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Integration of Chatbots in Additional Language Education: A Systematic Review*

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Abstract: This comprehensive systematic review delves into the increasing prevalence of integrating chatbots into language education. The general objective is to assess the current landscape of knowledge regarding chatbot utilisation and its influence on three crucial elements: students' skills, attitudes, and emotions. Additionally, the review seeks to scrutinise the advantages linked to incorporating chatbots in foreign language teaching, exploring their potential benefits while considering limitations and potential negative impacts on specific skills or user experiences. Consequently, this research offers valuable insights into the application of chatbots in foreign language education, shedding light on their potential advantages and areas that warrant further exploration and enhancement. The integration of chatbots in language learning, despite certain limitations, generally yields positive outcomes and enhances educational results in students' skills. Its characteristics can also influence a language learner's attitude, impacting factors such as motivation, interest, autonomy in learning, and engagement or even their sense of fun. Additionally, chatbots prove to be helpful in creating emotionally positive learning environments and can contribute to boosting students' self-esteem and self-confidence.

Keywords: *Artificial intelligence, chatbot, computer-assisted learning language, foreign language learning.*

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Introduction

Chatbots communicate in one or more languages and, thanks to their various features, have found wide application in numerous areas in the 21st century (Regona et al., 2022), including the education sector. In recent years, there has been a surge in the popularity of chatbot technology, with increasing integration into various educational domains. It is primarily used for automating educational processes, such as responding to frequently asked questions, thereby alleviating student query overload and streamlining various administrative processes. However, there is also a growing trend in the use of chatbots for teaching, generating knowledge on specific topics, and promoting learning (Pérez et al., 2020). Chatbots can also support academic research conducted by students by providing guidance on effectively developing research findings (Okonkwo & Ade-Ibijola, 2021), assisting in information retrieval from various sources, and as well as connecting students from different disciplines to acquire practical knowledge related to their profession (Paschoal et al., 2018). As indicated by research conducted by Nee et al. (2023), chatbots can be effectively deployed in various fields of study, not only in the areas of language and art but also in the fields of science, technology, engineering, and mathematics.

An increasing amount of research is being conducted on the impact and potential applications of chatbots in language teaching and learning. According to Moeller and Catalano (2015), foreign language learning refers to learning and teaching a foreign language and communicating in it outside the environment in which it is usually used. Currently an important direction of research on how to best teach foreign languages is to search for and use new media and technologies. Technology introduces a new dimension to the teaching and learning process, which in recent years has also included the use of tools equipped with artificial intelligence, such as chatbots.

A chatbot is a program that can imitate a human conversation (Tatai et al., 2003). A chatbot is an artificial intelligence system designed to simulate human conversation and perform various tasks such as providing information or assisting

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with education (Adamopoulou & Moussiades, 2020). While rudimentary chatbots emerged in the mid-to-late 20th century, it wasn't until the late 2010s and early 2020s, with the rise of AI, that they became more advanced and widely accessible (Gisonna, 2024). Today's chatbots process natural language input from users and generate responses using predefined rules and templates. With the advancement of deep learning, neural network-based chatbots have become more prevalent and capable of generating relevant and grammatically correct responses (Agarwal & Wadhwa, 2020).

Computer Assisted Language Learning (CALL), including the use of chatbots in the process of learning and teaching foreign languages, can potentially change the roles that students and teachers perform in traditional classrooms. This tool can be helpful in designing tasks and supporting individual and personalized learning tasks (Moeller & Catalano, 2015; Wollny et al., 2021). Many studies have highlighted the potential benefits of incorporating technology into foreign language teaching methods, including improved proficiency and fluency, greater opportunities for language exposure and practice, improved student motivation and engagement (Y. F. Wang et al., 2017), and a more tailored and interactive learning experience (Mohamed, 2023). Chatbots communicate in one or more languages, and thanks to other features, they have found wide application in many areas in the 21st century, including the education sector. More and more research is being conducted on the impact and possible applications of chatbots in language teaching and learning.

According to Huang et al. (2022), chatbots used for language teaching can be a useful tool due to their capabilities, personalization, ease of use, and wide range of applications. They can serve not only as simple conversation partners but also provide users with various information, recommendations, and educational assistance. For example, they can help users develop their communication skills.

The literature review highlighted various features and applications of chatbots, thus enabling the identification of research gaps. Conducting a systematic review has revealed gaps regarding the utilization of chatbots in foreign language learning and teaching, primarily evidenced by disparities in research outcomes. Despite the assertion of several studies regarding the potentially positive impact of chatbots on language skill development, significant variations exist in the extent of their utility, with some even suggesting a limited influence on student language proficiency due to the influence of digital tools on student attitudes and emotional states. Moreover, the effects of chatbots on student attitudes and emotional aspects are not fully understood. Some studies highlight potentially positive effects in reducing speaking anxiety or enhancing self-worth and motivation (H.-L. Chen et al., 2020; Kohnke, 2023; K.-A. Lee & Lim, 2023; Wallace, 2016; Yildiz Durak, 2023; Zhai & Wibowo, 2022) while others indicate that these effects may be transient due to novelty effects (J. A. Chen et al., 2016; Çakmak, 2022; El Shazly, 2021; L. K. Fryer et al., 2019).

These gaps and uncertainties in the literature underscore the need for further exploration of various variables to optimize the effectiveness of chatbots in teaching different language skills and to support positive student attitudes and emotional aspects, ultimately contributing to the enhancement of the entire teaching process.

The research questions covered in detail in this study are as follows:

RQ1. What skills are affected by using chatbot interaction?

RQ2. How does the use of a chatbot affect students' attitudes towards learning a foreign language?

RQ3. How does the use of a chatbot affect the students learning a foreign language's emotional aspect?

Methodology

To evaluate the key benefits and limitations associated with using chatbots in foreign language teaching, this study employed a systematic literature review (SLR) following the PRISMA (Page et al., 2021) methodology. The PRISMA framework ensures transparent and comprehensive research reporting by setting research goals, addressing research questions, specifying search keywords, and establishing inclusion and exclusion criteria. This systematic review aims to identify the primary benefits of using chatbots in language teaching and learning. The study searched for open-access articles in the Web of Science and ERIC databases. The contribution of this research lies in providing a systematic literature review of the potential benefits of chatbot integration in second language learning, as well as describing the advantages and disadvantages of specific chatbot functions.

In the literature review stage, the inclusion criteria were scientific articles peer reviewed that were searched. The exclusion criteria consider those articles that were not relevant or did not address this topic specifically, as well as other publications of different nature such as books, chapters of books, dissertations, etc. Selected articles were analysed according to established categories.

