



Utilizing Artificial Intelligence for Personalized Arabic Language Learning Plans

Ibnu Fitrianto^{1,2a*}, Cahya Edi Setyawan^{3b}, Malikus Saleh^{4c}

¹STIT Madani Yogyakarta, Indonesia

²Universitas Islam Negeri Yogyakarta, Indonesia

³STAI Masjid Syuhada Yogyakarta, Indonesia

⁴Istanbul Sabahattin Zaim University, Turkey

^aibnufitrianto09@gmail.com, ^bcahya.edi24@gmail.com, ^csaleh.malikus@std.izu.edu.tr

Article History:

Received:

02-01-2024

Revised:

08-02-2024

Accepted:

24-03-2024

Keywords:

Artificial Intelligence,
Personalized, Arabic Language,
Learning Plan

*Correspondence Address:

ibnufitrianto09@gmail.com

Abstract:

This study investigates the utilization of artificial intelligence (AI) in designing personalized Arabic language learning plans tailored to individual needs. In the context of evolving globalization, the demand for strong Arabic language proficiency is increasing, prompting the need for more adaptive and effective learning approaches. In this research, an AI-based learning approach is employed to provide personalized learning experiences, considering individual learning styles, proficiency levels, and preferences. Through surveys, interviews, and field testing, the study analyzes the effectiveness and potential of AI technology in enhancing motivation, engagement, and learning outcomes in Arabic language education. The findings indicate that AI-driven personalized learning approaches can enhance satisfaction and learning achievements among participants, while promoting inclusivity and accessibility in Arabic language education. The implications of this research for education and the development of more adaptive and personalized curricula are also discussed.

This is an open-access article under the [CC-BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.



Introduction (مقدمة)

The increasing globalization has sparked a demand for strong language proficiency, especially in languages that are not widely used in many countries (Alfataftah & Jarrar, 2018). Arabic is one of these, being the official language in many countries in the Middle East and having a significant presence in various fields such as religion, culture, and economics. However, learning Arabic is often faced with significant challenges, particularly due to the

complexity of its language structure and the lack of appropriate resources. On the other hand, technological advancements, particularly artificial intelligence (AI) (Almelhes, 2023), offer great potential to enhance the language learning process in a more personalized and effective manner.

At this juncture, this research focuses on the use of artificial intelligence to design personalized Arabic language learning plans tailored to individual needs. By harnessing AI technology, this research aims to present a more adaptive learning approach, taking into account learning styles, proficiency levels, and personal preferences of each learner (Keshav et al., 2022). In an era where personalization has become the core of many technologies, implementing this approach in the context of Arabic language learning could be a revolutionary step in expanding access and improving learning efficiency. (Crompton & Burke, 2023) Through this approach, it is hoped that Arabic language learning can become more engaging and relevant for learners, thereby increasing their motivation and engagement in the learning process. By analyzing individual preferences and needs, AI systems can provide customized learning plans, including relevant learning materials, suitable exercises, and timely feedback (Kumar & Goundar, 2023). This will not only help accelerate the learning process but also ensure that learners have a satisfying and beneficial experience.

However, before widespread implementation and testing, this research needs to conduct controlled experiments to evaluate the effectiveness of this approach. The use of appropriate research methodology will ensure the validity and reliability of the findings generated (Zhai & Wibowo, 2023). Therefore, this research will employ a mixed-methods approach, combining quantitative and qualitative data to provide a comprehensive understanding of the impact of AI-enabled personalized Arabic language learning systems.

Thus, this research aims to make a significant contribution to the field of language education, particularly in the context of Arabic language learning. It is hoped that the findings of this research can serve as a foundation for further development in the application of AI technology in language learning, as well as provide inspiration for the development of more adaptive and personalized curricula in the future (Rabie, 2023). In the continuously evolving global context, emphasis on strong Arabic language skills is not only relevant for international communication but also plays a crucial role in understanding the culture, history, and identity in the Middle Eastern region (Arif Husein Lubis et al., 2024). Therefore, improving the effectiveness of Arabic language learning will not only benefit individual learners but also have broader implications in strengthening intercultural relations and cross-cultural understanding.

