

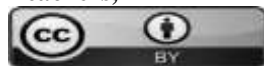


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**A Linguistic Study of the Integration of Artificial Intelligence Tools
in Teaching and Learning English Grammar****A B S T R A C T**

Using Artificial Intelligence (AI) in education has become very popular worldwide. It provides new and useful ways to improve teaching and help students learn better. There are big challenges to using AI in high schools in Iraq, especially for teaching English grammar. Teachers and students are often hesitant to use AI technologies, even though they have useful benefits like personalized teaching and quick feedback. This study looks at how Artificial Intelligence (AI) tools can be used in teaching English grammar. It involves 178 students from high schools and universities in Najaf, Iraq. Global trends show that AI is becoming more important in language learning, but Iraq faces special difficulties. The study showed that using AI to help teach grammar improved students' skills. However, many secondary schools were not very open to it. Surveys, classroom visits, and interviews with teachers showed that many high school teachers and students were unsure about using AI tools like grammar checkers and language-learning methods. Some teachers saw AI as a threat to traditional teaching methods, while others noticed that AI results didn't match the national curriculum. Adoption was made harder because students had trouble getting devices, having a reliable internet connection, and having a consistent power supply, especially in public schools. Even though AI has great potential for teaching, the findings show that using it successfully in Iraqi learners' secondary schools requires more than just having technology. It also needs ongoing investment in buildings and resources, training for teachers, and changes in how people think about new educational tools.

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دراسة لغوية لدمج أدوات الذكاء الاصطناعي في تعليم وتعلم قواعد اللغة الإنجليزية

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المستخلص

أصبح استخدام الذكاء الاصطناعي (AI) في التعليم شائعاً جداً على مستوى العالم. فهو يوفر طرقاً جديدة ومفيدة لتحسين عملية التدريس ومساعدة الطلاب على التعلم بشكل أفضل. ومع ذلك، هناك تحديات كبيرة تواجه استخدام الذكاء الاصطناعي في المدارس الثانوية في العراق، خصوصاً في تدريس قواعد اللغة الإنجليزية. إذ يتردد المعلمون والطلاب غالباً في استخدام تقنيات الذكاء الاصطناعي، على الرغم من فوائدها المهمة مثل التعليم المخصص والتغذية الراجعة السريعة. تتناول هذه الدراسة كيفية استخدام أدوات الذكاء الاصطناعي (AI) في تدريس قواعد اللغة الإنجليزية، حيث شملت 178 طالباً من المدارس الثانوية والجامعات في النجف، العراق. وتشير الاتجاهات العالمية إلى أن الذكاء الاصطناعي أصبح أكثر أهمية في تعلم اللغات، إلا أن العراق يواجه صعوبات خاصة في هذا المجال. أظهرت نتائج الدراسة أن استخدام الذكاء الاصطناعي في تدريس القواعد ساعد على تحسين مهارات الطلاب، إلا أن العديد من المدارس الثانوية لم تكن منفتحة بشكل كافٍ على ذلك. وأوضحت الاستبيانات والزيارات الصفية والمقابلات مع المدرسين أن الكثير من مدرسي المدارس الثانوية وطلابها غير متأكدين من استخدام أدوات الذكاء الاصطناعي مثل مدققي القواعد وطرق تعلم اللغات. بعض المدرسين اعتبروا أن الذكاء الاصطناعي يُهدد الأساليب التقليدية للتدريس، في حين لاحظ آخرون أن نتائج الذكاء الاصطناعي لا تتطابق مع المنهاج الوطني. كما زاد من صعوبة تبنيه أن الطلاب يواجهون مشاكل في الحصول على أجهزة مناسبة، أو اتصال إنترنت موثوق، أو حتى توفر الكهرباء بشكل مستمر، وخاصة في المدارس الحكومية. ورغم الإمكانيات الكبيرة التي يقدمها الذكاء الاصطناعي للتعليم، تشير النتائج إلى أن نجاح استخدامه في المدارس الثانوية العراقية يتطلب أكثر من مجرد توفير التكنولوجيا؛ فهو يحتاج أيضاً إلى استثمارات مستمرة في البنية التحتية والموارد، وتدريب المدرسين، وتغيير في طريقة التفكير تجاه الأدوات التعليمية الجديدة.

الكلمات المفتاحية: الذكاء الاصطناعي، القواعد، أدوات الذكاء الاصطناعي.

