Development of AI-based Arabic Learning Model to Improve non-native speaker Arabic Speaking Skills

M.Syaikhudin[1]
M. Isroul Laili[2]

m.syaikhudinbo89@gmail.com
misroullaili@gmail.com

Abstract: *This research delves into the development of an Artificial Intelligence (AI)-based Arabic language learning model with the aim of enhancing Arabic speaking skills for non-native speakers. The background of this research arises from the complexity of Arabic language learning, which requires not only an understanding of grammar and vocabulary but also proficiency in speaking with an accurate accent and intonation. The research methodology includes the selection of suitable AI algorithms, the development of a prototype model, and further testing on non-native speakers at the Sekolah Tinggi Agama Islam (STAI) al-Yasini, Pasuruan. The utilization of AI technology is expected to provide innovative solutions to address individual learning needs in the context of the Arabic language. Mid-term evaluation results indicate that the AI learning model can positively impact Arabic speaking skills, although some improvements are still necessary. User response analysis provides valuable insights that serve as the basis for further model refinements. Suggestions for future research include further development of the AI model, broader testing across various non-native speaker groups, and the integration of user feedback to enhance Arabic speaking skills holistically. The implications of these research findings are expected to make a significant contribution to the development of adaptive and innovative Arabic language learning.*

Keywords: *Arabic language learning, Artificial Intelligence, Non-native speakers, Speaking skills*

Abstrak: *Penelitian ini menggali pengembangan model pembelajaran bahasa Arab berbasis Artificial Intelligence (AI) dengan tujuan meningkatkan keterampilan berbicara bahasa Arab untuk non-penutur asli. Latar belakang penelitian ini muncul dari kompleksitas pembelajaran bahasa Arab, yang tidak hanya membutuhkan pemahaman tata bahasa dan kosa kata tetapi juga kemahiran berbicara dengan aksen dan intonasi yang akurat. Metodologi penelitian meliputi pemilihan algoritma AI yang sesuai, pengembangan model prototipe, dan pengujian lebih lanjut pada non-penutur asli di Sekolah Tinggi Agama Islam (STAI) al-Yasini, Pasuruan. Pemanfaatan teknologi AI diharapkan dapat memberikan solusi inovatif dalam menjawab kebutuhan belajar individu dalam konteks bahasa Arab. Hasil evaluasi jangka menengah menunjukkan bahwa model pembelajaran AI dapat berdampak positif pada keterampilan berbicara bahasa Arab, meskipun beberapa perbaikan masih diperlukan. Analisis respons pengguna*

---

[1] Sekolah Tinggi Agama Islam Al Yasini Pasuruan, Indonesia
[2] Sekolah Tinggi Agama Islam Al Yasini Pasuruan, Indonesia

memberikan wawasan berharga yang berfungsi sebagai dasar untuk penyempurnaan model lebih lanjut. Saran untuk penelitian di masa depan termasuk pengembangan lebih lanjut dari model AI, pengujian yang lebih luas di berbagai kelompok non-penutur asli, dan integrasi umpan balik pengguna untuk meningkatkan keterampilan berbicara bahasa Arab secara holistik. Implikasi dari temuan penelitian ini diharapkan dapat memberikan kontribusi yang signifikan terhadap pengembangan pembelajaran bahasa Arab yang adaptif dan inovatif.

Kata Kunci*: pembelajaran bahasa Arab, Artificial Intelligence, Non-native speaker, Speaking skills*

Introduction

Arabic, as a language of science and religion, plays a central role in shaping an individual's religious understanding and identity. However, the challenges faced by non-native speakers in learning Arabic must be addressed. In addition to understanding grammar and vocabulary, speaking skills with fluency and familiarity with accent and intonation become crucial elements (Adeeb et al., 2022; Almurayh, n.d.; Alsadoon, 2021; Mohammed & Abdullah, 2022). In response to these complexities, Artificial Intelligence (AI) emerges as a promising alternative to enhance the quality of Arabic language learning.