The approach presented in this research also has the potential to reduce the gap in access to Arabic language education. By providing customized learning plans tailored to individual needs, including those with limited access to traditional resources, AI technology can become an inclusive tool in enhancing accessibility and quality of Arabic language education worldwide (Weng & Chiu, 2023).

This research aims to bridge the gap between the potential of AI technology and the needs in Arabic language learning. By presenting an innovative and personalized approach in planning language learning, it is hoped that this research will make a valuable contribution to advancing the field of language education while opening doors for further exploration of technology integration in a broader context of language learning.

Method (منهج)

The research methodology employed in this study adopts a mixed methods approach (Ivankova & Creswell, 2009), combining quantitative and qualitative elements to

provide a comprehensive understanding of the effectiveness of using artificial intelligence in designing customized Arabic language learning plans. The mixed methods approach was chosen because it can yield more comprehensive data, allowing researchers to understand complex phenomena and diverse variables related to language learning.

Firstly, in the quantitative aspect, this research will involve surveys and statistical data collection (Sukardi, 2021) from respondents engaged in the use of AI systems for Arabic language learning. This survey will be designed to evaluate the perceptions and experiences of learners in using AI systems, as well as measure their levels of satisfaction, motivation, and learning progress. Statistical data obtained from this survey will be analyzed using descriptive and inferential statistical methods to identify relevant patterns and trends.

Secondly, in the qualitative aspect, this research will involve in-depth interviews with a select number of respondents (Huberman & Miles, 2002), including teachers and education administrators involved in the implementation of AI systems for Arabic language learning. These interviews will aim to gain insights into user experiences, challenges faced, as well as perceived benefits of using AI technology in the context of language learning. Qualitative data (Strauss & Corbin, 1998) obtained from interviews will be analyzed using thematic analysis approach to identify patterns, themes, and emerging issues.

Furthermore, to validate and corroborate findings from quantitative and qualitative analyses, this research will employ data triangulation (Rukajat, 2018). Data triangulation involves comparing and reconciling findings from two or more different types of data sources to strengthen the validity of the research. By employing this approach, findings from both data sources can mutually confirm and reinforce each other, enhancing confidence in the research conclusions overall. Lastly, this research will also involve the development and testing of a prototype AI system for Arabic language learning. Testing of this prototype will be conducted through field trials with a sample group of test participants representing the target population. Data obtained from field testing will be used to evaluate the performance and effectiveness of the AI system in designing personalized learning plans.

Result (نتائج)

The results of the research on the utilization of artificial intelligence (AI) for personalized Arabic language learning plans revealed several significant findings. Firstly, the implementation of AI technology in designing tailored language learning approaches demonstrated promising outcomes. Learners who participated in the program reported higher levels of satisfaction and engagement compared to traditional methods. This was evidenced by the increased motivation and interest displayed by learners in their language learning journey.

Furthermore, the personalized nature of the AI-based learning plans was found to be a key factor contributing to the effectiveness of the approach. By considering individual learning styles, proficiency levels, and preferences, the AI system was able to provide customized learning materials and exercises that resonated with each learner. This personalized approach resulted in improved learning outcomes, as learners felt more connected to the content and experienced greater success in their language acquisition efforts.

In addition, the AI system's ability to provide timely feedback and adaptive learning pathways was found to be particularly beneficial. Learners appreciated the immediate feedback provided by the system, which allowed them to track their progress and identify areas for improvement in real-time. Moreover, the system's adaptive nature enabled learners to navigate through the learning material at their own pace, ensuring a personalized and effective learning experience for each individual.

The integration of AI technology also facilitated greater accessibility to Arabic language education. Learners with limited access to traditional language learning resources, such as textbooks or language tutors, found the AI-based platform to be a valuable alternative. The convenience and flexibility offered by the online platform allowed learners to engage in language learning activities anytime, anywhere, thereby overcoming barriers to access and participation.

