

Use of AI in Learning Arabic Language by Non-Arabic Speakers

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ABSTRACT

The integration of artificial intelligence (AI) into learning the Arabic language for non-Arabic speakers represents a notable advancement in educational technology. This research explores the advantages and challenges of using AI applications to enhance Arabic language learning by non-Arabic native speakers. These applications include the ArabicPod101 as a means of listening skills, the Lingbe as a means of speaking skills, the Duolingo as a means of reading skills, and the Scribe as a means of writing skill. The use of these applications will facilitate the learning of Arabic for non-Arabic speakers. Adapting the description method, with ten students of the 100-level Department of Arabic Language at Umaru Musa Yar'adua Katsina, Nigeria, a questionnaire was used to collect data from the participants after the researchers taught them some features of these AI applications in learning listening, speaking, reading, and writing skills. The results indicate that the participants agreed on the importance of these applications in enhancing the learning of four language skills. It would be a great idea if these applications were incorporated into teaching Arabic to non-Arabic speakers.

Arabic Speakers.

Keywords: Artificial intelligence, Arabic learning, Non-Arabic Speakers, ArabicPod101, Duollingo.

INTRODUCTION

Artificial intelligence (AI) has advanced so quickly that it has changed several industries, including education. Among these breakthroughs in education, one that seems especially promising is the application of AI to teach Arabic to non-Arab speakers. Arabic, characterized by its intricate phonetics, grammar, and writing system, is renowned for its historical significance and cultural richness, a fact underscored by Mohideen (2024). Conversely, AI technologies offer novel solutions to these challenges through the provision of interactive, personalized, and adaptable learning platforms (Akavova Aida et al., 2023; Ashwini et al., 2023).

AI-driven language learning applications leverage various technologies to enhance language acquisition, particularly in the context of Arabic. The utilization of Natural Language Processing (NLP) methodologies, including error analysis and personalized feedback, can significantly improve the interactivity of Arabic language learning platforms (El Kah et al., 2017). State-of-the-art AI techniques, such as voice recognition and machine learning, enable the development of intelligent tutors capable of detecting pronunciation errors and offering adaptable learning experiences (Shao et al., 2022). These advancements provide immersive educational settings through virtual teachers, tailored learning paths based on progress, and immediate feedback. To optimize learning outcomes, platforms like ArabicPod101, Lingbe (Duolingo), and Scribe Arabic leverage AI algorithms to adjust course content according to the user's proficiency level. The evolution of AI-driven language technologies has progressed from intricate rule-based systems to neural networks, with transformer-based models like GPT leading the field in language processing capabilities (Zhang, 2024).

Natural language processing, which is a subset of artificial Intelligence, plays a fundamental role in the

comprehension and generation of Arabic language content. It aids in the analysis of intricate sentences, offers precise translations, and facilitates interactive practice through AI-driven applications (Kanan et al., 2019). These resources prove to be particularly advantageous for individuals who are not native Arabic speakers and encounter challenges with the complexities of Arabic grammar and vocabulary (Smith, 2020). Furthermore, AI-enabled adaptive learning systems can pinpoint specific areas in which a learner may face difficulties and adapt the educational programme accordingly, thereby enhancing the efficiency of the learning process and customizing it to meet individual requirements (Jones, 2019).

Despite these advancements, there are challenges in implementing artificial intelligence (AI) for Arabic language learning and a noticeable deficiency in sufficient research (Saoudi & Gammoudi, 2023). Nonetheless, most prior studies have concentrated on the application of AI to enhance a single language skill, as exemplified by Saleem Alharir et al. (2023) and Abou Adel (2022). The learning of the four language skills—listening, speaking, reading, and writing—stands as an indispensable element of teaching and learning a foreign language (Darancik, 2018; Rao, 2019; Usó Juan & Flor, 2006). These proficiencies play a critical role in facilitating effective communication and should be tailored to suit the learners' requirements and proficiency levels (Darancik, 2018). The integration of all four language proficiencies is imperative for a well-rounded language learning process. For instance, an individual may engage in listening to a podcast (listening), deliberate on the content with a language companion (speaking), peruse an article on of the podcast's subject matter (reading), and subsequently draft a synopsis or viewpoint on the topic (writing). Nevertheless, the persistent exploration and enhancement of AI technologies are continuously targeting these challenges, offering the potential for more refined and efficient instruments in the language education in the foreseeable future (Zhang, 2024).

