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## Investigating the Use of Pi as Real-Time Feedback for Improving Writing Proficiency in English Major University Students

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### Abstract

The integration of artificial intelligence (AI) in education facilitates great changes in the traditional methods of teaching, especially in language learning and writing. This study examined Pi, an AI-based personal assistant, and sought to determine how the presence of real-time feedback positively influences the writing of students majoring in the Teaching English as a Foreign Language (TEFL) program. Through semi-structured interviews with 25 TEFL students, the research explored how AI feedback on grammar, structure, coherence, and creativity shapes students' writing development and overall experiences. Thematic analysis of interview data revealed several core themes: (1) Enhanced Grammatical Awareness – participants reported improved accuracy in grammar usage due to AI's consistent corrective feedback; (2) Writing Confidence – students expressed increased self-assurance in their writing abilities, citing the non-judgmental nature of AI feedback; (3) Creativity Boost – Pi's suggestions on expanding ideas encouraged more creative expression in writing; (4) Personalized Learning – students highlighted the tailored feedback as a positive factor in their individual learning journey. The results pave the way to examine areas that link artificial intelligence and assisted language learning, specifically writing instruction at the university level. Overall, this study highlights the potential advantages and disadvantages of language learning assisted by AI.

**Keywords:** Artificial Intelligence (AI), Writing Development, Real-Time Feedback, Grammatical Awareness, Personalized Learning



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#### Introduction

Language acquisition is a particularly important element of foreign language teacher training, as the language teaching competency is overall expected to expand. Writing competence in such programs as TEFL is an even higher priority than linguistic range or other types of writing, as one can hardly be successful either in studies or professional activities without adequate writing skills (Biber & Conrad, 2009; Harmer, 2015). Moreover, despite the importance of writing skills in language teaching, the process of teaching-writing and learning-writing in TEFL practice raises a number of important questions (Faller, 2018).

According to the sociocultural theory (Fahim & Haghani, 2012; Vygotsky, 1978), learning is directly influenced by social interactions and within the process of language learning, the learner's tasks or activities are dependent on the communication tools and objects potentially available as well as the required forms or skills of interaction.

Despite the many transformative opportunities introduced by AI at each and every learning phase, this section discusses the discipline of English. AI methodologies are specifically associated with offering urgent instructions on providing feedback on written documents (O'Sullivan, 2016). The modern feedback comes as a potential shift to the traditional methods; this time not after the production has been done, but immediately after – telling directly what needs improving and how (Holmes et al., 2019; Wu, 2024; Zawacki-Richter et al., 2019). Pi, which is a conversational Artificial Intelligence, is a tool which is established to aid language learners through feedback relating to language mechanics, congruence, organization and originality aspects of pieces of writing produced.

Feedback in real-time has been admitted as an essential aspect of a good teaching and learning of language. Provision of immediate corrections enhances acquisition by enabling students to get used to the structures and sounds of a language while they are relevant to the moment (Shute, 2008). Whether the language spoken is intelligible or not, feedback, beyond technical error correction, is also a source of encouragement given it assists students in being creative. Pi encourages aid without prejudice.

#### Review of Literature

##### AI in Language Learning

The use of AI within language centers has harbored some changes in the old models of teaching; whereas new tools and approaches become more flexible, effective, and creative (Chapelle, 2009). Grammar checking, vocabulary enhancement, pronunciation practice, and even aspects of creativity are among the AI technologies that are gradually being employed (Fitria, 2021). Such tools allow learners to practice and get feedback at any time and be able to improve steadily without depending on the instructor's schedule (Mayer, 2019). Several examples can be cited – these include the likes of Grammarly, Duolingo, Pi among other platforms which have become popular courtesy of the personalized AI powered technology



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they provide (Chen et al., 2020). The conclusions show that feedback provided by AI tools is more effective because it is not only easier but more consistent than conventional forms of feedback (Luckin, R., et al., 2016). Although there are several reasons which can limit the quality of human feedback, such as time constraints, bias, and fatigue, AI tools provide standard assessment across the assignments. This is helpful particularly in writing where students need great amounts of detailed and frequent feedback in order to enhance their writing performance (Warschauer & Grimes, 2008)

AI tools are important in environments where teachers cannot provide individual focus on every student so that every student gets equal attention. In addition, AI enhances the engagement of learning by adding game elements, interactive tasks, and adaptive challenges for different levels of proficiency. For TEFL students, these functionalities are essential as they help provide the learners with a way to improve their language skills in a flexible and fun manner. AI's potential to duplicate real language scenarios, be it speaking in context or composing an essay, means that students are well prepared for practical interaction. This is completely different from the traditional method of restoring methods. This is the reason why AI is essential in the current language learning process.

