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ARTIFICIAL INTELLIGENCE IN ACADEMIC ENVIRONMENTS: REDUCING OR INCREASING FOREIGN LANGUAGE ANXIETY?

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Abstract

The integration of Artificial Intelligence (AI) tools into language learning and teaching is rapidly advancing in academic environments. Previous research has demonstrated the potential of AI tools to enhance learners' motivation, engagement, and attitudes while improving language skills such as speaking, writing, and reading. However, systematic reviews focusing on the role of AI technologies in managing foreign language anxiety (FLA) remain limited. This study systematically reviews the effects of AI tools on different types of FLA, including writing anxiety, reading anxiety, speaking anxiety, and general communication anxiety, in academic environments. Peer-reviewed articles were retrieved from the Scopus database and screened for relevance based on titles, abstracts, and full-text availability. Of the 59 articles identified, 11 studies published between 2022 and 2024 met the inclusion criteria. The findings reveal that AI tools, such as chatbots and automated writing evaluation systems, reduce writing and speaking anxiety by providing personalized feedback and fostering learner autonomy. However, challenges such as over-reliance on AI and limited human interaction may increase anxiety for certain learners. This review highlights gaps in the literature, emphasizing the need for longitudinal studies and hybrid learning models that combine AI technologies with teacher interventions to address learners' cognitive and affective needs.

Keywords: *Artificial Intelligence (AI) Tools, Foreign Language Anxiety (FLA), Language Learning.*

Introduction

The integration of artificial intelligence (AI) technologies into educational practices has been a transformative development in recent years, particularly in the

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field of language learning. AI tools are increasingly prevalent in educational settings, providing innovative solutions to support learners in their language acquisition process (Abernathy, 2024). These tools range from conversational tools to adaptive language platforms. They offer various benefits such as learners real-time feedback, personalized learning, and provide contextually appropriate examples, enabling them to improve their language competency (Niloy et al., 2024; Slamet, 2024). AI technologies support learners to experiment with the target language by providing interactive and adaptable learning environments, that encourage improvement of self-reliance and involvement in the learning process (El-Sabagh, 2021). However, this integration also raises concerns regarding foreign language anxiety (FLA), as learners may experience increased anxiety during the learning process (Delello et al., 2025; Lin & Chen, 2024). This anxiety often manifests as a fear of making mistakes, social apprehension, and a lack of confidence when learning or using a foreign language (Horwitz, 2010; Saeed, 2024). Given these challenges, it emphasizes the need for more research into how AI technologies may positively or negatively impact learners' anxiety in various kinds of academic contexts.

AI tools and foreign language anxiety have various and complex interconnections. On one hand, AI tools can positively impact foreign language anxiety by improving learners' attitude towards language acquisition (Biju et al., 2024), positively impacted learners' motivation (Zhang et al., 2024), and significantly lowered their foreign language anxiety (Wei, 2023). On the other hand, Biju et al. (2024) also addressed the potential of high reliance towards AI tools and may increase foreign language anxiety for some learners, as also observed by El Shazly (2021). Moreover, high reliance of using AI tools can impact real-life skills such as failing to understand basic skills, decreasing critical thinking and problem solving, and lowering learners' academic performance (Basha & Ijssc, 2024).

Recent studies have explored the integration of AI in language learning and various factors influencing foreign language anxiety (FLA). Marnani and Cuocci (2022) along with Xu and Xie (2024) highlighted that key predictors of FLA include individual learner characteristics such as self-esteem, motivation, previous language learning

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experiences, classroom environment, cultural factors, cognitive control abilities, and assessment and evaluation methods. These factors impact FLA in AI-integrated learning environments by shaping learners' emotional responses, engagement levels, and adaptability to AI-assisted instruction. For instance, cognitive control abilities influence how learners navigate AI-generated feedback, while motivation and self-esteem affect their willingness to engage with AI-driven language tasks. On the other hand, Namaziandost and Rezai (2024) further emphasized the role of emotional regulation and mindfulness in enhancing learning experiences, motivation, and autonomy in AI-supported language learning environments. Furthermore, studies from Son et al. (2023) as well as Rebolledo & González (2023) highlight the transformative potential of AI in language education. AI tools, such as chatbots and intelligent tutoring systems, significantly enhance learners' motivation, engagement, and personalized learning experiences. These tools offer tailored feedback, improve language skills, and provide cultural exposure. However, challenges remain, including the lack of human interaction, complexity in replicating language context, and data requirements. Together, these findings underscore the importance of self-efficacy, emotional regulation, and effective AI integration in foreign language learning contexts.

