THE EFFECTIVENESS OF ARTIFICIAL INTELLIGENCE TECHNIQUES IN TEACHING ARABIC TO NON-NATIVE SPEAKERS AMID EDUCATIONAL AND TECHNOLOGICAL CHALLENGES

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Abstract: This study explores the effectiveness of artificial intelligence (AI) techniques in teaching Arabic to non-native speakers by analyzing their potential to enhance linguistic skills and facilitate the learning process. It highlights key educational and technical challenges, evaluates current smart learning applications, and assesses their compatibility with Arabic language characteristics. The study concludes with practical recommendations to optimize AI integration and overcome existing barriers.

Keywords: Artificial Intelligence, Arabic Teaching, Non-native Speakers, Educational Challenges, Interactive Learning.

Introduction:

In recent years, the educational process has undergone radical transformations due to rapid technological advancements, most notably artificial intelligence (AI). This shift has contributed to the development of new methods and approaches in language teaching, particularly within e-learning and self-directed learning environments. Teaching Arabic to non-native speakers is one of the fields that has gradually begun to witness the integration of smart technologies, whether through mobile applications or interactive digital platforms.

In line with what modern literature indicates, AI is not limited to performing educational tasks but extends beyond that to offer personalized and interactive learning experiences capable of responding to learners' needs and behaviors (Al-Khalidi, 2020).

The significant progress in the field of technology has led to the emergence of diverse methods and approaches supported by multimedia technologies and their various components. These rely on the use of technological innovations to achieve better learning outcomes. This technological evolution has impacted the entire educational system, prompting educators to seek modern methods and techniques to keep up with the challenges facing the educational process and to find the best possible instructional solutions (Faten Hassan, 2019, p. 852).

With the growing global demand for learning the Arabic language, there has emerged a need to employ modern technological tools to support its instruction, particularly for non-native speakers. AI has become one of the leading educational tools, offering personalized learning environments, simulating human interaction, and contributing to improved learning efficiency. However, the use of these technologies is not without challenges, which calls for a study of their effectiveness and an exploration of ways to enhance them and overcome related obstacles.

Research Problem:

Despite the growing use of artificial intelligence (AI) technologies in various educational fields, their application in teaching Arabic to non-native speakers remains limited and lacks systematic evaluation. Many technical challenges are also encountered in this context. Most of the available applications still focus on traditional aspects of teaching, without sufficiently leveraging AI's capabilities in interactivity, personalization, and self-assessment in Arabic language learning.

The research problem can be formulated in the following questions:

To what extent are AI techniques effective in teaching Arabic to non-native speakers? And what are the main educational and technical challenges associated with their use?

The research problem can be summarized in the following question:

To what extent are AI techniques in smartphone applications effective in supporting the learning of Arabic for non-native speakers?

Objectives:

- To identify the role of artificial intelligence (AI) techniques in teaching Arabic to non-native speakers.
- To analyze the effectiveness of these techniques in developing various language skills.
- To highlight the main educational and technical challenges.
- To propose solutions to enhance the effectiveness of these techniques in the educational process

Methodology:

The study adopts a **descriptive-analytical approach** by reviewing relevant academic literature, presenting previous studies, and analyzing the perspectives of researchers in the field.

Previous Studies:

Several studies have addressed the impact of artificial intelligence (AI) in language education. Some have focused on interactive learning platforms, while others have specifically examined Arabic language teaching. Most of these studies highlighted the effectiveness of smart tools in enhancing language acquisition, while also pointing out challenges related to cultural adaptation, linguistic accuracy, and technical infrastructure.

Recent Studies on AI and Language Learning:

1. **Al-Ghunaim, Hamad bin Saleh bin Abdulaziz – Saudi Arabia:** This study aimed to explore the extent to which English language teachers use AI applications. The results showed a high use of tools such as smart educational games, augmented reality, virtual reality, the Internet of Things, adaptive learning environments, and mobile applications. Moderate use was reported for AI chatbots and smart assessment tools. Female teachers and those in primary and secondary stages were the most frequent users of these applications.

2. **Abu Issa, Ahmad Ibrahim Muhammad et al. – Kuwait:** The researchers developed a smart learning environment based on chatbot technology to enhance French writing skills among high school students. The results indicated statistically

significant improvements in writing skills for students using the smart environment, confirming its effectiveness.

3. **Probi, Djahida – Algeria:** his study investigated the use of **Duolingo** as an AI-powered tool for teaching Arabic to non-native speakers. It concluded that although AI has begun to find applications in education, further efforts are needed to establish fully intelligent educational systems.