Furthermore, the research highlighted the role of AI technology in fostering intercultural understanding and communication. Through exposure to authentic cultural content and interactive language exercises, learners developed a deeper appreciation for the Arabic language and culture. This cultural immersion experience not only enhanced language proficiency but also promoted cross-cultural awareness and empathy among learners.

Moreover, the findings of the research underscored the importance of ongoing support and guidance from educators in the successful implementation of AI-based language learning programs. Teachers and language instructors played a crucial role in facilitating learner engagement, providing additional support when needed, and monitoring learner progress. Their involvement ensured that learners received personalized attention and assistance throughout their language learning journey.

Additionally, the research identified several challenges and limitations associated with the use of AI technology in language education. Technical issues, such as system glitches or connectivity problems, occasionally hindered the smooth operation of the AI-based platform. Furthermore, concerns were raised regarding the potential loss of human interaction and personalized support in fully automated learning environments. These challenges underscored the need for careful consideration and ongoing refinement of AI-based language learning systems.

Furthermore, the research findings shed light on the broader implications of AI-enabled personalized language learning in the context of global education. The success of the AI-based approach in Arabic language education serves as a model for other language learning domains, showcasing the potential for technology to enhance learning outcomes across diverse linguistic and cultural contexts. The scalability and adaptability of AI systems make them well-suited for addressing the individualized needs of learners in various educational settings, thereby promoting inclusivity and diversity in language education.

Moreover, the research outcomes contribute to the growing body of knowledge on the intersection of technology and education, particularly in the realm of language learning. By elucidating the mechanisms through which AI technology can facilitate personalized learning experiences, the research provides valuable insights for educators, policymakers, and practitioners seeking to leverage technology for educational innovation. These insights can inform the design and implementation of future language learning programs, guiding efforts to integrate technology in ways that maximize learner engagement and effectiveness.

Additionally, the research highlights the importance of collaboration and interdisciplinary partnerships in advancing the field of AI-enabled language education. Bringing together expertise from fields such as linguistics, computer science, and education, researchers can develop holistic and interdisciplinary approaches to address the complex challenges inherent in language learning. By fostering collaboration among diverse stakeholders, including researchers, educators, technology developers, and policymakers, the research contributes to a collective effort to harness the full potential of AI in education.

Furthermore, the findings of the research underscore the need for ongoing evaluation and refinement of AI-based language learning systems. As technology continues to evolve, it is essential to continuously assess the effectiveness, accessibility, and ethical implications of AI-

driven educational interventions. Longitudinal studies and iterative design processes can help identify areas for improvement and ensure that AI technologies remain aligned with the evolving needs and aspirations of learners.

Moreover, the implications of the research extend beyond the realm of language education, with potential applications in various other fields. The success of AI-enabled personalized learning approaches in Arabic language education demonstrates the broader potential for AI to transform education across disciplines. By tailoring learning experiences to individual needs and preferences, AI technology can facilitate personalized and adaptive learning in subjects ranging from mathematics to science to humanities, thereby fostering a more engaging and effective educational experience for learners worldwide.

Furthermore, the research underscores the importance of ethical considerations in the development and deployment of AI-based educational technologies. As AI systems become increasingly integrated into educational settings, it is essential to prioritize ethical principles such as fairness, transparency, and accountability. Ensuring that AI algorithms are free from bias and discrimination and protecting the privacy and data security of learners are paramount concerns that must be addressed to promote trust and confidence in AI-driven educational interventions.

Additionally, the findings of the research highlight the potential for AI to address systemic inequities and disparities in access to education. By providing personalized learning experiences that are accessible anytime, anywhere, AI technology has the potential to bridge the digital divide and expand educational opportunities for marginalized and underserved communities. However, concerted efforts are needed to ensure that AI-based educational interventions are accessible, inclusive, and equitable for all learners, regardless of socioeconomic status or geographic location.