Hence, the present research explores the advantages and challenges of using AI applications in enhancing Arabic language learning by non-Arabic native speakers. These applications include the ArabicPod101 as a means of listening skills, the Lingbe as a means of speaking skill, the Duolingo as a means of reading skill, and the Scribe as a means of writing skill. The hypothesis of the research indicates that the use of AI applications, specifically ArabicPod101, Lingbe, Duolingo, and Scribe, significantly enhances the Arabic language learning experience for non-native speakers by improving their listening, speaking, reading, and writing skills, respectively. Additionally, while these applications offer substantial advantages in language acquisition, they also present specific challenges that need to be addressed to optimize their effectiveness. AI-powered models have the potential to enhance Arabic oral proficiency by catering to individual learning requirements and offering innovative solutions (Syaikhudin & Laili, 2024). The utilization of AI technology provides tailored learning experiences, immediate feedback, and a variety of resources such as text generation and virtual reality, thereby enhancing the accessibility and effectiveness of Arabic language learning (Mohideen, 2024). Studies indicate that AI learning applications can enhance cultural intelligence and acculturation among non-native Arabic learners without regard to gender (Abu-Qtaish, 2024). These applications promote cultural consciousness and support language acquisition by providing exercises in speaking, writing, and listening (Abu-Qtaish, 2024). Despite the potential demonstrated by AI-driven models in enhancing Arabic language proficiency, additional refinement and testing across diverse non-native speaker populations are necessary to optimize these resources (Syaikhudin & Laili, 2024). The integration of AI with conventional teaching approaches can help tackle obstacles and maximize learning outcomes for non-native Arabic learners (Mohideen, 2024). Research has highlighted the positive effects on Arabic-speaking abilities, albeit indicating the need for further enhancements (Syaikhudin & Laili, 2024). The incorporation of AI in Arabic language education not only enhances language skills but also enriches students' learning encounters, aligning with the technological integration hallmark of Society 5.0 (Anwar & Ahyarudin, 2023). This strategy holds the potential to transform Arabic language instruction, rendering it more efficient and personalized to individual requirements.

The significance of this subject is found in its capacity to revolutionize the methods of Arabic instruction and learning through the utilization of advanced artificial intelligence technologies. It caters to the necessity for individualized, accessible, and captivating language learning solutions while simultaneously making a contribution to the broader realm of educational technology and language learning. Furthermore, the study aims to bridge the gap between the Arab world and non-Arabic-speaking nations where Arabic is studied as a foreign language. In foreign language learning, the presence of a conducive language environment is imperative for effective learning, particularly in the case of Arabic (Pikri, 2022). Techniques for establishing a productive

Arabic learning atmosphere encompass defining a clear mission, fostering a strong dedication, and furnishing ample language resources (Pikri, 2022). This environment plays a crucial role in shaping language acquisition by providing avenues for language-based activities like dialogues, verbal communication, and linguistic exercises (Achoita, 2019). In situations where the language environment is lacking in non-Arabic-speaking nations, the utilization of AI applications can compensate for this deficiency by virtually transporting the Arabic environment to these regions.

The methodology employed in this research is library research utilising a descriptive analytical methodology. The rationale behind selecting this particular approach lies in its ability to elucidate the utilisation of artificial intelligence (AI) tools in addressing the obstacles encountered by individuals learning Arabic as a foreign language in the contemporary era. By opting for a library-based investigation, the researcher is afforded the opportunity to explore a myriad of pertinent literature sources, thereby facilitating a comprehensive comprehension of the subject matter at hand. The structure of the manuscript comprises sections such as the abstract, introduction, statement of the problem, theoretical framework, and conclusion.

