

The Effect of Using the Artificial Intelligence Application ChatGPT on Remediating Written Linguistic Errors among Learners of Arabic as a Second Language

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Abstract: This study aimed to measure the effect of using the artificial intelligence application ChatGPT in remediating written linguistic errors among learners of Arabic as a second language. To achieve this aim, the researcher employed a quasi-experimental method based on a one-group design, consisting of 45 learners at the Institute for Teaching Arabic at Imam Mohammad Ibn Saud Islamic University. The research materials and instruments included: a list of common written errors among learners of Arabic as a second language, a list of skills for remediating written errors, a writing skills test, and a guideline for using the ChatGPT application. The findings revealed statistically significant differences at the 0.05 level between the mean scores of the experimental group in the pre- and post-applications of the writing skills test, in favor of the post-test. The effect size of ChatGPT in remediating written linguistic errors among the experimental group learners reached 0.97. In light of these results, the study offered several recommendations, including directing the attention of specialists in teaching Arabic as a second language to the importance of using ChatGPT, given its considerable role in improving learning outcomes and addressing various linguistic errors.

Key words: ChatGPT Application, Written Linguistic Errors, Learners of Arabic As A Second Language

INTRODUCTION

Language is the means of communication among human beings and the repository of nations' heritage and civilization. Arabic is one of the most important languages of the world's great civilizations, and its status is manifested in the Noble Qur'an as the tongue of revelation, which has endowed it with sanctity and great honor. The Qur'an was revealed in it in many verses that affirm its clarity, eloquence, and preservation through the preservation of the Divine Reminder, as in His saying: **“Ha, Meem. A revelation from the Entirely Merciful, the Especially Merciful. A Book whose verses have been detailed, an Arabic Qur'an for a people who know.”**¹ This has given Arabic an eminent place and lofty status in the hearts of Muslims and Arabs alike.

Regarding the status of Arabic, Kyoung (2012) indicates that it is one of the greatest languages of the Semitic family in view of the number of its speakers, as it is used by approximately 300 to 500 million people in 22 Arab countries. It is the language of the two primary sources of Islamic legislation, in addition to being one of the six official languages of the United Nations and several international bodies, which attests to the importance of Arabic as one of the major languages of civilization, culture, and diplomacy worldwide.

This status has led many non-Arabs to pursue learning Arabic in depth. This is confirmed by the report of the First International Conference on Teaching Arabic to Speakers of Other Languages, held on 5 May 2008 at the Language Center of the University of Jordan, which noted the strikingly high demand for learning Arabic (Abu 'Ashmah, 2008).

An American study issued by the Modern Language Association in 2010 likewise reported that Arabic is among the foreign languages most favored and in demand in many countries around the world, including the United States of America, China, Spain, Portugal, and Russia (Lebanese Center for Research and Consulting, 2011).

Given its importance, many universities and institutions around the world have devoted considerable attention to teaching Arabic, and the demand for it has increased. Educational institutions in Arab countries have also taken the initiative to establish institutes and departments concerned with teaching Arabic to speakers of other languages and with designing targeted curricula.

¹ (Fussilat 41:1-3, Saheeh International). [legacy.quran](https://legacy.quran.com/41/1-5)

The motives for learning Arabic as a second language are diverse. As Sulayman (2010) notes, they vary in strength and importance: the motives that drive a learner to study Arabic may be very strong, moderate, or weak, depending on the learner's beliefs, inclinations, and attitudes.

This is corroborated by Hussein (2018), who points out that the motives for learning Arabic as a second language among non-native speakers range from religious motives for Muslim learners, to cultural, economic, and political motives, in addition to the desire to communicate with Arab citizens, to seek employment where Arabic is used, and to qualify for study or specialization at an Arab university.

To realize these motives for learning Arabic as a second language, it is necessary— as indicated by the studies of Al-Yubi (2018), Mursi (2020), and Al-Ḥamad (2024)—to focus on developing learners' language skills. The importance of these skills (listening, speaking, reading, and writing) for learners of Arabic as a second language lies in achieving communicative competence, understanding Arab culture, developing thinking, and integrating into environments of work, study, and everyday life.

Writing, as Al-Nāqah and Ṭu'aymah (2002) state, is one of the most important language skills, and mastery of it is a fundamental goal of learning Arabic or any other language. As a linguistic art, it is no less important than other language arts, and it is one of the key means of communication and self- and thought-expression. Learners of Arabic aspire to be able to write in it, for writing helps them acquire vocabulary, become familiar with expressions and linguistic structures, and use them, and it contributes to deepening and refining other skills.

Ramadan (2018) notes that writing and its sub-skills are of great importance, since the learner employs in writing all the language skills he or she has acquired. Writing constitutes a stage on which the learner's linguistic efforts are displayed, and it is possible to infer his or her linguistic competence from the written compositions produced. One cannot say that a learner has succeeded in learning Arabic unless he or she can select vocabulary and retrieve ideas, sentences, and expressions in accordance with a sound, systematic approach that is as free from errors as possible.

The importance of writing skills is further confirmed by the studies of Al-Ghamdi (2022), Aicha and Zohbie (2024), Muhammad (2025), Akram (2025), and Fu and Huang (2025), which indicate that writing skills hold a prominent and influential position in language education. These studies emphasize that learners of other languages must master

writing skills, as language cannot fulfil its communicative function in their absence; writing is one of the key means of accessing knowledge and communicating with others, and neglecting to learn it makes it difficult for the language learner to convey his or her aims and ideas to others.

Despite the importance of writing skills, learners of Arabic as a second language face some challenges in learning and acquiring these skills, foremost among them written errors—grammatical, orthographic, morphological, and expressive—which many of these learners frequently make.

As the literature indicates, these errors have numerous negative effects, owing to the crucial role of writing in performing two main functions: it is both a means of communication and an instrument of thinking and self-expression. A written error, therefore, causes a communication breakdown and introduces confusion into the expression of thoughts, feelings, and emotions; misunderstanding may occur, and the intended idea may not reach the reader correctly, which undermines the communicative process, alters meaning, and may lead to harm.