Moreover, recent systematic reviews on the integration of AI tools in language learning and foreign language anxiety (FLA) highlight significant contributions in the field. AI tools, particularly chatbots and adaptive technologies, have been shown to enhance learners' motivation, engagement, and overall attitude toward language learning, while also helping to reduce FLA (AlTwijri & Alghizzi, 2024). The positive perceptions of AI tools are consistent across various studies, with evidence suggesting that these technologies can reduce anxiety by offering learners personalized feedback and a less stressful learning environment (Al-Raimi et al., 2024; Yu, 2024). AI tools have been found to support both productive skills, such as speaking and writing, and receptive skills like listening and reading, though more research is needed in the latter area (Al-Raimi et al., 2024; Woo & Choi, 2021). The reviews underscore AI's transformative potential in language learning, emphasizing the need for further

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research on personalized, interactive AI technologies to better understand their impact on learners' affective factors, including anxiety.

Although previous studies have examined the cognitive and productivity-enhancing benefits of AI tools in language learning, there is a notable lack of research on their emotional impacts, particularly regarding foreign language anxiety (FLA). While AI tools have been shown to improve motivation, engagement, and overall language skills, less attention has been given to how these tools may influence learners' emotional states, including anxiety. This gap is critical, as understanding the interplay between AI tools and learners' emotional responses can guide educators in implementing these technologies more effectively. Given that FLA can significantly affect language acquisition, exploring whether AI tools contribute to reducing or increasing this anxiety is an urgent area of research. Therefore, this study aims to address this gap by systematically reviewing the existing literature on the effects of AI tools on foreign language anxiety and guided by a research question: "How are AI tools reported to affect foreign language anxiety in academic environments?"

The insights gained from this investigation will not only contribute to the existing literature but also offer practical implications for educators seeking to create supportive learning environments that use the benefits of AI while reducing potential anxiety among learners.

Method

This study employed a Systematic Literature Review (SLR) methodology to comprehensively review and synthesize the existing literature, exploring the impact of Artificial Intelligence (AI) tools on foreign language anxiety (FLA) among EFL learners. The SLR approach is ideal for this purpose, as it enables a structured and rigorous evaluation of relevant studies, identifies key findings in the research that warrant further investigation (Page et al., 2021). The analysis was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) technique, which provided a structured framework for conducting systematic reviews.

Search Strategy

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A comprehensive search strategy was developed to identify relevant studies related to AI tools and FLA. The search was primarily conducted using the Scopus database, which is known for its broad coverage of peer-reviewed journals. Scopus is selected for its ability to provide a high-quality dataset, ensuring the credibility and integrative nature of the research (Singh et al., 2021). Boolean operators (AND, OR) and keywords were used to construct search query, combining terms such as "Artificial Intelligence," "AI tools," "foreign language anxiety," and related synonyms. The search query included the term "TITLE-ABS-KEY", which defines the search results retrieved from the key terms in Title, Abstract, and Keywords to ensure that it is focused on relevant studies. The following search query was applied in Scopus:

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( TITLE-ABS-KEY ( AI ) OR TITLE-ABS-KEY ( "AI tools" ) OR TITLE-ABS-KEY ( "artificial intelligence" ) OR TITLE-ABS-KEY ( "AI-generated" ) OR TITLE-ABS-KEY ( "AI-based" ) AND TITLE-ABS-KEY ( "language anxiety" ) OR TITLE-ABS-KEY ( "foreign language anxiety" ) OR TITLE-ABS-KEY ( "foreign language classroom anxiety" ) OR TITLE-ABS-KEY ( foreign AND language AND anxiety ) OR TITLE-ABS-KEY ( "writing anxiety" ) OR TITLE-ABS-KEY ( "reading anxiety" ) OR TITLE-ABS-KEY ( "speaking anxiety" ) OR TITLE-ABS-KEY ( "communication anxiety" ) OR TITLE-ABS-KEY ( "listening anxiety" )
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Literature Selection Criteria

To ensure the inclusion of relevant studies, specific criteria were applied. Studies were included if they focused on AI tools in the context of FLA and were published between 2014 and 2024. Only peer-reviewed journal articles written in English and have open access were considered. Studies that focused on general educational technologies without explicitly addressing AI tools, did not involve FLA, or did not have full-text access were excluded. Gray literature, such as unpublished theses, reports, and conference proceedings, were also excluded to ensure that the review is based on widely recognized and accessible research.

The study selection process followed four stages. Initially, all retrieved titles, abstracts, and keywords were screened for relevance. Non-English articles were removed, and the remaining articles were further screened to ensure they aligned with the inclusion criteria. Full-text articles were then assessed for eligibility, and those that

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met all requirements were included in the final review. This process was documented using a PRISMA flow diagram as follows.