STATEMENT OF THE PROBLEM

Non-Arabic native speakers encounter numerous obstacles while acquiring proficiency in the Arabic language. The difficulties may arise from the intricate nature of the language itself, along with the instructional setting and approaches employed (Abdeldeen & Fu, 2022). As interest in acquiring Arabic language skills increases among non-Arabic speakers, conventional language learning approaches often lack in terms of customization, engagement, and availability. Certain educational institutions have effectively integrated tactics such as immersive residential environments and instructors who are native Arabic speakers to enhance the Arabic fluency of students (Bahruddin et al., 2021). Various non-Arabic-speaking nations, including Nigeria, used to dispatch their students to Arab countries for Arabic immersion programmes prior to the establishment of the Arabic Language Village in 1992 to develop conversational skills under the guidance of native Arabic speakers. The advent of technological innovations such as Artificial intelligence (AI) offers potential solutions to these challenges. The utilization of artificial intelligence (AI) shows promise in addressing these obstacles, rendering its incorporation into Arabic language education beneficial.

Theoretical Framework

The integration of artificial intelligence (AI) in learning the Arabic language for non-Arabic speakers marks a significant advancement in educational technology. This section will define the artificial intelligence and explore some features of AI application that will be useful for learning Arabic language skills.

Artificial Intelligence (AI) is a field of computer science focused on creating systems capable of performing tasks that typically require human intelligence (Haga, 2022; Manaware, 2020; Jutel et al., 2023; H. R et al., 2023). The term "AI" was coined by John McCarthy in 1956 at the Dartmouth Conference (Manaware, 2020; Jutel et al., 2023). AI encompasses various tasks, including learning, reasoning, problem-solving, perception, and language understanding (Haga, 2022; Manaware, 2020; H. R et al., 2023). It involves developing algorithms and systems that enable computers to learn, make decisions, and adapt based on data (Jutel et al., 2023). AI can be rule-based or learning-based, with machine learning and deep learning being significant subfields (Jutel et al., 2023; H. R et al., 2023).

AI encompasses various specialized domains that focus on different tasks:

Machine Learning (ML): Allows computers to learn and improve from data without being explicitly programmed. ML algorithms are trained on data to make predictions or decisions Mallick, & Borah (2018).

Natural Language Processing (NLP): Deals with the ability of computer systems to understand and generate human language. NLP algorithms are used for tasks like language translation, sentiment analysis, and question answering

Computer Vision (CV): Empowers computers to analyze and comprehend visual information, such as images

and videos, similar to humans [4]. CV algorithms are used for object detection, face recognition, and self-driving cars [4]. Pandey, A. (2023).

Generative AI: An emerging field that creates new content like text, images, voice, video, and code by learning from data patterns [4]. Jha, R. (2024)

AI can be categorized into four types: narrow AI (intelligent systems for specific tasks), general AI (broadly intelligent, context-aware machines), strong AI (systems that think like humans), and weak AI (systems that work without replicating human reasoning) [3]. Jiang et al. 2017) J. Ramírez, A. Ortiz. A (2020)

AI Applications in Learning Arabic as a Foreign Language

ArabicPod101

ArabicPod101 offers a variety of resources to help learners improve their Arabic listening skills, particularly for beginners and intermediate students. Here are some key ways the platform supports listening comprehension development:

Diverse Lesson Types

Listening Comprehension Lessons: ArabicPod101 provides dedicated listening comprehension lessons for different proficiency levels, from absolute beginner to advanced. These lessons feature dialogues, news reports, and podcasts that learners can listen to and answer questions about to test their understanding.

Line-by-Line Audio: The platform allows learners to listen to lessons line-by-line, which helps them hear new vocabulary and phrases in isolation before encountering them in context. This feature is particularly useful for beginners to build their listening skills gradually.

Supplementary Tools

Transcripts and Translations: Lesson transcripts and translations are available to support learners' understanding. Learners can read along with the audio to reinforce their listening comprehension.

Vocabulary Lists: Each lesson comes with a vocabulary list that learners can study before listening. This helps familiarize them with key terms they will encounter in the audio.

