RESEARCH ARTICLE

AI-assisted grammar learning: Improving present perfect tense proficiency in EFL students

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Abstract
This study explores how artificial intelligence (AI)-assisted feedback mechanisms influence self-regulated learning (SRL) processes and grammatical accuracy among Turkish EFL learners focusing on the Present Perfect Tense.Conducted with 18 Turkish university preparatory students, this qualitative research employed pre- and post-writing tasks, interactive sessions with an AI chatbot, and an open-ended survey to explore learners' experiences. The findings reveal that 72% of participants demonstrated improved grammatical accuracy, while many reported enhanced autonomy and confidence. The study highlights the role of AI chatbots in fostering SRL behaviours such as goal-setting, self-monitoring, and reflection through immediate and adaptive feedback mechanisms. By addressing a critical gap in EFL grammar instruction, this research contributes to the growing evidence of AI's potential to personalise learning and support the acquisition of complex grammatical structures. Despite the study's promising outcomes, limitations such as the small sample size and lack of long-term assessments are noted. Future research should focus on larger and more diverse samples, longitudinal evaluations, and advanced AI features to further enhance language learning experiences.

https://doi.org/10.47216/literacytrek.1556837

Keywords
AI-assisted language learning, Present Perfect Tense proficiency, Self-regulated learning, University students

Submission date
27.09.2024
Acceptance date
26.12.2024

Introduction

The integration of artificial intelligence (AI) tools in language education has expanded rapidly in recent years. Numerous studies conducted between 2022 and 2024 highlight the increasing pedagogical potential of AI-driven platforms (Jiang, 2022; Chen, Huang, & Li, 2023; Dai & Liu, 2024). Among these technologies, AI chatbots are emerging as valuable tools in English as a Foreign Language (EFL) education due to their ability to provide immediate, personalised feedback and adaptive scaffolding. These features

support self-regulated learning (SRL), enabling learners to set goals, monitor progress, and refine strategies to address grammatical challenges effectively.

One of the most challenging grammatical structures for EFL learners, particularly those whose first languages lack directly comparable forms, is the Present Perfect Tense (Ellis & Barkhuizen, 2020; Crovitz, Devereaux, & Moran, 2022). This tense expresses actions completed at unspecified times or actions that began in the past and continue into the present. For Turkish learners, the absence of equivalent structures in their native language compounds these challenges, often leading to errors and frustration (Na, Ahn, & Kim, 2008; Ranjbari, Tabrizi, & Afghari, 2020; Yang, 2024). AI chatbots can address these difficulties by offering tailored, real-time feedback that supports autonomy and reduces reliance on repetitive, instructor-led approaches.

While prior studies highlight the benefits of AI-assisted feedback in enhancing learner autonomy and accuracy (Chen et al., 2023; Wang, Chen, & Lin, 2021; Lin, Wang, & Chen, 2020), relatively few have focused on how these tools influence SRL in mastering complex grammatical structures like the Present Perfect Tense. By helping learners notice errors, reflect on their strategies, and improve iteratively, chatbots provide scaffolding aligned with SRL principles. They offer immediate, precise guidance, fostering deeper understanding and reducing instructor fatigue (Kim, 2019; Sperling, Stenberg, McGrath, Åkerfeldt, Heintz, & Stenliden, 2024; Jamal, 2023).

The study aimed to explore how AI-assisted feedback mechanisms influence self-regulated learning (SRL) processes and grammatical accuracy among Turkish EFL learners focusing on the Present Perfect Tense. This focus addresses a gap in the literature by investigating how AI tools can bridge linguistic challenges and support targeted grammar acquisition, contributing to effective, learner-centred strategies tailored to this context.

The qualitative research design included 18 participants, a sample size justified by its ability to achieve data saturation and rich insights into learners' experiences (Creswell, 2007; Creswell & Poth, 2017). Participants shared similar educational and language proficiency backgrounds, facilitating a focused analysis of how AI chatbots impact SRL and grammar learning. This study employs a multi-method approach,

including pre- and post-writing tasks, AI chatbot interactions, and a qualitative survey, to explore:

- How AI-based feedback mechanisms influence learners' SRL processes in tense-related grammar tasks.
- Changes in grammatical accuracy before and after guided AI interactions.
- Learners' perceptions of increased autonomy and confidence in grammar learning.

Research Questions

1. How do Turkish EFL learners perceive and experience the influence of AI-assisted feedback mechanisms on their SRL processes when working with the English Present Perfect Tense?
2. In what ways do learners perceive changes in their grammatical accuracy, autonomy, and confidence after engaging with an AI chatbot?