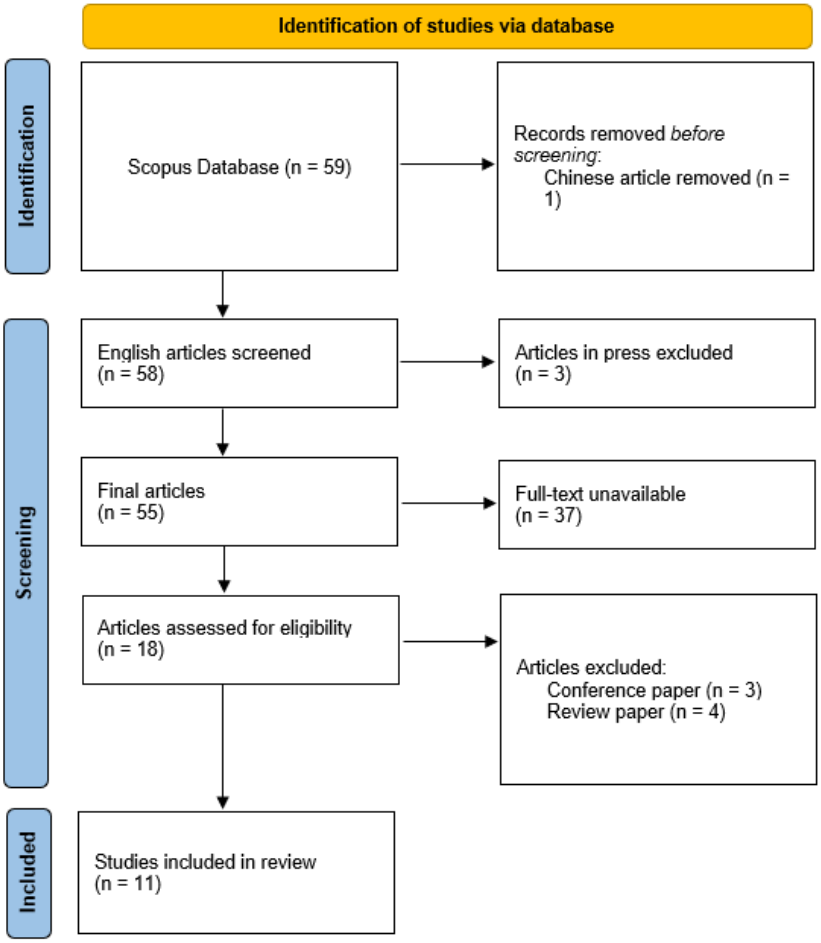

Figure 1. PRISMA flow diagram for the articles selection

Data Charting

A standardized data extraction form was developed to systematically chart data from the included studies. The extracted information includes key findings and discussions, as well as study characteristics such as author(s), article titles, year of publication, and study design. Specific data points were focused on the types of AI tools used, the methods for measuring foreign language anxiety, the contexts in which the tools were implemented, and any reported interventions or outcomes related to AI integration in language learning. Key findings were synthesized, with particular attention to the influence of AI tools on foreign language anxiety across different

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learning settings. This approach enables a thorough evaluation of the trends, methodologies, and gaps in the existing literature.

Reporting the Results

Data from the selected studies were extracted using a structured form to capture essential information, including study characteristics, the main findings, the intervention, the methods used in the articles, and the reported effects of AI tools on FLA. The extracted data were synthesized to identify effect patterns, such as whether AI tools reducing or increasing FLA, the contexts in which these effects were observed, and any contributing factors influencing the outcomes. The findings were interpreted based on the effects reported, providing a comprehensive overview of how AI tools interact with learners' anxiety in foreign language learning as described in the existing literature.

Results

In this section, 11 studies were included in the systematic review to answer the research question, *"How are AI tools reported to affect foreign language anxiety in academic environments?"* and the study characteristics information were extracted to the following table.

Table 1. Final articles included in the systematic review from Scopus database.

Author(s)	Year of Publication	Title
Alrajhi, A. S.	2024	Artificial intelligence pedagogical chatbots as L2 conversational agents
Biju, N., Abdelrasheed, N. S. G., Bakiyeva, K., Prasad, K. D. V., & Jember, B.	2024	Which one? AI-assisted language assessment or paper format: an exploration of the impacts on foreign language anxiety, learning

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		attitudes, motivation, and writing performance
Çelik, F., Ersanlı, C. Y., & Arslanbay, G.	2024	Does AI Simplification of Authentic Blog Texts Improve Reading Comprehension, Inferencing, and Anxiety? A One-Shot Intervention in Turkish EFL Context
Elsayed, A. M., Kholikov, A., Abdullayeva, I., Al-Farouni, M., & Wodajo, M. R.	2024	Teacher support in AI-assisted exams: an experimental study to inspect the effects on demotivation, anxiety management in exams, L2 learning experience, and academic success
Kim, A., & Su, Y.	2024	How implementing an AI chatbot impacts Korean as a foreign language learners' willingness to communicate in Korean
Wang, D.	2024	Teacher- Versus AI-Generated (Poe Application) Corrective Feedback and Language Learners' Writing Anxiety, Complexity, Fluency, and Accuracy
Wen, F., Li, Y., Zhou, Y., An, X., & Zou, Q.	2024	A Study on the Relationship between AI Anxiety and AI behavioral intention of secondary school learners learning English as a foreign language

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Yamaoka, K.	2024	ChatGPT's Motivational Effects on Japanese University EFL Learners: A Qualitative Analysis
Zheng, S.	2024	The effects of chatbot use on foreign language reading anxiety and reading performance among Chinese secondary school learners
Dizon, G., & Gold, J.	2023	Exploring the effects of Grammarly on EFL learners' foreign language anxiety and learner autonomy
Wang, Y., Luo, X., Liu, C., Tu, Y., & Wang, N.	2022	An Integrated Automatic Writing Evaluation and SVVR Approach to Improve Learners' EFL Writing Performance

The data presented in the studies indicate that each study employs different interventions to address language anxiety. Each intervention carried out using different methods yields distinct results. The information is detailed in the table below.