1.2. Introduction

Technology is changing quickly, and new advancements come out every day, making us wonder where we fit into this tech revolution. Artificial Intelligence (AI) is everywhere in technology and has become a big part of our everyday lives. We see it in search engines on the internet, mobile apps, and healthcare systems (Sánchez-Prieto et al. , 2020) It has greatly influenced many job areas, especially education, which has been one of the most affected. What matters isn't just if AI helps teaching, but how it can make learning better. One part of education where AI has really made a big difference is in learning languages.

Teaching English to people who don't speak it is tough, and one of the hardest parts is teaching grammar. English teachers in Lebanese middle schools find it hard to get ready for grammar lessons, teach them well, and meet their goals. They also have trouble making the rules easy to understand, creating exercises, quizzes, and other tests, and grading the work and tests. So, using AI can help teachers get more done, save time, and manage their work

better. English grammar is an important part of knowing the language. It helps learners communicate better. With the rise of Artificial Intelligence, we now have new ways to teach grammar that can adjust to different students' needs and make learning more engaging.

Also, even with this global movement, many countries in the Arab world, like Iraq, still haven't accepted that education is limited, not well-studied, and often not welcomed. Governments and groups are pushing for digital learning with technology plans, but what happens in classrooms often shows a big difference between these goals and what is actually possible with the technology available. Speak and write clearly so others can understand you. Traditional grammar teaching methods are organized, but they often have trouble meeting the different needs of individual learners and can become boring. Artificial intelligence (AI) plays a remarkable role in the progress of education proposition technology and has drastically influenced the process of learning English, including grammar. Artificial intelligence software enhances and facilitates learning and serves as a tool, platform, and communication resource for people worldwide (Luan et al., 2020). These artificial intelligence grammar tools are Duolingo, Grammarly, Quill bot, Deep English, Speak& improve, Chat GPT, White Smoke, Ginger, Scribe, and Sentence Master, which are used based on popularity and relevance in learning English grammar.

Also, Luan et al. (2020) add that AI provides solutions, predictions, and insights into the individual's situation and needs. Also, Chen et al. (2020) believe that AI technology has a phenomenal influence on the educational environment. According to Asad et al. (2021), technology pertains to learning effectively and facilitates students' learning

In summary, this research has focused on how AI helps in learning English grammar. It looked at different tools for learning grammar, such as Duolingo, Grammarly, Quill bot, Deep English, Speak & Improve, Chat GPT, White Smoke, Ginger, Scribe, and Sentence Master. These AI tools can help students understand English grammar and make learning easier by offering fun exercises, checking mistakes, and giving fast feedback (Ghaleb, 2024). Also, these tools can help create learning experiences tailored to the specific needs of language learners (Zulkarnain, 2023). Not many students and language learners use these tools because they don't know about them, aren't motivated to use new technology, or prefer traditional ways of learning. Not having the Internet or the right devices might be why some people can't use these resources (Al-Shidi, 2024). Even though AI programs for learning English grammar have good and bad points, it's important to help language learners feel more motivated and aware. This study aimed to answer these questions.

Q.1. What is the impact of AI tool's integration in teaching English Grammar?

Q.2. What is the attitudes of Iraqi EFL teachers and students toward using AI tools in teaching English grammar?

2. Literature Review

Earlier studies have looked at how AI software helps improve English grammar skills, and the results show that this technology is good for learning. Park (2019) says that tools using AI

to check grammar help students improve their grammar skills, but they still need teachers to help them understand and fix their mistakes. This result matches what a study by Lalira and others found. A study in 2024 showed that using smart tools like Grammarly and ChatGPT helped students improve their grammar scores. It also highlighted the need to mix technology well with regular teaching methods.

Also, other research shows that AI tools are important for learning. Kumar (2023) says that AI tools make learning more fun and interesting, and they also improve how we learn. Tamil and Vaishnavi (2024) think that students can improve their grammar skills by using AI tools. Also, Daniel (2023) in his study thinks that tools using artificial intelligence are very accurate and can help people learn English better. Sure, teachers need to oversee things to catch all mistakes. The results show that both old and new methods have their good and bad points, and using a mix of both can help lessen the bad points. Also, Lemons Reeves (2024) pointed out that AI tools help students improve their language skills by providing personalized learning. Using both old and new methods together will make them work better and help them improve even more.

Besides, , Limones Rios (2024) found that artificial intelligence is a helpful tool for learning and can make learning more effective. This article says that countries like China and the United States are expected to invest in artificial intelligence by 2025. This technology will help students get better at grammar and stay current. AI tools help improve English learning by mixing old-fashioned methods with new ones, making the learning experience better. This way gives fast and different opinions from many people. Using tools like Grammarly, Duolingo, and ChatGPT helps people learn, opens new chances, and encourages them to study. Rocky (2022) says that computer programs like Microsoft Word, which now have smart features, can help make writing and grammar better.

