

Enhancing Online English Teaching and Learning of Speaking in Libya through Artificial Intelligence (AI)

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**تحسين تدريس وتعلم اللغة الإنجليزية عبر الإنترنت في ليبيا
 باستخدام الذكاء الاصطناعي**

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المخلص:

أثر التطور السريع للذكاء الاصطناعي تأثيراً كبيراً على التعليم في جميع أنحاء العالم، إذ وفّر أدوات وأساليب مبتكرة لتحسين تجارب التدريس والتعلم. في الدول غير الناطقة بالإنجليزية كـ ليبيا، حيث يواجه تعليم اللغة التقليدي تحديات مثل محدودية الموارد، ونقص المعلمين، وتباين منهجيات التدريس، يُتيح الذكاء الاصطناعي فرصة لإحداث نقلة نوعية في تدريس وتعلم اللغة الإنجليزية. تستكشف هذه الورقة البحثية دمج الذكاء الاصطناعي في تدريس وتعلم اللغة الإنجليزية عبر الإنترنت في ليبيا، مُسلطة الضوء على إمكاناته في سد فجوات اكتساب اللغة وتعزيز استقلالية المتعلم. تُركّز الدراسة على التداخل بين التعليم عبر الإنترنت والحلول المعتمدة على الذكاء الاصطناعي، بما في ذلك أنظمة التدريس الذكية، ومنصات التعلم التكيفي، وأدوات معالجة اللغة الطبيعية (NLP)، وتقنيات التقييم الآلي. تُعدّ تطبيقات الذكاء الاصطناعي هذه ذات قيمة خاصة في معالجة الفروق اللغوية والثقافية الدقيقة للمتعلمين الليبيين، وتقديم ملاحظات شخصية، وتصحيح لغوي فوري، وإتاحة الوصول إلى محتوى ثري مُراعٍ للسياق. علاوة على ذلك، يُمكن للذكاء الاصطناعي دعم المعلمين من خلال أتمتة المهام الإدارية، وإعداد خطط دروس مُخصّصة، وتوفير رؤى مستندة إلى البيانات حول أداء الطلاب. تدعو هذه الورقة البحثية إلى وضع إطار عمل استراتيجي لدمج الذكاء الاصطناعي في تعليم اللغة الإنجليزية عبر الإنترنت في ليبيا، مع التركيز على تدريب المعلمين، وتطوير محتوى مناسب محلياً، ومراعاة الاعتبارات الأخلاقية. من خلال الاستفادة الفعّالة من الذكاء الاصطناعي، لا يمكن للبيبا فقط تعزيز كفاءة متعلميها في اللغة الإنجليزية، بل يمكنها أيضاً المساهمة في الحوار العالمي الأوسع حول الذكاء الاصطناعي في التعليم. تُقدّم نتائج هذه الدراسة رؤى قيمة لصانعي السياسات والمعلمين ومطوّري التكنولوجيا الذين يسعون إلى تسخير الذكاء الاصطناعي لتدريس اللغة الإنجليزية في السياقات غير الأم. كما تدعو هذه الورقة إلى مزيد من الحوار حول دور الذكاء الاصطناعي في إعادة صياغة مستقبل تعليم اللغات في البيئات محدودة الموارد.

الكلمات الدالة: الذكاء الاصطناعي (AI)، أنظمة التعليم الذكية، أداء الطلاب، منصات التعلم التكيفية، مهارات التحدث.

Abstract

The rapid evolution of Artificial Intelligence (AI) has profoundly impacted education worldwide, offering innovative tools and approaches to enhance teaching and learning experiences. In non-native English-speaking countries such as Libya, where traditional language instruction faces challenges such as limited resources, teacher shortages, and inconsistent methodologies, AI presents an opportunity to transform English language teaching and learning. This paper explores the integration