Many studies have confirmed the prevalence of written errors among learners of Arabic as a second language. Al-Hamad's (2016) study showed that many such learners face numerous challenges and difficulties in learning Arabic, which are evident in their written linguistic errors across various levels and sub-skills. Al-Rujaybi (2019) indicated that Arabic possesses features that distinguish it from other languages, and that these features constitute some of the most significant obstacles facing students of Arabic as non-native speakers; they lead to weak understanding of the language at its different levels: phonological, morphological, syntactic, semantic, and orthographic. Muhammad's (2022) study demonstrated the multiplicity of forms of written errors among learners of Arabic as non-native speakers. Al-Barq'awi (2024) reported that many written errors appear in these learners' Arabic at the grammatical, morphological, and semantic levels. Al-Afyoni (2024) showed that many learners of Arabic as non-native speakers commit numerous errors in their written production—grammatical, morphological, semantic, orthographic, and stylistic. Al-Sa'id (2025) confirmed the presence of many linguistic errors among learners of Arabic as non-native speakers, especially in writing, where such errors clearly manifest at the grammatical, semantic, orthographic, and expressive levels.

In light of the above, the importance of developing writing skills among learners of Arabic as a second language becomes evident, as does the urgent need to remediate the linguistic errors they commit in their written production at its various levels: grammatical, orthographic, morphological, and expressive. As Al-Tamimi (2023) points out, this can be achieved through adopting a comprehensive approach that integrates modern technology, interactive methods, a language-rich environment, a focus on active practice and intensive training in free writing, the enhancement of learning motivation, and the provision of psychological support to improve the quality of writing.

Al-Kanani's (2022) study indicates that the integration of technology into teaching Arabic to non-native speakers (TAFL) is a decisive factor in enhancing language skills and increasing motivation and engagement in learning. This is accomplished through interactive media, artificial intelligence applications, and augmented reality, which make it possible to individualize instruction according to learners' needs and to provide an environment rich in cultural and linguistic simulation, thereby facilitating skill acquisition, error remediation, and acceleration of the learning process.

As Morel and Spector (2022) note, artificial intelligence is one of the most influential and exciting fields, representing a forward-looking technology that aims to develop systems capable of simulating and imitating human cognitive abilities. It is continually evolving in terms of software, techniques, and diverse applications that play an increasingly significant role in many educational domains.

Among the most prominent artificial intelligence applications, as Al-'Umari (2025) points out, is ChatGPT, developed by OpenAI, which has recently attracted wide attention due to its ability to approximate human reasoning in dialogue and ideas, and its instant responses to users' questions across a wide range of fields.

Several studies have highlighted the importance of ChatGPT and recommended its integration into the educational process, including Baidoo and Ansah (2023), Mohamed and Alian (2023), Fabella (2023), Al-Shamsi (2024), Al-Suhaim (2024), and Al-Nusairat (2026). These studies have shown that using ChatGPT as a supportive tool in education can enhance learners' autonomy, improve their research skills and academic achievement, ease difficulties in language learning and skill acquisition, and help remediate their errors by providing them with accurate language models.

Building on these studies and their recommendations regarding the necessity of employing the ChatGPT artificial intelligence application,

the present study was conceived as an attempt to remediate written linguistic errors among learners of Arabic as a second language through the use of this technology.

Perception of the Research Problem

The perception of the present research problem arose from several sources, the most important of which are the researcher's work in the field of teaching Arabic to non-native speakers, during which he observed a large number of linguistic errors in the written production of learners of Arabic as a second language. These errors are diverse and include orthographic errors (such as omission, addition, letter substitution, and hamza errors), grammatical errors (such as number agreement, gender agreement, and use of the definite article), morphological errors (such as the formation of verbs and plurals), stylistic errors (such as literal translation, weak structures, awkward phrasing, and repetition), and semantic errors (such as using words in inappropriate meanings, lack of precision in terminology, and confusion between synonyms and meanings). These problems may be attributed to both linguistic and non-linguistic causes, foremost among them the fact that the curriculum presented to these learners is taught through traditional methods based mainly on explanation, memorization, and rote learning, with little attention to the practical use of these skills in different functional language situations. This is consistent with the results and recommendations of studies by Al-^ʿAjrami and Baydos (2016), ṣālīḥ (2019), Al-^ʿAwād (2020), Muḥammad (2020), Al-Ḥusaini (2021), Al-Afyoni (2024), and Al-^ʿAnazi (2025).

Consultation with experts and specialists in teaching Arabic to non-native speakers, who indicated that written linguistic errors among learners of Arabic as non-native speakers are among the most significant problems hindering the learning of Arabic, achieving comprehension, and ensuring effective communication. Such errors contribute to the fossilization of incorrect forms, generate feelings of frustration, and weaken motivation. They therefore recommended that these errors be addressed through the use of modern approaches and methods and the integration of contemporary technological applications into language teaching.

The results of an exploratory study, in which the researcher administered a free-writing test to a group of 15 learners of Arabic as a second language at the intermediate level at the Institute for Teaching Arabic at Imam Mohammad Ibn Saud Islamic University in Riyadh. The results revealed a large number of written linguistic errors—grammatical, orthographic, stylistic, semantic, expressive, and

morphological—among these learners, which confirmed to the researcher the existence of the problem and prompted him to seek an effective solution.

The recommendations of recent studies, such as Bou‘azzawi (2016), Shawish (2023), and Na‘im (2023), which stress the need to integrate technology into the teaching of Arabic as a second language because of its effective role in remediating linguistic errors, enhancing learning effectiveness, increasing student engagement, tailoring content to learners’ needs, overcoming learning difficulties, and providing feedback. These technologies include artificial intelligence applications, augmented reality, electronic language games, e-learning and digital platforms, and mobile applications.

Statement of the Problem

In light of the foregoing, the problem of the present study can be defined as the prevalence of written linguistic errors among learners of Arabic as a second language, which they encounter in their written production. These errors negatively affect their ability to express themselves accurately, the quality of communication, their understanding of Arabic, and their overall linguistic competence. Such problems may be attributed to multiple factors, including learner-related variables, the intrinsic nature of the Arabic language, and an overemphasis on theoretical aspects alongside the use of traditional teaching methods based on memorization and rote learning. To contribute to addressing these issues, it is necessary to respond to current calls for development in the field of teaching Arabic as a second language, which emphasize the integration of modern technological tools and applications—especially artificial intelligence applications—into instruction. Among these applications is ChatGPT.