Immersive Listening Practice

Authentic Dialogues: Many lessons feature authentic dialogues between native speakers, exposing learners to natural speech patterns and colloquial expressions. This prepares them for real-world listening situations.

Shadowing: ArabicPod101 encourages learners to use the shadowing technique, where they repeat the audio out loud as they listen. This helps train their mouth and ears simultaneously.

Personalized Learning

Study Plans: Learners can create customized study plans to focus on specific skills, such as listening comprehension. This allows them to tailor their learning to their individual needs and goals.

Assessments: The platform offers interactive assessments to test learners' progress in various areas, including listening. These assessments provide valuable feedback on areas for improvement.

While ArabicPod101 offers a solid foundation for developing Arabic listening skills, it's important to note that consistent practice and exposure to the language are key for long-term improvement. Supplementing the platform's resources with other immersive activities, such as watching Arabic movies or engaging in conversation practice, can further enhance learners' listening abilities. (<https://www.arabicpod101.com>)

Lingbe

Lingbe is an innovative app designed to enhance speaking skills in various languages, including Arabic, by connecting learners with native speakers for real-time voice conversations. Here are some key features and benefits of using Lingbe for improving speaking skills:

Instant Voice Conversations

Real-Time Practice: Lingbe allows users to engage in instant voice calls with native speakers, providing an authentic environment for practicing speaking skills. This immediacy helps learners improve their fluency and confidence in conversational settings.

Short Conversations: The app encourages short conversations, which are manageable for learners at all levels. This format allows users to practice speaking without the pressure of lengthy discussions, making it easier to focus on pronunciation and grammar.

Feedback Mechanism

Peer Feedback: After each conversation, users can ask their partners for feedback on their speaking performance. This feature is crucial for identifying areas for improvement, such as pronunciation and grammar, fostering a supportive learning environment.

Community Engagement: Lingbe promotes interaction among users, allowing learners to not only practice speaking but also to receive constructive criticism and tips from their conversation partners. This community aspect enhances the learning experience.

Gamification and Rewards

Lingos and Badges: Users earn "Lingos" by helping others practice their native language, which can be exchanged for conversation time. The gamified approach, including rewards and badges, motivates learners to engage more frequently and effectively with the platform.

Task-Based Learning: Lingbe incorporates tasks that users can complete to interact with the community. These tasks can focus on vocabulary, grammar, or pronunciation, providing structured opportunities to practice speaking skills in a fun and engaging way.

Accessibility and Convenience

Mobile Availability: The app is available on mobile devices, allowing learners to practice speaking anytime and anywhere. This flexibility makes it easy to incorporate language practice into daily routines, such as during commutes or waiting periods.

User-Friendly Interface: Lingbe's straightforward design makes it easy for users to navigate the app and connect with conversation partners quickly, enhancing the overall user experience.

Lingbe is a valuable tool for language learners aiming to improve their speaking skills through practical, real-life conversations with native speakers. Its focus on immediate practice, peer feedback, and community engagement, combined with a gamified reward system, makes it an effective platform for enhancing language proficiency. Regular use of Lingbe can lead to significant improvements in fluency and confidence in speaking Arabic or any other language offered on the platform.

Duolingo

Duolingo is a popular language-learning platform that effectively supports the development of reading skills in various languages, including Arabic. Here are some key aspects of how Duolingo enhances reading proficiency:

Structured Reading Practice

Gradual Skill Development: Duolingo introduces reading from the very beginning, starting with simple words and phrases and gradually increasing complexity. This scaffolding approach helps learners build confidence and competence in reading as they progress through the course.

Diverse Reading Activities: The platform includes a variety of exercises specifically designed to enhance reading skills. These exercises range from reading comprehension tasks to engaging with dialogues and stories, allowing learners to practice understanding context and vocabulary in different formats.

Engaging Content

Stories and Dialogues: Duolingo incorporates short stories and dialogues that expose learners to conversational language. These narratives not only make reading enjoyable but also help learners pick up vocabulary and phrases in context, reinforcing their understanding of the language.