of AI in online English teaching and learning in Libya, highlighting its potential to bridge gaps in language acquisition and foster learner autonomy. The study focuses on the intersection of online education and AI-driven solutions, including intelligent tutoring systems, adaptive learning platforms, natural language processing (NLP)-based tools, and automated assessment technologies. These AI applications are particularly valuable in addressing Libyan learners' linguistic and cultural nuances, offering personalized feedback, real-time language correction, and access to rich, contextualized content. Furthermore, AI can support educators by automating administrative tasks, generating tailored lesson plans, and providing data-driven insights into student performance. This paper argues for a strategic framework to integrate AI in Libyan online English language education, emphasizing teacher training, localized content development, and ethical considerations. By leveraging AI effectively, Libya can not only enhance English proficiency among its learners but also contribute to the broader global discourse on AI in education. The findings of this study provide valuable insights for policymakers, educators, and technology developers aiming to harness AI for English language teaching in non-native contexts. This paper also invites further dialogue on the role of AI in reshaping the future of language education in resource-limited settings.

Keywords: Adaptive learning platforms, artificial intelligence (AI), intelligent tutoring systems, student performance, speaking skills

Introduction

Technology has drastically transformed the landscape of language learning, particularly in countries where English is not the native language. In Libya, the acquisition of English is complicated by several factors, including limited resources, teacher shortages, and outdated pedagogical methods. Moreover, students often face challenges such as limited exposure to English outside the classroom, making it difficult to develop proficiency in the language.

A key challenge is the lack of opportunities to practice speaking English in authentic contexts, which impedes fluency, accuracy, and pronunciation. This issue is further compounded by the absence of native speakers and traditional teaching methods that prioritize grammar and reading comprehension over speaking and listening skills (Bakori & Albakai, 2025).

One promising solution to these challenges lies in the use of technology, particularly AI-powered tools such as intelligent tutoring systems (ITS), adaptive learning platforms, and natural language processing (NLP)-based resources. These tools can provide personalized feedback, real-time language corrections, and access to rich multimedia content, addressing the specific needs of Libyan learners. For example, platforms like YouTube can play a pivotal role in offering students exposure to native speakers and diverse accents, thereby improving listening comprehension and speaking abilities.

This research explores the role of AI and YouTube videos in enhancing speaking skills among Libyan secondary school students learning English as a foreign language (EFL). The aim is to investigate how these technologies can overcome the challenges faced by Libyan students and contribute to improving their fluency, vocabulary, and pronunciation.

The integration of technology in language learning has long been recognized for its potential to enhance language skills, particularly in listening and speaking. Research has shown that multimedia resources, such as YouTube videos, significantly improve learners' speaking and listening abilities (Anderson, et al. 2000; Zhao, et al. 2020). YouTube, in particular, offers an accessible and valuable tool for EFL learners, providing authentic language exposure through real-world contexts, native speaker models, and interactive content.

In Libya, the application of technology in language education is still emerging, though the potential is significant. Baker (2019) noted that EFL students in similar educational settings often lack opportunities to engage with native speakers, which hampers their oral proficiency. AI can provide a solution by giving

students the opportunity to hear native speakers, learn colloquial expressions, and practice conversational English in an informal setting.

Theoretical frameworks such as Communicative Language Teaching (CLT) and Task-Based Language Teaching (TBLT) support the use of video-based resources in language learning. CLT emphasizes communication as both the goal and means of language learning, which aligns with the interactive nature of YouTube. TBLT, on the other hand, advocates the use of authentic materials, including video content, to engage learners in real-world tasks that mirror actual language use (Bakori, 2021; Ellis, 2000,2003, Foster, 1999; Willis & Willis, 2007)

While research has established the effectiveness AI in improving speaking skills across various contexts, there remains a gap in the literature concerning its application in Libyan schools, particularly in combination with AI-enhanced tools, adaptive learning environments. This study aims to fill that gap by investigating how AI-driven learning can address the specific linguistic challenges faced by Libyan students.

1.1 Research Problem

Students face numerous obstacles in developing their English-speaking skills, stemming from limited exposure to the language outside the classroom, lack of interaction with native speakers, and teaching methods that often prioritize grammar and vocabulary over communication. Furthermore, Libya's educational system struggles with inadequate resources and infrastructure, limiting students' opportunities for speaking practice and contributing to poor fluency, vocabulary, and pronunciation (Bakori & Albakai,2025).