The main purpose of the study was to collect existing research and knowledge on the impact of the use of a chatbot from all levels on the process of learning and teaching a foreign language, especially on students' skills, their attitudes, and emotional aspects. For this purpose, criteria for selecting items in two databases (Web of Science and ERIC), were established, which are presented in the table below:

Table 1. Research Criteria

database	ERIC / WOS
search fields	title of the work, abstract, keywords
search terms	Chatbot, L2, language, education, learning, foreign language, English, didactics
boolean operators	y/and
period	limited:10 years (2013-2023)

As a result of the selection of such criteria at the start of this systematic literature review, a total of 4,635 items were found in both. The table below shows the distribution of the number of items by database and keywords.

Table 2. Initial Document Search

Key Words	**Number of Documents per Database**	
	ERIC	**Web of Science**
chatbot + language	32	955
chatbot + L2	9	13
chatbot + language + education	9	204
chatbot + foreign + language	11	43
chatbot + english	11	2717
chatbot + didactics	1	0
chatbot + education	30	600

The selection process for the articles included in this systematic review initially involved filtering results from two selected databases to include only those published within the last decade. These articles had to contain keywords selected for searching publications in the Web of Science and ERIC databases, utilising Boolean operators and combining two chosen keywords aimed at finding articles discussing the use of chatbots in educational processes, particularly in language teaching. These criteria aimed to explore the latest trends while considering broader changes in this topic over the past decade. Publications other than articles, systematic reviews, and early access were excluded from this study. Duplicate entries accumulated from various searches were removed. Subsequently, based on the abstracts of the articles initially qualified for this review, those focusing on the utilization of chatbot technology in language education were selected, rejecting articles addressing chatbots' use in unrelated fields not strictly associated with foreign language teaching. The final stage of publication selection in this review occurred after reading the entire article. If the sought-after information for this review was not found therein, the publication was also rejected in the final phase of article selection.

Other factors such as types of conducted studies and their methodologies, participants' age and language proficiency levels, as well as other factors like gender and socio-economic status, did not influence the publication selection process. The systematic review included all encountered sources that fit the previously described criteria regarding the topic under consideration. Consequently, the depiction provided in this publication presents various perspectives, uses, and research findings regarding the utilisation of chatbots in foreign language teaching. PRISMA graphics are shown below:

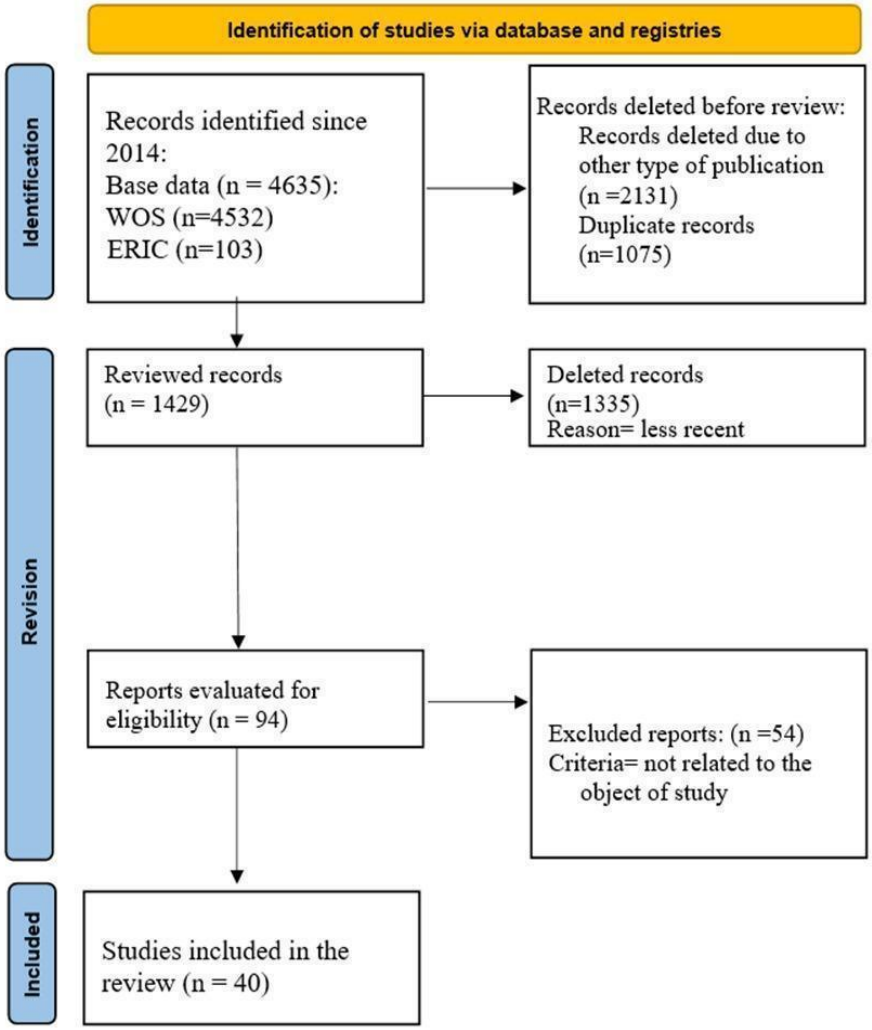

Figure 1. Review Flow Process

The articles listed in Table 3 have been classified into three categories depending on the main aspects affected by using a chatbot in the process of teaching and learning a foreign language, which has been analysed in this review. These aspects are the development of different skills in students and the attitude and emotional aspects. Then, each of these categories was divided into sub-components considering different skills and different emotions and attitudes. The table contains articles that have focused on the study and review of particular topics, allowing you to see some trends and popular issues in the work of various authors. The articles contained in Table 3 will appear at Annex 1.

Table 3. Results of Categories and Codes

Categories	Codes	Publications
Learning Achievement	Skills (written, oral, listening, and reading)	[1] [2] [4] [5] [7] [8] [13] [14] [15] [18] [20] [21] [41][22] [24] [25] [26] [28] [33] [36] [41]
	Vocabulary learning	[3] [5] [7] [9] [11] [15] [20] [29] [37]
	Grammar learning	[11] [15] [20] [27] [29] [36] [37]
	Communication skill	[3] [5] [18] [20] [21] [26] [41]
Attitude Aspect	Motivation	[3] [4] [5] [7] [8] [10] [11] [16] [17] [18] [21] [25] [26] [27] [28] [34] [36] [37] [38] [39]
	Interest	[1] [3] [10] [11] [12] [14] [16] [19] [33] [36]
	Fun (entertainment)	[6] [7] [8] [10] [24]
	Proactivity (referring to autonomy)	[3] [8] [11] [16] [19] [21] [36]
	Learning commitment	[1] [3] [4] [12] [16] [23] [24] [32] [35] [38] [39] [41]
Emotional Aspect	Anxiety	[3] [5] [13] [14] [18] [20] [21][28] [29]
	Emotional comfort	[3] [4] [6] [8] [25] [33]
	Self-confidence	[1] [16] [38]
	Self-esteem	[3] [18] [21] [32] [39]

Data analysis

To create this article, a systematic review methodology was employed, which enhances the credibility of the study through clear selection criteria and comprehensive analysis of available evidence, allowing for better inference and identification of research gaps. However, acknowledging the limitations of the systematic review methodology is essential for research credibility and transparency. Despite efforts to conduct thorough searches in selected databases, gaps may arise due to variations in terminology and indexing. Additionally, inclusion criteria, such as focusing on a specific time period or language, may limit the scope of the review and overlook valuable insights.

