The Role of Artificial Intelligence in Enhancing Critical Thinking Skills: A Focus on EFL Writing

دور الذكاء الاصطناعي في تعزيز مهارات التفكير النقدي: تركيزًا على الكتابة بين متعلمي اللغة الإنجليزية كلغة أجنبية

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Abstract:

This research investigates the use of Artificial Intelligence (AI) in improving critical thinking skills in the context of English as a Foreign Language (EFL) writing instruction. Through student questionnaires, we explore EFL learners' perceptions and experiences shedding light on the effectiveness of AI integration in their writing learning journey and its impact on nurturing critical thinking abilities. As a noteworthy addition to the literature on AI and critical thinking in EFL education, this study provides insights for educators and curriculum designers to navigate the challenges of integrating AI technology in education.

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Keywords: Artificial Intelligence (AI), Critical Thinking Skills, EFL Writing.

ملخص:

تهدف هذه الدراسة إلى معرفة كيف يمكن للذكاء الاصطناعي أن يساعد طلاب تعلم اللغة الإنجليزية على تحسين مهاراتهم في التفكير النقدي من خلال ممارستهم الكتابة. سنسأل طلاب اللغة الإنجليزية عن آرائهم وتجاربهم في استخدام الذكاء الاصطناعي لمساعدتهم في تعلم الكتابة من خلال استخدام استبيانات. سنحاول فهم ما إذا كان استخدام الذكاء الاصطناعي يمكنه تحسين مهارات التفكير النقدي لديهم وكيف يؤثر ذلك في تعلمهم بشكل عام. تعزز هذه الدراسة المعرفة المتاحة حول الذكاء الاصطناعي والتفكير النقدي وستساعد نتائجها تقديم نصائح قيمة للمعلمين ومصممي المناهج في اتخاذ قرارات أفضل حول كيفية التحديات والفوائد المتعلقة بدمج تكنولوجيا الذكاء الاصطناعي في التعليم .

كلمات مفتاحية: *الذكاء الاصطناعي(AI)، مهارات التفكير النقدي، متعلمي اللغة الإنجليزية كلغة أجنبية*

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1. INTRODUCTION

Artificial Intelligence (AI) has evolved into a powerful catalyst for change in education. In thefield of pedagogy, AI provides innovative solutions to elevate learning outcomes and skill development. In English as a Foreign Language (EFL) education, fostering critical thinking skills is paramount, enabling learners to engage with language more profoundly. Within this framework, integrating AI tools emerges as a

promising avenue for pedagogical advancement in EFL education.

This article aims to explore AI's role in enhancing critical thinking skills among EFL learners, specifically in the context of writing. To begin, we recognize the vital role of critical thinking in education. Critical thinking, as defined by Paul and Elder (2006), involves actively and skilfully analysing, synthesizing, and evaluating information to guide belief and action. It equips individuals to think critically, solve complex problems, make informed decisions, and engage in meaningful discourse—a skill set of utmost importance in today's globalized world.

EFL educators have long recognized the significance of critical thinking in language learning, going beyond memorization to enhance language comprehension and communication (Paul, 1992). AI technologies have become crucial in advancing this goal, offering opportunities to accelerate critical thinking skill development. AI-driven platforms, chatbots, and natural language processing tools enable personalized and adaptive learning, providing real-time feedback, identifying performance patterns, and offering challenging exercises tailored to individual needs. These technologies empower students to think critically and foster autonomy in their language acquisition journey (Johnson et al., 2016).

As EFL instructors and researchers delve into AI-driven interventions, it's crucial to investigate the potential advantages and challenges linked to AI tools in nurturing critical thinking skills. This article takes a comprehensive approach, examining the critical thinking framework, the current state of AI in EFL

education, and how AI can enhance critical thinking, particularly in writing. The goal is to illuminate both the opportunities and constraints of this technological revolution, offering valuable insights to educators and researchers for informed pedagogical practices in an AI-augmented EFL environment.

2. Literature Review

The use of AI technologies in EFL classrooms can enhance students' writing skills and critical thinking abilities, helping them refine their ideas and improve writing clarity and coherence (Abdalgane & Othman, 2023). However, it's crucial to emphasize that AI should complement rather than replace human intelligence and the role of teachers in the learning process (Spector & Ma, 2019).