Accordingly, the present study seeks to use the artificial intelligence application ChatGPT to remediate common written linguistic errors among learners of Arabic as a second language. To this end, the study attempts to answer the following questions:

1. What are the common written linguistic errors among learners of Arabic as a second language?
2. What skills are required to remediate these common written linguistic errors among learners of Arabic as a second language?
3. Are there statistically significant differences at the 0.05 level between the mean scores of the experimental group in the pre- and post-administrations of the test of skills for remediating common written linguistic errors, attributable to the use of the artificial intelligence application ChatGPT?

4. What is the effect of using the artificial intelligence application ChatGPT on developing the skills required to remediate common written linguistic errors among learners of Arabic as a second language?

Objectives of the Study

This study aimed to:

1. Identify the common written linguistic errors among learners of Arabic as a second language.
2. Identify the skills required to remediate common written linguistic errors among learners of Arabic as a second language.
3. Measure the effect of using the artificial intelligence application ChatGPT on developing the skills required to remediate common written linguistic errors among learners of Arabic as a second language.

Significance of the Study

This study is expected to be beneficial in the following ways:

Theoretical significance:

- It contributes to building a theoretical framework on the use of artificial intelligence (ChatGPT) in teaching Arabic as a second language and its effect on developing the skills needed to remediate written linguistic errors among learners of Arabic as a second language.
- It helps bridge a research gap in the Arabic educational literature, particularly in light of the scarcity of local studies that have addressed the use of artificial intelligence (ChatGPT) in teaching Arabic as a second language.
- It reinforces scholarly trends towards integrating the artificial intelligence application ChatGPT into the teaching of Arabic as a second language from a comprehensive educational perspective that combines theoretical and practical dimensions.

Practical Significance:

- The list of written linguistic errors identified in this study can be used in developing programs and curricula for learners of Arabic as a second language.
- It proposes innovative mechanisms for assessing the writing performance of learners of Arabic as a second language and for providing personalized learning experiences, thereby improving their communicative competence.
- It provides policymakers and decision-makers in Arabic-as-a-second-language programs with an empirical basis for making informed decisions regarding the adoption of artificial intelligence applications, particularly ChatGPT.

- It offers practical suggestions and recommendations for developing Arabic-as-a-second-language programs in line with the requirements of integrating ChatGPT.
- It contributes to the professional development of teachers of Arabic as a second language by enabling them to acquire the skills and competencies needed to use ChatGPT effectively in the teaching-learning process.
- It may open avenues for future researchers to conduct further studies on problems in teaching Arabic as a second language and on the use of modern technological applications in learning.

Delimitations of the Study

The findings of the present study are limited by the following delimitations:

1. Human delimitation: A group of 50 learners of Arabic as a second language at the intermediate level.
2. Spatial delimitation: The Institute for Teaching Arabic at Imam Mohammad Ibn Saud Islamic University in Riyadh.
3. Temporal delimitation: The first semester of the 2024/2025 academic year
4. Topical delimitation: Measuring the effect of the artificial intelligence application ChatGPT on developing the skills required to remediate common written linguistic errors among learners of Arabic as a second language.

Research Materials and Instruments

To achieve the objectives of the study, the following materials and instruments were prepared:

1. A list of common written linguistic errors among learners of Arabic as a second language.
2. A list of the skills required to remediate common written linguistic errors among learners of Arabic as a second language.
3. A test of skills for remediating common written linguistic errors among learners of Arabic as a second language.
4. A guideline for using the artificial intelligence application ChatGPT to develop the skills required to remediate common written linguistic errors among learners of Arabic as a second language.

Operational Definitions of Terms

In light of the theoretical background of the study, its key terms are defined operationally as follows:

-Written linguistic errors: Errors committed by learners of Arabic as a second language when writing sentences and expressions, which

deviate from the established conventions of Arabic writing. These errors may be orthographic, grammatical, morphological, or expressive.

-ChatGPT artificial intelligence application: An artificial intelligence application that allows learners of Arabic as a second language to engage in interactive language activities, either through voice-based interaction or text-based input. It helps them improve their responses and provides them with suggestions and ideas that enrich the topics they work on in a linguistically accurate manner that is, as far as possible, free from spoken and written errors.

-Learners of Arabic as a second language: Learners whose first language is not Arabic and who are enrolled in programs designed to teach and learn Arabic, whether in their home countries or abroad, in order to understand its linguistic system, cultural meanings, and to acquire and develop it. Operationally, this term refers to learners of Arabic as a second language at the intermediate level who are enrolled at the Institute for Teaching Arabic at Imam Mohammad Ibn Saud Islamic University in Riyadh.

Theoretical Framework of the Study

In line with the objectives of the study, the theoretical framework is supported by previous research and studies related to the study variables. It addresses two main axes: Arabic writing among learners of Arabic as a second language, and the artificial intelligence application ChatGPT. A detailed discussion of these axes follows.

First Axis: Arabic Writing among Learners of Arabic as a Second Language

This axis presents a detailed discussion of the nature of writing, its importance and objectives, the challenges involved in learning it and acquiring its skills, as well as written errors, their causes, and how to correct them among learners of Arabic as a second language.

To begin with, writing may be described as a language art that lives through use and through which a person expresses their thoughts to achieve effective communication—communication that can only be realized when it adheres to the linguistic rules agreed upon by language scholars.

Numerous definitions of writing have been proposed, but they all revolve around a common core: explaining what writing is and how the writing process unfolds. Al-Harith (2014) points out that writing is not merely the transcription of graphic symbols; rather, it is the true

indicator of the extent to which the learner has mastered language skills.

Al-Wa'ili (2018) views it as a complex process that involves the ability to generate ideas, represent them in correct letters, words, and structures, and employ them in varied styles, while presenting these ideas clearly, handling them in a coherent and flowing sequence, and then revising them in ways that invite greater precision and reflection.

Hasan (2020) considers writing to be a linguistic performance whose essence consists of information, ideas, opinions, and feelings, and whose outward form consists of written letters and specific symbols; both the deep content and the visible form are organized according to agreed-upon rules to regulate communication and improve expression.

Lemmon and Grajo (2023) likewise describe writing as one of the language skills in which the learner passes through several stages, including generating ideas, organizing them, formulating them in correct structures, and revising them, culminating in producing the final written product.