Once the articles forming the sample were selected, an expert conducted the initial qualitative analysis, extracting three main categories and codes. Subsequently, a general scheme was developed. This scheme was then reviewed by another expert, who re-examined the articles. After adjusting the scheme by this second expert, all articles in the sample were coded to analyse the results.

The analysis of studies on chatbots in education, especially foreign language learning, reveals diverse research efforts. Studies like [1] and [3] explore chatbots' effectiveness in English lessons and empathic strategies, while [4] and [5] scrutinize their impact on writing skills and language learning outcomes. Investigations such as [6] and [7] delve into perceptions and impacts on vocabulary acquisition, while [8] and [9] focus on systematic reviews and pedagogical implications.

Moreover, studies like [10] and [11] assess chatbot applications for vocabulary learning and basic language acquisition, while [13], [14], and [20] address mitigating detrimental effects on language learners. Further research, like [15] and [16], examines technological and psychological aspects, while [18] and [19] explore chatbots' impact and potential.

Additionally, studies like [21] and [22] propose innovative architectures, [23] and [24] integrate chatbots with CALL systems, and [25], [26], and [27] scrutinize linguistic accuracy and pedagogical implications. Further investigations, like [28], [29], and [30], explore cognitive and motivational aspects, while [31], [32], and [33] discuss emerging trends and educational roles.

Moreover, research such as [34], [35], and [36] proposes innovative applications, [37], [38], and [39] design task-oriented chatbots, and [40] focuses on narrative-focused interactions to enhance language learning efficiency, offering insights into pedagogical strategies and technological innovations in language education.

Findings

Given the wide range of studies analysed, the results are extensive and varied. To provide an overall structure to these findings, this section has been divided into three subsections. The first focuses on the impact of the chatbot on the development of various skills of students during the process of teaching and learning a foreign language. The second subsection considers the impact of the use of a chatbot in teaching a foreign language on the student's attitude, and the third subsection focuses on the impact of the chatbot on the student's emotional sphere.

Learning Achievement

The authors included in this review largely focused on the chatbot's affordances in terms of learning the various skills needed in the process of learning a foreign language, such as speaking, listening, writing and reading skills, as well as knowledge of grammar, vocabulary, and communication. Their conclusions and research results, both positive and negative, are described in the following sections:

Skills

Research conducted by Zhang et al. (2023) utilised a meta-analysis of diverse samples from various studies examining students across elementary, secondary, and university levels, demonstrating the superiority of digital tools like chatbots in language learning over traditional methods. Chatbots, offering diverse functions, significantly enhance students' language skills, as noted by Abu Shawar (2017) in her documentary study. However, the optimal language proficiency level for maximising chatbots' effectiveness is still under debate. While some scholars argue for their benefits for low to intermediate learners (Çakmak, 2022; Kim et al., 2019; N. Wang et al., 2008; Yang et al., 2022; Yin & Satar, 2020), others question their advantages for those with lower language proficiency (Yin & Satar, 2020). Utilising various approaches, such as mixed methods (Çakmak, 2022; Yang et al., 2022; Yin & Satar, 2020) or quantitative (N. Wang et al., 2008). All participants in the studies were university students, except in the study by Yang et al. (2022), which included children and adolescents aged 10-15.

Researchers are currently focusing on developing foreign language speaking skills, where chatbots offer valuable support. Çakmak (2022) underlines their significance for students without regular L2 conversation partners, highlighting their role in facilitating language exposure, enhancing task engagement, and increasing interaction frequency. Similarly, El Shazly (2021) conducted a quasi-experimental mixed model study involving undergraduate students, while Bibauw et al. (2019) and Kim et al. (2019) conducted documentary studies, all of which found that chatbots significantly improved

students' speaking skills and motivation for further language development. Martinez-Quezada et al. (2022) conducted a quantitative study involving 10 participants, ranging in age from 14 to 35, with diverse nationalities (Mexican and American) and varying language proficiency levels. Their research highlights the potential of chatbots, particularly the mispronunciation function, in enhancing students' pronunciation in a foreign language.

Moreover, chatbots show the potential to develop listening skills. While limited research exists, as indicated by Kim (2018b), recent studies by Mohamed (2023), which involved university participants and employed qualitative methods, engagement and Chien et al. (2022), which included high-school students and used quasi-experimental quantitative methods, recognize chatbots as valuable tools for enhancing language proficiency, particularly in speaking and listening. Furthermore, chatbots have been shown to enhance writing skills in a foreign language, addressing grammar, composition, and other written forms (L. K. Fryer et al., 2019; Kohnke, 2023; Kohnke et al., 2023). Utilizing mixed methods (L. K. Fryer et al., 2019; Kohnke, 2023) and technology review (Kohnke et al., 2023), these studies argue for the effectiveness of chatbots in language learning. Similarly, chatbots contribute to the development of reading skills by providing one-on-one interaction and generating comprehension questions, as demonstrated in studies with university students using mixed methods (H.-L. Chen et al., 2020) and technology review (Kohnke et al., 2023).

Vocabulary Learning

Chatbots are extensively researched for their role in vocabulary learning. Quantitative studies by Kim (2018a) conducted with college students and the meta-analysis study by H. Lee and Lee (2022) suggest that presenting vocabulary independently enhances its learning effectiveness. Using chatbots as a foreign language learning tool allows students to practice expressions and vocabulary. Chatbot exercises aid word association, improve receptive skills, and enhance vocabulary recall (Zhai & Wibowo, 2022), as indicated in their systematic review study. ChatGPT, as noted by Kohnke et al. (2023), simulates authentic interactions, helping students understand word meanings in context and correcting errors through definitions and examples. H.-L. Chen et al. (2020) confirm that students find chatbots useful, enjoyable, and easy to use, enhancing vocabulary memory through features like generating multiple-choice questions and providing feedback. Combining chatbots with gamified elements makes vocabulary learning more enjoyable and facilitates the acquisition of new words (Polyzi & Moussiades, 2023), as indicated in their quantitative study conducted with twenty proficiency-level students in an English course.