AI integration in EFL education offers several advantages, including personalized learning experiences tailored to individual needs, immediate feedback on writing assignments, assistance in understanding language in context through natural language processing, ample opportunities for language practice and fluency development, and data-driven insights that enable educators to address specific challenges and promote critical thinking (Johnson et al., 2016).

Immediate feedback is a standout benefit of AI integration in EFL education. It can significantly expedite the learning curve for EFL students by providing real-time insights and corrections that traditionally would have taken much longer (Smith & Anderson, 2018).

Despite its advantages, AI in EFL learning presents challenges. Overreliance on AI tools can potentially diminish

students' independent critical thinking and problem-solving abilities, as they become heavily dependent on automated assistance for language correction (Hsu et al., 2020). Additionally, the absence of genuine human interaction in AI-driven platforms may limit the development of crucial conversational and interpersonal skills (Fahimirad & Shakib Kotamjani, 2018).

Privacy and data security are significant concerns in AI-driven EFL education, as the collection of learner data raises privacy issues that need careful management (Johnson et al., 2016). There's also the risk of AI models perpetuating biases or inaccuracies in language instruction, potentially hindering accurate language skill development and critical thinking (Fahimirad & Shakib Kotamjani, 2018).

Equity in access to AI-driven EFL learning tools is a concern, as not all students have equal access due to socioeconomic disparities. This digital divide can exacerbate educational inequalities, potentially leaving some learners at a disadvantage (Hsu et al., 2020). Lastly, AI systems may struggle to adapt to diverse linguistic and cultural contexts, limiting language development and critical thinking in varied real-world situations (Johnson et al., 2016).

3. Research Design

The research design of this study includes the research questions, methodology, participants, research tools, and data analysis.

3.1 Research Questions

The study aims to answer the following questions.

1. What is the perceived effectiveness of AI-enabled feedback in improving critical thinking skills in EFL writing?

2. What are the attitudes and perceptions of EFL learners towards the integration of AI in writing instruction?

3. What are the potential benefits and challenges associated with the integration of AI in writing?

4.2 Methodology

This section presents the methodology employed in this study starting with the research design which encompasses the research questions, sample, a questionnaire as the primary data collection tool, and data analysis.

4.3 Participants

The participants for this study were 60 English students, mainly at the master's level, from Yahia Fares University of Medea. The selection criteria included having a proficient level of English and prior knowledge of the existence of AI-powered tools in the context of writing instruction. The sample size was determined based on the principles of data saturation, aiming to achieve a comprehensive understanding of participants' experiences and perspectives (Guest, Bunce, & Johnson, 2006).

4.4 Research Tools

A structured questionnaire was developed to assess learners' satisfaction with AI-enabled feedback and their overall attitudes towards the integration of AI technology. The questionnaire design drew inspiration from established measurement scales and previous research in the field, ensuring the reliability and validity of the instrument (Hair et al., 2019).

To gain a holistic understanding of the role of AI in enhancing critical thinking skills among EFL learners, a combination of closed-ended and open-ended questions. The closed-ended questions focused on learners' perception of AI in EFL writing instruction and their experiences with AI-enabled feedback, while the open-ended questions explored the challenges and benefits of AI integration in EFL writing instruction, feedback, and recommendations.

4.5 Data Analysis Demographic Information

Table 1 presents the demographic characteristics of the participants, including their age group, gender among the 60 participants. 35 (58%) female and 25 (42%) male. All fell within the age range of 18 to 35. Among them, the majority, 40 students (67%) were between the ages of 18 and 25, while the remaining 20 participants (33%) were between the ages of 26 and 35.

Table 1. Demographic Information

Demographic Characteristic	**Count**	**Percentage (%)**
Gender		
- Female	35	58%
- Male	25	42%
Age Group		
- 18-25	40	67%
- 26-35	20	33%

Perception of AI use in EFL Writing Instruction

Q1: Have you used AI-powered writing tools or platforms in

your EFL writing instruction?