This issue is compounded by the scarcity of interactive, AI-driven educational tools and the challenge of making English-speaking practice accessible to students with limited exposure to English in their daily lives. This study explores how teaching materials enhanced by AI-driven tools can bridge these gaps and improve students' speaking skills in authentic, real-world contexts.

1.2 Research Question

This study aims to address the following question to explore the effectiveness of using AI tools to improve students' speaking ability.

The question is, "How can AI-driven educational tools enhance speaking skills among Libyan students facing language exposure challenges?"

1.3 Research Hypothesis: The hypothesis for this study is as follows

Not applying AI would significantly hinder Libyan learners of English from improving their fluency, pronunciation, and vocabulary when learning English as a foreign language. This hypothesis is based on the premise that AI tools, such as natural language processing (NLP), will provide personalized, context-aware feedback. At the same time, AI applications will offer authentic language input that exposes students to real-world English usage.

1.4 Objectives: The primary objectives of this study are to:

- Assess the impact of AI-enhanced tools on the fluency, pronunciation, and vocabulary of Libyan University students learning English, investigate the role of AI-driven adaptive learning platforms in improving students' engagement with YouTube content and fostering language practice and Identify to address the pedagogical and technological challenges that teachers and students face when integrating YouTube and AI tools into language learning.

1.5 Significance of the Study

This study is significant because it explores the potential of AI to overcome traditional challenges in language learning, particularly in resource-limited settings like Libya. The findings could inform future language teaching practices, especially in contexts where students lack access to native speakers and other

advanced language learning resources. Furthermore, this study will contribute to the growing body of research on AI in education, particularly in non-native English-speaking countries. It will provide actionable insights for educators, policymakers, and technology developers who are working to improve English language proficiency through innovative technological solutions. By enhancing the understanding of how AI can benefit English language learners in Libya, this study offers a more localized, methodologically rigorous, and theoretically grounded approach to integrating AI into the educational process.

2 Literature Review

The integration of Artificial Intelligence (AI) into education, particularly in English Language Teaching and Learning (ELTL), is transforming traditional methods of language acquisition. As AI technologies rapidly evolve, tools such as Intelligent Tutoring Systems (ITS), adaptive learning platforms, and Natural Language Processing (NLP) are creating new opportunities for personalized, effective learning experiences. In countries like Libya, where educational challenges such as teacher shortages, resource limitations, and inconsistent teaching methodologies are prevalent, AI presents a promising solution to enhance English language education. This literature review explores how AI can improve speaking skills within the context of ELTL in Libya, emphasizing the role of AI in overcoming existing barriers and providing learners with tailored, accessible learning opportunities.

2.1 Introduction to Artificial Intelligence (AI) In Education And English Language Teaching (ELT)

Artificial Intelligence (AI) refers to the development of computer systems designed to perform tasks that typically require human-like cognition, such as learning, reasoning, and decision-making. AI's growing integration across sectors, especially in education, has introduced innovative teaching and learning approaches (Anderson & Dill, 2000; Chua & Ng, 2019; Quirk & Crystal, 1985). In countries like Libya, where challenges such as limited resources, teacher shortages, and inconsistent pedagogical strategies are prevalent, AI offers an opportunity to overcome these barriers and significantly enhance English Language Teaching and Learning (ELTL). Specifically, AI provides personalized learning experiences that address students' individual needs, potentially improving their academic outcomes (Baker, 2019; Coyne, et al, 2023; Zhao & Zhang, 2021).

For Libya, AI can play a critical role in enhancing English proficiency, particularly in speaking skills, by providing tools like Intelligent Tutoring Systems (ITS), adaptive learning platforms, and Natural Language Processing (NLP). These AI tools can facilitate real-time language practice, enabling students to improve their speaking abilities even when qualified instructors are unavailable. This literature review focuses on how AI can be applied to enhance speaking skills in online ELTL, particularly for Libyan learners.