From these definitions, it becomes clear that writing is not a mechanical encoding process, but rather an organized and complex mental activity that involves creating meanings and expressing them through interconnected words, sentences, and paragraphs in the form of a message that conveys meaning clearly to the reader.

The importance of writing for learners of Arabic as a second language, as highlighted by Al-Hamad (2016), Al-Husseini (2021), Al-Ghamdi (2022), and Mohammad (2025), lies in the variety of motives that lead these learners to study Arabic. These purposes and motivations are diverse. When a learner studies Arabic for religious purposes, writing becomes important because of its status and value in Islam and because the learner may wish to pursue university studies in Arabic language and religious sciences. When Arabic is learned for instrumental purposes such as work, learners need Arabic writing in order to interact with others in their workplaces and to perform the professional tasks for which they have learned the language.

When the motivation is cultural, writing offers learners an opportunity to express their ideas, document literary and intellectual production, and discover Arab civilization. When the motivation is economic, a learner who masters Arabic writing can teach it to others and can also translate written documents to and from Arabic, particularly scientific books in fields such as medicine, mathematics, chemistry, and physics. In addition, the Arabic script has an aesthetic

and artistic dimension: it is one of the most flexible writing systems and lends itself to a wide range of artistic and geometric designs, a form of beauty appreciated by lovers of art and aesthetics, whether they are native speakers of Arabic or learners of Arabic as a second language. Through these various dimensions and motivations, Arabic writing acquires its significance and status for learners of Arabic as a second language.

As for the objectives of teaching writing to learners of Arabic as a second language, the literature (Abdullah, 2015; Abd Al-Azim, 2020; Safar, 2021; Al-Bayk, 2021) indicates that they center on enabling learners to use the Arabic writing system accurately and skilfully for effective communication. These objectives are distributed progressively across different proficiency levels, and they may be summarized as follows:

The objectives of teaching writing to learners of Arabic as a second language can be grouped into four main categories:

- 1. Motor and technical objectives, including:**
 - Mastering the motor skills involved in writing.
 - Forming the Arabic letters clearly and correctly.
 - Adhering to basic spelling conventions.
 - Using punctuation marks correctly.
 - Increasing writing speed while maintaining accuracy and legibility.
- 2. Expressive and functional objectives, including:**
 - Enabling the learner to produce grammatically and morphologically correct sentences and phrases.
 - Developing the ability to produce different types of texts (narrative, descriptive, persuasive).
 - Writing functional texts such as letters, forms, job applications, and summaries of texts.
- 3. Cognitive and cultural objectives, including:**
 - Enhancing cultural and social awareness by understanding the contexts of Arabic writing.
 - Acquiring vocabulary and stylistic structures that strengthen the learner's linguistic intelligence.
 - Developing the ability to express ideas and feelings in Standard Arabic.
- 4. Thinking-development objectives, including:**
 - Developing logical and critical thinking by organising and articulating ideas.

- Transforming abstract ideas into well-organised written texts.

The researcher believes that achieving these objectives requires intensifying efforts in teaching Arabic writing to learners of Arabic as a second language and training them in its skills so that they become accustomed to practising them in diverse language situations. Some of these objectives, however, may in themselves pose challenges, since the Arabic writing system generally differs from the system the learner is used to in their first language, in addition to the following challenges:

- Applying and using Arabic rules and structures: Differences between the linguistic system of the mother tongue and that of Arabic as the target language often led the learner to make written and non-written errors.

- Translation to and from Arabic: Literal translation and constant reliance on the first language may result in numerous writing errors, because literal translation does not always convey the intended meaning (Al-Hamad, 2016).

- Using Standard Arabic: Resorting to colloquial or borrowed words is one of the major obstacles and common errors that a learner makes when writing on a given topic.

- Lexical repertoire: Many learners who make writing errors do not possess a sufficient stock of vocabulary to express their intended meanings, whether orally or in writing.

- The nature of writing itself: Writing is a skill that is consolidated and developed through practice; the more practice opportunities a learner has, the better their expressions, sentences, and ideas become (Murihah, 2025).

The researcher thus stresses the need to overcome these challenges, as they are among the main causes of Arabic writing errors; they make the learner feel anxious and frustrated and may discourage them from using the language for fear of making mistakes.

The main linguistic errors in the writing of learners of Arabic as a second language can be summarised as follows:

- Competence-related errors: These arise from incorrect use of linguistic rules and occur systematically rather than incidentally; they may be due to the method of instruction or to the learner's own tendency to simplify rules for themselves through over-generalisation or faulty analogy.

- Performance-related errors: These errors stem from psychological factors such as fatigue, haste, anxiety, and fear, and they are associated with the surface level of linguistic performance (Saleh, 2019).

Al-Hamad (2016) further notes that written errors can be classified according to whether they impede communication or not; they may be distinguished based on how far the message can be understood. Errors

that hinder communication are called global errors, such as word order problems at the sentence level, omission or misuse of conjunctions, and incorrect use of grammatical rules. Errors that do not hinder communication are called local errors; they affect only a single element of the sentence, such as errors in inflecting nouns and verbs.

It is also observed that these errors differ in type and frequency, and that they vary according to the learner's ability to identify and correct them, which in turn depends on their level of study. According to Abdulrahim (2022), such errors may be attributed to a lack of knowledge of grammatical, morphological, and orthographic rules, to differences between Arabic structures and sounds and those of other languages, to the failure to present rules within appropriate instructional contexts, to faulty analogy, and to the fact that the linguistic system has not yet fully formed in the learner's mind.

In addition to these causes, the researcher believes that part of the problem lies with the learners themselves, as well as with the curriculum and traditional teaching methods. It is therefore necessary to reconsider these curricula and enrich them with modern activities, techniques, and tools appropriate for foreign-language education, especially technological applications such as the artificial-intelligence-based application Chat GBT.

Section Two: The Application of Artificial Intelligence (ChatGPT)

Artificial intelligence has become a central driver of human development across a wide range of domains, endowing societies that invest in it with greater creativity and progress. In education, its integration has turned into an urgent necessity for advancing the teaching-learning process, as AI applications have introduced instructional patterns and strategies that were previously not in effect. Among the most prominent of these applications is ChatGPT.