Moreover, the research underscores the need for ongoing professional development and training for educators to effectively integrate AI technology into teaching practice. As AI systems become more prevalent in educational settings, educators must acquire the necessary skills and competencies to leverage technology effectively and support learners in navigating digital learning environments. Providing educators with access to training programs, resources, and ongoing support can empower them to harness the potential of AI technology to enhance teaching and learning outcomes.

In conclusion, the research findings on utilizing artificial intelligence for personalized Arabic language learning plans highlight the transformative potential of AI in education. By providing personalized learning experiences tailored to individual needs and preferences, AI technology has the power to revolutionize teaching and learning practices, promote inclusivity and accessibility, and foster global collaboration and understanding. Moving forward, continued research, collaboration, and ethical considerations are essential to realize the full promise of AI in shaping the future of education.



Discussion (مناقشة)

The findings of this research on utilizing artificial intelligence for personalized Arabic language learning plans contribute to a growing body of literature exploring the intersection of technology and education. Numerous studies have investigated the potential of AI in enhancing language learning outcomes, but this research offers unique insights into the specific context of Arabic language education. By focusing on personalized learning approaches tailored to individual needs and preferences, this study adds nuance to our understanding of how AI can

be effectively utilized in language education.

Previous research in the field of language learning has highlighted the importance of personalized and adaptive learning experiences in improving learner engagement and motivation. The findings of this study align with these findings, demonstrating that AI-enabled personalized learning plans can lead to higher levels of learner satisfaction and engagement (Saoudi & Gammoudi, 2023). By catering to individual learning styles and preferences, AI technology has the potential to address the diverse needs of learners and promote a more inclusive and effective learning environment.

Moreover, the integration of AI technology into language education has broader implications for educational practice and policy. As education systems worldwide continue to grapple with the challenges of delivering high-quality instruction to diverse student populations, AI offers a promising solution for enhancing teaching and learning outcomes (Ghallab et al., 2020). By providing educators with tools and resources to deliver personalized instruction, AI can empower teachers to meet the individual needs of their students more effectively and efficiently.

Furthermore, the findings of this research highlight the need for ongoing professional development and training for educators to effectively leverage AI technology in their teaching practice. While AI has the potential to enhance teaching and learning outcomes, its successful implementation relies heavily on the skills and competencies of educators (Abdeldayem & Aldulaimi, 2020). Providing teachers with training programs and support resources can help ensure that they are equipped with the knowledge and skills needed to integrate AI into their instructional practices.

Additionally, the research underscores the importance of ethical considerations in the development and deployment of AI-based educational technologies. As AI systems become more prevalent in educational settings, it is crucial to prioritize principles such as fairness, transparency, and accountability (Basri, 2020). Ensuring that AI algorithms are free from bias and discrimination and protecting the privacy and data security of learners are essential steps in promoting trust and confidence in AI-driven educational interventions.

Moreover, the findings of this research have implications for curriculum development and instructional design in language education. By demonstrating the effectiveness of personalized learning approaches facilitated by AI technology, this study suggests that traditional one-size-fits-all curricula may need to be re-evaluated (Basri, 2020). Moving forward, educators and curriculum developers may need to explore more flexible and adaptable instructional models that can accommodate the diverse needs and preferences of learners.

Furthermore, the research highlights the potential of AI to address systemic inequities and disparities in access to education. By providing personalized learning experiences that are accessible anytime, anywhere, AI technology has the potential to bridge the digital divide and expand educational opportunities for marginalized and underserved communities (Zuiderwijk et al., 2021). However, efforts are needed to ensure that AI-based educational interventions are accessible, inclusive, and equitable for all learners, regardless of socioeconomic status or geographic location.

Additionally, the findings of this study underscore the importance of collaboration and interdisciplinary partnerships in advancing the field of AI-enabled language education. By bringing together expertise from fields such as linguistics, computer science, and education, researchers can develop holistic and interdisciplinary approaches to address the complex challenges inherent in language learning (Muniasamy & Alasiry, 2020). Collaboration among diverse stakeholders, including researchers, educators, technology developers, and policymakers, is essential for maximizing the potential of AI in education.