2.2 The Role of AI in Enhancing English Language Teaching and Learning (ELT) Speaking Skills

AI technologies are revolutionizing language education by offering adaptive and personalized learning experiences that cater to each learner's needs. These tools are particularly effective in addressing the challenges Libyan students face in developing speaking skills, a vital component of language acquisition (Dillenbourg, 2016; Gonzalez & Thompson, 2021).

2.2.1 Intelligent Tutoring Systems (ITS)

Intelligent tutoring systems (ITS) are AI-powered platforms that simulate one-on-one tutoring experiences. These systems adapt content and pacing according to the learner's progress, offering real-time feedback on speaking skills such as pronunciation, fluency, and accuracy (Koedinger et al., 2013). In Libya, where qualified English teachers are scarce, ITS can offer invaluable support by providing learners with continuous, personalized speaking practice. These systems can identify specific speaking challenges, offer corrective feedback, and allow learners to improve at their own pace (Kessler, 2018; Lee&Kim,2020). Research indicates that ITS can significantly enhance students' speaking abilities by

delivering tailored instruction that focuses on weaknesses, thus on weaknesses, thus promoting continuous improvement (Luckin et al., 2016).

2.2.2 Adaptive Learning Platforms

Adaptive Learning Platforms utilize AI to adjust the difficulty of lessons and tasks in real-time, based on students' performance. These platforms create customized learning paths, ensuring that content is neither too easy nor too challenging, keeping learners engaged while progressively developing their skills. For Libyan learners, who may have varying levels of English proficiency, adaptive learning platforms can offer a tailored environment in which students receive speaking practice suited to their abilities. These platforms can significantly enhance learners' fluency, vocabulary usage, and overall confidence in speaking (Corbett & Anderson, 1994; Holmes & Gee, 2019; Sheikh, et al. 2023).

2.2.3 Natural Language Processing (NLP) in Speaking Practice

Natural Language Processing (NLP) refers to AI technologies that enable machines to understand, interpret, and generate human language. NLP is particularly effective in enhancing speaking skills by providing real-time feedback on pronunciation, sentence structure, and conversational fluency. Tools such as Duolingo, Google Translate, and speech recognition software are already demonstrating promising results in helping students practice speaking by offering immediate corrections (Higgins et al., 2018; Gonzalez & Thompson, 2021). For Libyan students, who often face challenges in pronunciation and grammatical accuracy, NLP can be a powerful tool for identifying errors and providing detailed feedback. Additionally, NLP tools can simulate conversational interactions, enabling learners to practice real-world communication and build confidence in speaking English (Zou et al., 2019; Besser, 2018).

2.2.4 Automated Assessment and Feedback for Speaking Skills

AI-driven automated assessment systems provide instant feedback on students' speaking performance. These tools assess various aspects of speaking, such as pronunciation, intonation, and fluency, and offer immediate insights into learners' performance. In Libya, where large class sizes and limited teacher time make individualized feedback difficult, automated assessments can ensure that learners receive timely, constructive input. Research indicates that regular feedback on speaking tasks leads to faster improvement, as students are more likely to refine their skills when given actionable, immediate advice (Bakori & Albakai, 2025; Nouri et al., 2020; Lee & Kim, 2020).

2.3 Challenges in Implementing Ai For Speaking Skills in ELT in Libya

While AI holds significant promise for improving speaking skills among Libyan students, several challenges hinder its widespread implementation. These include infrastructural issues, digital literacy gaps, and cultural perceptions of AI.

2.3.1 Technological Infrastructure

Libya's technological infrastructure poses a significant challenge to the effective implementation of AI in education. Limited access to reliable internet, frequent power outages, and high technology costs can prevent students from fully utilizing AI-powered platforms designed to improve speaking skills (Abdelrahman, 2020). To effectively integrate AI, Libya must invest in improving technological infrastructure, including stable internet connectivity and affordable access to devices. Without addressing these infrastructure gaps, AI tools may remain inaccessible to many students, especially those in rural areas.