Grammar Learning

The authors also suggest using chatbots to improve foreign language grammar skills and knowledge. While Coniam (2014) noted in his mixed-method study, which involved an evaluator who was an ESL teacher chatting with different chatbots and assessing their accuracy and grammatical level in their responses, that chatbots can provide grammatically acceptable responses, they also sometimes offer nonsensical replies, indicating their incomplete reliability as conversation partners.

However, recent studies show the increasing usefulness of chatbots in enhancing students' grammar knowledge. Haristiani et al. (2022) demonstrated in their quantitative research, which involved vocational students, that Gengobot's features align with basic Japanese learning materials, making learning easier for students. Additionally, Hsu (2022), in quantitative research conducted with university students, found that learners feel more comfortable talking to chatbots than to peers or teachers, improving verbal memory, cognitive balance, vocabulary, and spelling. Moreover, chatbots can help practice correct punctuation and syntax (Vázquez-Cano et al., 2021), as indicated in their quantitative study with university students.

Communication Skills

The authors emphasize the importance of developing communication skills, an essential part of the foreign language curriculum. AI-based chatbots offer a flexible and interactive approach to language learning, stimulating effective communication skills, as shown in a mixed methodology study by Timpe-Laughlin et al. (2022), which involved 16 female ESL teachers. Interaction with technology enhances students' willingness to communicate, especially for beginners, as indicated in mixed-method studies conducted by Peng and Woodrow (2010) with university students and by Tseng (2018) with junior high students. Martinez-Quezada et al. (2022) emphasize the benefits of AI-based chatbots in developing language skills through a student-centered approach.

Chatbots provide instant feedback, motivating students to interact and enhance their communication skills (Zhai & Wibowo, 2022). Kim (2016) suggests in her quantitative research that chatbots reduce anxiety related to foreign language learning, encouraging university students to communicate more. Mohamed (2023) highlights the personalized and interactive practice offered by chatbots for communication skills development, while storybots provide models for real-life conversations (Bailey et al., 2021), as indicated in their quantitative study involving university students. Despite potential grammatical errors, practicing with chatbots encourages communication skill development (Tseng, 2018).

Attitude Aspects

According to Smith (1971), attitudes are relatively stable belief organizations that predispose individuals to preferential responses. These attitudes, though durable, can be learned or unlearned, especially in language teaching contexts (Oroujlou & Vahedi, 2011), as indicated in their descriptive literature analysis. The influence of the situation, including a student's personality traits and openness, strongly shapes their attitude towards language and language learning. Researchers also examined how chatbot use affects various aspects of student attitudes.

Motivation

Various studies have shown that integrating chatbots with CALL technology significantly impacts students' motivation to learn a foreign language. In Kohnke's (2023) study, quick answers from a chatbot positively impacted students' motivation, especially when encountering learning difficulties. Yildiz Durak (2023) in his mixed-methods research emphasizes that an interactive agent like a chatbot can motivate university students with a personalized approach to their skill level. Teaching with a chatbot sustains the motivation of beginning students and children, contributing to continuous learning progress (K.-A. Lee & Lim, 2023), as indicated in their mixed-method study.

Qualitative research by Mohamed (2023), Mixed-methods study of Ebadi and Amini (2024) conducted on 256 EFL learners, and study of Yan (2023) conducted on university students confirm that chatbots enhance students' motivation, fostering a desire to learn languages. Additionally, Leonardi (2010) suggests that chatbots help teachers quickly assess progress and design exercises tailored to areas needing improvement. Introducing competitive elements, as described by H.-L. Chen et al. (2020) and Wallace (2016) in their mixed-methods studies conducted with university students, further boosts students' motivation. However, some researchers, such as El Shazly (2021), argue that chatbots, lacking a *human factor*, may fail to meet emotional needs and decrease motivation.

While chatbots have mastered certain aspects of grammar, they have yet to reach the level that would allow them to pass the Turing Test. Despite this, chatbots remain a subject for further research to enhance language learning motivation (Coniam, 2014).

Interest

Many studies highlight the role of chatbots in arousing students' interest and motivation in language learning. Chatbot applications can either increase or decrease students' motivation for further exercises, as indicated in mixed-method research by Heller et al. (2005) conducted on university students and a systematic review by Sivabalan and Ali (2019). Additionally, Goda et al. (2014) conducted a quantitative study on university students, and L. K. Fryer et al. (2020) conducted a documentary study, emphasising that chatbots contribute to designing enriched learning scenarios with automatic assessment functions and instant feedback, impacting student effort, learning performance, and interest.

The feedback function of chatbots is crucial for language skill development, enhancing users' feelings with support and feedback, thus increasing interest in the topic (Vázquez-Cano et al., 2021). Chatbot technology, offering audio-visual affordances, serves as a partner in spoken language practice, often with a more authentic accent, further elevating interest (Çakmak, 2022). However, unclear answers or interruptions can quickly diminish user engagement (L. K. Fryer et al., 2020), and the novelty effect may decrease motivation over time (J. A. Chen et al., 2016; L. K. Fryer et al., 2019). Continued research is necessary to understand chatbots' impact on student motivation and interest in foreign language learning (L. K. Fryer et al., 2017). L. K. Fryer et al. (2017) conducted their study with university students, while J. A. Chen et al. conducted a mixed-method study with middle-school students.

Fun

The use of chatbots in teaching and learning a foreign language offers students a new and exciting way to improve their language proficiency. The integration of multimedia features, games, and quizzes enhances students' positive feelings, promoting both the pleasure of learning and motivation, as indicated in Polyzi and Moussiades' (2023) quantitative research and in M. P.-C. Lin and Chang's (2020) mixed-method study conducted on university students.

Proactivity (referring to autonomy)

In the context of interaction with chatbots, authors often emphasize increasing students' autonomy in learning a foreign language. Chatbots possess characteristics such as attractiveness, interactiveness, and flexibility, which support students' autonomy and independence in learning (Haristiani et al., 2022). According to Yildiz Durak (2023), chatbots provide an alternative autonomous learning environment, fostering independent decision-making without fear of mistakes, as evidenced by Mageira et al.'s (2022) mixed-method study conducted on university students.

Personalization enhances student involvement, autonomy, and intrinsic motivation (Vázquez-Cano et al., 2021), leading to improved self-regulation and learning strategy control (Al-Abdullatif et al., 2023), as demonstrated in a quantitative study conducted on university students. In a chatbot learning environment, students can better plan, manage, and monitor their learning, including goal setting, learning progress tracking, self-testing, and self-monitoring.