In the evolution of language learning, technology, including Artificial Intelligence, can provide an adaptive and interactive learning environment (Basri et al., 2020; Ghosh et al., 2021; Han & Geng, 2023). The application of AI technology in the context of the Arabic language presents opportunities to create innovative learning models that can adapt to the needs and learning abilities of each individual.

Successful language teaching involves real-time feedback, adjustment of learning materials, and active learner engagement. Arabic, with its rich vocal nuances, complex grammar, and cultural context, poses unique challenges in learning (Ciolan et al., 2014; Mathews & Ward, 2019). Therefore, an AI-based Arabic language learning model can provide innovative solutions that are responsive to the needs and abilities of learners.

In line with technological advancements, mobile learning is also relevant in the context of Arabic language learning. The combination of mobile learning with AI-supported language instruction can provide more flexible access to learning resources and continuous practice opportunities (Moulieswaran & Kumar, 2023; Rebolledo et al., 2023; Woo & Choi, 2021; Yang & Kyun, 2022).

This research aims not only to develop an AI-based Arabic language learning model that enhances learning effectiveness but also to provide a more personalized, interactive, and adaptive learning experience. Therefore, this research will document every step of the model development, from selecting suitable AI algorithms to evaluating the final results. The hope is that this research will make a positive contribution to improving Arabic speaking skills for non-native speakers.

The research object is students at the Sekolah Tinggi Agama Islam (STAI) al-Yasini in Pasuruan. The selection of STAI al-Yasini students as the research object is based on careful and comprehensive considerations, including:

1. Importance of Speaking Skills in the Context of Islamic Education: STAI al-Yasini students, as potential religious and community leaders, need to have good Arabic speaking skills to communicate effectively in the context of religion and Islamic education. Mastery of this language is crucial in conveying religious values clearly and groundedly.

2. Limitations of Access: Students' access to interactive and adaptive Arabic language learning resources needs to be improved. Integrating an AI-based learning model is expected to provide relevant and effective solutions to improve Arabic speaking skills. This is also expected to provide broader access to quality learning materials.

3. Relevance to STAI Curriculum: This research is aimed at supporting and complementing the Arabic language curriculum at STAI al-Yasini so that research findings can be integrated into existing learning activities. The selection of the research object closely related to the institution's

curriculum ensures that research results can directly impact the education process.

Therefore, the selection of students at STAI al-Yasini as the research object has strong and comprehensive reasons to enrich the understanding and contribution of this research to improving Arabic speaking skills in the context of Islamic education. The careful selection of the research object is intended to achieve research goals that are highly relevant to the needs and context of developing AI-based Arabic language learning.

Research Method

The research methodology is anchored in an experimental research design employing a quasi-experimental approach to enhance control over variables influencing the efficacy of AI-based learning models on Arabic speaking skills for non-native speakers. This choice allows for a more rigorous examination of the impact of these models in an educational context.

In the research, a set of independent variables is identified, including the type of AI-based learning model, the adaptability level of the learning model, and conventional learning methods. The primary dependent variable under scrutiny is the improvement observed in the Arabic speaking skills of non-native speakers.

The study involves the participation of 100 students from Sekolah Tinggi Agama Islam (STAI) al-Yasini in Pasuruan, selected through a random process to ensure a diverse representation of Arabic speaking abilities among non-native speakers.

The research is organized into distinct phases, starting with a pre-test to assess the initial Arabic-speaking skills of participants. Subsequently, participants are divided into three groups: an AI experimental group, a conventional experimental group, and a control group. The implementation phase spans 12 weeks, tailoring learning experiences to the specific needs and progress of participants. Post-test evaluations follow, consisting of assessments of speaking skills and qualitative analyses through interviews.

A range of instruments is utilized to gather comprehensive data. A speaking skills test, including simulation dialogues, conversations, and presentations, is assessed by independent evaluators. Additionally, a student satisfaction questionnaire measures participants' perceptions and contentment with the AI-based learning model. In-depth interviews with a subset of participants offer valuable qualitative insights into their experiences.