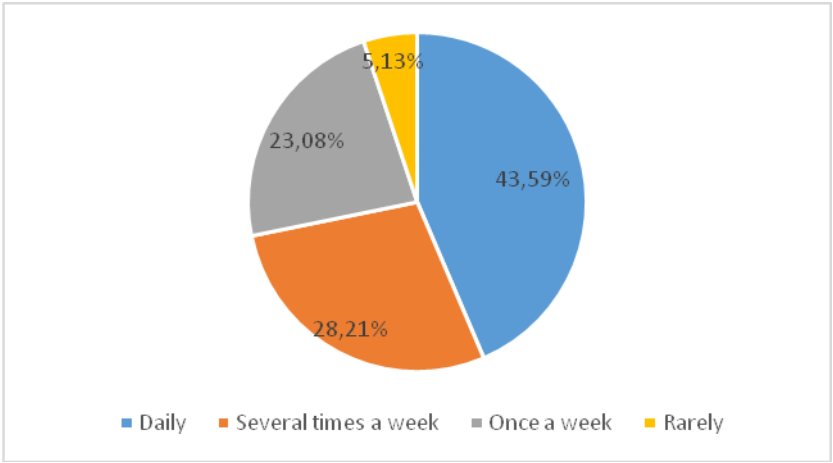
Table 2 presents whether or not the participants used AI-powered writing tools or platforms in their EFL writing instruction, 39 participants (65%) have used AI-powered writing tools or platforms in their EFL writing instruction, while 21 participants (35%) have not.

Table 2. Use of AI-powered Writing Tools

Use of AI-powered writing tools in writing		
Have used	*39*	*65%*
Have not	*21*	*35%*

Q2: If yes, how frequently do you use AI-powered writing tools or platforms?

Figure 1. Frequency of Usage



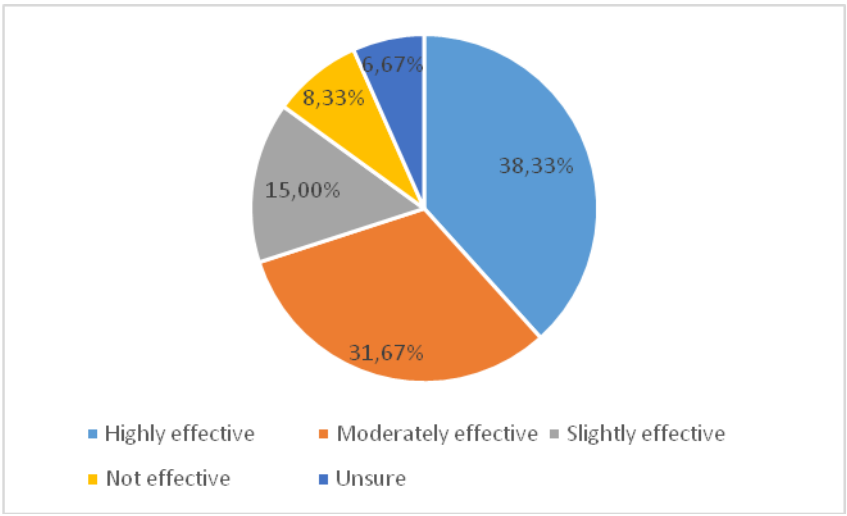
Among the participants who have used AI-powered writing tools or platforms, the frequency of usage varies as shown in Figure 1. 17 participants (43.59%) reported using them daily, 11

participants (28.21%) use them several times a week, 9 participants (23.08%) use them once a week, and 2 participants (5.13%) use them rarely.

Q3: What is your overall perception of AI-enabled feedback in EFL writing instruction?

Regarding the overall perception of AI-enabled feedback in EFL writing instruction, 23 participants (38.33%) perceive it as highly effective, 19 participants (31.67%) perceive it as moderately effective, 9 participants (15%) perceive it as slightly effective, 5 participants (8.33%) perceive it as not effective, and 4 participants (6.67%) were unsure about their perception.