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Table 2. Articles results.

Author(s) and Year of Publication	Main Findings	Methodology	Intervention	Intervention Effects
Alrajhi, A. S. (2024).	- The learners had overall positive experiences with the pedagogical chatbot, finding it intelligible, supportive of L2 practice and writing development, and able to reduce writing anxiety. - The learners also reported certain limitations of the chatbot, including its inability to maintain extended conversations, sensitivity to inaccurate language forms, and sporadic irrelevant responses. - L2 proficiency did not significantly affect overall perceptions of the chatbot,	- Introducing the chatbot (Tutor Mike) to the participants - Individualized interactions with the chatbot, including guided and self-initiated interactions - A questionnaire survey to explore the participants' perspectives on the chatbot - Focus group discussions to further elucidate the questionnaire responses	The intervention was the use of the text-based pedagogical chatbot "Tutor Mike" by the participants. The participants engaged in a 15-minute introduction to the chatbot, followed by individualized interactions with the chatbot, including a guided interaction and self-initiated interactions lasting approximately 25-30 minutes.	Not mentioned (the paper does not report any quantitative intervention effects or results from an experiment)

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	except for the aspect of usefulness for L2 practice, which was viewed more positively by high-intermediate learners.			
Biju, N., Abdelrasheed, N. S. G., Bakiyeva, K., Prasad, K. D. V., & Jember, B. (2024).	- AI-assisted language assessment significantly reduced foreign language anxiety (FLA) and improved L2 learners' attitudes and motivation towards language learning. - While not statistically significant, the experimental group using AI-assisted assessment outperformed the control group in writing skills.	The study used a sequential exploratory mixed-methods design, with qualitative data collection through narrative frames followed by quantitative assessment of writing skills using the TOEFL iBT. Participants were 70 intermediate-level English learners from two intact university classes in Bangladesh, randomly assigned to an experimental group receiving AI-assisted assessments or a control group receiving paper-format assessments.	The intervention in this study was the use of AI-assisted language assessment, specifically the ChatGPT tool, by the experimental group for their weekly writing assignments. The participants in the experimental group used the AI tool for at least 1 hour per week in a monitored lab setting.	- The experimental group (AI-assisted assessment) showed a notable drop in foreign language anxiety (FLA) compared to the control group (paper-format assessment). - The experimental group reported more favorable attitudes towards the AI-assisted assessment compared to the control group's attitudes towards the paper-format assessment. - The experimental group showed increased motivation for language learning due to the AI-assisted assessment, while the control group had

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				more mixed and sometimes reduced motivation. - On the posttest, the experimental group outperformed the control group in writing skills, though the difference was not statistically significant.
Çelik, F., Ersanlı, C. Y., & Arslanbay, G. (2024).	- The use of ChatGPT to simplify an authentic text significantly improved university learners' reading comprehension and inferencing scores. - However, the use of ChatGPT did not significantly change learners' reading anxiety levels. - The study's findings contrast with some previous research, highlighting the need for further exploration of how	- The study employed a within-subjects design, where each participant engaged with both the original and ChatGPT-simplified texts, serving as their own controls. - The participants were 105 undergraduate English as a foreign language (EFL) learners at a public university in Türkiye, who were selected based on their enrollment in an EFL course.	The intervention in this study was the use of ChatGPT to simplify an authentic text from a life advice website. Participants read the original authentic text, then read the ChatGPT-simplified version of the same text.	- Inferencing scores: - Pre-intervention mean: 3.43 (SD = 4.769) - Post-intervention mean: 5.71 (SD = 4.972) - Statistically significant improvement (p = 0.001) - Reading comprehension: - Statistically significant improvement after ChatGPT intervention, though the exact quantitative effect is not reported

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	AI-driven tools can influence language learning outcomes.	- The materials included an authentic text from a life advice blog, a reading comprehension test (RCT) developed by the researchers, and the foreign language reading anxiety scale (FLRAS). - The procedure involved participants first reading the original authentic text, completing the FLRAS and RCT, then reading the ChatGPT-simplified version of the text, and completing the FLRAS and RCT again.		- Reading anxiety: - No statistically significant change in reading anxiety levels after the ChatGPT intervention
Elsayed, A. M., Kholikov, A., Abdullayeva, I., Al-Farouni, M., & Wodajo, M. R. (2024).	- Teacher support in AI-assisted exams significantly reduced L2 learner demotivation and anxiety. - Teacher support in AI-assisted exams significantly improved L2	The study used a quantitative quasi-experimental pretest-posttest control group design. Participants were divided into an experimental group that received teacher support	The intervention in this study was the provision of teacher support during AI-assisted exams. The experimental group received this support, which included a two-day training workshop for teachers on providing	- Reduced demotivation and anxiety levels among L2 learners - Enhanced L2 learning experiences - Improved academic success