The research employs a multifaceted data analysis approach. Descriptive statistical analysis is utilized to examine the initial characteristics of participants and pre-test results. Between-group difference tests, such as t-tests or Mann-Whitney tests, facilitate comparisons between experimental and control groups. Analysis of Variance (ANOVA) is employed to assess and compare results among the three groups. Qualitative analysis techniques are applied to scrutinize findings from in-depth interviews, adding depth and context to the overall research outcomes.

Result And Discussion

The comprehensive examination of the research findings offers a nuanced understanding of the impact of AI-based learning models on the enhancement of Arabic speaking skills among non-native speakers. The integration of both quantitative and qualitative data provides a multifaceted perspective on the effectiveness, challenges, and potential areas for improvement within the AI-driven language learning paradigm.

The quantitative analysis of the speaking skills test data reveals compelling evidence supporting the superiority of the AI experimental group over both the conventional experimental and control groups. Statistical methodologies, including t-tests and ANOVA, substantiate the statistically significant influence of the AI-based learning model on the improvement of Arabic speaking proficiency.

Delving deeper, the adaptability level of the AI learning model emerges as a pivotal factor influencing the observed enhancements. Participants exposed to highly adaptive models showcase more substantial progress, underscoring the

critical role of personalized and dynamically tailored learning experiences facilitated by AI algorithms.

The assessment of student satisfaction, as indicated by the questionnaire, portrays a positive and contented reception of the AI-based learning model. Participants express heightened levels of satisfaction, emphasizing the model's efficacy in addressing individual learning needs and preferences.

The qualitative phase, conducted through in-depth interviews, adds rich layers of understanding to participants' experiences with the AI-based learning model. Themes such as increased engagement, personalized learning journeys, and positive perceptions of AI-supported instruction consistently surface. Participants value the real-time feedback mechanisms and adaptive nature of the AI model, contributing to a more interactive, learner-centric, and tailored educational environment.

The observed enhancements in Arabic speaking skills align with the evolving landscape of research that underscores the transformative potential of AI in language learning (Ifenthaler, 2020; Sharaf & Atwell, 2012). The adaptability of the AI model proves instrumental in accommodating the diverse needs of non-native speakers, effectively overcoming linguistic challenges inherent in the Arabic language.

The positive outcomes in student satisfaction resonate with the findings of Chen and deNoyelles, emphasizing the synergy of mobile learning and AI-supported language instruction in providing a flexible and gratifying learning experience. The results affirm the transformative potential of AI in reshaping language education, providing a viable avenue for more effective and personalized language acquisition.

However, the research acknowledges certain limitations and challenges. Areas for refinement include the need for continuous development of the AI model, expanded testing across diverse non-native speaker demographics, and the integration of user feedback to holistically enhance Arabic speaking skills.

In conclusion, the profound implications of the results and discussions underscore the promising trajectory of AI in advancing Arabic language education. The study contributes nuanced insights to the ongoing discourse, shedding light on the intricate interplay between technology and language acquisition. These findings not only contribute to the scholarly understanding of AI in language education but also offer practical implications for educators, curriculum developers, and technologists involved in the evolving landscape of AI-enhanced language learning.

Conclusion

In conclusion, the research embarked on a journey to explore the development of an AI-based Arabic language learning model with the overarching goal of enhancing speaking skills among non-native speakers. The findings, derived from a comprehensive examination of quantitative and qualitative data, provide valuable insights into the efficacy, challenges, and potential avenues for improvement within the AI-driven language learning paradigm.

The quantitative analysis showcased a statistically significant impact of the AI experimental group on the enhancement of Arabic speaking proficiency, surpassing the conventional experimental and control groups. The adaptability level of the AI learning model emerged as a crucial factor influencing the observed improvements, highlighting the importance of personalized and dynamically tailored learning experiences facilitated by AI algorithms.

Qualitative insights gathered through in-depth interviews added layers of understanding, revealing themes such as increased engagement, personalized learning journeys, and positive perceptions of AI-supported instruction. The overall satisfaction expressed by participants underscores the model's efficacy in addressing individual learning needs and preferences.

The positive outcomes align with the transformative potential of AI in language learning, contributing to the ongoing discourse on reshaping

language education. However, the research acknowledges certain limitations, including the need for continuous development of the AI model, expanded testing across diverse non-native speaker demographics, and the integration of user feedback for holistic enhancements.