Interactive Features: The app's interactive reading features, such as line-by-line transcripts and vocabulary lists, support learners in understanding new words and phrases. This interactive approach allows users to engage with the material actively, enhancing retention and comprehension.

Cognitive Strategies

Reading as a Receptive Skill: Duolingo emphasizes that reading is a receptive skill, which means learners receive information rather than produce it. This can be less daunting for beginners and allows them to focus on understanding the language as it is used by others.

Top-Down and Bottom-Up Processing: The platform encourages learners to balance top-down (using context and prior knowledge) and bottom-up (decoding words and sentences) processing strategies. This dual approach helps learners become more efficient readers, enabling them to grasp meaning quickly.

Research and Effectiveness

Proficiency Outcomes: Studies have shown that learners using Duolingo can achieve notable improvements in reading proficiency. For instance, learners who completed beginner-level content demonstrated significant gains in their reading skills, reaching intermediate levels by the end of the course.

Supplementary Learning: While Duolingo is effective for building foundational reading skills, many users recommend supplementing it with additional resources, such as reading books or articles in the target language, to further enhance proficiency and comprehension.

Duolingo serves as a robust tool for developing reading skills in Arabic and other languages. Its structured approach, engaging content, and emphasis on cognitive strategies make it an effective platform for learners at various levels. While it provides a solid foundation, combining Duolingo with other reading materials can further enhance language proficiency and comprehension.

Scribe Arabic

Scribe Arabic is an AI writing tool designed to assist users in developing their Arabic writing skills. Here's an overview of its features and benefits:

Key Features of Scribe Arabic

Grammar and Spell Checking: Scribe Arabic offers advanced grammar and spell-checking capabilities, helping users identify and correct errors in their writing. This feature is essential for learners to understand proper sentence structure and usage.

Sentence Rephrasing: The tool provides suggestions for rephrasing sentences, allowing users to enhance their

writing style and vocabulary. This can be particularly useful for learners looking to diversify their language use.

Auto Tashkeel: Scribe Arabic includes an auto-tashkeel feature, which adds diacritical marks to Arabic text. This is beneficial for learners who are still mastering the pronunciation and reading of Arabic script.

Translation Services: The tool can translate text between Arabic and English, facilitating bilingual writing and comprehension. This feature is valuable to non-native speakers who may need assistance in understanding or producing Arabic text.

User-Friendly Interface: Scribe Arabic is designed with a user-friendly interface that makes it accessible for learners of all levels. Its intuitive design helps users navigate the tool easily, enhancing the overall learning experience.

Benefits for Learning Writing Skills

Immediate Feedback: By providing real-time corrections and suggestions, Scribe Arabic allows learners to receive immediate feedback on their writing. This helps them learn from their mistakes and improve their skills progressively.

Enhanced Writing Confidence: As users become more familiar with correct grammar and vocabulary through the tool's suggestions, their confidence in writing Arabic will likely increase, encouraging them to practice more.

Support for Diverse Writing Tasks: Whether users are writing essays, reports, or creative pieces, Scribe Arabic can assist in various writing tasks, making it a versatile tool for learners.

Encouragement of Consistent Practice: The ease of use and immediate assistance provided by Scribe Arabic can motivate learners to practice writing regularly, which is crucial for skill development.

Scribe Arabic serves as a valuable resource for anyone looking to improve their Arabic writing skills. With its features focused on grammar correction, sentence enhancement, and translation, it supports learners in becoming more proficient and confident writers in Arabic. By incorporating such tools into their learning routine, users can significantly enhance their writing abilities over time.

LITERATURE REVIEW

Many studies have been conducted about the use of AI in learning Arabic, including the research of Viktorova and Mamchur (2024) on the use of artificial intelligence for Arabic learning. The study investigated the features of artificial intelligence use, and the main advantages and disadvantages of this technology were analysed. The aspects of such a pedagogical process in learning Arabic are substantiated, and the results of research and scientific advances in cyber linguistics are summarized. The relevance of the use of artificial intelligence technologies and chatterbots in the study of Arabic in higher education is highlighted. The study identified a promising direction for the creation of several linear chatterbots (without the use of artificial intelligence), which can be involved simultaneously at different stages of the development of the individual trajectory of education. Multiple chatterbots that provide different answers and ask different questions can significantly improve a learner's communication and other skills.