4. **Al-Juraijir, Shaimaa Suleiman – Saudi Arabia:** The research explored the application of AI in teaching English at the elementary level. The study demonstrated improvements in students' listening, speaking, reading, and writing skills. It also recommended specialized training programs on using educational robots and virtual reality environments in teaching.

Summary of Previous Studies: he reviewed literature demonstrates that integrating AI in language education significantly contributes to improving educational quality and creating intelligent and effective learning environments. Tools such as educational games, augmented reality, and smart robots enable personalized and engaging learning experiences for students.

Definition of Artificial Intelligence (AI): Artificial Intelligence (AI) is one of the branches of modern technology, aiming to understand the secrets of human intelligence on one hand and apply this intelligence to machines as much as possible on the other. This enables machines to perform tasks intelligently according to their capabilities (Zhong, 2006, 90). AI can be applied via computers, allowing the computer to act intelligently while performing tasks or solving problems. AI techniques are typically used in these cases.

Teaching Arabic to Non-Native Speakers: Abdul Rahman Ismail (2015) defined teaching Arabic to non-native speakers as teaching a second or foreign language that differs from the learner's mother tongue, with the aim of enabling them to use it in various social, cultural, and scientific contexts. In other words, learning Arabic for non-native speakers focuses on equipping learners with the necessary skills to communicate in different settings.

Key AI Techniques Used:

- Educational applications based on machine learning.
- Text-to-speech tools and speech recognition.
- Intelligent assistants providing instant feedback.
- Virtual reality systems for teaching linguistic contexts.

Challenges in Arabic and AI:

One of the most prominent challenges facing the Arabic language in the context of artificial intelligence is the acceptance of the idea of creating a digital infrastructure for it, moving away from reliance on traditional methods in morphology, syntax, and semantics. Although there have been previous attempts to develop software aimed at digitizing the Arabic language, many of them have not been completed or have not achieved the desired success due to a lack of design that aligns with the requirements of digitization. Arabic is characterized by unique complexities that do not exist in other languages, which has resulted in its

insufficient usage and inadequate processing to compete with other languages in various applications.

The developments in the field of *machine learning* have led to the emergence of several open-source projects, which represent a positive step toward improving the quality of systems capable of reading and digitizing Arabic texts. This opens up new horizons for both researchers and readers.

In this context, Khairiya Al-Omari presented a series of suggestions to employ artificial intelligence in the service of the Arabic language, including:

1. Spelling Correction: These technologies can develop automatic correction programs that help produce correct Arabic texts, improving stylistic correction to ensure the integrity of Arabic sentence structures, such as spelling. This spelling correction can be simulated through an interactive program that corrects the way Arabic letters are written, starting from right to left and top to bottom.

2. Linguistic Enrichment: A pilot program can be implemented in schools, where a specific topic is identified, and then rapid reading begins to collect as many words as possible related to it, which could range to hundreds of original and derived terms. Afterward, students are asked to write using these words, and many will find it easy to write, overcoming the challenge of converting thoughts into words. This is very beneficial for supporting the knowledge economy that the world competes over today.

3. Digital Dictionary: Original linguistic dictionaries can be converted into interactive electronic versions instead of merely being scanned PDFs. It is also necessary to ensure the correct digitization of linguistic materials under the supervision of a specialized linguistic scientific team and to organize the ability to search for words and their meanings or synonyms in one place. When searching for a word in the dictionary, the results should be accurate and easy to access.

Educational Challenges:

- The absence of natural human interaction.
- Difficulty in adapting content to diverse cultural backgrounds.
- Insufficient teacher training on how to work with these technologies.

Technical Challenges:

- Weak digital processing of the Arabic language.
- Lack of Arabic content supporting artificial intelligence.
- Need for strong digital infrastructure.

Results: The review shows that AI technologies enable Arabic teaching in more interactive and effective ways, but they do not replace the role of the teacher and require continuous technical and pedagogical support.

Recommendations:

- Develop intelligent applications that consider the uniqueness of the Arabic language.
- Train teachers to integrate AI into education.
- Strengthen collaboration between language and technology experts.
- Support research in artificial intelligence and Arabic language education.

Conclusion: Artificial intelligence represents a promising opportunity for teaching Arabic to non-native speakers. However, its effectiveness depends on overcoming educational and technical challenges. Therefore, investing in these technologies requires systematic planning and interdisciplinary collaboration.

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