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	learners' learning experiences. - Teacher support in AI-assisted exams significantly enhanced L2 learners' academic success.	during AI-assisted exams and a control group that did not receive such support. Both groups completed pretests to establish baseline measures for demotivation, anxiety, L2 learning experience, and academic performance. After an 8-week intervention period, posttests were administered to assess changes in these variables.	effective support, as well as active monitoring and real-time support from teachers during the AI-assisted exams.	
Kim, A., & Su, Y. (2024).	- The use of Danbee AI chatbots significantly increased Korean as a foreign language (KFL) learners' willingness to communicate (WTC) in Korean compared to the control group.	- Participants: 65 learners enrolled in an elementary-level Korean language course, randomly assigned to an experimental group (n=20) and a control group (n=45)	The intervention in this study was the use of Danbee AI chatbots by the experimental group during the production stage of their Korean language classes. The experimental group conducted 8 chatbot activities, each lasting 15-20	- No significant difference in WTC between experimental and control groups at baseline ($p = 0.987$) - Significant improvements in WTC, reduced anxiety, and enhanced communication confidence in the experimental group

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	- Interacting with chatbots helped reduce learners' anxiety and increase their communicative confidence, leading to higher levels of L2 production. - Learners perceived the use of chatbots positively, reporting that it created a less threatening environment and enhanced their language learning experience.	- Instruments: Chatbots developed by the Danbee AI platform, WTC surveys, and semi-structured interviews - Experimental group tasks: 8 closed conversation tasks using the chatbots, focused on practicing and mastering expressions from the course textbook - Interviews: Semi-structured interviews with the experimental group participants to obtain insights on their perceptions of the chatbot activities and their impact on WTC	minutes, as part of their language learning.	compared to the control group after the 8-week chatbot intervention ($p < 0.001$)
Wang, D. (2024).	- The AI-generated feedback group outperformed the teacher feedback and no feedback groups in terms of writing	The study used a quasi-experimental design with three intact classes of 25 language learners each from the School of	- Teacher-provided corrective feedback on participants' written work.	Writing Anxiety: - Teacher feedback group: Significant reduction in

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	accuracy, fluency, and complexity. - The AI-generated feedback group experienced a greater reduction in writing anxiety compared to the other groups. - The study highlights the remarkable impact of AI-generated corrective feedback in improving writing outcomes and alleviating anxiety among undergraduate language learners.	Foreign Studies at East China University of Political Science and Law. The participants were native Mandarin speakers learning English as a second language. A writing test was administered to the entire pool of participants, and only those within +/-1 standard deviation of the mean were included in the final analysis. The three classes were randomly assigned to three groups: one received teacher-generated corrective feedback, one used the Poe AI application for feedback, and one received no corrective feedback. Participants completed weekly assignments, and three	- Use of the Poe AI application to receive corrective feedback on participants' written work, with a focus on grammar, accuracy, coherence, and complexity. - No corrective written feedback.	writing anxiety compared to no-feedback group - AI (Poe) feedback group: More significant reduction in writing anxiety compared to teacher feedback group Writing Accuracy: - AI (Poe) feedback group: Significantly higher proportion of error-free T-units and error-free clauses compared to no-feedback group - Teacher feedback group: Significantly higher proportion of error-free clauses compared to no-feedback group - AI (Poe) feedback group: Significantly lower total number of errors per total

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	assignments from the start, middle, and end of the semester were analyzed for changes in writing complexity, accuracy, and fluency. The same Writing Anxiety Scale and Writing Test were used for pre- and post-assessment. The data was analyzed using one-way ANOVA to compare the performance and anxiety levels of the three groups.	words compared to teacher feedback group Writing Fluency: - AI (Poe) feedback group: Significantly higher total number of T-units, total number of words, and words per T-unit compared to teacher feedback and no-feedback groups Writing Complexity: - AI (Poe) feedback group: Significantly higher ratio of clauses per T-unit and ratio of dependent clauses per T-unit compared to teacher feedback and no-feedback groups - Teacher feedback group: Significantly higher ratio of clauses per T-unit and ratio

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				of dependent clauses per T-unit compared to no-feedback group
Wen, F., Li, Y., Zhou, Y., An, X., & Zou, Q. (2024).	- Secondary school learners had a positive perception of the ease of use and usefulness of AI EFL learning tools, and were willing to continue using them. - AI Learning Anxiety and Job Replacement Anxiety had indirect negative effects on learners' acceptance and use of AI EFL learning tools. - The most important factor positively predicting learners' intention to use AI EFL learning tools was Social Influence.	- Convenience sampling of 347 secondary school learners in Beijing, with 293 valid questionnaires - Questionnaire with two sections - demographics and measures of key variables - Data analysis using SPSS for reliability and Mplus for CFA and SEM, with all 273 samples used	Not mentioned (the paper does not mention any specific intervention that participants received)	Not mentioned (the paper does not report any quantitative intervention effects or results from an experiment)
Yamaoka, K. (2024).	- Learners were motivated and experienced decreased anxiety when using	- Participants: 10 tertiary-level EFL learners, mostly sophomores	The intervention in this study was allowing learners to choose learning materials	Not mentioned (the paper does not report any quantitative intervention