Literature Review

Self-Regulated Learning in EFL Contexts

Self-regulated learning (SRL) plays a pivotal role in language acquisition, involving learners actively managing their cognitive, motivational, and behavioural processes. Zimmerman (2002) describes SRL as encompassing metacognitive strategies (e.g., planning, monitoring, evaluating), motivational factors (e.g., self-efficacy, interest), and behavioural skills (e.g., time management, resource use). In EFL contexts, SRL is critical for internalising linguistic rules, such as advanced grammar, while maintaining motivation and persistence (Oxford, 2001). This process also supports learner autonomy, an essential goal in modern language pedagogy.

Research consistently highlights positive correlations between SRL behaviours and language performance. For instance, Mahmoodi, Kalantari, and Ghaslani (2014) found that learners with higher self-regulatory behaviours demonstrated stronger motivation and better achievement in language learning. Pintrich (2005) emphasised how learners shape their learning environments by adapting strategies to match efficacy

beliefs and task demands. These findings underline the importance of fostering SRL to enhance EFL learners' proficiency.

Integrating SRL with technological tools, such as AI-powered applications, enhances learning outcomes by offering adaptive support. By providing real-time feedback and enabling learners to monitor their progress, AI tools align closely with SRL principles. This connection between SRL and technology offers a foundation for understanding how AI tools, like chatbots, can target specific grammatical challenges, such as mastering the Present Perfect Tense.

Meyer, Jansen, Schiller, Liebenow, Steinbach, Horbach, and Fleckenstein (2024) demonstrated that large language model (LLM)-generated feedback improves revision quality, increases task motivation, and elicits positive emotions in secondary school students. Their findings highlight the dual cognitive and emotional impact of AI tools, enhancing iterative learning and intrinsic motivation. Similarly, Ruwe and Mayweg-Paus (2023) emphasised the importance of personalised feedback language in AI systems, which enhances learners' trust in feedback, their self-efficacy, and motivation. These findings highlight the role of socioemotional factors in complementing cognitive gains in SRL contexts.

Technological enhancements in grammar learning

The integration of digital tools has transformed language learning, enabling personalised and adaptive experiences. Bikowski (2018) and Warschauer (2002) highlighted how mobile-assisted systems facilitate the acquisition of complex grammatical structures through interactive and responsive platforms. These technologies deliver grammar exercises and create immersive learning environments tailored to individual learners' needs. AI and machine learning advancements, such as natural language processing and adaptive algorithms, enable tools to provide real-time feedback that enhances learners' grammatical accuracy and confidence. For example, Wang, Chen, and Lin (2021) demonstrated the efficacy of mobile-assisted environments in improving Chinese EFL students' grammar through immediate, personalised feedback. Similarly, game-based learning and contextual simulations have shown promise in enhancing grammar acquisition, though their effectiveness varies (Lin, Wang, & Chen, 2020). Emerging technologies like augmented reality (AR) and virtual reality (VR) offer multisensory

opportunities that could further enrich grammar learning. By linking SRL principles with technological tools, these advancements empower learners to manage their grammar practice autonomously.

Despite these innovations, the application of AI tools to specific grammatical challenges, such as the Present Perfect Tense, remains underexplored. The Present Perfect Tense poses unique difficulties for many EFL learners due to its nuanced temporal relationships, which are often absent in their native languages (Ellis & Barkhuizen, 2020). AI tools, particularly chatbots, can bridge this gap by providing targeted, adaptive support that aligns with learners' self-regulated strategies.

Complementing these advancements, Meyer et al. (2024) found that AI-generated feedback fosters sustained engagement and intrinsic motivation by addressing not only grammatical errors but also socioemotional needs. Their research demonstrated that students perceive AI feedback as rewarding and empowering, which in turn boosts their confidence and persistence. Ruwe and Mayweg-Paus (2023) further suggested that personalised feedback language, particularly when used by AI systems, increases feedback acceptance and perceived effectiveness, thereby bridging gaps in traditional feedback mechanisms.

AI chatbots in language learning

AI chatbots have emerged as transformative tools in language learning, offering learners simulated conversational practice with immediate feedback. These tools can adapt to individual proficiency levels, fostering personalised learning experiences. Kim (2019) and Chen et al. (2023) highlighted how chatbots enhance grammar learning by providing targeted feedback and opportunities for sustained practice. One of the strongest attributes of AI chatbots is their adaptability. Beginners might receive basic feedback on sentence restructuring, while advanced learners engage in complex interactions requiring nuanced grammar and vocabulary integration. This flexibility ensures learners remain engaged and challenged, enhancing their motivation and self-regulation.