Figure 2. AI-enabled Feedback Perception

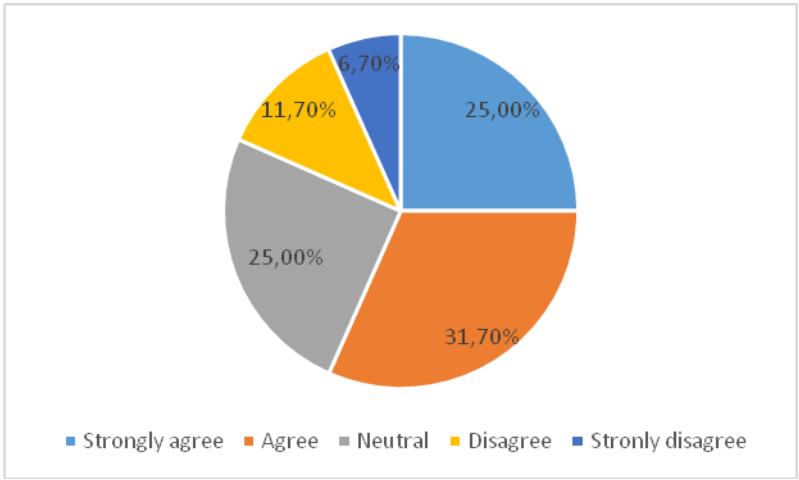


Q4: How do you perceive the role of AI in enhancing critical thinking skills in EFL writing?

In terms of the perception of AI's role in enhancing critical

thinking skills in EFL writing, 15 participants (25%) strongly agree, 19 participants (31.7%) agree, 15 participants (25%) are neutral, 7 participants (11.7%) disagree, and 4 participants (6.7%) strongly disagree.

Figure 3. The Impact of AI on Enhancing Critical Thinking Skills in EFL Writing

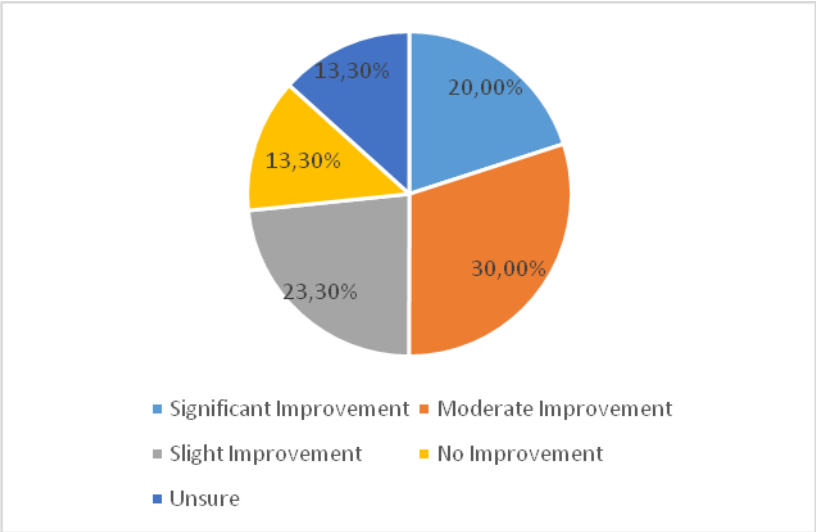


Experiences with AI-Enabled Feedback in EFL Writing

Q5: To what extent do you think AI-powered feedback has improved your writing skills?

Participants were asked to evaluate the extent to which AI-powered feedback has improved their writing skills. 12 participants (20%) reported a significant improvement, 18 participants (30%) reported a moderate improvement, 14 participants (23.3%) reported a slight improvement, 8 participants (13.3%) reported no improvement, and 8 participants (13.3%) were unsure.

Figure 4. The Extent of AI-Powered Feedback in Improving Writing Skills



Q6: In what specific areas has AI-enabled feedback helped you in your writing?