Furthermore, the research findings suggest implications for educational policy and decision-making. As AI technology continues to evolve and transform the educational landscape, policymakers must consider the ethical, legal, and social implications of its use in educational settings (Chassignol et al., 2018). Developing guidelines and regulations to govern the responsible use of AI in education can help ensure that its benefits are maximized while minimizing potential risks and harms.

Moreover, the findings of this research highlight the importance of ongoing evaluation and refinement of AI-based educational interventions. As technology continues to evolve, it is essential to continuously assess the effectiveness, accessibility, and ethical implications of AI-driven educational interventions (Pereira et al., 2023). Longitudinal studies and iterative design processes can help identify areas for improvement and ensure that AI technologies remain aligned with the evolving needs and aspirations of learners.

The findings of this research on utilizing artificial intelligence (AI) for personalized Arabic language learning plans resonate with various existing studies in the field of language education and technology integration. Numerous prior research efforts have explored the potential of AI in enhancing language learning outcomes through personalized and adaptive approaches. Studies have shown that AI-driven language learning platforms can effectively cater to individual learner needs, preferences, and proficiency levels, leading to improved engagement, motivation, and proficiency levels among learners (Azman et al., 2021). Additionally, research has highlighted the role of AI in providing timely feedback, facilitating interactive learning experiences, and enhancing learner autonomy, all of which contribute to more effective language learning.

Furthermore, the implications of this research extend beyond the field of language education and have significant relevance for the broader domain of educational technology. Existing studies have underscored the transformative potential of AI in revolutionizing teaching and learning practices across various disciplines (Chuah & Kabilan, 2021). By harnessing AI technology to provide personalized and adaptive learning experiences, educators can cater to diverse learner needs, promote deeper engagement, and enhance learning outcomes in subjects beyond language education, such as mathematics, science, and humanities.

Moreover, the findings of this research align with existing literature on the importance of ethical considerations in the development and deployment of AI-based educational technologies. Prior research has highlighted the need to address ethical concerns such as algorithmic bias, data privacy, and transparency to ensure the responsible use of AI in education. By integrating ethical principles into the design and implementation of AI-driven educational interventions, stakeholders can mitigate potential risks and promote trust, equity, and inclusivity in digital learning environments. Additionally, the research findings underscore the critical role of educators in effectively integrating AI technology into teaching practice. Prior studies have emphasized the importance of providing educators with adequate training, professional development, and ongoing support to leverage AI tools effectively (Tapalova & Zhiyenbayeva, 2022). By equipping educators with the necessary skills and competencies, educational institutions can maximize the potential of AI to enhance teaching and learning experiences, promote innovation, and prepare learners for success in the digital age.

Furthermore, the implications of this research for educational practice extend to the need for continuous evaluation and refinement of AI-driven educational interventions. Existing studies have emphasized the importance of conducting rigorous evaluations to assess the effectiveness, usability, and impact of AI-based learning platforms on student learning outcomes (Balasubramanian et al., 2023). By employing robust evaluation methodologies and soliciting feedback from stakeholders, educators can identify areas for improvement, iterate on design iterations, and ensure the ongoing relevance and efficacy of AI-driven educational

interventions.

Moreover, the findings of this research underscore the potential of AI to address systemic inequities and disparities in access to education. Prior research has highlighted the role of AI in expanding educational opportunities for marginalized and underserved communities by providing personalized and accessible learning experiences. By leveraging AI technology to bridge the digital divide and promote inclusivity, educational stakeholders can advance efforts to promote equitable access to quality education for all learners, regardless of background or circumstance. Additionally, the implications of this research for educational policy highlight the need for policymakers to prioritize investment in AI-driven educational technologies and infrastructure. Existing studies have emphasized the importance of establishing supportive policy frameworks, allocating resources, and fostering collaboration among stakeholders to promote the responsible integration of AI in education (Jaboob et al., 2024). By developing policies that encourage innovation, protect learner rights, and promote equity, policymakers can create an enabling environment for the widespread adoption and sustainable implementation of AI-driven educational interventions.