By encouraging learners to notice errors, reflect on their strategies, and iteratively improve, chatbots serve as strategic scaffolds that align with SRL principles. Notably, they offer immediate, targeted guidance without instructor fatigue, potentially

accelerating language gains and deepening learners' understanding of complex grammatical structures (Kim, 2019; Jamal, 2023; Sperling et al., 2024). For learners struggling with the Present Perfect Tense, chatbots provide context-sensitive feedback that reinforces accuracy and fosters autonomy.

Meyer et al. (2024) extended these findings by demonstrating that LLM-based feedback systems not only improve grammatical accuracy but also nurture positive emotions and self-efficacy. Their study revealed that students view AI chatbots as reliable and supportive, fostering a sense of trust and engagement in learning. Moreover, Ruwe and Mayweg-Paus (2023) highlighted the interplay between personalised feedback language and trust in AI systems, showing that such features create a more human-like and motivating learning experience, essential for long-term engagement.

Critical analysis and identification of gaps

While SRL and technology-enhanced grammar learning are well-documented, gaps remain in applying these frameworks to specific grammatical challenges. Few studies focus on integrating SRL strategies with AI tools to address the Present Perfect Tense, a structure particularly challenging for learners from linguistically diverse backgrounds like Turkish (Na, Ahn, & Kim, 2008; Ranjbari, Tabrizi, & Afghari, 2020). Additionally, much of the existing research emphasises quantitative outcomes, neglecting qualitative aspects such as learner perceptions and emotional responses.

The recent contributions of Meyer et al. (2024) and Ruwe and Mayweg-Paus (2023) address these gaps by highlighting the dual cognitive and affective benefits of AI-generated feedback. By integrating socioemotional factors, such as motivation and trust, into the design of AI tools, these studies pave the way for more holistic approaches to grammar instruction. This emerging evidence stresses the necessity of combining cognitive precision with emotional support to create effective and inclusive learning environments.

This study aimed to explore how AI-assisted feedback mechanisms influence SRL processes and grammatical accuracy among Turkish EFL learners focusing on the Present Perfect Tense. Integrating SRL strategies and frameworks like the technology acceptance model (TAM) (Davis, 1989) and the community of inquiry (CoI) (Garrison, Anderson, & Archer, 2000) provides a multifaceted understanding of how learners

interact with AI tools. TAM explores learners' perceptions of technology's usefulness and ease of use, while CoI examines the interplay of social, cognitive, and teaching presence in online learning environments. By applying these frameworks, this study contributes to a deeper understanding of AI's role in fostering learner autonomy, confidence, and grammatical proficiency.

Methodology

Research design

This study employed a qualitative exploratory design to examine how Turkish university preparatory students engage with AI-assisted strategies to enhance their understanding and use of the English Present Perfect Tense. This approach was chosen for its ability to capture the complexity of learners' experiences and provide detailed insights into their interactions with AI tools (Creswell, 2007; Creswell & Poth, 2017). Specifically, the study aimed to explore how AI-assisted feedback mechanisms influence self-regulated learning (SRL) processes and grammatical accuracy among Turkish EFL learners focusing on the Present Perfect Tense.

Setting and participants

The study took place entirely online, utilising the Zoom platform to support synchronous interaction and to simulate conditions increasingly common in real-world, technology-mediated educational contexts. Convenience sampling (Creswell & Poth, 2017) was employed to recruit 18 university preparatory students (10 female, 8 male; ages 18–23, M ≈ 20.5 years) enrolled at a private university in Istanbul, Türkiye. All participants were at an intermediate (B1, Common European Framework of Reference for Languages (CEFR, 2001) English proficiency level.The online setting allowed students from diverse geographic locations to participate without logistical constraints. Using digital platforms familiar to the participants minimised technical barriers and facilitated seamless integration of AI chatbots and other tools. This environment provided a realistic backdrop for examining AI-assisted learning, reflecting current trends where EFL learners increasingly engage with AI-driven support in remote and blended scenarios.

Although the sample size (N=18) is relatively small, it is justified by the qualitative research design, which prioritises data saturation and rich, context-sensitive insights over broad generalisability. In qualitative research, a sample size of 18 is considered sufficient to capture diverse experiences and achieve data saturation, where no new themes emerge from the data (Creswell, 2007; Creswell & Poth, 2017). Additionally, the homogeneity of the sample in terms of educational background and language proficiency facilitates a focused exploration of the research questions.