3. Methodology

3.1. Materials of the Research

- **Tools and Platforms:** Grammarly and QuillBot for real time grammar checking and paraphrasing were used while NoRedInk was used for structured grammar drills.
- **Pre- and Post-Grammar Tests:** Standardized grammar tests were administered to measure students' proficiency before and after a six-week intervention. The test included sections on: Sentence correction, verb usage, tense consistency, subject-verb agreement and lastly article and preposition use.
- **Student' Scale:** A structured questionnaire (30 items) with Likert-scale responses was developed to measure: Accessibility of AI tools, frequency of AI use, perceived usefulness, engagement and motivation and challenges in using AI. Reliability testing yielded a Cronbach's Alpha of 0.86, indicating good internal consistency.
- **Teacher Interview Guide:** A semi-structured interview guide explored teacher perceptions, attitudes, challenges, and pedagogical concerns about AI tools. Key focus areas included: Familiarity with AI applications, willingness to integrate AI into teaching, observed student responses and ethical and practical concerns.

3.1. Data Collection

The target group included students and teachers from both government and private high schools in different areas of Najaf, Iraq. A group of 178 students took part in this study. The students were between 13 and 19 years old, and 92 English teachers from the schools took part as well. In addition, a type of study design was used where tests were given before and after the experiment to both the control group and the group that was tested. The group that was tested learned with help from AI, while the other group learned grammar in a regular classroom setting. For the treatment, the program lasted six weeks. During this time, 178 students in the experimental groups took grammar lessons with the help of AI tools like Grammarly, ChatGPT, and QuillBot. The control groups of 178 students learned grammar the usual way, using textbooks and lessons on a chalkboard, without help from AI. Both groups learned the same material that matched the national curriculum to keep things similar. In the end, we used simple statistics (like the average and how much scores vary) to understand how students felt. We also used paired t-tests to compare scores before and after the tests within each group and between different groups. ANOVA was used to compare performance in different regions and between males and females. The analysis was done using SPSS version 25. In the qualitative part, we looked at interview notes and observation records. We used thematic analysis to find patterns and developed codes based on what we found. These codes were organized into themes like "doubts about AI," "lack of digital skills," and "wrong teaching methods. "

4. Results

This section shares the results of the study using data from 178 students and 92 teachers in Iraq. The results are grouped into four main topics: better grammar skills, how students feel about AI tools, teachers' feelings, and problems with facilities and putting plans into action. So, a test was given before and after to see how much the students improved in grammar in both the experimental and control groups.

Table 1

Pre-test and post-test results of control and experimental groups

N	Pre-test Mean	Post test Mean	Total mean	SD	p-Value
Experimental	53.8	78.6	24.6	7.8	<0.001
Control	56.5	66.6	10.68	6.12	<0.001

Students who used AI tools did better in grammar than those who did not use them. The 233% increase in scores showed that AI can be a useful tool for teaching grammar better.

Students' Perception of AI

Besides, documenting to table 1, 76% of AI group students reported that AI tools helped them understand grammar errors better. 71% felt more confident in revising their work using AI and 68% preferred AI aided practice over workbook drills. This result showed a positive response from the participants.

On the other hand, 59% of all students said they did not fully understand how AI made some corrections. 44% reported that their schools had insufficient internet access to use AI tools consistently and 32% believed that AI undermined the teacher's role, suggesting mistrust or misunderstanding of AI's function. This result revealed negative or neutral responses from the participants

Teacher Attitudes toward AI

Interviews with 92 English teachers showed different opinions. About 32% thought that AI could help them with their teaching, especially in grading essays and creating practice activities. Some of them mentioned that AI helped students learn on their own and got more active participation from stronger students, which is a good thing. On the other hand, 71% of the teachers were unsure or against using AI, and more than 60% said they had not been trained on AI or digital tools for teaching languages. This is a worrying sign..

Table 2.