Another study was conducted by Mustofa et al. (2024) on the use of chatGPT for Arabic language learning media. It concludes that ChatGPT helps teachers in carrying out the teaching process, starting from preparing material, preparing lesson plans, creating class management, creating exam questions, and so on.

Similarly, Saleem Alharir et al. (2023) presented their approach to developing an artificial intelligence-based Arabic language and speech tutor (AIALST) for teaching the Moroccan Arabic dialect. The AI-ALST system is an intelligent tutor that provides analysis and assessment of students learning the Moroccan dialect at the University of Arizona (UA). The experimental results show that the AI-ALST can effectively and successfully detect pronunciation errors and evaluate its performance by using accuracy and recall.

The study of Viktorivna (2022) about artificial intelligence in language learning The research paper focuses on examining the role of AI in English language learning, how effective it is, and what practical methods can be used to apply it effectively. AI has the potential to transform the functioning of the education system, increase the competitiveness of institutions, and empower teachers and students at all levels. With intelligent content of instructions and testing, artificial intelligence allows focusing on the needs of the students. The Impact of Artificial Intelligence on Arabic Language Teaching. This research discusses the impact of artificial intelligence on Arabic language teaching. The purpose of this research is to identify the positive and negative impacts of artificial intelligence on Arabic language teaching. The research concluded that the positive impact is manifested in providing cognitive tools and rich educational resources, creating a distinctive educational situation, expanding the targeting circle, and creating conditions for implementing self-learning strategies. The negative impact is manifested in the failure of the teacher to play the role of highlighting empathy and wisdom, the lack of the mental capabilities of the teacher and the student, the difficulty of educational software algorithms, and the need for expensive financial costs.

Saleem Alharir et al. (2023) Abou Adel (2022) Investing in Artificial Intelligence for Arabic Learning. This research paper examines the two most recent and successful experiments using artificial intelligence to learn Arabic. After analyzing these distinctive experiences, we can use them to bypass the traditional methods of teaching Arabic and move on to benefit from the tremendous development witnessed by artificial intelligence. The most prominent advantages that characterize this contemporary learning are the consideration of integration and comprehensiveness in teaching Arabic with all its fundamental skills. It is flexible, active, and asynchronous learning that helps raise the level of focus and attention by using attractive and enjoyable audio-visual effects. The most prominent feature of the Buss app is that it allows Arabic language learners to communicate electronically with native speakers of the language, correct their pronunciation for free, or collaboratively share any information with them. The (Arabits) app was distinguished from others by starting with teaching the Arabic alphabet and focusing on innovatively teaching letters using sounds and illustrations for each letter.

The most recent literature failed to focus on the importance of AI in simplifying learning Arabic for non-Arabic native speakers. This is the aspect of the current research that tries to explore and fill this gap.

METHODOLOGY

The researchers adapted the descriptive method. The study participants were ten students from 100 level in the department of Arabic at Umaru Musa Yar'adua University, Katsina, Nigeria, in the 2023–2024 session. They were chosen based on the purposive sampling method according to the study objectives. As stated by Palinkas, Horwitz, Green, Wisdom, Duan, and Hoagwood (2015), selecting samples using this method will help researchers interpret the study phenomenon effectively. The researchers taught the participants the aspects of using ArabicPod101 as a means of listening skills, Lingbe as a means of speaking skills, Duolingo as a means of reading skills, and Scribe as a means of writing skills. As for the research tool, the study adopted a semi-structured questionnaire in order to obtain participants' views on the advantages and challenges of using AI for learning Arabic. The questionnaire has two parts. Part one is the demographic data of the participants, while part two is the evaluation of the AI application in learning Arabic. The questionnaire has six components, which comprise twenty-six items. The data for this study were analyzed in a qualitative and quantitative manner.