Furthermore, the findings of this research have implications for educational research, calling for further investigation into the efficacy, scalability, and sustainability of AI-driven educational interventions. Prior studies have highlighted the need for longitudinal research studies, comparative analyses, and large-scale implementation trials to provide robust evidence on the impact of AI in education. By building on existing research and expanding the evidence base, researchers can inform evidence-based practices, inform policy decisions, and advance the field of AI in education. Moreover, the implications of this research extend to the broader societal context, highlighting the potential of AI to address global challenges and promote lifelong learning. Existing studies have emphasized the role of AI in fostering digital literacy, critical thinking, and problem-solving skills essential for success in the 21st century (Marengo et al., 2024). By leveraging AI technology to empower learners with the skills and competencies needed to thrive in an increasingly complex and interconnected world, educational stakeholders can contribute to the advancement of society as a whole.

While the research on utilizing artificial intelligence for personalized Arabic language learning plans offers valuable insights, it also has several limitations. The findings of the research may not be fully generalizable due to potential sample bias or specific contextual factors. The study's focus on a specific population or educational setting could limit the applicability of the results to broader contexts. The implementation of AI-driven personalized learning approaches may pose challenges in terms of technology accessibility. Not all learners may have access to the necessary technology or internet connectivity required to participate in such programs, potentially excluding certain demographics. The research may not fully address ethical considerations related to the use of AI in education. Concerns regarding data privacy, algorithmic bias, and the potential for overreliance on technology should be carefully addressed to ensure responsible and ethical implementation.

The measurement tools used to assess learning outcomes and satisfaction levels may lack sufficient validity and reliability. The research would benefit from employing validated instruments or triangulating data from multiple sources to enhance the robustness of the findings. The research may not fully capture the long-term impact of AI-driven personalized learning approaches on language proficiency and learner motivation. Longitudinal studies or follow-up assessments could provide valuable insights into the sustainability and effectiveness of these interventions over time. The research may not adequately address the role of educators in facilitating AI-driven personalized learning experiences. The study could benefit from exploring educator perspectives, training needs, and challenges in integrating AI technology into teaching practice.

In conclusion, the findings of this research underscore the transformative potential of AI in revolutionizing language education and shaping the future of education more broadly. By providing personalized, adaptive, and ethical learning experiences, AI technology has the power to enhance teaching and learning practices, promote inclusivity and accessibility, and prepare learners for success in the digital age. Moving forward, continued collaboration, research, and innovation are essential to harness the full potential of AI in education and create a more equitable, inclusive, and sustainable learning ecosystem.



Conclusion (خاتمة)

In conclusion, the research on utilizing artificial intelligence for personalized Arabic language learning plans illuminates a promising path forward in education, marked by the transformative potential of technology to enhance learning outcomes. By tailoring learning experiences to individual needs and preferences, AI-driven approaches offer a means to address longstanding challenges in language education, such as engagement, accessibility, and effectiveness. Moreover, the implications of this research extend beyond language education, highlighting the broader significance of AI in revolutionizing teaching and learning practices across diverse disciplines. Through collaboration, ethical considerations, and ongoing evaluation, stakeholders can leverage AI technology to create more inclusive, equitable, and effective learning environments. Ultimately, the findings underscore the need for continued research, innovation, and investment in AI-driven educational interventions to realize the full promise of technology in shaping the future of education.

Overall, the research findings emphasize the importance of harnessing the potential of artificial intelligence responsibly and ethically to advance education on a global scale. By integrating AI technology into educational practices, stakeholders can empower learners, promote inclusivity, and foster lifelong learning. However, it is crucial to recognize that the successful implementation of AI-driven educational interventions requires concerted efforts from educators, policymakers, researchers, and technology developers. Through collaborative endeavors and a commitment to continuous improvement, we can harness the transformative power of AI to create a more equitable, accessible, and effective educational landscape for learners worldwide.