Summary of findings

N	Main Results
Grammar improvement	AI-assisted group showed a 23.3% gain in test scores (vs. 10.2% in control).
Student engagement	Most students found AI tools engaging, though some struggled with understanding feedback.
Teacher attitudes	High skepticism; limited digital training; perceived threat to instructional authority

Table 3

Student Access to AI Tools

Targeted Context: Najaf	Regular Access to AI Tools	Reporting Net Access at School	Having Individual Devices
Sub-Context 1	74%	69%	64%
Sub-Context 2	61%	46%	39%
Sub-Context 3	47%	39%	34%

The table showed that participants in Context 1 had the highest digital access at 74%. Those in Sub-Context 2 and 3 had lower levels of access at 61% and 47% respectively.

Table 4

Teachers' Support and Attitudes toward AI

Targeted Context : Najaf	Teachers' Access to AI Tools	Digital Literacy Training	Main Proposed Concerns
Sub-Context 1	48%	51%	Over-reliance by students
Sub-Context 2	34%	36%	Lack of curriculum alignment
Sub-Context 3	47%	39%	AI threatening job security

Tabulated Data (table 3) revealed that the highest number of Teachers who support the use of AI in teaching grammar, correlating with access to training and infrastructure. Other teachers were the least supportive, mainly due to a lack of exposure and fear of job redundancy.

Discussion

The results of this study offer helpful information about how Artificial Intelligence (AI) is currently being used, its possibilities, and the difficulties of including it in English grammar teaching and general English lessons in secondary schools in Iraq. The discussion focuses on five main topics: (1) better grammar skills, (2) differences in how well AI works in different areas, (3) what students think and how prepared they are to use digital tools, (4) teachers' views and teaching challenges, and (5) problems with facilities and system limits.

Grammar Improvement

The experimental group showed an average improvement of 23.3%, while the control group had an average improvement of 10.2%. This shows that students using AI tools improved their grammar skills a lot more. This result matches what other studies around the world have found: giving quick, personalized feedback can help improve language skills with AI-supported education.

Besides, Schmidt's Noticing Hypothesis from 1990 says that to fix their language mistakes, learners need to notice them first. This idea is backed by the results of the study. AI tools like Grammarly and ChatGPT help a lot with this process. They can spot mistakes and give corrections quickly, which students may not get straight away from their teachers due to limited time or large class sizes. However, even though these improvements are important, they make us wonder how well people really understand the topic. Some students said they used AI recommendations without really understanding the grammar rules that explained the changes. This was a worry raised in Vardi's (2012) study about not using automated feedback tools deeply enough.

Students Insights and Digital Access

The study found that most students thought AI tools were cool and helpful. Over 70% said they felt more confident and understood grammar better. Research shows that AI helps students take charge of their own learning and stay interested in it (Ranalli, 2018; Luckin et al., 2016). But there are specific challenges because of the situation in Iraq.

Almost 60% of students had trouble understanding AI feedback because they didn't have enough digital skills or the explanations were too complex and didn't match what they were supposed to learn in school. This shows that students are not ready to use AI tools even though they may have some skills. Selwyn (2019) also talked about this problem, warning that we shouldn't assume that "digital natives" know how to use educational technology well and carefully just because they grew up with it..

Teacher Attitudes: Caution and Struggle

The study found that many teachers are worried about using AI in their teaching. Over 70% of them do not support it. Some of the concerns mentioned were: worry about losing jobs, uncertainty about whether AI can teach grammar well, and problems with following the national curriculum. These worries are not without a good reason. As stated by Yin and others. In 2020, using AI in classrooms often raises questions about traditional roles and teaching authority, especially in places where teachers lack proper training. Some of the teachers in this study did not have formal training in AI or ICT, leading to them feeling unsure and resistant.

Comparing with Worldwide and Contextual Studies

Studies have shown that using AI in grammar training helps people write better and more correctly in countries like the US, South Korea, and Finland. These improvements often happen because there are good digital systems in place, teachers are getting regular training, and AI tools are being used in the school lessons.

Although students in Iraq made similar learning improvements, they achieved this despite facing many resource challenges. This means that if we improve things like facilities and support for teachers, there is a great chance for better learning with the help of AI. A study by Owusu and Danso (2021) looked at how AI is used in senior high schools in Ghana. It found that students were excited about language learning apps that use AI, but teachers were hesitant to use them. There was also a shortage of relevant local content and teachers didn't feel confident in using these automated systems, which made it hard to use them effectively. These results are very similar to what we see in Iraq. There is a mismatch between AI feedback and local teaching materials, concerns about whether AI can replace teachers, and a lack of digital skills among teachers.

Adeoye and Lawal (2022) say that in Nigeria, even schools that have technology are not using AI tools very much. This is because of rules about using digital learning and worries that students might rely too much on it. This highlights an important lesson for Iraqi learners: combining teaching methods is necessary, and just using technology isn't enough.