Data collection

Data were collected through a structured online workshop and a post-workshop open-ended survey. The workshop comprised three distinct tasks (see Appendix I) designed to engage students in controlled practice, open-ended questions, and free writing activities, all aimed at enhancing their proficiency in the English Present Perfect Tense.

An external teacher, who was also the participants' regular instructor, facilitated the workshop. The teacher explained the stages of the workshop in detail and monitored all activities to ensure participants followed the instructions and completed the tasks as required. During the workshop, the teacher actively observed participant engagement and ensured that all stages, pre-writing, AI interaction, and post-writing, were conducted as planned.

To track task completion, the teacher reviewed timestamped responses recorded within the AI chatbot platform. Any discrepancies or incomplete submissions were flagged for immediate follow-up, and instructions or procedures were clarified as needed. This approach ensured consistency and full participation throughout the workshop. The workshop lasted approximately 110 minutes and included multiple phases, each serving specific analytical purposes.

Introductory Remarks (≈20 minutes): An overview of the workshop's objectives was provided, the AI chatbot was introduced, and the tasks were explained to ensure that participants understood the procedure and their roles.

Pre-Writing Activity (≈30 minutes): Participants completed a writing task focused on using the Present Perfect Tense, establishing a baseline for their proficiency. Clear criteria were provided (e.g., accuracy of tense usage, sentence complexity) to ensure consistency in evaluation.

Interaction with the AI Chatbot (≈30 minutes): Students engaged with an AI chatbot specifically designed for language learning, receiving immediate, context-specific feedback on their use of the Present Perfect Tense. The chatbot employed adaptive strategies, offering hints, examples, and corrections aimed at promoting self-regulated learning (SRL). For instance, participants were encouraged to revise sentences, reflect on feedback, and gradually build more complex structures.

Post-Writing Activity (≈30 minutes): After interacting with the chatbot, participants completed a similar writing task to demonstrate potential improvements in accuracy and complexity. They were guided to incorporate feedback from the AI interactions into their new responses.

Additionally, an online open-ended survey (17 questions) (see Appendix II) was administered immediately after the workshop. This survey involved participants' reflections on their experiences, perceptions of the AI chatbot's usefulness, and any shifts in their learning strategies. The open-ended nature of the survey encouraged candid responses about motivation, engagement, and SRL aspects, thereby complementing the observational data collected during the workshop tasks.

Data Analysis Plan

All data sources—including pre- and post-writing samples, screenshots of AI interactions, and written survey responses—were analysed using inductive thematic analysis (Denzin, 2006). Two researchers independently coded the data, compared their findings, and resolved discrepancies through discussion. To enhance the credibility of the analysis, inter-coder reliability was assessed using Cohen's Kappa, which resulted in a coefficient of 0.82, indicating strong agreement between the two researchers. Any discrepancies in coding were discussed and resolved to ensure consistency and reliability in theme development.

Using the thematic coding scheme in Table 1, the study adopted a multi-method approach, including pre- and post-writing tasks, AI chatbot interactions, and a qualitative survey. The primary aim was to explore how AI-assisted feedback mechanisms influence learners' SRL processes and grammatical accuracy among Turkish EFL learners focusing on the Present Perfect Tense**.** Themes naturally emerged

from the data, shedding light on participants' experiences with the English Present Perfect Tense and the role of AI-assisted feedback in shaping their learning processes.

Illustrative examples of participant-generated texts and quotations were incorporated into the analysis to anchor interpretations in concrete evidence. For example, within the "Personalised and Immediate Feedback" theme, codes such as "Real-Time Correction and Clarity" and "Confidence and Anxiety Reduction" highlighted participants' experiences with the AI chatbot's feedback mechanisms. Similarly, under the "Autonomy and SRL" theme, codes like "Increased Autonomy in Learning" and "Enhanced Motivation and Engagement" reflected how AI tools supported independent learning and heightened student motivation.

The emergent themes were systematically organised into Table 1, providing a comprehensive overview of key findings, including improvements in grammatical accuracy, and qualitative shifts in learning behaviours. This structured approach facilitated a nuanced understanding of the data, highlighting both the strengths and limitations of AI-assisted strategies in enhancing English grammar proficiency and promoting SRL among Turkish EFL learners.

Ethical considerations

Ethical protocols were rigorously adhered to throughout the study to ensure the rights and well-being of participants. Informed consent forms were provided to all participants, clearly outlining the study's purpose, the measures taken to ensure data confidentiality, and the voluntary nature of participation. Participants were informed that they could withdraw from the study at any point without any negative consequences.