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	ChatGPT, as it served as a reliable and effective learning assistant. - However, some learners with high English proficiency experienced a loss of self-confidence when ChatGPT provided high-quality proofreading. - Many learners did not use ChatGPT, mostly because they did not feel it was necessary or were reluctant to register for it.	- Procedure: 15-week course with MOOC learning and ChatGPT usage - Data collection: 4-item questionnaire distributed online - Data analysis: Qualitative analysis using open coding procedures	from massive open online courses (MOOCs) and proceed at their own pace for 30 minutes per class, followed by discussing what they learned with a partner. In the latter half of the semester, the teacher-led MOOC learning was replaced with speaking practice to prepare learners for presentations on the MOOCs they had chosen.	effects or results from an experiment)
Zheng, S. (2024).	- The chatbot intervention significantly reduced the participants' FLRA within the experimental group. - However, there was no significant difference in FLRA or FLRP between the experimental and comparison groups after the intervention.	- Mixed-methods quasi-experimental pre-test/post-test design - Experimental group used a chatbot for reading practice, comparison group received teacher-led instruction	The intervention in this study was the use of a GenAI-based chatbot called "Reading Bot" by the experimental group (EG) for 30 minutes after reading and comprehension check, while the comparison group (CG) received teacher-led	- FLRA: - Significant reduction in overall FLRA within the EG group from pre-test to post-test ($p = 0.021$, small effect size) - Significant reduction in two sub-dimensions of FLRA (General reading ability and Vocabulary) within the EG

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	- The chatbot provided various affordances (technological, pedagogical, linguistic, and affective) to assist reading, but also had some potential drawbacks and challenges that may have influenced FLRA and FLRP.	- Both groups participated in 5 reading sessions - FLRA measured using the EFLRAI, FLRP assessed using the KET reading test - Qualitative interviews conducted to complement quantitative data	explanations and discussions.	group from pre-test to post-test ($p < 0.05$, small effect sizes) - No significant difference in FLRA between the EG and CG groups after the intervention - FLRP: - No significant difference in FLRP between the EG and CG groups before or after the intervention - No significant difference in FLRP within the EG or CG groups from pre-test to post-test
Dizon, G., & Gold, J. (2023).	- Grammarly had a significant positive effect on reducing foreign language anxiety and increasing learner	- Convenience sampling of 96 EFL learners from two faculties at a Japanese university - All participants required to use Grammarly for	The intervention was the use of the Grammarly automated writing evaluation (AWE) tool by the EFL learners in their academic writing courses over a 16-week	- Foreign language anxiety (FLA) decreased by 16.6% from pre-survey to post-survey ($p < 0.0001$) - Learner autonomy (LA) increased by 10.2% from

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	autonomy among the EFL learners. - The learners generally had favorable perceptions of Grammarly as a tool to support their English writing development. - Many learners felt Grammarly helped them identify and correct errors, improve their English skills, and become more aware of their linguistic weaknesses.	weekly writing assignments, with a tutorial provided - Pre- and post-surveys measuring FLA and LA, administered via Qualtrics - Written reflective task completed by learners at the end of the semester	semester. The learners received training on Grammarly at the start of the semester and were required to use it for approximately 20 writing assignments during the course.	pre-survey to post-survey ($p < 0.0001$) Learners also had largely positive perceptions of Grammarly, with the most common positive themes being related to error correction, improving writing skills, increased awareness of errors, enjoyment, ease of use, and increased confidence.
Wang, Y., Luo, X., Liu, C., Tu, Y., & Wang, N. (2022).	- The SVVR-AWE approach significantly improved learners' EFL writing performance, motivation, self-efficacy, and sense of presence, while reducing their writing anxiety, compared to the conventional AWE approach.	- 76 college learners (37 in the experimental group, 39 in the control group) participated in the 4-week study - All learners completed a pre-test and pre-questionnaires on writing motivation, self-efficacy, and anxiety	The intervention was the SVVR-AWE approach, which integrated Spherical Video-based Virtual Reality (SVVR) and Automatic Writing Evaluation (AWE) for EFL writing instruction. The experimental group of 37 learners used this approach, while the control group of 39	- Experimental group adjusted mean: 23.84 (SD = 3.31) - Control group adjusted mean: 22.52 (SD = 2.90) - Statistically significant difference ($p = 0.04 < 0.05$) with a medium effect size ($\eta 2 = 0.06$)

