 1, the majority of the interview results showed that Cami AI-SAMR implementation boosted the participants' writing skills especially to get direct and more personalized feedback related to sentence structure and grammar, as well as for diction selection. Participants admitted that learning writing through Cami AI made them happy since it could be conducted 24/7 at any place and meet each participant's learning needs, especially in developing a desirable image as a writing guide.

> It was one of the most engaging and effective writing activities that I have participated in. Cami AI helped me to improve my writing skills in several ways,

> including helping me visualize my topic. The image guide helped me to think more carefully about my topic and to come up with more specific and descriptive language. Also, I found that Cami AI provided immediate feedback, which helped me improve my writing skills. Moreover, Cami AI encouraged me to experiment with different writing styles and techniques. Lastly, Cami AI created a safe and supportive environment where I felt comfortable experimenting with different writing styles and techniques." P4

> The activity helped me to develop my critical thinking skills. I now think more carefully about the words that I choose and the way that I structure my sentences. In addition, the activity helped me develop my creativity and come up with more engaging ways to express myself. I am now able to come up with more interesting and engaging ways to express myself. P5

> I like that Cami is available 24/7 for me to practice my writing. P8

> Cami provides personalized feedback based on my writing. P10

Some participants also retell their experiences on how Cami AI helped them compose descriptive text through the SAMR framework.

> When tasked with describing a mountain range, I turned to Cami AI for assistance. The AI recommended beginning with a powerful image of the mountains, like 'The snow-capped peaks piercing the azure sky.' It also advised me to include details on the colors, textures, and the awe-inspiring feeling of being surrounded by such magnificence. With Cami AI's guidance, my descriptive text became both informative and engaging. P1

> I recently had to write about a city street and sought help from Cami AI. It suggested starting with an overall impression of the street, such as 'The bustling city street alive with activity.' Cami AI also guided me to focus on specific elements like people, buildings, and sounds. Thanks to Cami AI's support, my descriptive text turned out vivid and informative. P4

Those excerpts showed that Cami AI helped them to substitute writing medium from paper into a technology-based writing medium. They also augmented the function of Cami AI to respond as a chatbot to talk about writing ideas. Then, Cami AI developed dialogic feedback for collaborative composition development with participants as they worked together to provide details in descriptive text. Lastly, two excerpts (P7 and P8) below showed the manipulation of Cami AI's function to reach the redefinition level in SAMR.

> I collaborated with a classmate on a blog post using Cami AI. We found Cami AI to be a great tool for helping us to write a well-organized and informative blog

> post. We used Cami AI to generate images and videos to support our blog post. We also used Cami AI to get feedback on our writing and to help us to optimize our blog post for search engines. P7

> I collaborated with a group of classmates on a social media campaign using Cami AI. We found Cami AI to be a very helpful tool for creating engaging and visually appealing social media posts. We used Cami AI to generate images and videos for our social media posts. We also used Cami AI to get feedback on our social media posts and to help us track our results. P8

Instead of creating a pace of autonomy in learning EFL writing, participants admitted that Cami AI-SAMR implementation directed them to collaborate with classmates.

> Yes, I have collaborated with classmates when using Cami AI for EFL writing. We found it to be a helpful way to get feedback on our work and to learn from each other. For example, we would often share our Cami-generated images and give each other feedback on the feedback that Cami AI provided. We also found it helpful to brainstorm ideas for descriptive text together. P1

From the overall participants' responses through the questionnaire and interview, the majority believed that Cami AI-SAMR positively impacted their EFL writing learning outcome, the enactment of a more personalized EFL writing learning experience, the improvement of learning motivation and interest, the creation of creative skills to use technology, and the growth of collaborative writing activities. On the other hand, a few participants admitted that Cami AI-SAMR had limitations that challenged participants during the writing class.

Discussion

Cami AI is an example of generative AI that enables users to generate information and images through typing prompts in the chat feature (Yu & Guo, 2023). This AI can serve as a personal chatbot to assist with any questions delivered to it. For academic purposes, Cami AI can be used as a personal teacher who gives direct feedback on the EFL student's text. Hence, EFL teachers can use it to support teaching with the goal of students' EFL learning achievement enhancement, including EFL writing learning, which becomes the raised issue in this research.