To protect privacy, participant identities were anonymised, and all collected data were securely stored in encrypted digital formats. Access to this data was restricted to the research team. The AI chatbot's responses were monitored throughout the study to ensure they remained fair, unbiased, and supportive of the learning process.

Comprehensive instructions and guidance were given to participants before and after the tasks to promote equitable participation and full engagement. Any ethical concerns or technical issues that arose during the study were promptly addressed to uphold the integrity of the research process.

Findings

The analysis of data from pre- and post-writing tasks, AI chatbot interactions, and survey responses revealed six key themes aligned with the study's aim. These themes include improvements in grammatical accuracy specific to the Present Perfect Tense, the impact of personalised and immediate feedback on learning outcomes, enhancements in autonomy and SRL, the practical utility and future potential of AI tools in language learning, identified limitations and suggested improvements, and the overall engagement and interaction quality experienced by learners. The following sections delve into each theme, incorporating participant quotations and examples from their interactions with the AI chatbot to offer a detailed understanding of how AI-assisted feedback mechanisms influence Turkish EFL learners' SRL processes and grammatical accuracy in the Present Perfect Tense.

Table 1.

Thematic Analysis Coding Scheme and Hypothetical Frequencies

Theme	Code	Definition	Frequency (N=18)
Improved Grammatical Accuracy	Present Perfect Tense Improvements	References to improved use of the Present Perfect Tense	72% (N=13)
	Other Tenses and Grammar Forms	Corrections in tenses other than Present Perfect	44% (N=8)
	Vocabulary Enhancements	Improvements in word choice and vocabulary usage	22% (N=4)
	Spelling Enhancements	Corrections in spelling errors	33% (N=6)
Personalised and Immediate Feedback	Real-Time Correction and Clarity	Immediate, clear AI feedback	55% (N=10)
	Confidence and Anxiety Reduction	Reduced stress and increased confidence due to immediate feedback	50% (N=9)
Autonomy and Self-Regulated Learning (SRL)	Increased Autonomy in Learning	Greater independence in grammar improvement	50% (N=9)
	Enhanced Motivation and Engagement	Heightened interest due to interactive AI responses	33% (N=6)
	Ease of Access & Cost-Effectiveness	AI tools seen as readily available and affordable	28% (N=5)
Practical Utility & Future Potential	Comparing Languages and Concepts	Using AI to understand differences between English and native language	22% (N=4)
	AI as a Substitute Teacher	Seeing AI as a substitute teacher	25% (N=4-5)

Limitations and Desired Improvements	Lack of Voice Interaction	Desire for voice capabilities and more complex examples	22% (N=4)
	Long-Term Adequacy Concerns	Uncertainty about sustained benefits over time	11% (N=2)
Enhanced Engagement and Interaction Quality	Interactive Learning Experience	AI chatbots providing engaging, interactive practice that maintain motivation	39% (N=7)
	Mimicking Human Conversation	AI chatbots simulating human-like interactions for a natural learning feel	33% (N=6)

Improved grammatical accuracy

The findings of this study demonstrate that AI-assisted strategies enhance grammatical accuracy among Turkish EFL learners, particularly in the use of the Present Perfect Tense. 72% (N=13) of participants showed notable improvements in their post-writing tasks, specifically in their use of the Present Perfect Tense. Additionally, 44% (N=8) of the participants corrected or expanded their use of other tenses, 22% (N=4) made vocabulary enhancements, and 33% (N=6) addressed spelling errors. These results align with the findings of Chen et al. (2023) and Kim (2019), who highlighted that AI chatbots provide immediate and personalised feedback, fostering substantial grammatical improvements. The ability of AI tools to offer context-specific corrections likely contributed to these enhancements, as students could identify and rectify mistakes promptly, thereby reinforcing their understanding of grammatical structures.

Furthermore, the improvement in other tenses and vocabulary suggests that AI chatbots facilitate a broader range of linguistic skills beyond the targeted tense. This comprehensive grammatical support is consistent with the adaptive and multifaceted feedback mechanisms discussed by Warschauer (2002) and Wang et al. (2021), which emphasise the role of technology in providing holistic language learning experiences. These findings also reflect the results of Meyer et al. (2024), who demonstrated that LLM-generated feedback improves revision accuracy and fosters grammatical precision through immediate and context-sensitive support.