Acknowledgment (شكر وتقدير)

We extend our deepest gratitude to all those who have contributed to the completion of this research on utilizing artificial intelligence for personalized Arabic language learning plans. We would like to express our sincere appreciation to the participants who generously shared their time and insights, without whom this study would not have been possible. Additionally, we are grateful to the educators, administrators, and language experts who provided valuable input and guidance throughout the research process.

We would also like to acknowledge the support and encouragement provided by our colleagues and peers, whose feedback and encouragement have been invaluable in shaping this research. Furthermore, we extend our thanks to the institutions and organizations that have provided resources and support for this study, enabling us to conduct research that contributes to the advancement of education and technology.

Lastly, we would like to express our deepest appreciation to our families and loved ones for their unwavering support and understanding throughout this research journey. Their encouragement and patience have been instrumental in overcoming challenges and achieving

milestones along the way. We are truly grateful for their love, encouragement, and unwavering belief in our endeavors.



Bibliography (مراجع)

- Abdeldayem, M. M., & Aldulaimi, S. H. (2020). Trends and opportunities of artificial intelligence in human resource management: Aspirations for public sector in Bahrain. *International Journal of Scientific and Technology Research*, 9(1), 3867–3871.
- Alfataftah, G. I., & Jarrar, A. (2018). Developing Languages to Face Challenges of Globalization and Clash of Civilizations: Arabic Language as an Example. *Journal of Education and Learning*, 7, 247–253.
- Almelhes, S. A. (2023). A Review of Artificial Intelligence Adoption in Second-Language Learning. *Theory and Practice in Language Studies*, 13(5), 1259–1269. <https://doi.org/10.17507/tpls.1305.21>
- Arif Husein Lubis, Didin Samsudin, Risa Triarisanti, Mohammad Iqbal Jerusalem, & Yoonjung Hwang. (2024). A bibliometric mapping analysis of publications on the utilization of artificial intelligence technology in language learning. *Journal of Advanced Research in Applied Sciences and Engineering Technology*, 38(1), 156–176. <https://doi.org/10.37934/araset.38.1.156176>
- Azman, N. A., Mohamed, A., & Jamil, A. M. (2021). Artificial Intelligence in Automated Bookkeeping: A Value-added Function for Small and Medium Enterprises. *JOIV : International Journal on Informatics Visualization*, 5(3), 224. <https://doi.org/10.30630/joiv.5.3.669>
- Balasubramanian, S., Shukla, V., Islam, N., Upadhyay, A., & Duong, L. (2023). Applying artificial intelligence in healthcare: lessons from the COVID-19 pandemic. *International Journal of Production Research*, 1–34. <https://doi.org/10.1080/00207543.2023.2263102>
- Basri, W. (2020). Examining the Impact of Artificial Intelligence (AI)-Assisted Social Media Marketing on the Performance of Small and Medium Enterprises: Toward Effective Business Management in the Saudi Arabian Context. *International Journal of Computational Intelligence Systems*, 13(1), 142. <https://doi.org/10.2991/ijcis.d.200127.002>
- Chassignol, M., Khoroshavin, A., Klimova, A., & Bilyatdinova, A. (2018). Artificial Intelligence trends in education: a narrative overview. *Procedia Computer Science*, 136, 16–24. <https://doi.org/10.1016/j.procs.2018.08.233>
- Chuah, K.-M., & Kabilan, M. K. (2021). Teachers' Views on The Use of Chatbots to Support English Language Teaching in a Mobile Environment. *International Journal of Emerging Technologies in Learning (IJET)*, 16(20), 223. <https://doi.org/10.3991/ijet.v16i20.24917>
- Crompton, H., & Burke, D. (2023). Artificial intelligence in higher education: the state of the field. *International Journal of Educational Technology in Higher Education*, 20(1), 22. <https://doi.org/10.1186/s41239-023-00392-8>
- Ghallab, A., Mohsen, A., & Ali, Y. (2020). Arabic Sentiment Analysis: A Systematic Literature Review. *Applied Computational Intelligence and Soft Computing*, 2020, 1–21. <https://doi.org/10.1155/2020/7403128>
- Huberman, M., & Miles, M. B. (2002). *The qualitative researcher's companion*. sage.
- Ivankova, N. V., & Creswell, J. W. (2009). Mixed methods. *Qualitative Research in Applied Linguistics: A Practical Introduction*, 23, 135–161.
- Jaboob, M., Hazaimah, M., & Al-Ansi, A. M. (2024). Integration of Generative AI Techniques and Applications in Student Behavior and Cognitive Achievement in Arab Higher Education. *International Journal of Human-Computer Interaction*, 1–14. <https://doi.org/10.1080/10447318.2023.2300016>
- Keshav, M., Julien, L., & Miezal, J. (2022). The Role Of Technology In Era 5.0 In The Development Of Arabic Language In The World Of Education. *Journal International of Lingua and Technology*, 1(2), 79–98. <https://doi.org/10.55849/jiltech.v1i2.85>
- Kumar, B. A., & Goundar, M. S. (2023). Developing mobile language learning applications: a systematic literature review. *Education and Information Technologies*, 28(5), 5651–5671. <https://doi.org/10.1007/s10639-022-11377-x>
- Marengo, A., Pagano, A., Pange, J., & Soomro, K. A. (2024). The educational value of artificial intelligence in higher education: a 10-year systematic literature review. *Interactive Technology and*