2.3.2 Digital Literacy and Teacher Training

For AI to be successfully integrated into ELTL, both teachers and students must possess sufficient digital literacy. In Libya, many teachers lack proficiency in using AI tools, which limits their ability to fully leverage these platforms (Baker, 2019). To overcome this, professional development programs should focus on enhancing digital literacy and equipping educators with the skills necessary to use AI platforms effectively in their teaching practices. Empowering teachers to utilize AI tools for speaking instruction will enable them to better support students in improving their oral language proficiency.

2.3.3 Cultural Perceptions of AI

Cultural attitudes toward AI can also impact its acceptance in Libyan classrooms. Some learners may prefer traditional face-to-face instruction over AI-driven tools, and there may be concerns about AI replacing human teachers (Hutchinson, 2020). Public awareness campaigns that emphasize the complementary role of AI in enhancing speaking skills—rather than replacing teachers—will be essential in fostering acceptance of these technologies in Libya.

2.3.4 Data Privacy and Security

AI in education involves the collection of large amounts of personal data, which can raise concerns about privacy and security, especially in countries with limited data protection laws (Tschandl et al., 2020). Ensuring that AI tools comply with international data privacy standards is crucial to building trust among students and educators. Establishing transparent data handling practices is essential for the ethical use of AI in enhancing speaking skills.

2.4 Case Studies of AI Implementation in Education

Looking at how AI has been successfully integrated into educational systems in other countries provides valuable insights for its potential application in Libya.

Case Study: AI in India

India has implemented AI in education through platforms like BYJU's, which uses AI to personalize learning paths for students. These platforms have been particularly effective in improving language skills, including speaking, by offering tailored content and real-time feedback (Gupta, 2020). The success of these platforms suggests that AI could be similarly effective in enhancing English language speaking skills in resource-constrained environments like Libya.

Case Study: AI in Egypt

Egypt has also adopted AI in education through initiatives like the Egyptian Knowledge Bank, which provides AI-driven resources to support language learning, including speaking practice (El-Araby, 2021). These platforms offer adaptive learning systems and NLP tools, providing students with real-time speaking practice and feedback. Egypt's experience offers valuable lessons for Libya, particularly in terms of content localization and teacher training.

2.5 AI's Potential to Transform English Language Speaking Skills in Libya

AI has the potential to address key challenges in Libyan education, particularly in improving English language speaking skills. AI-powered tools can provide personalized speaking practice, real-time feedback, and simulations of real-world conversations. These tools not only engage students but also enhance pronunciation, vocabulary usage, and overall fluency (Luckin et al., 2016). Furthermore, AI can assist teachers by automating administrative tasks and providing valuable insights into student performance, allowing for more focused instruction on speaking skills (Coyne, et al, 2023; Corbett & Anderson, 1994).

2.6 Strategic Framework For Integrating AI in Libya's ELT System

To effectively integrate AI into Libya's ELT system, a strategic framework must be developed. This framework should prioritize teacher professional development, the creation of culturally relevant content, addressing technological barriers, and ensuring robust data privacy protections (Mouza et al., 2014; Zou et al., 2019; Abdelrahman, 2020).

2.7 Conclusion: The Future of AI In Libya's English Language Education

AI offers tremendous potential to enhance English language speaking skills in Libya by addressing challenges such as teacher shortages, limited resources, and diverse learner needs. However, successful integration requires a comprehensive approach that addresses technological, cultural, and ethical considerations. With a well-developed framework, Libya can harness AI to improve English language proficiency, especially in speaking, across the country. AI-powered tools can provide personalized learning paths, immediate feedback, and simulated real-world interactions, helping students overcome

speaking difficulties and improve their proficiency. With careful planning and investment, Libya has the opportunity to build an innovative, inclusive English language education system that meets the needs of diverse learners and prepares them for global communication.

3 Methodology

This section outlines and describes the procedures of data collection and the approach to data analysis employed. It discusses the research design, selection of participants and data collection.

3.1 Research Design

This study employs a quantitative research method to evaluate the effectiveness of AI tools in improving speaking skills. This design allows for a comprehensive understanding of the impact of AI on learners' speaking abilities.