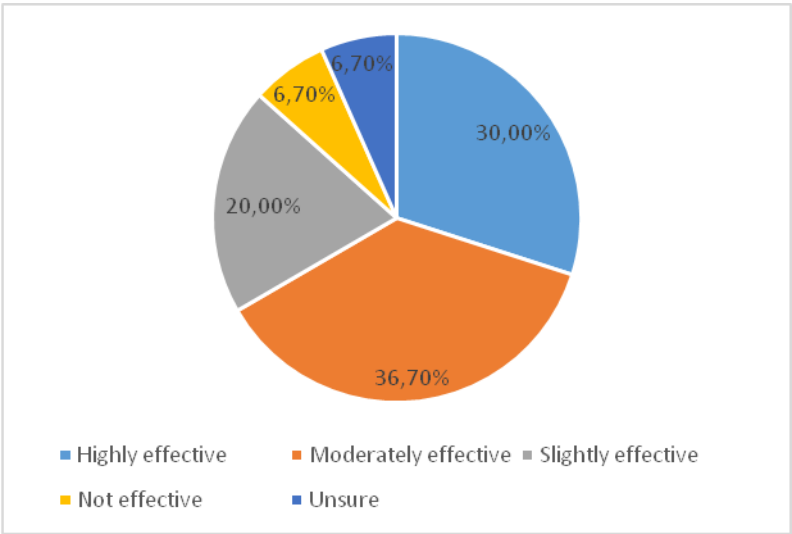
Participants were asked to select the specific areas in which AI-enabled feedback has helped them in their writing. The majority of participants reported improvement in grammar and syntax (36 participants, 60%), vocabulary usage (26 participants, 43.3%), sentence structure (30 participants, 50%), organization and coherence (32 participants, 53.3%), clarity and conciseness (28 participants, 46.7%), and critical thinking skills development (20 participants, 33.3%). 4 participants (6.7%) provided other specific areas of improvement.

Q7: How do you perceive the effectiveness of AI-powered feedback in promoting critical thinking skills during the writing

process?

Participants were asked to assess the effectiveness of AI-powered feedback in promoting critical thinking skills during the writing process. 18 participants (30%) perceived it as highly effective; 22 participants (36.7%) perceived it as moderately effective; 12 participants (20%) perceived it as slightly effective; 4 participants (6.7%) perceived it as not effective, and 4 participants (6.7%) were unsure.

Figure 6. Perception of AI-powered Feedback Effectiveness in Promoting Critical Thinking in Writing



Challenges and Benefits of AI Integration in EFL Writing Instruction

Q8: What challenges, if any, have you encountered when using AI-powered writing tools or platforms?

Among 60 participants surveyed regarding challenges

faced when using AI-powered writing tools, a majority expressed concerns across four predominant themes. First being Technical Issues highlighted by 40 participants. Second, Limited Contextual Understanding was a challenge for 30 participants. 25 participants expressed concerns about Overreliance on AI. Lastly, Lack of Personalized Feedback mentioned by 35 participants.

Q9: What benefits, if any, have you experienced when using AI-powered writing tools or platforms?

From a pool of 60 participants who provided feedback on the advantages of AI-powered writing tools, Enhanced Writing Efficiency emerged as a dominant advantage with 40 participants. Improved Language Accuracy was emphasized by a significant portion with 45 participants. Increased Confidence with 28 participants. Lastly, Accessibility and Convenience, was deemed a key benefit by 40 participants.

Section 5: General Feedback and Recommendations

Q10: Do you have any additional comments or feedback regarding the use of AI in EFL writing instruction?

In examining feedback from 60 participants concerning the use of AI in EFL writing instruction, several prominent themes emerged. Firstly, the Appreciation for AI's Potential was evident, with 37 participants reflecting a positive stance on integrating AI into EFL. Importance of Teacher Guidance was a focal point for 31 participants. The Need for Customization was a significant theme with 28 participants. Lastly, Ethical Considerations played a key role with 22 participants.

Q11: Based on your experiences, what recommendations would

you provide to educators and curriculum designers for effectively integrating AI technology to enhance critical thinking skills in EFL writing?

Based on feedback from 60 participants regarding the integration of AI in EFL writing instruction, severalrecommendations surfaced. The key recommendation was on Balancing AI and Human Feedback. 25 participants underscored the indispensability of an integrated feedback mechanism. 12 participants felt that this blended approach would best nurture critical faculties. The necessity for Training and Support was also prevalent. 24 participants believed that educators require adequate training to optimally implement AI tools. Lastly, Continuous Improvement of AI tools was deemed critical as 18Students felt these enhancements should align with the evolving pedagogical paradigms.