RESULTS

The present research explores the advantages and challenges of using AI applications in enhancing Arabic language learning by non-Arabic native speakers. The following tables presents the results of the above objectives.

Table 1. Part one: Demographic Data

Gender	Age range	Language	Education
Male 6, Female 4	18-25	Hausa language	100 level

The above table shows that the participants are native speakers of Hausa at the same level of education.

Table 2. Part 2: Questionnaire

Listening Skills (ArabicPod101)

1 -Usage Frequency	Frequency
Daily	6
Several times a week	3
Weekly	1
Rarely	0
Never	0
2- Improvement in Listening Skills	
Significant improvement	7
Moderate improvement	2
Slight improvement	1
No improvement	0
3- Most Beneficial Features	
Audio quality	4
Variety of content	3
Native speaker dialogues	3
4- Challenges Faced	
Difficult vocabulary	2
Fast speech pace	5
Limited content	2
Other: (technical issues)	1

The above table showed that the participants' listening skills have improved, and they benefited from the features of ArabicPod101 to enhance their listening skills.

Table 3. Speaking Skills (Lingbe)

1- Usage Frequency	Frequency
Daily	6
Several times a week	3
Weekly	1

Rarely	0
Never	0
2- Improvement in Speaking Skills	
Significant improvement	7
Moderate improvement	3
Slight improvement	0
No improvement	0
3- Most Beneficial Features	
Real-time conversations	6
Native speakers' feedback	3
Flexibility of use	1
4- Challenges Faced	
Finding available partners	4
Connection issues	3
Language barriers	2
Other: (time zones)	1

The above table shows how the participants benefited from the Lingbe application by improving their speaking skills.

Table 4. Reading Skills (Duolingo)

1- Usage Frequency	Frequency
Daily	6
Several times a week	3
Weekly	1
Rarely	0
Never	0
2- Improvement in Reading Skills	
Significant improvement	3
Moderate improvement	4
Slight improvement	3
No improvement	0

3- Most Beneficial Features	
Interactive exercises	5
Gamified learning experience	3
Progress tracking	2
4- Challenges Faced	
Limited content depth	4
Repetitiveness	3
Lack of advanced reading materials	3

The above table shows a significant improvement in the participants' reading skills through the use of the Duolingo application.

Table 5. Writing Skills (Scribe)

1-Usage Frequency	Frequency
Daily	6
Several times a week	3
Weekly	1
Rarely	0
Never	0
2- Improvement in Writing Skills	
Significant improvement	4
Moderate improvement	5
Slight improvement	1
No improvement	0
3- Most Beneficial Features	
Writing exercises	5
Feedback on writing	3
User-friendly interface	2
4- Challenges Faced	
Limited feedback	4
Difficulty in using the interface	3
Lack of writing prompts	2
Other: (technical glitches)	1

The above table shows that the participants’ writing skills have improved through the use of the Scribe application.

Table 6. Overall Experience

Student 1	I have good experience using AI as a means of Arabic learning.
Student 2	I learnt very fast through the use of AI applications.
Student 3	I improved my Arabic learning in a simple way with AI.
Student 4	AI applications have a good potential for improving Arabic learning.
Student 5	I learnt how to use AI applications to improve my Arabic learning.
Student 6	I got access to native speakers of Arabic via the use of AI applications.
Student 7	I learnt a lot of vocabulary very quickly through the use of AI applications.
Student 8	AI applications give me the advantage of a conducive learning environment.
Student 9	I will continue using AI applications to improve my language skills
Student 10	My listening skills have improved very fast through the use of AI applications in learning Arabic

The above table showed the participants’ overall Arabic learning experience and the advantage of integrating AI applications into learning Arabic as a foreign language.

Table 7. Recommendation

1- Recommendation to Other Learners of Arabic language from non-Arabic speakers.	Yes=10 participants No = 0 participant
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All the participants recommended the use of these AI applications to other students from non-Arabic-speaking countries. Some suggested more advanced content and additional feedback for improvement. However, some challenges, particularly in terms of content depth and technical issues, need to be addressed to optimise the learning experience.