This research focused on how Cami AI-SAMR implementation affected the EFL students' EFL writing learning achievement and their perceptions. The findings showed that EFL students' writing achievement improved after the implementation of Cami AI-SAMR, which was characterized by the test score improvement (see Table 3) and the students' responses in the questionnaire (see Figure 1) and the interview. The sig. score was 0.000 or lower than 0.05, meaning that there was a significant difference between EFL students' writing pre-test and post-test. Table 2 showed that the students' post-test scores were higher than pre-test scores with a 6.472 points difference. The questionnaire and the interview results also reveal the potential of Cami AI-SAMR implementation to aid students in improving their writing achievement. These

findings were supported by some previous studies mentioning that AI can enhance the EFL learning outcome (Aladini, 2023; Alamar & Amin, 2023; Ataizi & Aksak-Komür, 2021; Imamyartha et al., 2023; Marzuki et al., 2023; Wolf & Wolf, 2023; Zang & Aslan, 2021). Then, this study's findings counter Mohamed's (2023) study result to show that Cami AI-SAMR could leverage the EFL students' critical thinking skills by being more attentive to diction and sentence structure.

The improvement in EFL students' writing achievement was supported by some factors, which were also mentioned during the data collection. First, Cami AI-SAMR triggered the EFL students' learning interest (Kohnke et al., 2023). The students' interest leverages internal motivation that promotes EFL writing learning resilience for always improving (Muslimin & Cahyono, 2023). Second, the student's learning joys increased due to the flexibility of Cami AI to meet the student's personal needs across time, space, and feedback requests (Irwin, 2017; Schroeder et al., 2022; Wang et al., 2023; Wolf & Wolf, 2023). The students experienced less anxiety since the feedback was given personally to the EFL students without any fear of being judged (Koenka & Anderman, 2019; Tapalova & Zhiyenbayeva, 2022). Third, the students could make their descriptive writing composition coherent with the help of images generated by Cami AI (Ismayanti & Kholiq, 2020; Navidinia, 2019; Rizqullah et al., 2023). Fourth, the integration of technology using the SAMR framework guided the teacher to assist EFL students with the stage-by-stage descriptive writing process (Bhowmik, 2021; Canbay, 2020), which reduced learning complexity. The student learned to develop the composition from the simple step to a more advanced level along with familiarization with technology, Cami AI. Fifth, the EFL students were directed to learn EFL writing collaboratively during the Cami AI-SAMR implementation (Coffin, 2020; Muslimin et al., 2023). The students were delighted to share and ask for suggestions from peers regarding the image they generated and discuss the feedback given by the Cami AI. They also learned from each other about giving more accurate commands or prompts for Cami AI to make it accurately generate the desirable output.

In addition to improving the EFL students' writing achievement, most of the students believed that Cami AI-SAMR implementation also enhanced their learning engagement (Aliyu et al., 2022; Schroeder et al., 2022). The teacher requested them to keep interaction with Cami AI from the lowest stage of SAMR to the highest. The students enjoyed asking Cami AI for suggestions of ideas, experimenting with the images generated in Cami AI, and maintaining communication for descriptive writing improvement by requesting feedback. Furthermore, Cami AI promoted EFL writing efficiency (Mou & Li, 2022; Wolf & Wolf, 2023) since the students sometimes did not need to contact or meet their teacher to gain writing feedback. They could directly ask for instant feedback from Cami AI to efficiently use the time and maintain the flow of ideas for writing descriptive text. Supiani et al. (2023) stated that EFL students' AI-based writing self-assessment using Grammarly enhanced their motivation to write.