4. Results and Interpretation

The findings from this study provide valuable insights into the perceptions and experiences of EFL learners regarding the integration of AI-powered writing tools in their instruction, particularly in terms of enhancing critical thinking skills. These results reveal a nuanced perspective on the role of AI in the EFL writing classroom.

The diverse age group and gender distribution of the participants suggest that the study captures a representative sample of EFL learners. This diversity enhances the generalizability of the findings to a broader EFL student population.

The majority of participants (65%) reported using AI-

powered writing tools in their EFL writing instruction, highlighting a substantial adoption rate of these technologies. This adoption reflects the growing prevalence of AI in language education and its integration into daily instructional practices.

The mixed perceptions regarding the effectiveness of AI-enabled feedback are noteworthy. While 38.33% of participants found it highly effective, a considerable proportion (31.67%) considered it moderately effective. However, 8.33% perceived it as not effective, indicating room for improvement in AI feedback systems. The varying levels of effectiveness reported may be attributed to differences in AI tool quality and the extent to which these tools align with individual learning needs.

A notable finding is the split perception of AI's role in enhancing critical thinking skills in EFL writing. While 56.7% either strongly agreed or agreed with its positive impact, 25% remained neutral, and 18.4% expressed varying degrees of disagreement. This suggests that AI's ability to foster critical thinking is perceived differently among learners. It is essential to consider that critical thinking development involves a multifaceted process that AI may influence in varying degrees.

The reported improvements in writing skills due to AI-powered feedback are encouraging, with 50% of participants reporting moderate to significant improvements. However, 36.7% noted only slight enhancements, and 20% reported no improvement. These discrepancies may reflect differences in learner receptiveness to AI feedback, the quality of AI tools used, or the extent of engagement with AI-driven instructional resources.

The recognition of AI's positive impact on grammar, vocabulary usage, sentence structure, and critical thinking skills development aligns with the literature on AI in language education. These areas are foundational to effective communication and language proficiency, making AI an asset in addressing learners' needs.

The challenges identified, including technical issues, limited contextual understanding, overreliance on AI, and a lack of personalized feedback, underscore the need for continuous improvement in AI tool development. These challenges should inform the design and refinement of AI-powered writing tools to enhance their user-friendliness and effectiveness.

The reported benefits of AI integration, such as enhanced writing efficiency, improved language accuracy, increased confidence, and convenience, highlight the potential advantages of AI in EFL writing instruction. These benefits contribute to a more efficient and effective learning experience, aligning with the pedagogical goals of language educators.

The participants' feedback underscores the importance of a balanced approach that combines AI and human feedback, aligning with previous research highlighting the complementary roles of technology and human instruction in language learning. The emphasis on teacher guidance, customization of AI tools, and ethical considerations reflects a broader discourse on responsible AI integration in education.

5. Conclusion

The findings of this study provide a multifaceted view of the role of AI-powered writing tools in enhancing critical

thinking skills within the context of EFL writing instruction. These results reveal both the potential benefits and challenges associated with the integration of AI in language learning, shedding light on important considerations for educators, curriculum designers, and technology developers.

The diverse demographic characteristics of the participants, spanning a wide age range and balanced gender distribution, suggest the relevance and generalizability of the study's outcomes to a broader EFL learner population. This diversity underscores the increasing prevalence of AI in language education, reaching a wide spectrum of learners.

The study found a substantial adoption rate of AI-powered writing tools among EFL learners, with 65% of participants reporting their use in instruction. This adoption trend reflects the evolving landscape of language education, where AI technologies are becoming integral to the learning process. However, perceptions regarding the effectiveness of AI-enabled feedback were mixed, with varying degrees of perceived effectiveness among participants. While a significant proportion found it highly effective, some expressed reservations or uncertainty about its impact.

One key takeaway is the divergent perception of AI's role in enhancing critical thinking skills in EFL writing. While a considerable portion of participants agreed on its positive influence, a noteworthy proportion remained neutral or disagreed. This suggests that AI's capacity to foster critical thinking is perceived differently among learners and underscores the multifaceted nature of critical thinking development.