While positive changes, such as reduced emails to teachers about homework and increased student willingness to tackle unfamiliar language tasks and challenges, have been observed (Kohnke, 2023), concerns such as privacy and unfamiliarity may impede autonomy and decision-making (Yildiz Durak, 2023), as individual user factors may hinder independent choices.

Learning Commitment

Authors frequently highlight the positive impact of chatbots on student engagement in language learning (Zhai & Wibowo, 2023). Yan (2023), Yildiz Durak (2023) and Y. Chen et al. (2023) emphasize increased engagement, self-efficacy, and satisfaction due to technology-enhanced learning, with feedback playing a crucial role. Many studies indicate that students are more likely to engage in well-structured speaking practices embedded in context and linked to a dialogue system such as chatbots (Li et al., 2020), as indicated in their mixed-method study conducted on beginner level learners. Features like notifications help students prepare, and immediate feedback stimulates an active learning process, enabling students to engage actively in class (Epstein et al., 2002; Lo & Hew, 2023), as indicated in their review (Lo & Hew, 2023) and in the quantitative study conducted on undergraduate students (Epstein et al., 2002)

Providing enough feedback makes students feel valued and relaxed (H. Lee & Lee, 2022), and feedback is responsible for the sense of perseverance necessary for language learning (L. K. Fryer et al., 2020). Chatbots provide students with immediate and high-quality feedback during the learning process to reduce the difficulty of seeking help in learning (Y.-F. Lee et al., 2022). However, M. P.-C. Lin and Chang's (2020) study suggests that while low-level language learners benefit, high-level learners may express dissatisfaction and lower involvement.

Emotional Aspects

Emotions, defined as subjective and conscious feelings that evoke spontaneous reactions (Ross, 2015), have gained significant attention in education (Martínez Agudo, 2018). The authors included in this review also included in their works research and conclusions regarding various elements describing the emotions of chatbot users in the context of using this tool in the process of teaching and learning a foreign language.

Anxiety

Chatbots can be beneficial tools for reducing language-related anxiety, although findings are inconsistent. While Zhai and Wibowo (2022) suggest that AI dialogue systems may decrease students' fear of speaking, El Shazly (2021) found that anxiety levels were not alleviated. Çakmak (2022) also found chatbots ineffective in reducing fear of speaking, attributing this to communication difficulties and frustration. The novelty effect of chatbots, initially boosting motivation and interest, may diminish over time (J. A. Chen et al., 2016; L. K. Fryer et al., 2019).

The effectiveness of chatbots in reducing anxiety depends on factors such as interaction quality, chatbot design, and students' perceptions of its role in language learning. While chatbots may not be ideal for reducing language-related anxiety, more advanced conversational systems may be more effective in addressing this issue.

Emotional Comfort

Research emphasizes the importance of providing students with emotional comfort, which contributes to positive educational outcomes. Chatbots play a crucial role in providing this comfort. Kohnke (2023) highlights that chatbots enable timely teaching and explanation, comforting students when they encounter knowledge gaps. Chien et al. (2022) found that students felt more at ease using a chatbot compared to interacting with a real partner. Bibauw et al. (2019) demonstrated that introducing a dialogue-based chatbot reduced students' nervousness during language exercises, fostering engagement. H. Lee and Lee (2022) observed that chatbots actively involve students in the learning process, offering valuable feedback that makes interactions more relaxing and friendlier, positively influencing academic performance.

Self-Esteem and Self-Confidence

In the scientific literature, the relationship between self-esteem and self-confidence is often emphasized, especially in the context of using chatbots in the process of teaching and learning foreign languages. Self-esteem, encompassing positive and negative feelings about oneself, fluctuates due to factors like self-perception and external opinions (Jhangiani & Tarry, 2022). On the other hand, self-confidence involves believing in one's abilities, with healthy self-esteem positively influencing self-confidence (Rubio, 2007).

Research indicates that utilizing chatbots enhances students' self-confidence and task performance compared to traditional methods (Al-Abdullatif et al., 2023; Chang et al., 2022; H.-L. Chen et al., 2020; Pérez et al., 2020). Pérez et al. (2020) highlighted this positive impact in their systematic literature review. Students who enjoy chatbot interactions tend to exhibit heightened self-confidence. The ease of using chatbots positively influences students' language skills and self-esteem, fostering confidence in communication abilities (Bailey et al., 2021).

H. Lee and Lee (2022) highlight chatbots as tools that actively engage students, boosting self-confidence and motivation through instant feedback. They prove beneficial in overcoming communication barriers, particularly for Asian students hesitant to approach teachers with questions (Stowell et al., 2010), as indicated in their quantitative study conducted on university students. The personalized and interactive nature of chatbots contributes to a more comfortable language learning environment, as evidenced by Mohamed's (2023) study on ChatGPT.

Teachers also acknowledge the positive impact of chatbots on students' self-confidence (Timpe-Laughlin et al., Tunçel, 2015; C.-J. Lin & Mubarok, 2021), with Lin and Mubarok specifically highlighting this in their quantitative study conducted on EFL students. In summary, integrating chatbots into language education enhances students' self-confidence, positively influencing their self-esteem, motivation, and engagement.

Discussion

The aim of this work was to discover the relationship between the use of chatbot technology and the development of students' language skills, as well as the impact of this tool on the emotional aspects and attitudes of students. Thanks to this, it is possible to have a general view of the current state of knowledge in this matter and to isolate topics that require further research in order to enable the research and then the best application of new technology in order to improve the process of learning and teaching a foreign language. Furthermore, it was possible to outline the main areas of interest of researchers over recent years. The authors' research encompasses responses to all inquiries delineated within the confines of this systematic review. Nevertheless, their degree of interest in the different spheres scrutinised in this study exhibits a certain level of non-uniformity.

The authors displayed the highest level of interest for matters of learning achievement and attitude aspects. Subsequently, they demonstrated a pronounced interest in emotional aspects, with particular emphasis on the domain concerning a reduction of the problem of anxiety when conversing in a foreign language through the implementation of innovative technology. On the other hand, the areas of self-esteem and self-confidence were accorded the lowest degree of attention, which is an important point of this study, giving another perspective in which direction further research could take place.

Compared to earlier studies, current findings show both similarities and significant differences. The development of chatbot technology and artificial intelligence-based tools has led to significant changes in the functionalities of currently available chatbots compared to those described in older publications. Recent studies suggest that ChatGPT may be close to passing the original Turing test (Gams & Kramar, 2024), which represents a significant difference from previous research findings (L. Fryer & Carpenter, 2006).