Personalised and immediate feedback

A significant portion of participants (55%, N=10) highlighted the effectiveness of real-time correction and clarity provided by AI chatbots. This immediate feedback was instrumental in identifying and rectifying mistakes promptly, which is consistent with

the assertions of Chen et al. (2023) and Kim (2019) regarding the benefits of personalised feedback in language learning. Moreover, 50% (N=9) of the students reported a reduction in anxiety and an increase in confidence, attributing these changes to the supportive and non-judgemental feedback from the AI tools. For instance, Participant 10 remarked, *"Thanks to the immediate feedback provided by the AI-chatbot, I saved time and improved significantly as it offered very descriptive feedback."* This statement echoes the findings of Lin et al. (2020) and Pintrich (2005), who emphasised that immediate and clear feedback can significantly enhance learner motivation and reduce anxiety associated with language acquisition.

These findings align with Meyer et al. (2024), who observed that AI-generated feedback not only supports grammatical accuracy but also boosts learners' confidence and task motivation through tailored feedback mechanisms. Similarly, Ruwe and Mayweg-Paus (2023) emphasised the importance of personalised feedback language, which enhances learners' trust and self-efficacy, further reinforcing the emotional and cognitive benefits of AI-assisted learning.

Autonomy and self-regulated learning (SRL)

Half of the participants (50%, N=9) achieved full corrections in their papers, reflecting an increased autonomy in their learning process. Additionally, 33% (N=6) of the students experienced enhanced motivation and engagement, finding the interactive responses from AI chatbots stimulating. The accessibility and cost-effectiveness of AI tools were appreciated by 28% (N=5) of the participants, who viewed these resources as easily available and affordable means to support their learning. These findings resonate with the research of Hopkins (2021) and Zimmerman (2002), which suggest that AI tools can enhance learner engagement and support SRL behaviours. The increased autonomy observed in this study highlights the potential of AI tools to foster independent learning and self-regulation among EFL learners, aligning with Oxford's (2001) emphasis on learner autonomy as a critical component of effective language pedagogy.

These results are consistent with Meyer et al. (2024), who identified that AI tools enhance learners' ability to self-regulate by offering immediate and personalised

support, enabling them to correct mistakes autonomously and refine their learning strategies.

Practical utility & future potential

25% (N=4-5) of the students utilised AI chatbots to compare grammatical structures between English and their native language, Turkish, thereby enhancing their understanding of linguistic nuances. Furthermore, 25% (N=4-5) perceived AI chatbots as substitute teachers, noting that the detailed explanations provided by AI mimicked traditional teacher interactions, thereby supporting their learning needs. This perception aligns with the findings of Warschauer (2002) and Wang et al. (2021), who identified that AI tools create immersive and adaptive learning experiences. The ability of AI chatbots to simulate teacher-like interactions offers a scalable solution to personalised learning, especially in contexts where access to qualified instructors may be limited. Additionally, the comparison between languages facilitated by AI tools supports deeper cognitive processing and understanding of grammatical structures, as suggested by Yang (2024).

These observations are further supported by Meyer et al. (2024), who found that AI systems serve as scalable and effective substitutes for traditional instruction by providing detailed, context-sensitive feedback. Ruwe and Mayweg-Paus (2023) also highlighted the ability of personalised feedback to mimic human-like interactions, fostering a sense of engagement and trust in AI systems.

Limitations and desired improvements

Despite the positive outcomes, 22% (N=4) of the participants expressed a desire for voice interaction capabilities and more complex examples to enrich the learning environment. Additionally, 11% (N=2) voiced concerns regarding the long-term adequacy of AI chatbots, questioning whether these tools could sustain their learning benefits over extended periods. Participant 6 suggested, *"Learning can be advanced by adding more varied and complex sentence examples, creating a real conversational environment with AI voice-over capabilities."* These concerns highlight the current limitations of AI tools in replicating the richness of human interaction and providing diverse, context-rich examples. Kim (2019) similarly argued that while AI-driven

platforms offer personalised learning, they fall short in replicating rich, real-life conversational experiences. Addressing these limitations is essential for enhancing the effectiveness and sustainability of AI-assisted language learning tools.

Enhanced engagement and interaction quality

Engagement levels were notably high, with 39% (N=7) of participants reporting that AI chatbots provided an interactive learning experience that maintained their motivation. Moreover, 33% (N=6) felt that the AI chatbots successfully mimicked human conversation, creating a more natural and comfortable environment for practising the Present Perfect Tense. Participant 4 commented, *"I think it will be very useful for the future because this artificial intelligence, which explains the subject as if there is a teacher in front of us, is easy to access and there is no cost. I think it will soon become the main source of learning for all students."* These findings support the work of Lin et al. (2020) and Pintrich (2005), which highlight that tools fostering interaction and critical thinking are more likely to sustain engagement and result in better learning outcomes.