### **Importance of Real-Time Feedback and Writing Performance**

Real time feedback has become, perhaps, a go-to strategy for many students grappling with how to answer a writing prompt. In other words, when one gives feedback after a session is over, it is not likely that each activity would be relevant as each student strives to learn new things (Shute, 2008). In this regard, it also allows students to get feedback on their writing in real time, which enhances their experience. Because the task is still active, learners can make corrections immediately after seeing the error which aids instant learning. For instance, if a student has made a grammatical mistake, an AI tool could immediately notify them and let them understand it better before the task is over. Real-time feedback has other advantages, not just grammatical accuracy. Students can receive real-time feedback from AI tools, which includes suggestions on sentence structure and word choice, as well as the ability to add more clarity and precision to their writing, resulting in better written work. Through this iterative process, students gain a deeper understanding of writing conventions and engage in critical thinking as they evaluate and apply feedback (Ellis, 2009). Additionally, real-time feedback decreases the cognitive burden associated with revisiting past errors, enabling students to concentrate on improving their current work.

TEFL students frequently face difficulties when writing in a non-native language, making real-time feedback invaluable. The tool offers a chance for learners to experiment with new vocabulary, idioms, and sentence patterns without the risk of making mistakes. By encouraging students to view their mistakes as learning opportunities, rather than negative experiences, they foster a growth mindset. Additionally, feedback that is available in real-time, bridges cultural and linguistic gaps by providing contextual suggestions aligning with English writing



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Literature and Translation Studies



conventions.

### **The Impact of Personalization on Learning**

The focus on personalized learning has become a central issue in education, as one-size-fits-all methods are often ineffective. Learning experiences can be enhanced by AI tools, which can tailor their educational content based on the preferences, needs, and goals of each learner (Mayer, 2019). For TEFL students, this level of customization is especially important as their language skills and learning objectives differ greatly from each other.

Through the use of AI-controlled platforms, students can be tracked and evaluated based on their learning behavior, including strengths, weaknesses, and patterns. Based on this analysis, the tools generate tailored feedback and suggest areas for improvement (Graesser et al., 2018). For example, a student who has trouble with verb tense consistency may be given more explanations and practice exercises while another student with good grammar may find it helpful in improving their creativity and narrative flow. By taking an individual approach, learners are able to develop and improve at their own pace, reaching their full potential.

Personalization not only provides academic advantages, but also boosts learner motivation and engagement. Students are more likely to experience meaningful and rewarding learning when they receive feedback that is tailored to their needs (Chapelle, 2009). Students' motivation is maintained by the use of AI tools, which often include progress updates, achievement awards, and goal-setting features.

TEFL students can learn to master English by tailoring their learning to their specific linguistic preferences. This is known as personalized learning. AI tools can offer context-specific guidance that is not present in traditional classroom instruction, whether it be in learning cultural idioms, improving academic writing skills, or getting ready for professional communication (Kulik & Fletcher, 2016). The process of learning a language with personalized attention is made more effective and comprehensive by closing these gaps.

A paradigm shift has occurred in the way AI is used to teach students about writing, with a focus on personalized learning and real-time feedback. In addition to addressing traditional methods, these developments provide new opportunities for innovation in teaching and learning. The use of AI tools has transformed the English language learning process for TEFL students, providing them with the necessary skills and confidence to excel in both academics and careers.

### **Methodology**

This research employed a qualitative approach to investigate how Pi, an AI-generated personal assistant (PA), enhances the writing proficiency of university students enrolled in TEFL studies. A total of 25 individuals participated in semi-structured interviews. They were TEFL





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students, chosen through purposive sampling, to maintain consistency in their writing proficiency and academic qualifications. Participants spent three sessions working with Pi and receiving real-time feedback on their writing tasks. By incorporating various types of writing, the evaluation of Pi's efficacy could be carried out across diverse settings. The interviews were conducted to gather information on participants' assessments of Pi's feedback on grammar, coherence, creativity, and personalized learning, as well as their overall experiences using the tool.

Interviews that were recorded in audio format were utilized to obtain data for analysis. To uncover recurrent patterns and insights from the data, thematic analysis was conducted to explore how Pi impacted students' writing abilities. Coding was carried out in iterations, with topics modified to suit participants' individualities. The results were triangulated with observational notes and participants' written work to ensure their reliability and validity (Ellis & Larsen-Freeman, 2009). During the research, ethical considerations were taken into account to include informed consent and data confidentiality.