ChatGPT is an artificial language model based on deep neural networks and is distinguished by its ability to process language effectively and generate coherent and relevant text (Shidiq, 2023). Rudolph (2023) defines it as a natural language chatbot powered by artificial intelligence, which allows users to pose any question and obtain an answer. Likewise, Saif and Al-Juhani (2023) describe it as a pre-trained language model developed by OpenAI and trained on a large corpus of conversational texts. The model is further fine-tuned to perform a wide range of natural language processing tasks, including language translation, question answering, and text completion.

Taken together, these definitions indicate that ChatGPT is an AI-driven application capable of producing human-like responses to textual input by leveraging advanced deep learning techniques. Its capabilities have led many users to rely on it extensively in various domains, particularly in education. In light of this, the present study adopts ChatGPT as a tool in the teaching of Arabic as a second language.

Fabella (2023) outlines a set of key features that characterise ChatGPT. The application can provide users with clear and detailed responses to queries on specific topics and allows them to refine or rephrase their prompts until they are satisfied with the output. Moreover, ChatGPT stores previous conversations within a user-specific conversation tree, enabling it to retrieve prior turns and maintain contextual continuity and consistency in its responses. It has also been programmed to decline inappropriate or harmful prompts.

The educational value of ChatGPT, as highlighted by Baidoo and Ansah (2023), Morsi (2024), and Al-Nusairat (2026), lies in its ability to save considerable time that would otherwise be spent checking learners' comprehension of course content. It can support learners in tailoring their progression through learning pathways according to their interests, needs, and the time available to complete their study programs. In addition, it offers continuous access to learning materials and activities. For teachers, ChatGPT makes it possible to transform lessons into a series of messages that resemble a coherent human dialogue, and it assists them in designing semester- and year-long instructional plans as well as developing a variety of assessment formats to monitor learners' progress.

ChatGPT can be employed in education in several complementary ways:

- Automated tutoring: ChatGPT can function as an intelligent tutor by providing rapid, targeted feedback and support, delivering detailed explanations, and suggesting additional resources, thereby helping learners—particularly those engaged in self-directed study—better understand course content.
- Personalized feedback: The application can generate individualized feedback for learners, including constructive critique, suggestions for improvement, and guidance that helps them identify their needs and sustain their motivation to continue progressing.
- Interactive assessment: ChatGPT can be used to design interactive tests by generating questions and corresponding answers based on pre-defined parameters (Abd Al-Azim, 2023).
- Support for virtual classrooms: In online and distance learning environments, ChatGPT enables teachers to support their students by

responding to their questions, providing supplementary learning materials, and helping to address learning difficulties in virtual classroom settings (Abu Hammad, 2025).

Overall, ChatGPT can play a significant role in education when employed appropriately. It is able to understand and respond to natural language input and can be integrated in multiple ways to enhance learners' educational experiences and to support teachers' instructional practices.

Regarding the specific benefits of using ChatGPT in second language education, these can be summarized, following Al-Shathri (2024), Awad (2025), and Al-Obaydi (2025), as follows:

Personalized learning: ChatGPT supports personalized learning by analyzing users' strengths and weaknesses, learning pace, and preferences, and by recommending the most suitable learning pathway, which promotes continuous learning and improves learning outcomes.

Immediate feedback: It provides learners with immediate feedback on their pronunciation, grammar, and vocabulary use, identifying and correcting their errors in real time and thereby accelerating the learning process.

Improving writing skills: ChatGPT enables learners to practise and develop their writing skills by engaging in hands-on writing tasks and by receiving suggestions on text organization, headings, transitions, and paragraphing, which enhances the overall quality of their written performance.

Enhancing vocabulary: It helps learners expand their lexical repertoire by providing instant suggestions and alternative word choices, thus enriching their vocabulary base.

Developing cultural awareness: ChatGPT can be used to teach the target language together with its relevant cultural background, allowing learners to explore cultural nuances, idiomatic expressions, and common proverbs in the target community, which deepens their understanding of both the language and its associated culture.

These benefits indicate that AI applications can play an effective role in redirecting educational pathways and moving away from traditional, memorization-based practices, particularly in language education.

Despite this pedagogical value and functional versatility, the use of ChatGPT in education also raises several challenges. As highlighted by Burkhard (2022), Salvagno (2023), and Al-Qarni (2024), privacy is a major concern, since ChatGPT collects and segments student data,

which creates a persistent worry among educators and policymakers about possible breaches and unauthorized access. In the same vein, academic integrity has become a central issue, because ChatGPT generates human-like responses that may be misused by students in preparing assignments, projects, and exams, thereby facilitating cheating and plagiarism. Furthermore, ChatGPT can occasionally provide inaccurate or misleading answers, and its use does not automatically promote the development of critical thinking and problem-solving skills, which remain essential components of meaningful learning.

In the present researcher's view, addressing these challenges in the context of teaching Arabic as a second language requires training learners to verify the accuracy of information generated by ChatGPT and to vary the way they formulate prompts so as to obtain comprehensive and reliable answers. Learners should be guided to use ChatGPT primarily as a source of instant feedback on linguistic errors, to avoid plagiarism and other forms of academic dishonesty, and to subject AI-generated texts to careful linguistic proofreading and revision before incorporating them into their work.

Comment

Within this theoretical framework, the study has so far addressed two main axes. The first Axis examined Arabic writing among learners of Arabic as a second language by discussing the nature and importance of writing, the objectives of teaching it, the challenges these learners face in acquiring writing skills, and the most common linguistic errors they tend to make. The second Axis focused on the application of artificial intelligence—specifically ChatGPT—by reviewing its definitions, key features, educational value, areas of use, benefits for teaching Arabic as a second language, and the challenges associated with its integration. To develop this framework, the researcher drew on a wide range of Arabic and international literature and previous studies, and used this body of knowledge to design the study materials and instruments and to interpret and discuss the findings.

RESEARCH METHODOLOGY AND PROCEDURES

This section presents the methodological procedures adopted in the present study, as outlined below.

1. Research Design: The present study employed an experimental methodology based on a quasi-experimental one-group design. This approach was used in selecting the learners who formed the study group, administering the measurement instrument in both the pre-test

and post-test phases, and presenting the writing tasks while applying artificial intelligence (ChatGPT) to the learners in the experimental group. This design was deemed appropriate in light of the nature of the research problem and its variables, namely the impact of applying artificial intelligence (ChatGPT) on treating written linguistic errors among learners of Arabic as a second language.