3.2 Participants

This study involved 20 participants who were EFL (English as a Foreign Language) learners at Fezzan University. All participants were in their third semester or higher. The selection criteria required participants to have completed the speaking-1 and speaking-2 modules, beside teaching aids course. This method was designed to control the variables such as language skill level, ensuring that any observed effects on speaking skills could be more directly attributed to the AI-assisted tools used in the study. All participants were native Arabic speakers with the same educational backgrounds, having studied English for more three semesters at the university. This approach enhances the reliability and validity of the findings by minimizing extraneous variables.

3.3 AI Teaching and Learning

To assess the effectiveness of AI-based speaking instruction on participants' speaking skills, three components were measured: vocabulary, grammar, and pronunciation. The study was conducted at two different points in time: as a pretest and a posttest. This method allowed for consistent measurement of oral communication and the tracking of changes over time. Pretest measurements were collected before the intervention began, embedded within the first week course sessions, while posttest measurements were gathered in the final course session.

3.4 Training Sessions

This study utilized a one-group design to investigate the impact of AI-based language learning applications. During the treatment phase, Google Speech-to-Text, YouTube videos and Speechify applications were integrated into the language learning process to enhance assessment and feedback mechanisms for speaking skills. In the first training session, participants were introduced to Google Speech-to-Text and Speechify. They received guidance on how to use these AI tools, including how to submit their speaking responses and interpret the feedback provided. This orientation ensured that all learners were familiar with the tools and could use them effectively. After the first session was completed, participants continued to utilize the tools for five weeks. Comprehensive training sessions were conducted by the researchers responsible for delivering the AI-based speaking instruction, covering detailed instructions on how to effectively utilize Google Speech-to-Text and Speechify, facilitate speaking activities, and provide constructive feedback to learners.

The study began with a pretest in which participants completed a task to assess their speaking abilities. Their responses were submitted to AI applications such as: SoundType and ChatGpt-4o free version for evaluation, which analyzed their linguistic performance, including grammar and pronunciation, and provided personalized feedback. These AI tools highlighted areas needing improvement. During the training sessions, participants engaged in various speaking tasks, such as discussing a favorite place, a current event, or a cultural tradition. They practiced speaking on their chosen topics using the AI tools, which listened to their speech and provided real-time feedback on pronunciation, grammar, and

vocabulary usage. Additionally, participants were encouraged to record their speech during they used AI-assisted practice sessions. The tools assessed the quality of their speech, and they submitted their recorded responses to the AI tools, which offered immediate feedback, facilitating continuous improvement in grammar, vocabulary usage, and pronunciation.

After completing the training sessions, a posttest was administered. Participants took the same speaking task test they had completed during the pretest. To evaluate speaking skills, the SoundType and ChatGPT-4. o mini, the free version of the model, were employed for this study. AI applications were used to analyze the participants' responses and measure improvements in their speaking abilities. This posttest provided insights into the impact of the AI tools on language learning.

3.5 Ethical Considerations

Informed consent obtained from participants before data collection. Participants responses will be kept confidential, and participants will have the right to withdraw at any stage.

4. Data Analysis

This section presents the analysis and discussion of the data collected through pre-test and post-test assessments. The objective of the study was to determine the effectiveness of AI tools in enhancing the speaking skills of L2 learners. Statistical methods such as descriptive statistics (mean, median, standard deviation) and the Wilcoxon Signed Ranks Test were employed to identify any significant differences between the two tests.

4.1 Data Analysis Procedures

The data analysis procedure followed a quantitative approach to comprehensively assess the impact of AI tools on learners' speaking skills. Descriptive statistics and paired t-tests were used to measure the effect of the AI intervention on the participants' performance. The pre-test and post-test were designed to evaluate the learners' speaking abilities both before and after exposure to the AI tools. The pre-test assessed the speaking skills of participants prior to the training sessions, which involved a speaking task administered to the group. Data were collected through recorded speaking tasks, and these recordings were then evaluated using AI-powered applications, SoundType AI and ChatGPT.