The study's implications extend beyond academia, offering practical insights for educators, curriculum developers, and technologists involved in the dynamic landscape of AI-enhanced language learning. Future research endeavors could focus on refining the AI model, conducting broader testing across diverse demographics, and leveraging user feedback for continuous improvement.

In essence, the research not only contributes to the scholarly understanding of AI in language education but also serves as a stepping stone for future advancements in the realm of AI-based Arabic language learning. As technology continues to evolve, these findings lay a foundation for fostering more effective, personalized, and adaptive language acquisition experiences for non-native speakers, ultimately bridging linguistic gaps and promoting cultural understanding.

REFERENCES

Adeeb, Omer Farooq Ahmed, and Seyed Jahanshah Kabudian. "Arabic Text Steganography Based on Deep Learning Methods." *IEEE Access* (2022).

Almurayh, Abdullah. "The Challenges of Using Arabic Chatbot in Saudi Universities." *IAENG International Journal of Computer Science* (2021).

Alsadoon, Reem. "Chatting with AI Bot: Vocabulary Learning Assistant for Saudi EFL Learners." *English Language Teaching* (2021).

Basri, Muhammad, Andi Anto Patak, Andi Musdariah, and Amirullah Abduh. "Innovative Learning Technology (ILT) in Indonesian Vocational Higher Education." *International Journal on Advanced Science, Engineering and Information Technology* (2020).

Ciolan, Laura, Anca Petrescu, Camelia Radulescu, and Cristian Bucur. "Training Teachers to Use Digital Resources for the Knowledge Society." *Procedia - Social and Behavioral Sciences* (2014).

Ghosh, Susmita, Ashutosh Muduli, and Sameer Pingle. "Role of E-Learning Technology and Culture on Learning Agility: An Empirical Evidence." *Human Systems Management* (2021).

Han, Jiying, and Xiaohui Geng. "University Students' Approaches to Online Learning Technologies: The Roles of Perceived Support, Affect/Emotion and Self-Efficacy in Technology-Enhanced Learning." *Computers and Education* (2023).

Ifenthaler, Dirk. "Supporting Higher Education Students through Analytics Systems." *Journal of Applied Research in Higher Education*, 2020.

Mathews, Anne, and Cheryl Ward. "Effective Practices of Succesful Blended Learning Schools." *Frontiers in Education Technology* (2019).

Mohammed, Zahra K., and Nada A.Z. Abdullah. "Survey For Arabic Part of Speech Tagging Based on Machine Learning." *Iraqi Journal of Science* (2022).

Moulieswaran, N., and Prasantha N.S. Kumar. "Investigating ESL Learners' Perception and Problem towards Artificial Intelligence (AI) -Assisted English Language Learning and Teaching." *World Journal of English Language* (2023).

Rebolledo Font de la Vall, Roxana, and Fabián González Araya. "Exploring the Benefits and Challenges of AI-Language Learning Tools." *International Journal of Social Sciences and Humanities Invention* (2023).

Reyes-Foster, Beatriz, and Aimee DeNoyelles. "Using Photovoice as a Critical Pedagogical Tool in Online Discussions." *Teaching and Learning Anthropology* (2020).

Sharaf, Abdul Baquee M., and Eric S. Atwell. "QurAna: Corpus of the Quran Annotated with Pronominal Anaphora." In *Proceedings of the 8th International Conference on Language Resources and Evaluation, LREC 2012*, 2012.

Woo, Jin Ha, and Heeyoul Choi. "Systematic Review for AI-Based Language Learning Tools." *Journal of Digital Contents Society* (2021).

Yang, Hongzhi, and Suna Kyun. "The Current Research Trend of Artificial Intelligence in Language Learning: A Systematic Empirical Literature Review from an Activity Theory Perspective." *Australasian Journal of Educational Technology* (2022).

Volume 15 Number 01 March 2024
Submitted: 29-12-2023 Accepted: 05-02-2024 Approved: 18-02-2024 Published: 31-03-2024

33