2. Experimental Design: The researcher adopted a quasi-experimental design with partial control for a single experimental group taught using Copilot, as illustrated in the following figure.

Table 1: Experimental Design of The Study

The group	Pre-test	Independent variable	Post-test
Experimental	Test in skills of treating common linguistic errors in writing	Use of the artificial intelligence application ChatGPT	Test in skills of treating common linguistic errors in writing

3. Research Population: Defining the research population accurately is essential, as it is difficult to select a sample when the population cannot be precisely specified. The population of the present study consists of learners of Arabic as a second language at the Arabic Language Teaching Institute of Imam Muhammad ibn Saud Islamic University in Riyadh, Kingdom of Saudi Arabia.

4. Research sample: In line with the requirements of the present study, a sample was selected to represent the research population. The sample consisted of 50 intermediate-level learners of Arabic at the Arabic Language Teaching Institute of Imam Muhammad ibn Saud Islamic University in Riyadh.

5. Research Materials and Instruments

A. A List of Common Linguistic Errors in Writing Among Learners of Arabic As A Second Language

To develop this list, the researcher followed the following procedural steps:

- The researcher consulted several books, theses, and educational studies closely related to written errors, and drew on them to identify a set of common written errors among learners of Arabic as a second language.

- The researcher referred to the theoretical framework of the study and to its discussion of the common written linguistic errors experienced by learners of Arabic as a second language.

- The learners in the study group were asked to write on two different topics, and their written productions were then analyzed to identify the errors that frequently occurred in their writing and whose frequency exceeded 25%.

- The learners' writings were analyzed by a second rater in addition to the researcher, to determine the degree of agreement

between the two raters regarding the identification of the errors that frequently appeared in the learners' writing. The mean percentage of agreement was 86%. These errors are presented in Table 1 below.

Table 2. Common linguistic errors in writing among learners of Arabic as a second language

No.	Domain	Number of errors	Percentage
1	Content and organization of the written text	9	34.61%
2	Writing style	7	26.93%
3	Use of linguistic rules (grammar, spelling, and morphology)	10	38.46%
Total		26	100%

By identifying these errors, the first research question has been answered, namely: "What are the common linguistic errors in writing among learners of Arabic as a second language?"

B. A List of Skills Required for Treating Acceptable Linguistic Errors in Writing Among Learners of Arabic As A Second Language

To develop a list of skills required for treating acceptable linguistic errors in writing among learners of Arabic as a second language, the researcher followed the following steps.

- The researcher consulted many books and scientific references closely related to Arabic writing and drew on them to identify a set of writing skills required for learners of Arabic as a second language.

- The researcher also made use of several educational studies that dealt with teaching writing to learners of Arabic as a second language, to benefit from the skills identified in these studies as necessary for such learners.

- The researcher referred to the theoretical framework of the study and to its discussion of Arabic writing for learners of Arabic as a second language.

- The objectives associated with teaching Arabic as a second language were taken into account.

- The linguistic programs studied by learners of Arabic as a second language were reviewed.

- In light of the above, the researcher prepared an initial list of skills required for treating acceptable linguistic errors in writing among learners of Arabic as a second language. This list comprised three main skills and 35 sub-skills, which were incorporated into a questionnaire to be presented to a group of specialists.

- The questionnaire was submitted to a panel of experts specializing in teaching Arabic to non-native speakers, to obtain their views on the extent to which these skills are appropriate for learners of Arabic as a second language.

▪ The percentage of importance and appropriateness for each skill was then calculated by assigning a score of 1 if the skill was deemed appropriate and 0 if it was not, for each rater separately. The scores obtained by each skill from all raters were then summed, and a skill was accepted if it reached a consensus level of 75% or higher.

▪ In light of the outcomes of the validation process, the researcher introduced the modifications recommended by the raters and excluded the skills that did not achieve an approval rate of at least 75%, a threshold adopted in many educational studies. Accordingly, a final list of skills required for treating acceptable linguistic errors in writing among learners of Arabic as a second language was produced, as shown in the following table.

Table 3. Skills required for treating acceptable linguistic errors in writing among learners of Arabic as a second language

No.	Main skill	Number of subs-skills	Percentage
1	Content and organization of the written text	10	35.71%
2	Writing style	8	28.58%
3	Use of linguistic rules (grammar, spelling, and morphology)	10	35.71%
Total		28	100%

By identifying these skills, the second research question has been answered, namely: “What are the skills required for treating acceptable linguistic errors in writing among learners of Arabic as a second language”?

C. A Test of Skills in Treating Common Linguistic Writing Errors Among Learners of Arabic As A Second Language

The test was developed through the following steps.

▪ Defining the purpose of the test: The test aims to measure the writing skills needed to treat common writing errors among learners of Arabic as a second language.

▪ Sources for constructing the test: In constructing the test, the researcher drew on several sources, the most important of which were:

- Previous studies and research related to writing skills.
- Specialized literature in the field of measurement and evaluation in general, and the assessment of writing skills in particular.
- A review of existing scales and tests related to writing skills.
- The views of specialists in teaching Arabic as a second language.
- The list of skills for treating common linguistic writing errors had been developed earlier.

- Formulating the test instructions: Test instructions were prepared in view of their importance for the learners in the study group, as the clarity and accuracy of instructions directly affect the scores they obtain. The instructions were written in brief and clear language and explained the purpose of the test, how to answer its items, and the time allowed for completion.

- Writing the test items: The test consisted of 28 items, including short constructed-response questions, completion items, ordering items, and error-correction items, depending on the nature of the skills to be measured. An initial version of the test was prepared and submitted to a group of referees, who suggested modifying the wording of some items and simplifying others. The required modifications were made until the test reached its final draft of 28 items, together with an answer key. Each item was assigned two marks, so that the total score for the test as a whole was 56 marks.

- Pilot administration of the test: After incorporating the referees' comments on the test items, the test was administered on a pilot basis to a group of 15 intermediate-level learners of Arabic as a second language at the Arabic Language Teaching Institute of Imam Muhammad ibn Saud Islamic University in Riyadh, who were not part of the main study sample. After scoring the test, the following results were obtained:

- Linguistic clarity of the test items: The test items were found to be appropriate for the learners, and the researcher did not observe any difficulties while they were answering the test.