One major risk found from talking to students and watching them in class is that students often accept AI suggestions without questioning them, especially when they use tools like Grammarly or ChatGPT to make corrections. These tools are good at pointing out basic grammar mistakes, but they usually don't provide much teaching or explain the grammar rules behind the corrections. This behavior supports Vardi's (2012) idea that without clear instructions, learners might treat AI like a "black box" and just accept its answers without really focusing on learning grammar. For example, some students said in interviews that they copied sentences changed by AI without knowing the difference between present perfect and simple past, or when to use countable and uncountable nouns. So, while AI can help improve basic performance, it doesn't really help much with teaching deep grammar understanding, especially without a teacher's help.

Implications for Syllabus and Pedagogy

The results of this study show that we need to rethink how we teach grammar in Iraq ,Najaf. Even though the national curriculum focuses a lot on paper exercises and strict rules, students are now using more digital grammar tools that don't follow those guidelines.

To fix these issues, it's important to adapt AI content to match local English styles and the school curriculum in Iraq, Najaf. Teachers should change how they see their job so that they help students understand and think critically about AI information instead of fighting against it. We can gradually combine different learning methods by using AI tools for review tasks and keeping classroom instructions for explaining rules and practices. However, having support from institutions, like national policies that encourage the safe, equal, and effective use of AI in classrooms, is important for these programs to succeed.

Lastly, it's important to talk about the fairness and moral questions raised by this research. There is a clear difference in access to technology, with students in cities, especially in the Western Area, benefiting much more than those in the countryside. In Iraq, Najaf Leone, there are differences between boys and girls in using technology. Girls are slightly less likely to say they have personal devices.

Also, no AI tools were made easier for students with disabilities in schools, and they had the least access and training. Not fixing these issues could make current problems worse, especially as AI is used more in schools and teaching methods. Governments, NGOs, and school leaders say that using AI should include everyone, consider different genders, and pay attention to students who don't get enough support.

Conclusive Remarks

This study looked at how Artificial Intelligence (AI) affects English grammar teaching in Iraqi secondary schools, with 3,676 students from four main areas. From what we found, we can say the following things. Students got much better at grammar because they used AI tools for practice. The study showed that students who used AI got an average score 23. 3% higher on grammar tests, while the other group improved by 10. 2% This backs up results from studies around the world that show AI helps people write better and be more accurate with grammar (Roscoe & McNamara, 2013). Although students did better in their work, many still didn't understand the grammar rules behind their changes.

This shows that we need better teaching methods. Students' grammar skills got a lot better because they used AI tools for grammar practice. The study showed that students who used AI for help improved their grammar test scores by an average of 23. 3%, while the other group improved by 10. 2%This agrees with research from around the world that shows AI helps people write better and makes their grammar more accurate (Roscoe & McNamara, 2013). Even though students got better at their work, many didn't understand the grammar rules behind their changes. This shows that we need to teach in a better way.

The results of this study highlight the importance of creating detailed plans to include AI in Najaf's education system. For AI to really help improve English grammar teaching, we can't just give tools and hope that teachers and students will learn how to use them. Here are the following actions for policy and practice that should be taken:

Teacher Training and Skill Development: It is important for teachers to get specific training on how to use AI tools to improve their teaching. Teachers need to know how AI can help them with their teaching instead of taking their place. Continuous training for professionals should be a key part of any plan to use AI. **Investment in Infrastructure:** To make sure that all students, teachers, and secondary schools can use AI tools equally, we need to invest in digital services. This means providing good internet access, working devices, and a steady power supply, especially in rural and less-served areas. Governments and nonprofit organizations should work together to solve these problems step by step. AI tools should be changed to fit Iraqi learners' school curriculum and different ways of speaking English in the country. Making content suitable for local students and teachers will help AI be more helpful and effective as a learning tool.

Inclusive Policies: We need to create rules to make sure that all students and teachers can access AI technology, especially those from underprivileged backgrounds, girls, and students with disabilities. We should focus on making sure everyone can access AI tools that are easy to use and that meet the different needs of students in Najaf Leone. But more research is needed to see how well students who use AI remember grammar over time. Look at how AI changes how we use language, think critically, and write smoothly. Also, make AI tools for grammar that help people learn other language skills in different areas.

It will also look at how AI can help in inclusive education, especially for students with disabilities and those in programs with few resources. A longer study over several years could help us better understand how AI affects test scores, student feelings, independence in learning, and confidence in language skills.

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