Instead of providing positive impacts, since Cami AI was newly introduced in 2023, it also triggered some recommendations due to challenges and limitations that the EFL students encountered. First, Cami AI should extend the limit of the images generated to accommodate the EFL students' needs during the trial-and-error stage (see excerpt of P101). Second, Cami AI can

be equipped with a collaborative chatting feature such as a WhatsApp group that enables EFL students to discuss their composition without copying and pasting from a chatbot space (in Cami AI) to another chatbot space (in students' WhatsApp group or a classmate's WhatsApp private chat; see excerpt of P38). This recommendation addresses Barnett-Itzhaki et al.'s (2023) findings to attract EFL teachers' creativity to employ a variety of AI to increase learning efficacy and encourage the AI developer to keep evaluating for feature improvement. Third, Cami AI should be equipped with the ability to connect chat records to give more precise responses when students ask for feedback, which the prompts are still correlated to the previous prompts (see excerpt of P10). Lastly, Cami AI's image-generating ability should be advanced with various types of prompts to increase its accuracy (see excerpt of P7). Bozkurt and Sharma (2023) suggest that prompt engineers and education stakeholders should equip AI with adaptability to any language to respond to the prompts accurately. Hence, educational institutions and educational technology companies should collaborate to advance teaching and learning research, including AI development for education, to support better outcomes (Schroeder et al., 2022). These recommendations reflect that any AI has its strengths and weaknesses. Then, it is the job of EFL teachers to use Cami AI strength to empower their class to leverage the students' learning achievement (Tapalova & Zhiyenbayeva, 2022). It is successfully proven through the findings of this research.

Conclusion

This research aimed to investigate the impact of Cami AI-SAMR implementation on the students' EFL writing achievement and perceptions. The findings show that Cami AI-SAMR had a significant impact on the EFL students' writing achievement enhancement, which was validated by the test scores and students' responses in the questionnaire and interview. Therefore, the majority of the students perceived positively Cami AI integration into EFL writing instruction using the SAMR framework. Then, the students also contributed some recommendations to increase Cami AI operation practicality from the view of students who are learning EFL descriptive writing. This study's findings not only contribute to enhancing EFL students' writing achievement but also offer valuable insights for future researchers exploring the integration of AI technology to improve writing skills across diverse student populations.

In addition, this research serves theoretical and practical implications. Theoretically, it enriches the knowledge of generative AI for EFL teaching and learning. Practically, this research exemplifies the AI integration into EFL writing instruction through the SAMR framework, which opens application adoption for another teaching context. It also guides future researchers to conduct studies with similar interests and methodologies. Nevertheless, it is important to note that due to the limitations of the research setting and context, further investigation is recommended to achieve a more comprehensive understanding of the topic. Additionally, while the mixed methods approach employed in this study was suitable for addressing the research questions and providing comprehensive insights, it is crucial to acknowledge potential biases in data interpretation and the complexities associated with integrating qualitative and quantitative data, which may have influenced the study outcomes.

Declarations

The authors declare no conflicts of interest associated with this study, nor with the software product Cami or the commercial company WhatsApp.

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Appendix 1

Cami AI-Powered EFL Instruction: User Questionnaire

Thank you for participating in our research. Your ideas are valuable in understanding the integration of Cami's AI capabilities into EFL instruction. Your answers will be kept confidential.

Name (Optional):		
Semester of study:		
Perceptions of Cami: Please rate your agreement with the following statements about your experience with Cami! (write the score: 1 = strongly disagree, 5 = strongly agree)	Cami enhances my engagement with EFL content.	
	Cami has positively impacted my learning efficiency.	
	Cami has positively impacted my EFL writing learning outcomes.	
	Cami increased my EFL writing learning interest	
	I met a few challenges during Cami AI-SAMR's operation	
Final thought: (write your responses in the box)	Is there anything else you would like to share about your experiences with Cami, its integration within EFL instruction, or any suggestions for improvement?	

Thank you for your participation. Your feedback is invaluable to our research.

Appendix 2

Cami AI-Powered EFL Instruction: Interview Guideline

Thank you for participating in our research. Your ideas are valuable in understanding the integration of Cami's AI capabilities into EFL instruction. Your answers will be kept confidential.

1. How would you describe your experience with Cami AI in EFL writing instruction?
2. Can you share any examples of Cami AI facilitating different SAMR stages in your writing assignments?
3. What benefits have you experienced in your writing tasks due to Cami AI?
4. Have you encountered any challenges or limitations when using Cami AI for writing? Please describe them.
5. Have you collaborated with classmates or peers when using Cami AI for EFL writing? If yes, can you describe those experiences?