#### Findings

Several key themes that demonstrate the transformative effect of Pi on students' writing ability were examined in the interview data:

Table 1: Themes and Subthemes Extracted

Themes	Sub themes
<b>Grammatical Awareness</b>	Feeling more confident in spotting grammar mistakes Understanding complex grammar with real-time explanations Noticing an improvement in sentence structure AI feedback to better grasp grammar
<b>Writing Confidence</b>	Becoming less anxious about making mistakes Gaining independence in writing Feeling proud of being able to self-correct after AI feedback Increased motivation to write more often
<b>Creativity Boost</b>	Feeling inspired by AI suggestions when stuck for ideas Using AI to explore new ways of writing Enjoying more freedom to experiment Relying on AI to expand vocabulary
<b>Personalized Learning</b>	Feeling like AI offers more practice Enjoying the customized writing prompts Recognizing that AI provides learning paths that cater to their individual learning needs



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Literature and Translation Studies



### Enhanced Grammatical Awareness

Participants consistently exhibited substantial advancements in their ability to read and write correctly. The real-time correction capabilities of Pi allowed learners to identify repeated errors and adopt correct usage. Moreover, Pi's consistent corrective feedback on verb tense, sentence structure and punctuation were noted by students, who could use these same rules in later writing (Biber & Conrad, 2009).

### Writing Confidence

English writing was found to have a significant impact on students' confidence (Wertsch, 1991). Pi's lack of judgment and openness in giving constructive feedback was widely attributed to this. In this supportive environment, students were encouraged to experiment with language and structure, which helped them overcome concerns about making errors (Hyland, 2019). According to a participant, Pi allowed them the freedom to write without worrying about their mistakes.

### Creativity Boost

The guidance provided by Pi on expanding ideas and reworking sentences stimulated creativity in writing. Many respondents reported that the AI tool enabled them to explore new methods of expressing their opinions, motivating them in creating more engaging and imaginative content (Heift & Schulze, 2015). Pi's prompts, as observed by a student, allowed them to make their ideas come alive and challenge their own thinking.

### Personalized Learning

The personalized feedback provided by Pi was a highlight for many participants. The AI device identified individual strengths and weaknesses, delivering tailored recommendations for learning. Students appreciated the way Pi adapted to their progress, keeping feedback relevant and actionable. With this tailored approach, students were able to concentrate on areas that required the most attention, leading to a more effective learning experience.

The results indicate that Pi plays a crucial role in improving writing skills by increasing grammar, confidence, creativity, and personalization. This is true for all subjects. Although there were some challenges they encountered (such as the AI misinterpreting context or overemphasizing certain errors), overall participants overwhelmingly saw Pi as a useful tool for improving their writing skills. The use of AI in education can be utilized to enhance traditional teaching methods and aid TEFL students in developing their writing proficiency.

### Conclusion

This research demonstrates that the use of AI, particularly Pi on computers can transform writing skills in university students enrolled in their TEFL studies. By providing feedback in real-time, Pi helped students improve their writing by addressing critical aspects of grammar,



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Literature and Translation Studies



structure, and coherence (Chen et al., 2020). In addition to strengthening learning, this immediacy also encouraged more active writing: students could identify weaknesses and fix them in real-time. In addition, it provided consistent and unbiased feedback that gave students full support - something often done in traditional classrooms (Zawacki-Richter et al., 2019).

The study revealed that Pi had a significant impact on students' confidence and creativity. This was particularly noteworthy. The AI's non-judgmental feedback created a positive atmosphere where students felt empowered to experiment with language and ideas. TEFL students experienced a significant boost in confidence, which is especially important when they write in slang. Furthermore, Pi's innovative advice spurred students to discover fresh methods of expression, leading to a more engaging and dynamic writing experience. The outcomes demonstrate how AI can promote a growth mindset among students, who view errors as opportunities for improvement rather than hindrances to achievement.

However, the study also found some drawbacks to using AI tools for language learning. Feedback inaccuracies were occasionally observed by participants, particularly in terms of interpreting context or nuanced language use. The need for a balanced learning experience through the use of AI and human instruction is highlighted. Teachers can be instrumental in addressing areas where AI is lacking, such as offering more comprehensive knowledge of cultural and rhetorical conventions (Holmes et al, 2019). Overall, this study shows that AI tools such as Pi are useful complements to traditional teaching methods and can equip TEFL students with the confidence and skills required to excel in academic and professional writing. This is an encouraging observation. Future research could focus on longer term effects, and how AI could be integrated into educational systems.

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The 5th Conference on Interdisciplinary  
Approaches to Language Teaching,  
Literature and Translation Studies



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