As a result of analysing different studies, it can be concluded that the use of a chatbot can have varying effects on all the factors listed above, including both positive and negative ones and the limitations of using this tool in the process of learning a foreign language. The positive reception of the tool may depend on various factors, such as the manner in which it is utilized, the frequency of its use, the students' attitude toward the tool, or their already possessed language skills (Yan, 2023). Moreover, its effectiveness and numerous applications are due to its own features, such as their personalization, ease of use, automatic assessment functions, capabilities of providing information, recommendations and direct feedback to their users and simulations for transmission (Huang et al., 2022). Audiovisual affordances and playable elements are also additional useful tools in the whole foreign language learning and teaching process (H.-L. Chen et al., 2020; Wallace, 2016). These findings are consistent with earlier research by Kumar and Khurana (2012), indicating that play-related activities are naturally more engaging, and a properly designed game enhances students' motivation and effectiveness.

It has been demonstrated that chatbots can serve as a complementary tool in language education (Abu Shawar, 2017; Mohamed, 2023). This is consistent with previous research by N. C. Ellis and Bogart (2007), who suggested that Speech and Language Technology could supplement instructors' multilingual knowledge and their metalinguistic knowledge to enhance language learning. However, there is no complete agreement on this topic as to what extent it is a tool that can actually be of significant use in foreign language education, and the authors in their works also present significant limitations of the use of chatbots and negative results of research using it (J. A. Chen et al., 2016; Coniam, 2014; Çakmak, 2022; El Shazly, 2021; L. K. Fryer et al., 2019, 2020; M. P.-C. Lin & Chang, 2020; Munoz-Luna, 2015; Yildiz Durak, 2023).

When trying to answer the first research question, one may encounter the greatest interest of the authors, which, however, is not associated with an unambiguously positive reception of the tool for this purpose. Engaging with a chatbot can offer numerous benefits to students, such as enhancing speaking skills due to the possibility of working on correct pronunciation and speech patterns, which may also cause improvement in communication skills and further language development in real social interactions (Bailey et al., 2021; R. Ellis, 2005; Krashen, 1982; H. Lee & Lee, 2022; Zhang et al., 2023). These findings are consistent with previous research on the subject conducted by Kerly et al. (2006), who observed an improvement in conversational fluency and speaking proficiency through the use of a chatbot, which could support the language learning process.

As for the positive impact on listening skills thanks to the use of chatbots among foreign language learners, it has been shown that thanks to this tool, students can practice and refine this skill (Abu Shawar, 2017; Chien et al., 2022; Mohamed, 2023; Shadiev et al., 2016). These results align with earlier studies that highlighted the significance of employing tools to enhance listening skills in a foreign language, provided that the chatbot offers easy access to conversation transcripts without distractions and incorporates pedagogical features capable of suggesting corrections for students' mistakes (Coniam, 2008; Kerly et al., 2006).

Furthermore, the use of chatbots can have a positive impact on reading comprehension skills thanks to one-on-one interactions enabling more effective skill development through generating comprehension questions and reading tasks (Abu Shawar, 2017; H.-L. Chen et al., 2020; Kohnke et al., 2023). Regarding writing skills in a foreign language, a chatbot can be useful to practice writing and text comprehension, grammatical correctness, and proper paragraph and dialogue composition (L. K. Fryer et al., 2019; Haristiani et al., 2022; Kohnke, 2023; Kohnke et al., 2023; M. P.-C. Lin & Chang, 2020). These findings are consistent with previous research, which highlights that chatbots can measure students' progress in language skills by counting the number of steps needed to achieve correct spelling (De Gasperis & Florio, 2012). In addition, it can also result in more effective vocabulary learning, associating new words and expressions, improving vocabulary recall, strengthening students' memory of vocabulary, and correcting and explaining their mistakes (H.-L. Chen et al., 2020; Kim, 2018a; Kohnke et al., 2023; H. Lee & Lee, 2022; Polyzi & Moussiades, 2023). These results align with the earlier research by Stewart and File (2007), suggesting that students can anticipate improving their idiomatic knowledge.

Apart from that, it has been shown that chatbots can also have a positive impact on learning grammar and developing communication skills (Bailey et al., 2021; Kim, 2016; Martinez-Quezada et al., 2022; Mohamed, 2023; Peng & Woodrow, 2010; Tseng, 2018). Previous studies revealed various shortcomings in the functioning of chatbots, such as their limited ability to understand and generate natural language and free-flowing conversation, as well as delays in response, which may negatively affect the development of communication skills (Jia, 2009; Mazur et al., 2012). Studies indicate the usefulness of chatbots in improving student's grammar, spelling, punctuation, and syntax learning (Coniam, 2014; Haristiani et al., 2022; Vázquez-Cano et al., 2021). Furthermore, some language learners tend to feel more comfortable while talking to chatbots than with real people and it can result in demonstrating higher levels of meditation (Hsu, 2022). The results discussed above provide an answer to the first research question regarding the impact of chatbot interaction on language skills. Chatbots, despite certain limitations, prove to be valuable tools for language learning and positively influences multiple language skills in foreign language learners.

When it comes to the impact of chatbots on the attitude aspects of foreign language students, which is the focus of the second research question, the authors often discuss the topics of students' motivation, entertainment, interest, autonomy, and sense of learning commitment. Many independent studies confirm that the use of chatbots can play an important role in the process of motivating students learning foreign languages (H.-L. Chen et al., 2020; Ebadi & Amini, 2024; Kohnke, 2023; K.-A. Lee & Lim, 2023; Mohamed, 2023; Wallace, 2016; Yan, 2023; Yildiz Durak, 2023).These results align with earlier studies, which present chatbots as an innovative technology capable of increasing students' motivation to learn and promoting their autonomy by encouraging students to engage in additional tasks (Abu Abu Shawar & Atwell, 2007).

Whereas, in terms of interest, it is often brought up in conjunction with the topic of motivation. because it is precisely by arousing students' interest that these tools often turn out to be motivating, for example, through enriching learning scenarios (Çakmak, 2022; Goda et al., 2014; Heller et al., 2005; Sivabalan & Ali, 2019; Vázquez-Cano et al., 2021). Thanks to its functions, a chatbot may seem to be an exciting tool to implement into the process of teaching and learning a foreign language, especially if they are equipped with multimodal features and games. These features can further increase the satisfaction and sense of fun during classes (M. P.-C. Lin & Chang, 2020; Polyzi & Moussiades, 2023).