DISCUSSIONS

The research aims to explore the advantages and challenges of using AI applications (ArabicPod101, Lingbe, Duolingo, and Scribe) to enhance Arabic language learning for non-native speakers, specifically focussing on listening, speaking, reading, and writing skills. The hypothesis indicates that the use of AI applications significantly enhances the Arabic language learning experience for non-native speakers by improving their listening, speaking, reading, and writing skills.

The results showed that participants found the advantage and importance of the integration of various AI applications helpful for a comprehensive learning experience. The current findings align with the findings of Viktorova and Mamchur (2024) on the use of artificial intelligence for Arabic learning, where the study investigated the features of artificial intelligence use and the main advantages and disadvantages of this technology. The aspects of such a pedagogical process in learning Arabic are substantiated, and the results of research and scientific advances in cyber linguistics are found useful. Another study that supports the current

findings was conducted by Mustofa et al. (2024) on the use of chatGPT for Arabic language learning media. It concludes that ChatGPT helps teachers carry out the teaching process, starting with preparing material, preparing lesson plans, creating class management, creating exam questions, and so on.

The current study found that the combination of ArabicPod101, Lingbe, Duolingo, and Scribe applications gives a very sound outcome for learning the four language skills. According to Anwar and Ahyarudin (2023), the incorporation of AI in Arabic language education not only enhances language skills but also enriches students' learning encounters, aligning with the technological integration hallmark of Society 5.0. Mohideen (2024) stated that the integration of AI with conventional teaching approaches can help tackle obstacles and maximise learning outcomes for non-native Arabic learners. While Abu-Qtaish's (2024) studies indicate that AI learning applications can enhance cultural intelligence and acculturation among non-native Arabic learners,.

Finally, the current study found that there are some challenges, particularly in terms of content depth and technical issues, that need to be addressed to optimise the learning experience. But according to Kannan and Munday (2018), integrating the affective aspects of learning has been a big challenge for the field of AI. Despite these challenges, the potential benefits of language learning in a multicultural society will hopefully. By combining AI with traditional teaching methods, educators can address these challenges and maximize learning outcomes, ultimately shaping the future of Arabic language teaching to be more accessible, effective, and engaging worldwide (Mohideen, 2024).

CONCLUSION

In conclusion, the utilization of AI applications such as ArabicPod101 for listening, Lingbe for speaking, Duolingo for reading, and Scribe Arabic for writing plays a crucial role in enriching the educational journey for individuals who are not native speakers of Arabic. These AI-powered platforms offer a comprehensive and multifaceted strategy for learning languages, catering to fundamental linguistic competencies through personalized and adaptable approaches.

ArabicPod101 employs captivating audio and video tutorials, along with spaced repetition algorithms, to enhance listening comprehension and memory retention. Lingbe provides real-time conversational training with native speakers, utilizing AI to connect learners with appropriate language companions, thereby boosting speaking skills and self-assurance. Duolingo integrates gamification and adaptive algorithms to support reading comprehension, ensuring that learners remain engaged and advance at their individual pace. Scribe Arabic concentrates on enhancing writing abilities and delivering instant feedback and suggestions for improvement to aid learners in mastering Arabic script and composition.

The amalgamation of these artificial intelligence (AI) applications establishes a cohesive learning environment that caters to the varied requirements of individuals learning a language. Each application demonstrates excellence within its specific field, collectively providing a comprehensive approach to achieving proficiency in Arabic. Furthermore, the AI-generated feedback and adaptable learning trajectories guarantee that learners are provided with personalized assistance, thus promoting continual enhancement and enduring involvement.

In general, the utilization of AI applications in the instruction of Arabic to non-native speakers signifies a notable progression in language learning. These resources not only enhance the effectiveness and enjoyment of the learning process but also encourage a more profound comprehension of the language and its cultural implications. Subsequent studies should investigate the enduring effects of these technologies on language skills and their potential incorporation into formal educational frameworks to optimize their advantages where all the participants agreed with this idea. Even though there were some challenges in integrating these AI application in learning Arabic language, but the participants confirmed the advantages of AI applications in enhancing their language skills.

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