- Reliability of the test: To verify the reliability of the test, it was re-administered after an interval of 15 days. The correlation coefficient between the learners' total scores in the first and second administrations was calculated using Pearson's correlation coefficient and was found to be 0.84, which is considered a good value indicating that the test is suitable for use.

- Statistical validity: Statistical validity was calculated as the square root of the reliability coefficient, and was found to be 0.91, which is a high validity coefficient. This value indicates that the test enjoys a high degree of validity and supports the judgment of the expert referees.

- Test duration: The time taken by all learners in the pilot group to complete the test was recorded, and the mean was calculated. The average time required to answer the test was 55 minutes. The researcher decided to add 5 more minutes, so that the final time allowed for the test was set at 60 minutes.

- Final form of the test: After modifying the test items in light of the referees' comments and the pilot administration, and after verifying its validity and reliability and determining the appropriate time limit, the

test reached its final form and became ready for actual application to the learners in the study group.

D. An Instructional Guide for Using the Artificial Intelligence Application (Chatgpt) To Develop Skills in Treating Common Linguistic Writing Errors Among Learners of Arabic As A Second Language

The guide was prepared through the following procedural steps.

Guide objective: The instructional guide was developed to investigate the effect of using the ChatGPT application on treating written linguistic errors among learners of Arabic as a second language. In doing so, the researcher drew on educational literature and previous studies that addressed artificial intelligence in education and intelligent learning systems, and benefited from them in organizing and presenting the content of the guide.

Guide content: The guide includes a variety of activities, exercises, and models related to the writing skills needed to treat writing errors among learners of Arabic as a second language. It focuses on three main domains:

- Content and organization of the written text
- Writing style
- Use of linguistic rules (grammar, spelling, and morphology)

In preparing this content, the researcher referred to Arabic-as-second-language teaching programs, as well as to literature and previous studies that dealt with writing skills among learners of Arabic as a second language and with the use of the artificial intelligence application ChatGPT.

Guide components: The guide consists of the following elements:

- Introduction
- Objectives of the guide, an explanation of what ChatGPT is, and how to use it and increase its effectiveness
 - Instructional objectives related to the target writing skills
 - Preparation of writing topics and the associated activities, exercises, and practical models
 - Providing appropriate feedback to learners using ChatGPT
 - Formative and summative assessment using ChatGPT, taking into account the variety and comprehensive coverage of the targeted writing skills.

Guide validity: To ensure the validity of the guide, it was submitted to a group of experts and specialists in teaching Arabic as a second language and in educational technology, in order to obtain their views on its pedagogical and scientific soundness. Their feedback aimed to

confirm the linguistic and academic accuracy of the guide, its alignment with the way ChatGPT is used, and the appropriateness of the steps it proposes, as well as to solicit suggestions for improving the guide.

The experts approved the guide and recommended some modifications and comments, mainly the addition of accompanying activities and exercises that would help achieve the objectives of the study. The researcher implemented these modifications, and the guide thus reached its final form and became ready for application to the study group.

6. Research Variables

The present study includes the following variables.

- **Independent variable:** the ChatGPT application.
- **Dependent variable:** written linguistic errors.

7. Research procedures and experiment

To identify the effect of using the ChatGPT application in treating written linguistic errors among learners of Arabic as a second language, the following steps were taken.

- Reviewing educational literature and previous studies that addressed artificial intelligence applications (ChatGPT) as an independent variable and writing skills for treating written linguistic errors as a dependent variable.
- Developing the research instrument (the test) in light of the writing skills required to treat written linguistic errors among learners of Arabic as a second language, and verifying its psychometric properties.
- Preparing an instructional guide for using the ChatGPT artificial intelligence application.
- Selecting the study group: a group of 45 intermediate-level learners of Arabic as a second language was chosen from the Arabic Language Teaching Institute at Imam Muhammad ibn Saud Islamic University in Riyadh.
- Administering the writing-skills test as a pre-test to the members of the study group to determine their level in these skills before instruction and before experimentation.
- Teaching the study group: after clarifying the purpose of the experiment to the learners, explaining the importance of Arabic writing skills, and introducing the ChatGPT application and how to use it to identify writing skills, model correct Arabic writing, and treat different writing errors, the researcher taught the learners and provided them with the necessary guidance for implementing the experiment. An agreement was reached with them on the time frame for the experiment, which lasted six weeks.

- Administering the writing test as a post-test to the members of the study group to determine their level in these skills after instruction and experimentation.
- Coding the data, processing them statistically, presenting the results and discussing them, and formulating recommendations and suggestions for further research.

8. Statistical Methods Used

The Statistical Package for the Social Sciences (SPSS, version 25) was used to analyze the collected data. The following statistical procedures were applied: frequencies, percentages, arithmetic means, standard deviations, Pearson's correlation coefficient, the self-validity coefficient, the t-test, and eta squared (η^2) to measure effect size.

RESEARCH RESULTS AND DISCUSSION

This section presents the results of the present study, which were obtained through statistical analysis of the data, in order to answer the research questions. It then discusses and interprets these results in light of the theoretical framework and relevant previous studies, as detailed below.

To answer the third research question, which states: "Are there statistically significant differences at the 0.05 level between the mean scores of the experimental group in the pre-test and post-test of the test of skills in treating common linguistic writing errors that can be attributed to the use of the ChatGPT artificial intelligence application?"

The t-test was used to calculate the arithmetic means and standard deviations, and then the t-value and its statistical significance between the mean scores of the study group in the pre- and post-applications of the writing-skills test. The data were processed using the SPSS (version 25) statistical package. The results are shown in Table 3.

Table 4. The means, standard deviations, t-value, and the statistical significance of the scores of the experimental research group in the pre- and post-applications of the overall writing skills test.