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	- The SVVR-AWE approach enhanced learners' writing in terms of organization, originality, and elaboration. - Learners who used the SVVR-AWE approach outperformed those who used the conventional AWE approach.	- The experimental group used the SVVR-AWE approach while the control group used a conventional AWE approach - After the learning activities, all learners completed post-tests and post-questionnaires, and some were interviewed	learners used a conventional approach with only AWE.	- Writing self-efficacy: - Experimental group adjusted mean: 55.39 (SD = 8.53) - Control group adjusted mean: 51.55 (SD = 9.61) - Statistically significant difference ($p = 0.03 < 0.05$) with a medium effect size ($\eta 2 = 0.06$) - Writing anxiety: - Experimental group adjusted mean: 26.77 (SD = 5.42) - Control group adjusted mean: 28.58 (SD = 4.77) - Statistically significant difference ($p = 0.03 < 0.05$) with a medium effect size ($\eta 2 = 0.06$)

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Discussion

AI chatbots have emerged as a well-known tool in reducing learners' anxiety and enhancing their language learning experiences. Across multiple studies, AI generative tools have demonstrated effectiveness in decreasing writing and speaking anxiety, increasing learners' autonomy, and improving engagement. Alrajhi (2024) found that the text-based pedagogical chatbot "Tutor Mike" significantly reduced writing anxiety by providing consistent feedback and autonomous learning opportunities. However, its limitations, such as sensitivity to errors and the inability to sustain extended conversations, occasionally led to frustration, highlighting the need for further refinement of chatbot interactions. It proves that the impact of AI chatbots on reading-related anxiety remains inconclusive.

In speaking-related context, the challenge in decreasing speaking anxiety remains persistent. Its challenge is influenced by multiple psychological and situational factors. Pohan & Kusumawardany (2023) found that Indonesian junior high school learners experienced significant speaking anxiety, primarily due to lack of confidence, fear of making mistakes, test-related anxiety, and pressure to perform well. Test anxiety was identified as the dominant type of speaking anxiety, suggesting that learners may struggle with performance-based tasks regardless of their proficiency. In order to overcome speaking anxiety, some learners usually prioritize self coping strategies. Martiningsih et al. (2024) revealed that most learners did relaxation and preparations as their coping strategies to overcome speaking anxiety. Moreover, peer seeking and positive thinking were also employed as learners' strategies. However, AI chatbots may offer an alternative approach by simulating real-time speaking practice in a low-pressure environment. Kim & Su (2024) explored the use of Danbee, an AI chatbot in oral communication, as an intervention. The finding showed that Danbee significantly reduced speaking anxiety by creating a safe and flexible interaction space. Learners reported increased willingness to communicate (WTC) due to personalized support and structured practice opportunities.

Beyond chatbots, automated writing evaluation (AWE) tools like Grammarly and SVVR-AWE have demonstrated potential in reducing writing-related FLA while

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improving learners' confidence and writing quality. Dizon & Gold (2023) observed a 16.6% reduction in writing anxiety among Japanese EFL learners using Grammarly for weekly assignments. Learners appreciated the tool's detailed, constructive feedback, which enhanced their linguistic awareness and confidence. Wang et al. (2022) introduced an immersive approach combining spherical video-based virtual reality (SVVR) with automated writing evaluation, leading to reduced writing anxiety and improved self-efficacy. The engaging and interactive nature of the virtual environment fostered motivation and reduced fear of judgment, reinforcing the potential of immersive AI technologies. Furthermore, D. Wang (2024) compared AI-generated feedback (Poe Application) with teacher-provided and no-feedback conditions among EFL learners in China. The AI feedback group exhibited the most significant reduction in writing anxiety, outperforming both the teacher-feedback and no-feedback groups. Learners found AI-generated feedback to be less intimidating than instructor feedback, reducing anxiety related to performance evaluation. However, limitations in AI-generated feedback were noted, including the lack of detailed explanations for complex errors and its inability to adapt to context-specific challenges.

AI-assisted assessments also play a role in reducing anxiety and encouraging positive attitudes toward language learning. Biju et al. (2024) compared AI-assisted assessments with paper-based evaluations among Bangladeshi learners. The experimental group, which used ChatGPT for writing tasks, reported significantly lower FLA and more positive attitudes toward learning. However, the improvement in writing performance was not statistically significant, suggesting that long-term interventions may be necessary to realize cognitive gains. Similarly, Elsayed et al. (2024) investigated AI-assisted exams with teacher support. The study revealed that learners who received both AI and teacher guidance reported lower anxiety levels than those in the control group. These findings highlight the importance of integrating AI technologies with human guidance to optimize learning outcomes and emotional support.

These findings align with prior research on AI's role in language learning. Park et al. (2022) introduced "FreeTalky," a humanoid robot employing persona-based

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dialogue, which effectively reduced foreign language anxiety by providing a non-judgmental conversational partner. Similarly, Yuan & Liu (2025) found that AI applications like Duolingo significantly improved learner engagement and motivation, indirectly contributing to reduced anxiety levels. These studies reinforce the conclusions drawn by Alrajhi (2024) as well as Kim and Su (2024), demonstrating that AI chatbots provide a supportive, low-pressure environment that reduces speaking and writing anxiety. Additionally, Dizon & Gold (2023) and Y. Wang et al. (2022) highlight the motivational benefits of AI-assisted writing tools, showing that AI-generated feedback not only reduces anxiety but also enhances linguistic confidence and motivation.