Apart from that, the features of chatbots can be useful in developing students' sense of autonomy and engagement in their own foreign language learning process. Besides, chatbots allow students to make their own decisions and provide personalized tasks and instant feedback, which are supposed to have a positive impact on students' involvement in interactions and their feeling of control of their own learning strategies (Al-Abdullatif et al., 2023; Y. Chen et al., 2023; Haristiani et al., 2022; Kohnke, 2023; Mageira et al., 2022; Vázquez-Cano et al., 2021; Yildiz Durak, 2023). This is consistent with the findings of previous studies, which described the use of chatbots as an activity that enhances motivation, self-confidence, and autonomy by allowing students to control the learning process and utilize various software functions (Petroni, 2012). The findings described above address the second research question, concerning the impact of chatbots on the attitudes of students learning a foreign language, proving that they may have a positive impact on students' motivation, interest, autonomy, engagement, and satisfaction.

The last topic included in this review is the answer to the third question of what impact the use of a chatbot in the process of teaching and learning foreign languages may have on the emotional aspect of students. The authors included in this systematic review mentioned such advantages of its use as the ability to influence the level of anxiety from the use of a foreign language, emotional comfort, self-esteem and self-confidence of students. The problem of the fear of speaking a foreign language is well documented, and there are many studies on the possibility of reducing this anxiety by interacting

with artificial intelligence chatbots (Alemi et al., 2015; Bao, 2019; L. Fryer & Carpenter, 2006; Zhai & Wibowo, 2022; Zhang et al., 2023).

Nonetheless, the results of these studies are inconclusive, and many authors mention many limitations and even their drawbacks (Çakmak, 2022; El Shazly, 2021). Previous research indicates that using a chatbot may have a positive impact on anxiety levels, although the decrease was significant only in text chat conditions. Anxiety levels during voice chat discussions remained similar (Macaro et al., 2012).

Usefulness for its implementation results from a more relaxed atmosphere when using a chatbot than with interacting with a real partner and instant feedback, which permits reducing nervousness and increasing emotional comfort (Bibauw et al., 2019; Chien et al., 2022; Kohnke, 2023; H. Lee & Lee, 2022), and level of self-esteem and self-confidence by quickly finding knowledge gaps and being able to quickly catch up on the material. Supporting active engagement in the process of learning increases the self-confidence and motivation of students and can reduce the communication barrier of shy students who feel too ashamed to ask questions to their teachers (Al-Abdullatif et al., 2023; Bailey et al., 2021; Chang et al., 2022; H.-L. Chen et al., 2020; H. Lee & Lee, 2022; C.-J. Lin & Mubarok, 2021; Mohamed, 2023; Pérez et al., 2020; Stowell et al., 2010; Timpe-Laughlin et al., 2022). With these results presented, the third research question is answered. The findings discussed above address the third research question regarding the influence of chatbots on the emotional aspect of foreign language learning. While there are grounds to consider chatbots as imperfect tools for reducing speaking anxiety, the studies cited provide a positive view of the tool for further development and refinement. This suggests the potential for working on students' well-being and emotional comfort during foreign language learning.

Although in responding to research questions, many positive applications and results of using a chatbot in the process of learning and teaching a foreign language could be found, which may encourage further research and its implementation in the classroom and individual teaching, the authors also pay a lot of attention to the limitations of this tool, as well as its drawbacks and negative impacts. Concerning the authors' predominant areas of discussion, skill development is not the primary subject of dispute. In general, students using chatbots experience certain advantages, albeit not significantly greater ones, leading many scholars to concur that the utilization of currently accessible chatbots is a logical approach as a supplementary and adjunctive tool in the foreign language pedagogical context.

Firstly, the ideal language proficiency level for chatbot effectiveness remains uncertain. Some authors suggest low to intermediate proficiency learners may benefit from chatbots, while others argue that those with low proficiency may not gain as much (Çakmak, 2022; N. Y. Kim et al., 2019; N. Wang et al., 2008; Yang et al., 2022; Yin & Satar, 2020). These findings are consistent with earlier research by Jia (2009) on this topic, which categorized chatbot dialogues into two types: free (unlimited), which is most beneficial for proficient language users, and given (limited), which is more useful for users with weaker language skills.

Although numerous publications have documented the advantages of incorporating chatbots in foreign language education, certain studies view them primarily as auxiliary tools in the process of teaching speaking skills, yielding limited advantages in the language learning process (Çakmak, 2022). The same problem applies to the use of chatbots to learn writing skills in a foreign language, because, as much chatbots may be a beneficial tool for practicing a variety of topics in writing exercises, some authors point to some limitations related to interacting with chatbot, especially in the case of practicing academic forms (Munoz-Luna, 2015). What is also raised by some authors is the fact that still many chatbots do not have a real high level of grammatical correctness (Coniam, 2014).

To a considerably high degree, the authors engage in a discourse regarding the influence of the chatbot on the students' attitudes and emotional aspects, which subsequently affect their skill development. On the topic of motivation, a different opinion presents a chatbot as a tool devoid of ¨human factor,¨ which, instead of motivating, demotivates students (El Shazly, 2021). The authors do not reach complete agreement with the topic of the chatbot's impact on students' interest as well. Some studies, instead of an increase, mention a decrease in interest in users of chatbots (L. K. Fryer et al., 2020) and the concept of the "novelty effect", where chatbots can enhance students' motivation and interest only at the beginning (J. A. Chen et al., 2016; L. K. Fryer et al., 2019) They may initially arouse great interest but also can arouse anxiety, especially if their mechanisms are not fully understood by new users.

One of the most discussed topics in the debate between various authors are the emotional aspects of students in the process of teaching and learning a foreign language using a chatbot and the topic of anxiety. Just as there are studies confirming the positive impact of using a chatbot to reduce anxiety when using a foreign language, there are also studies that marginalize the impact of the chatbot on reducing anxiety or even claim that it may have a negative impact on this factor (Çakmak, 2022; El Shazly, 2021).

This research review focuses primarily on exploring the numerous benefits associated with the use of chatbots in foreign language teaching. Overall, the article highlights the significant advantages of integrating chatbots in foreign language education, which can ultimately constitute a comprehensive and innovative method of improving the language learning process. The study focused primarily on assessing the current state of knowledge regarding the use of this tool and its impact on three main aspects: students' skills, their attitudes, and emotions.

The research included in the article includes both evidence of the potential positive effects of chatbots, as well as debates between various authors regarding the sense of their use, limitations or even negative impact on specific skills or user experiences. Moreover, the analysis of all literature material revealed gaps in existing knowledge and an insufficient amount of research in some fields, which creates the prospect of new research directions. The authors of the study paid considerable attention to the topic of language learners' fear of speaking a foreign language, paying relatively less attention to issues of self-esteem and self-confidence. This emphasis may provide a promising avenue for further research and publication, ultimately benefiting the broader educational community.