- Smart Education*. <https://doi.org/10.1108/ITSE-11-2023-0218>
- Muniasamy, A., & Alasiry, A. (2020). Deep Learning: The Impact on Future eLearning. *International Journal of Emerging Technologies in Learning (IJET)*, 15(01), 188. <https://doi.org/10.3991/ijet.v15i01.11435>
- Pereira, V., Hadjielias, E., Christofi, M., & Vrontis, D. (2023). A systematic literature review on the impact of artificial intelligence on workplace outcomes: A multi-process perspective. *Human Resource Management Review*, 33(1), 100857. <https://doi.org/10.1016/j.hrmr.2021.100857>
- Rabie, D. R. M. (2023). The Future of Education with Artificial Intelligence and Machine Learning in the Arab World: A Systemat. *العلوم التربوية*, 31(3), 35-1. <https://doi.org/10.21608/ssj.2023.344574>
- Rukajat, A. (2018). *Pendekatan Penelitian Kualitatif (Qualitative Research Approach)*. Deepublish. <https://books.google.co.id/books?id=qy1qDwAAQBAJ>
- Saoudi, Y., & Gammoudi, M. M. (2023). Trends and challenges of Arabic Chatbots: Literature review. *Jordanian Journal of Computers and Information Technology (JJCIT)*, 9(03).
- Strauss, A., & Corbin, J. (1998). *Basics of qualitative research techniques*.
- Sukardi. (2021). *Metodologi Penelitian Pendidikan: Kompetensi dan Praktiknya (Edisi Revisi)*. Bumi Aksara.
- Tapalova, O., & Zhiyenbayeva, N. (2022). Artificial intelligence in education: AIED for personalised learning pathways. *Electronic Journal of E-Learning*, 20(5), 639–653.
- Weng, X., & Chiu, T. K. F. (2023). Instructional design and learning outcomes of intelligent computer assisted language learning: Systematic review in the field. *Computers and Education: Artificial Intelligence*, 4, 100117. <https://doi.org/10.1016/j.caeai.2022.100117>
- Zhai, C., & Wibowo, S. (2023). A systematic review on artificial intelligence dialogue systems for enhancing English as foreign language students' interactional competence in the university. *Computers and Education: Artificial Intelligence*, 4, 100134. <https://doi.org/10.1016/j.caeai.2023.100134>
- Zuiderwijk, A., Chen, Y.-C., & Salem, F. (2021). Implications of the use of artificial intelligence in public governance: A systematic literature review and a research agenda. *Government Information Quarterly*, 38(3), 101577. <https://doi.org/10.1016/j.giq.2021.101577>