Application	Number of learners	Mean scores	Standard deviation	t-value	Significance level
Pre-test	50	14.48	5.18	40.21	0.05
Post-test	50	46.52	2.32		

The previous table shows that the mean score on the writing skills test reached 48.14 in the pre-application, with a standard deviation of 18.5, while the mean score in the post-application of the writing skills test was 52.46, with a standard deviation of 32.2. To determine the significance level of the differences between the mean scores of the

two applications on the writing skills test, the t-value for the difference between the two means was calculated and found to be 21.40, and examination of the significance level revealed that it is statistically significant at the 0.05 level. This indicates that there are statistically significant differences between the mean scores of the experimental group in the two applications of the writing skills test in favor of the post-application, which means a clear improvement in the participants' mastery of the writing skills required to remedy their written linguistic errors after using the artificial intelligence application (ChatGPT). As for the results of each main writing skill, they can be presented as follows:

Table 5. Means, standard deviations, t-value, and significance level for the experimental group's pre- and post-test scores on each main writing skill.

Main writing skills	Application	Number of learners	Mean scores	Standard deviation	t-value	Significance level
Content and organization of the written text	Pre-test	50	5.32	1.31	38.28	0.05
	Post-test	50	16.90	1.36		
Writing style	Pre-test	50	4.96	1.01	24.71	0.05
	Post-test	50	13.22	2.13		
Use of linguistic rules (grammar, spelling, and morphology)	Pre-test	50	5.80	1.87	39.38	0.05
	Post-test		16.92	1.17		

From the previous table, it is evident that there are statistically significant differences between the mean scores of the learners in the experimental group in the pre- and post-applications for each main writing skill, in favor of the post-application. Examination of the significance level showed that these differences are statistically significant at the 0.05 level, which indicates that a clear improvement occurred in the performance of the experimental group learners, and that the artificial intelligence application (ChatGPT) had a positive role in developing each main writing skill and its associated sub-skills among these learners.

To answer the fourth question: What is the effect of using the ChatGPT artificial intelligence application in developing the skills necessary to address common linguistic errors in writing among learners of Arabic as a second language?

The Eta squared (η^2) was used to measure the effect size of using the ChatGPT application in developing the skills necessary to address common linguistic errors in writing among learners of Arabic as a second language (experimental group):

$$\eta^2 = t^2 / (t^2 + df)$$

Where:

- t: t-value from the table
- df: degrees of freedom (n-1)

Table 6. The effect size of using the ChatGPT artificial intelligence application in developing the skills required to remedy acceptable linguistic errors in writing among learners of Arabic as a second language

Application	Maximum score	Mean	Standard deviation	t-value	Effect size	Type
Pre-test	56	14.48	5.18	40.21	0.97	High
Pre-test	56	46.52	2.23			

The previous presentation of the research results reveals the following:

From the comparison of the performance of learners of Arabic as a second language (the research group) in the pre- and post-applications of the writing skills test, it became clear that there were differences between the two performances in favor of the post-performance, and these differences were statistically significant at the 0.05 level; this indicates the effectiveness of using the ChatGPT application in developing the skills required to remedy acceptable linguistic errors in writing among learners of Arabic as a second language.

Furthermore, the statistical analysis showed the effect of the ChatGPT artificial intelligence application in developing the skills required to remedy common linguistic errors in writing among learners of Arabic as a second language, as confirmed by the calculated effect size, which was 0.97.

The Researcher Attributes These Results to The Following Factors

- The ChatGPT artificial intelligence application enabled learners to diversify their sources of knowledge by presenting instructional content that was aligned with each learner's performance, thereby supporting learner-centered instruction.
 - Learners showed a high level of engagement with the intervention due to the introduction of a novel technological tool into the learning environment.
 - The application took individual differences into account and allowed for the repetition of writing topics and their targeted skills, which helped to consolidate learning, strengthen memory, and support the retention of information.

- The writing topics were engaging and novel for the learners, which increased their motivation to develop their writing skills and to address their written linguistic errors.

- The use of ChatGPT enhanced learners' sense of security during the learning process by providing them with greater freedom to choose learning modes that suited their preferences.

- The researcher sought to move beyond a traditional learning environment by incorporating engaging learning resources, such as images and texts, which contributed to learners' enjoyment of the learning process and to the transfer of acquired writing skills to various linguistic situations.

- ChatGPT is easily accessible anytime and anywhere via mobile devices, which helped to reduce the pressures that learners of Arabic as a second language may experience during the learning process.

In light of the findings of the present study, these results are consistent with those reported by Burkhard (2022), Shidiq (2023), Rudolph (2023), Al-Shethri (2024), Awad (2025), and Al-Nusairat (2026), which have shown that artificial intelligence applications and tools - including ChatGPT - are effective in:

- Enhancing learning and deepening contextual understanding.
- Developing higher-order thinking skills.
- Increasing learners' engagement and satisfaction and promoting their active involvement in the learning environment.
- Improving productivity and efficiency in tasks such as information retrieval, writing, thinking, idea generation, text translation, and the correction of oral and written linguistic errors.

CONCLUSIONS

Based on the results obtained, the researcher concluded the following:

- The ChatGPT artificial intelligence application outperformed traditional teaching methods, as evidenced by statistically significant differences between the mean scores of the research group in the pre- and post-applications of the writing skills test, in favor of the post-application.

- ChatGPT demonstrated a high effect in developing the skills required to remedy common linguistic errors in writing among learners of Arabic as a second language, as reflected in the large effect size value.

Recommendations

In light of the results obtained in the present study, the following recommendations are proposed:

- Focusing on Arabic-as-a-second-language curricula on practical exercises and activities that consolidate and enhance writing skills and remediate learners' written linguistic errors.
- Identifying and documenting the linguistic problems and difficulties encountered by learners of Arabic as a second language in order to develop appropriate solutions for addressing and remedying them.
- Moving away from traditional, routinized methods and techniques that emphasize rote memorization and mechanical repetition in teaching Arabic as a second language.
- Providing immediate feedback to correct written linguistic errors as they occur during the learning process for learners of Arabic as a second language.
- Developing supporting guidelines for teachers and learners that enable them to interact positively with artificial intelligence applications, particularly the ChatGPT application.
- Equipping classrooms with the necessary facilities and infrastructure to use artificial intelligence applications in teaching Arabic as a second language.
- Encouraging research and development in the field of teaching Arabic as a second language through the use of the ChatGPT application.
- Drawing the attention of specialists in teaching Arabic as a second language to the importance of artificial intelligence applications, especially ChatGPT, given their significant role in developing various linguistic learning outcomes.

Acknowledgment

The authors are thankful to the Deanship of Graduate Studies and Scientific Research at the University of Bisha for supporting this work through the Fast-Track Research Support Program.

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