Participants reported diverse experiences with AI-powered feedback, with a significant percentage noting improvement in writing skills. However, discrepancies in the extent of these improvements were observed, possibly due to differences in tool quality, learner receptiveness, or engagement levels.

The study also highlighted specific areas of improvement attributed to AI, including grammar, vocabulary usage, sentence structure, and critical thinking skills development. These areas align with the foundational aspects of effective communication and language proficiency.

Challenges identified, such as technical issues, limited contextual understanding, overreliance on AI, and a lack of personalized feedback, underscore the need for continuous refinement and improvement in AI tool development. These challenges provide valuable insights for technology developers seeking to enhance user-friendliness and effectiveness.

Conversely, participants acknowledged several benefits of AI integration, including enhanced writing efficiency, improved language accuracy, increased confidence, and the convenience of anytime, anywhere learning. These benefits align with pedagogical goals and contribute to a more efficient and effective learning experience.

The feedback and recommendations offered by participants emphasize the importance of a balanced approach that combines AI and human feedback. This aligns with research highlighting the complementary roles of technology and human instruction in language learning. The emphasis on teacher guidance, customization of AI tools, and ethical considerations reflects a

broader discourse on responsible AI integration in education.

In conclusion, this study provides valuable insights into the complex landscape of AI in EFL writing instruction. While AI holds promise in fostering critical thinking skills and enhancing language proficiency, the study underscores the importance of ongoing research, development, and customization to maximize its benefits and address learner-specific needs and preferences. As technology continues to evolve, the dynamic interplay between AI and human instruction will play a pivotal role in shaping the future of language education.

6. References

AbdAlgane, M., & Othman, K. A. J. (2023). Utilizing artificial intelligence technologies in Saudi EFL tertiary level classrooms. *Journal of Intercultural Communication, 23*(1), 92–99.

https://doi.org/10.36923/jicc.v23i1.124

Fahimirad, M., & Shakib Kotamjani, S. (2018). A review on application of artificial intelligence in teaching and learning in educational contexts. *International Journal of Learning and Development*, *8*.

https://doi.org/10.5296/ijld.v8i4.14057

Guest, G., Bunce, A., & Johnson, L. (2006). How many interviews are enough? An experiment with data saturation and variability. *Field Methods*, *18*(1), 59-82.

https://doi.org/10.1177/1525822X05279903

Hsu, C. K., Wang, D. C., & Comac, L. (2020). Application of artificial intelligence in english writing: A review. *Journal*

of Educational Technology & Society, 23(2), 77-92.

https://doi.org/10.1177/1525822X05279903

Johnson, W. L., Rickel, J. W., & Lester, J. C. (2016). Animated pedagogical agents: Face-to-face interaction in interactive learning environments. *International Journal of Artificial Intelligence in Education*, 11(1), 47-78.

https://doi.org/10.1007/s40593-015-0065-9

Paul, R. (1992). *Critical thinking: What every person needs to survive in a rapidly changing world*. Sonoma State University Press.

https://eric.ed.gov/?id=ED338557

Paul, R., & Elder, L. (2006). Critical thinking: The nature of critical and creative thought. *Journal of Developmental Education*, *30*(2), 34-35.

https://api.semanticscholar.org/CorpusID:151509960

Smith, A., & Anderson, M. (2018). *Social Media Use 2018: Demographics and Statistics*. Washington DC: Pew Research Center.

https://www.pewresearch.org/internet/2018/03/01/social-media-use-in-2018/

Spector, J. M., & Ma, S. (2019). Inquiry and critical thinking skills for the next generation: From artificial intelligence back to human intelligence. *Smart Learning Environments*, *6*(1), 8.

https://doi.org/10.1186/s40561-019-0088-z

Hair, J. F., L.D.S. Gabriel, M., da Silva, D., & Braga Junior, S.

(2019). Development and validation of attitudes measurement scales: fundamental and practical aspects. *RAUSP Management Journal*, *54*(4), 490–507.

https://doi.org/10.1108/RAUSP-05-2019-0098