These findings also align with Meyer et al. (2024), who observed that AI chatbots foster engagement by creating human-like interactions, thus maintaining learner motivation and enhancing the overall learning experience. Ruwe and Mayweg-Paus (2023) further noted that personalised feedback language contributes to the perceived authenticity and effectiveness of AI systems, making them more engaging for learners over time.

Discussion

The study aimed to explore how AI-assisted feedback mechanisms influence processes and grammatical accuracy among Turkish EFL learners specialising in the Present Perfect Tense. Addressing the first research question, the findings clearly demonstrate that AI-assisted feedback significantly enhances SRL processes. Half of the participants reported increased autonomy in their learning, aligning with Zimmerman's (2002) SRL framework, which highlights the critical role of self-regulation in language acquisition. Autonomy allowed learners to set goals, monitor progress, and adjust strategies independently, reducing reliance on instructor-led guidance. The immediate,

personalised feedback provided by AI chatbots facilitated effective self-monitoring and goal-setting, enabling learners to identify and correct errors promptly. These outcomes support the findings of Chen et al. (2023) and Kim (2019), who emphasised the importance of personalised feedback in promoting learner autonomy. Additionally, the chatbot's capacity to deliver context-specific corrections likely deepened learners' understanding of the Present Perfect Tense and enhanced their application of grammatical rules.

Furthermore, the reduction in anxiety and the increase in confidence reported by participants resonate with Pintrich's (2005) assertion regarding the positive impact of SRL strategies on motivation and emotional well-being. By creating a supportive and non-judgemental learning environment, AI chatbots reduced stress associated with mastering complex grammatical structures, fostering persistence and engagement. This emotional support is especially significant in mastering challenging constructs like the Present Perfect Tense, which can cause frustration and confusion among learners. These findings underline the chatbot's role not just as a learning tool but also as an emotional support mechanism that encourages sustained effort and motivation.

In response to the second research question, the study highlights significant improvements in grammatical accuracy, particularly in the Present Perfect Tense, with 72% of participants demonstrating better performance in their post-writing tasks. This enhancement aligns with studies by Chen et al. (2023) and Kim (2019), which emphasise the effectiveness of immediate, personalised feedback in correcting grammatical errors. The chatbot's ability to deliver context-specific corrections facilitated a deeper understanding of tense usage, enabling learners to apply grammatical rules with greater accuracy and confidence. These improvements also reflect increased self-efficacy among participants, as they gained confidence in practising and applying complex grammatical structures independently. This is consistent with Mahmoodi et al. (2014), who identified a positive correlation between self-regulatory behaviours and language performance. The findings suggest that autonomous learning supported by AI tools can lead to enhanced language proficiency and a sense of self-reliance in learners.

Additionally, high levels of engagement and the perception of AI chatbots as substitute teachers indicate the potential of these tools to sustain motivation and provide

continuous learning support. The interactive and conversational nature of AI chatbots contributes to an immersive learning experience, encouraging repeated practice and sustained effort. This observation builds on Warschauer's (2002) assertion that technology creates immersive learning environments, enhancing engagement and motivation. By mimicking human interaction, chatbots offer a dynamic and engaging platform for learners to practise their skills in a safe and controlled environment.

This study makes a unique contribution by focusing specifically on the Present Perfect Tense among Turkish EFL learners—a grammatical challenge compounded by the absence of direct equivalents in Turkish. While previous research has broadly examined AI-assisted language learning, this study addresses an underexplored area, providing nuanced insights into the role of AI chatbots in facilitating the acquisition of complex tenses. The integration of theoretical frameworks such as the TAM (Davis, 1989) and the CoI framework (Garrison et al., 2000) further enriches the analysis. TAM sheds light on learners' perceptions of the usefulness and ease of use of AI tools, while CoI offers a comprehensive view of the interplay between social, cognitive, and teaching presence in online learning environments. Together, these frameworks provide a robust foundation for understanding how AI chatbots influence SRL processes and grammatical accuracy, offering a multifaceted interpretation of the study's findings.

Conclusion

In summary, this study stresses the potential of AI-assisted feedback mechanisms to significantly influence SRL processes and improve grammatical accuracy in EFL learners, particularly in mastering the Present Perfect Tense. Through immediate and personalised feedback, AI tools such as chatbots effectively support learners in setting goals, monitoring progress, and refining strategies—key components of SRL. By fostering both autonomy and confidence, these tools address critical challenges faced by Turkish EFL learners when navigating complex grammatical structures, such as the Present Perfect Tense, which lack direct equivalents in their native language.