Participants submitted their speaking recordings to SoundType AI for transcription, and the same recordings were sent to ChatGPT to assess improvements in speaking abilities. The AI tools provided scores on three key components of speaking: vocabulary, grammar, and pronunciation. Each component was rated on a scale from 1 to 5, where:

- 1 = Poor
- 2 = Fair
- 3 = Good
- 4 = Very good
- 5 = Excellent

These AI evaluations enabled the tracking of participant progress over time, allowing for an analysis of how AI tools contributed to improvements in speaking skills.

4.2 Findings

This section outlines the primary findings of the study, with a focus on the speaking skills of participants both before and after the intervention. The data obtained from the pre-test and post-test assessments are analyzed to determine the impact of the AI training sessions. Tables 4.1, 4.2, and 4.3 present the descriptive statistics for the various speaking components, namely vocabulary, grammar, and pronunciation. These tables summarize the participants' performance and provide insight into the extent of their improvement.

Table 1. Descriptive Statistics for Vocabulary Scores

Measure	Pre-test Scores	Post-test Scores
Mean	2.1	3.1
Median	2	3
Range	1 to 3	3 to 4

Table 1 illustrates the vocabulary scores. The mean score increased from 2.1 in the Pre-test to 3.1 in the Post-test, reflecting a significant improvement in vocabulary skills. Similarly, the median score rose from 2 to 3, meaning that at least half of the participants scored above 3 in the Post-test. The range expanded from 1-3 in the Pre-test to 3-4 in the Post-test, suggesting greater variability in participants' vocabulary performance after the intervention.

Table 2. Descriptive Statistics for Grammar Scores

Measure	Pre-test Scores	Post-test Scores
Mean	1.9	2.8
Median	2	3
Range	1 to 3	2 to 4

Table 2, the descriptive statistics for grammar scores show a significant improvement. The mean score increased from 1.9 in the Pre-test to 2.8 in the Post-test, indicating progress in grammar. The median score also rose from 2 to 3, suggesting that over half of the participants showed improved grammar skills. The range expanded from 1-3 to 2-4, highlighting a wider distribution of performance levels following the intervention.

Table 3. Descriptive Statistics for Pronunciation Scores

Measure	Pre-test Scores	Post-test Scores
Mean	2.1	2.9
Median	2	3
Range	1 to 3	2 to 4

Table 3 demonstrates the improvements in pronunciation. The mean score increased from 2.1 in the Pre-test to 2.9 in the Post-test, indicating a notable enhancement in pronunciation skills. The median score rose from 2 to 3, and the range expanded from 1-3 to 2-4, reflecting greater variability in pronunciation performance following the intervention.

The Wilcoxon Signed Ranks Test

In the following analysis, the Wilcoxon Signed Ranks Test was conducted to assess changes in speaking components, including vocabulary, grammar, and pronunciation, among the participants. the Wilcoxon Signed Ranks Test aim to determine whether the intervention resulted in significant improvements in these areas.

Table 4. Wilcoxon Signed Ranks Test Statistics for Vocabulary, Grammar, and Pronunciation

	Vocabulary	Grammar	Pronunciation
Z	-3.839 ^b	-4.066 ^b	-3.827 ^b
Asymp. Sig. (2-tailed)	.000	.000	.000

The Wilcoxon Signed Ranks Test findings reveal significant improvements in student performance across vocabulary, grammar, and pronunciation. For vocabulary, the Z value of -3.839 ($p = 0.000$) indicates a notable enhancement in knowledge. Similarly, the grammar scores improved significantly, with a Z-value of -4.066 ($p = 0.000$), suggesting effective instructional strategies. In pronunciation, the Z-value of -3.827 ($p = 0.000$) also points to a marked improvement.

Overall, these results highlight the effectiveness of the teaching methods employed, demonstrating their success in enhancing language skills among students.