While most studies emphasize AI's benefits in reducing FLA, some studies also present contrasting findings. While chatbots and AI tools have been effective in many contexts, they have not consistently reduced anxiety levels across all skills. Çelik et al. (2024) and Zheng (2024) found that ChatGPT-simplified texts improved reading comprehension and inferencing skills but failed to significantly reduce reading anxiety. These results are in line with Hawanti and Zubaydulloevna (2023), who found that AI chatbots did not significantly reduce learners' anxiety levels in English writing classrooms. Additionally, Yamaoka (2024) found that high-proficiency learners experienced increased anxiety when ChatGPT provided overly critical feedback. While lower-proficiency learners appreciated constructive input, high-proficiency learners perceived the feedback as undermining their confidence.

Wen et al. (2024) also noted that learners' apprehensions about AI replacing regular learning process and job prospects contributed to anxiety. Social influence emerged as a critical factor in shaping learners' acceptance of AI tools, suggesting that broader socio-cultural dynamics impact emotional responses to AI integration. These findings suggest that while AI contributes to cognitive development, anxiety reduction may require additional pedagogical strategies beyond comprehension improvement.

Given the evidence from these studies, they show that significance of teacher involvement in EFL learning remains crucial. AI technologies alone may not fully

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address learners' emotional and academic needs. D. Wang (2024) found that while AI-generated feedback effectively reduced writing anxiety and improved linguistic accuracy, learners still required teacher support to interpret feedback effectively. Similarly, Elsayed et al. (2024) emphasized the need for teacher guidance in AI-assisted assessments to provide emotional support and ensure academic growth. Moreover, Wen et al. (2024) found that fears surrounding AI replacing regular education environment contributed to anxiety. The findings indicated that AI cannot be fully used as the only educator, but it can be an additional teaching media or resources. To be assumed, teacher presence is still highly necessary in AI-integrated classrooms. This variation suggests that the effectiveness of AI tools in anxiety reduction depends on factors such as implementation strategies, learner differences, and learners' environments.

While this review highlights AI's role in reducing foreign language anxiety, several limitations should be acknowledged. First, the majority of studies focused on short-term interventions, making it unclear whether anxiety reduction effects persist over extended periods. Future research should explore longitudinal studies to assess the sustained impact of AI tools on language learning anxiety. Second, individual learner differences, including proficiency level, cognitive style, and technology familiarity, may influence the effectiveness of AI tools. More research is needed to examine how these factors interact with AI-based interventions. Third, while AI has been shown to reduce writing and speaking anxiety, its impact on reading anxiety remains inconsistent. Further studies should investigate how AI can be optimized to support reading comprehension while addressing affective barriers. Additionally, socio-cultural influences on AI acceptance and anxiety warrant further exploration, as highlighted by Wen et al. (2024), who found that social factors significantly shaped learners' attitudes toward AI.

Lastly, future research should examine hybrid approaches that combine AI with teacher-led instruction to maximize learning benefits. As studies by Elsayed et al. (2024) and D. Wang (2024) suggest, AI alone may not be sufficient to fully support learners' emotional and cognitive development. A balanced integration of AI and

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human intervention may provide the most effective strategy for addressing both cognitive and affective challenges in EFL learning. Additionally in speaking-related context, further research on the coping strategies to overcome speaking anxiety should be conducted. It is needed to compare AI-based interventions with conventional anxiety management strategies.

Conclusion

This systematic review highlights the various effects of AI tools on foreign language anxiety (FLA) in academic environments. The findings indicate that AI tools such as chatbots, automated writing evaluation systems, and immersive technologies can significantly reduce FLA by offering personalized feedback, creating individual learning spaces, and strengthening learner autonomy. For instance, tools like Tutor Mike and Grammarly demonstrated notable progress in reducing writing and speaking anxiety. Similarly, immersive systems like SVVR-AWE were effective in enhancing motivation and self-efficacy while lowering writing anxiety. However, the review also revealed challenges, such as technical limitations, as observed in some studies. AI tools often struggle to replicate the nuanced feedback provided by human instructors, emphasizing the importance of teacher involvement in AI-assisted learning.

The primary limitations of this study include the narrow focus on peer-reviewed articles available in English and the exclusion of gray literature, which may overlook valuable perspectives. Moreover, most studies reviewed were short-term, limiting insights into the long-term effects of AI tools on FLA.

Recommendation for additional research may explore longitudinal impacts, consider diverse learner demographics, and investigate the interplay between AI tools and socio-cultural factors. Additionally, studies should focus on developing hybrid models that integrate AI tools with teacher interventions to address both cognitive and affective dimensions of learning.

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