Conclusion

Research on the use of chatbots in language education and its possible benefits and limitations has been gaining popularity in recent years. New, updated tools equipped with artificial intelligence technologies are constantly changing and adapting to the needs of their users, which is why it is so important to try to keep the pace of research in line with the pace of development of new technologies. The main contributions presented in this research review focus primarily on examining the numerous benefits associated with the use of chatbots in foreign language teaching.

To this end, three research questions were stated at the beginning of the research. The use of chatbot interaction positively impacts various language skills, including vocabulary learning, grammar learning, and communication skills development. Chatbots aid in vocabulary acquisition, grammar practice, and communication skill enhancement. However, they may occasionally generate grammatical errors and nonsensical responses, posing a limitation to their effectiveness. The use of chatbots can positively affect students' attitudes toward learning a foreign language, enhancing motivation, interest, fun, proactivity, and learning commitment. However, the novelty effect may decrease motivation over time and lacking a *human factor* may fail to meet emotional needs and decrease motivation. Top of Form Chatbots can play a crucial role in providing emotional comfort to students and enhance their self-confidence and task performance, contributing to positive educational outcomes. However, the potential positive impact of chatbots on reducing language-related anxiety is inconclusive, with some studies suggesting a decrease in anxiety levels, while others report no significant effect.

The article draws attention to the significant advantages of integrating chatbots in foreign language education, which may ultimately constitute a comprehensive and innovative method of improving the foreign language learning process. The study focused primarily on assessing the current state of knowledge about the use of this tool and its impact on three main aspects: students' skills, their attitudes, and emotions.

The research included in the article includes both evidence of the potential positive impact of chatbots, as well as discussions between various authors about the sense of their use, limitations or even negative impact on specific skills or user experiences. This analysis revealed that the use of a chatbot in the foreign language teaching process can have a positive impact on learning outcomes, especially in core skills such as reading, writing, listening, speaking, and especially learning new vocabulary. The chatbot has a positive impact on these factors, mainly thanks to its characteristics and available functions, so far influencing mainly the motivation and interest of students thanks to its innovative nature. However, the emotional topics and attitudes of students turned out to be more difficult to investigate, as they caused more dialogue between different authors, which makes it difficult to clearly determine only the positive or negative reception of chatbots in this respect by foreign language students.

Recommendations

The analysis of all the literature revealed gaps in existing knowledge and an insufficient amount of research in some areas, which creates the prospect of new research directions. The authors of the study paid a lot of attention to the problem of language learners' fear of speaking a foreign language, paying relatively less attention to other issues. Specifically, attention has not been given to affective topics such as self-esteem and self-confidence, or cognitive, social, or economic topics. This emphasis may provide a promising avenue for further research and publication, which will ultimately benefit the broader educational community.

The results of our study indicate that chatbots can be effectively utilized in the process of teaching and learning foreign languages. However, this entails certain practical implications for both educators and educational technology developers, in order to fully harness the potential of these tools and ensure that newly developed tools are increasingly effective.

Practical implications for both educators and educational technology developers include the necessity of keeping pace with the rapid development of new technologies and ensuring that scientific research and the utilisation of tools in the classroom keep up with these advancements. Teachers should pay attention to the need to adapt various tools and tasks performed using chatbots to the language proficiency level of students, using these tools as a complement to traditional teaching methods and providing additional practice opportunities for students. At the same time, it is important to consider the limitations of these tools as well as the emotional aspects and attitudes of students in order to effectively integrate them into the teaching process.

Educational technology developers should focus on creating chatbots with diverse functions to cater to different language learning needs and conduct further research to determine their effectiveness across various proficiency levels. Chatbots should be designed with characteristics and functions that positively impact students' motivation, interest, and learning outcomes, continuously refining features to enhance their effectiveness in improving learning outcomes. Additionally, developers should understand the factors influencing chatbots' effectiveness, including utilisation patterns, frequency of use, students' attitudes, and existing language skills, and design chatbots with features that enhance students' engagement, motivation, and satisfaction with the language learning process.

Limitations

Nonetheless, this research was not devoid of constraints. First, as the data analysis in this study has been manual, code frequencies could have been provided if qualitative data processing software such as Qda Miner, Atlas.ti, or Maxqda had been used. Second, it is imperative to acknowledge that the subject of chatbots is presently undergoing extensive research, and the body of knowledge is evolving and changing rapidly, as this technology does, adding more functionalities. Novel applications continually enter the market, while existing ones receive updates, introduce fresh features, or rectify prevailing issues. Third, the study drew data from two databases, excluding other databases such as Scopus, Dialnet, etc., which might have affected the accessibility to a larger set of research studies.

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Authorship Contribution Statement

Cislowska: Conceptualization, design, data curation, data analysis/interpretation, writing, Editing/reviewing, drafting manuscript, corresponding author. Peña-Acuña: Conceptualization, design, intervention, data acquisition, editing/reviewing, supervision.

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Appendix

Articles Included in Revision (Table 3)

[1]	Yang et al. (2022)
[2]	Guo et al. (2022)
[3]	Zhai and Wibowo (2022)
[4]	Yan (2023).
[5]	Zhang et al. (2023)
[6]	Mohamed (2023)
[7]	Chen et al. (2020)
[8]	Kohnke (2023)
[9]	Zhai and Wibowo (2023)
[10]	Polyzi and Moussiades (2023)
[11]	Haristiani et al. (2022)
[12]	L. K. Fryer et al. (2020)
[13]	Bao, M. (2019)
[14]	Çakmak, F. (2022)
[15]	Kohnke et al. (2023)
[16]	Yildiz Durak (2023)
[17]	K. A. Lee and Lim (2023)
[18]	Bibauw et al. (2019)
[19]	Mageira et al. (2022)
[20]	El Shazly (2021)
[21]	Martinez-Quezada et al. (2022)
[22]	Yin and Satar (2020)
[23]	Lin and Chang. (2020)
[24]	Abu Shawar (2017)
[25]	Chien et al. (2022)
[26]	Coniam (2014)
[27]	Klímová and Ibna Seraj (2023)
[28]	Hsu (2022)
[29]	Belda-Medina and Calvo-Ferrer (2022)
[30]	Y. F. Wang et al. (2017)
[31]	Lo and Hew (2023)
[32]	Hwang and Chang (2023)
[33]	Wollny et al. (2021)
[34]	Y. Chen et al. (2023)
[35]	Vázquez-Cano et al. (2021)
[36]	Tseng (2018)
[37]	Lee et al. (2022)
[38]	Al-Abdullatif et al. (2023)
[39]	Kuhail et al. (2023)
[40]	Bailey et al. (2021)