4.3 Discussion

This study aims to assess the impact of AI-enhanced tools on the fluency, pronunciation, and vocabulary of Libyan University students learning English. The findings of this study demonstrate that the AI intervention significantly enhanced participants' speaking skills, particularly in vocabulary, grammar, and pronunciation. The pre-test and post-test data reveal substantial improvements in all assessed components:

- Vocabulary: The mean score increased from 2.1 to 3.1, and the median score rose from 2 to 3. The range expanded from 1-3 to 3-4, indicating a wider spread of performance levels.
- Grammar: The mean score rose from 1.9 to 2.8, with the median increasing from 2 to 3. The range expanded from 1-3 to 2-4, showing improvements in participants' grammatical abilities.
- Pronunciation: The mean score increased from 2.1 to 2.9, while the median score rose from 2 to 3. The range expanded from 1-3 to 2-4, suggesting enhanced clarity and fluency in pronunciation.

Statistical analysis confirmed the significance of these improvements, as evidenced by the Wilcoxon Signed Ranks Test with the Z value of -3.839 ($p = 0.000$) for vocabulary, -4.066 for grammar, and -3.827 for pronunciation. These results validate the effectiveness of the AI-driven intervention in improving language skills.

Additionally, the findings align with the literature on AI's role in English Language Teaching and Learning (ELTL), particularly in resource-constrained contexts such as Libya. This study supports the growing body of research on the transformative potential of AI tools like Intelligent Tutoring Systems (ITS), adaptive platforms, and Natural Language Processing (NLP) in enhancing speaking skills.

5. Conclusion

In conclusion, this study provides strong empirical evidence supporting the effectiveness of AI in enhancing speaking skills in ELTL. The significant improvements observed in vocabulary, grammar, and pronunciation align with the benefits outlined in the literature regarding AI-driven feedback and personalized instruction. The intervention not only led to immediate gains in language proficiency but also demonstrated the potential of AI tools to address key challenges in language education, such as individualized learner needs and resource limitations.

The study's positive outcomes suggest that AI tools can effectively support language learning in contexts like Libya, where infrastructure and digital literacy challenges may exist. While there are several limitations of the present review must be acknowledged. These include limited access to technology, cultural nuances that are not addressed by AI models, and the need for training for instructors. Additionally, the study did not directly address all of these challenges, the results imply that AI tools are accessible and beneficial for L2 learners for short-term effects, this could restrict our understanding of long-term effects.

Future research should explore the scalability of AI interventions in broader contexts and assess their long-term impact on language acquisition. This study contributes valuable insights to the growing literature on AI's role in language education, offering practical suggestions for enhancing ELTL practices, particularly in underserved regions.

Recommendations

Based on the findings of this study, several recommendations can be made to enhance the effectiveness of online English teaching and learning of speaking skills in Libya through the integration of Artificial Intelligence (AI):

Integration of AI Tools in the Curriculum:

Educational institutions in Libya should systematically integrate AI-powered applications, such as intelligent tutoring systems, automated speech recognition tools, and virtual speaking assistants, into

English language curricula. These tools can provide real-time feedback and personalized learning experiences that promote active speaking practice.

Teacher Training and Professional Development:

Teachers should receive continuous training on how to effectively use AI technologies in their online classrooms. Professional development programs should focus on building teachers' digital literacy, pedagogical innovation, and adaptability to new technologies that facilitate interactive and communicative learning.

Infrastructure and Technical Support:

The Libyan education system must invest in improving digital infrastructure, ensuring reliable internet access, and providing necessary technological resources to both teachers and students. Technical support teams should also be established to assist educators in implementing AI-based teaching platforms smoothly.

Learner Motivation and Autonomy:

AI can be used to foster learner motivation and autonomy by allowing students to set goals, track progress, and receive individualized feedback. Educational platforms should encourage learners to take an active role in their speaking development through AI-driven assessments and gamified learning experiences.

Collaboration Between Institutions and Developers:

Collaboration between universities, language centers, and technology developers is essential for designing localized AI solutions that suit Libyan learners' linguistic and cultural contexts. This partnership can ensure that AI tools are pedagogically relevant and linguistically accurate.

Further Research

Future studies should explore the long-term impact of AI-based instruction on learners' speaking proficiency and communicative competence. Research should also investigate teachers' and students' perceptions of AI integration to identify challenges and refine implementation strategies.

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