AI tools offer more than grammar correction; they serve as platforms for interactive, self-paced learning and deep language engagement. Their ability to simulate human interaction creates a supportive learning environment where learners can practise

without fear of judgement or failure. This is especially valuable for university preparatory students who often experience anxiety when tackling advanced grammatical forms.

Despite these promising findings, the study identifies several limitations. Current AI tools would benefit from advanced features such as voice interaction and richer, context-sensitive examples to further enhance their effectiveness. Future research should explore these enhancements while expanding the scope to include larger and more diverse learner populations, as well as longitudinal studies to assess the sustained impact of AI-assisted learning on SRL and grammatical proficiency.

The broader implications of this study suggest that as AI technologies continue to evolve, their integration into language pedagogy will transform how grammar is taught and learned. For educators and policymakers, this highlights the importance of leveraging AI advancements to complement traditional teaching methods, ensuring a balanced and comprehensive approach to language education. By combining the strengths of AI tools and human instruction, educators can create personalised, engaging, and effective learning experiences tailored to diverse learner needs.

Overall, the findings contribute to the growing body of evidence supporting AI-assisted feedback as a transformative tool in EFL instruction. By enhancing both SRL processes and grammatical accuracy, AI tools like chatbots hold significant potential to reshape the landscape of language learning, offering new pathways for learners to achieve proficiency in complex grammatical structures such as the Present Perfect Tense.

Ethics Committee Permission Information

This research study was conducted with the Research Ethics Committee approval of MEF University, dated 19.10.2023 and numbered E-47749665-050.01.04-3987.

Acknowledgment

This article is based on the Bachelor's thesis of Barkin Baran Yener, successfully completed at MEF University, under the supervision of Dr. Hasan Selcuk.

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Appendices

Appendix A: Pre-and post-writing tasks

Pre-writing task

Part 1: Sentence Completion

Complete the following sentences using the present perfect tense of the verbs in brackets:

1. I _____ (never, eat) sushi before.
2. She _____ (write) three emails so far today.
3. They _____ (not, see) the new movie yet.
4. We _____ (live) in this city since 2010.
5. He _____ (just, finish) his homework.

Part 2: Short Answer Questions

Answer the following questions using the present perfect tense:

1. What books have you read recently?
2. How many new people have you met this month?
3. Have you ever visited a foreign country? If so, which ones?
4. What's the best movie you have seen this year?
5. What achievements have you accomplished in the last year?

Part 3: Creative Writing Prompt

Write a short paragraph about an imaginary holiday you have just returned from. Use the present perfect tense to describe your experiences, the places you have visited, and the activities you have done

Post-writing task

1. Please revise your conversation that you created for 15 minutes.
2. You could include more details or sentences. (Optional)

Appendix B: Post-study Survey Questionnaire

1. Age:
2. Gender:
3. Level of English knowledge (e.g., elementary, pre-intermediate, intermediate, advanced)

4. Level of ICT knowledge (e.g., elementary, pre-intermediate, intermediate, advanced)
5. Which AI-powered application do you use?
6. What were the main takeaways from your experience with AI-assisted strategies for improving your understanding of the English Present Perfect Tense?
7. How did using AI chatbots impact your learning process regarding convenience, engagement, and comprehension?
8. Can you please provide examples of instances where the AI-assisted strategies helped you better grasp the nuances of the Present Perfect Tense?
9. Reflecting on your language learning journey during the study, what aspects of AI-powered strategies did you find most effective in enhancing your language skills?
10. In what ways did the immediate feedback provided by the AI chatbots contribute to your learning and language improvement?
11. Were there any challenges or limitations you encountered while using AI-assisted strategies? If so, how did you overcome them?
12. How has your perspective on AI technology's role in language learning evolved throughout the study? Do you see it as a valuable tool for future language improvement?
13. Based on your participation in this study, what suggestions would you offer to improve the integration of AI-powered tools for language learning purposes?
14. Can you share any personal insights on how the AI-assisted strategies have influenced your confidence and motivation in using the English Present Perfect Tense?
15. While using the AI tool, what strategies did you employ to learn the English present perfect tense? How did you adapt these strategies during the activity based on your learning progress?
16. How did you monitor your own progress when using the AI tool for learning the English present perfect tense? Can you describe any specific moments where you had to reflect on your learning approach and make adjustments?
17. In your experience, how effective was the AI tool in helping you understand and use the English present perfect tense? What challenges, if any, did you face while using the tool, and how did you address them?