IAIC Transactions on Sustainable Digital Innovation (ITSDI)
Vol. 5 No. 1 October 2023

p-ISSN: 2686-6285
e-ISSN: 2715-0461

AI-Powered Arabic Language Education in the Era of Society 5.0

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Author Notification
22 March 2019
Final Revised
27 March 2019
Published
31 March 2019

To cite this document:
Anwar, M. R., & Ahyarudin, H. A., (2023). AI-Powered Arabic Language Education in the Era of Society 5.0. IAIC Transactions on Sustainable Digital Innovation (ITSDI), 5(1), 50-57. Retrieved from http://aptikom-journal.id/index.php/itsdi/article/view/607

Abstract

In the Society 5.0 era characterized by technological integration, Arabic language education is experiencing a transformation through the application of artificial intelligence (AI). The background to this research is the increasing need for Arabic language skills amidst globalization and the growth of cross-cultural interactions. Meanwhile, AI technology has reached a level of maturity that allows its effective use in education, providing new opportunities to improve language teaching methods. This research aims to explore the potential of using AI in Arabic language teaching, understanding how this technology can facilitate more adaptive, interactive and efficient learning, according to individual student needs. The implications of this research are very significant. The implementation of AI in Arabic education not only improves language skills, but also enriches students' learning experience. In Society 5.0, where humans and technology synergize, the use of AI in Arabic language education can be a model for integrating intelligent technology in the learning process. The main contribution of this research is the development of an AI learning system that can be adopted by educational institutions, enabling them to provide more personalized and effective Arabic language education. This research also explores updates in teaching methods, introducing an approach based on individual student responses. Thus, this research provides an in-depth understanding of how AI can be adapted to each student's learning needs in the context of Arabic language education. Overall, this research not only provides new insights into the integration of AI in Arabic education, but also provides a foundation for the development of responsive and adaptive curricula in the Society 5.0 era.

Keywords: Learning Media, Artificial Intelligence, Society 5.0 Era, Digital Era Education

1. Introduction

Arabic as a language that occupies a strategic position in the historical and religious context of Muslims throughout the world, has a significant impact on culture and science. However, in the contemporary era, increasing interest in studying Arabic is triggered by the professional and economic needs of society[1]. In Indonesia, even though learning Arabic is recognized as an important agenda in the world of education, it is still faced with various obstacles such as a lack of quality human resources, monotonous teaching methods, as well

as limited media and an unsupportive environment. As a result, Arabic language learning outcomes have not reached the expected standards.

One important innovation to overcome these challenges is the use of effective and interesting learning media. Learning media, both in physical form and software, must be able to stimulate students' interests and thoughts. In the era of Society 5.0, where humans and technology synergize, artificial intelligence (AI) has opened up new opportunities in education. In this case, AI can create interactive and varied Arabic language learning media, as well as provide instant feedback to students, improving the quality and effectiveness of learning.

In the context of Society 5.0, where human collaboration with technology creates a harmonious ecosystem, the application of artificial intelligence as a medium for learning Arabic is a progressive step. By utilizing Internet of Things (IoT) technology, students can learn Arabic flexibly and practically via electronic devices connected to the internet, anytime and anywhere. However, even though the potential of AI as a medium for learning Arabic in the Society 5.0 era is very large, understanding of the concept of AI and its application in learning is still limited among students and teachers.

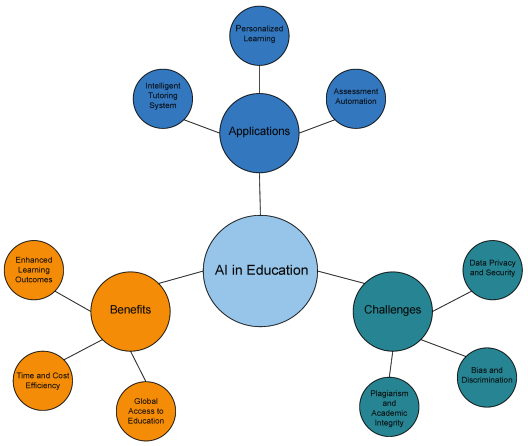

Figure 1. Artificial Intelligence in Education

Therefore, this research aims to explore the concept of artificial intelligence (AI) and analyze its various applications as a medium for learning Arabic in the Society 5.0 era[2]. Thus, this research will not only provide deep insight into the potential of AI in enhancing Arabic language learning, but will also provide a foundation for the development of responsive and adaptive curricula in this era of ever-evolving technology.

2. Research Method

This research adopts a literature study approach with a focus on library data. The research method applied is a qualitative descriptive approach, which involves structured analysis of data that has been collected, processed and presented in the form of observations of words and language in a scientific report format[3], [4]. This approach gives readers a clear and detailed picture of the research object. In the context of research entitled "AI-Powered Arabic Language Education in the Era of Society 5.0", this method allows researchers to explore the essence of various ideas contained in literacy, extract the essence of these ideas, and then formulate conclusions that are in-depth and relevant to the research topic the.

Data sources in this research include various library materials such as books, journals, papers and articles related to the subject discussed. Data collection was carried out using the documentation method, where relevant information was taken from these sources. In

analyzing the data from this library study, a content analysis method was used which allows researchers to explore the main ideas contained in literacy. This in-depth approach provides a comprehensive and in-depth understanding of the content encountered, enabling the formulation of solid and in-depth conclusions, in accordance with the problems posed in this research[5]–[8]. With this approach, this research promises a deep understanding of the application of artificial intelligence in Arabic language education in the Society 5.0 era.

2.1 Literature Review

Arabic language education has become a focus of global attention, particularly in countries with large Muslim populations. Arabic not only has religious significance as the language of the Qur'an and hadith, but is also the key to access to the intellectual and cultural heritage of Islam. In the context of the Society 5.0 era, where humans and technology come together in harmony, Arabic language education faces new demands[9]–[11]. The use of artificial intelligence (AI) as a tool in the learning process has emerged as an answer to this challenge. Previous research identified that AI enables adaptive learning, where the curriculum and learning methods can be tailored to individual students' needs. The use of AI in language education shows significant improvements in learning outcomes, provides students with personalized learning experiences, and helps teachers in designing responsive curricula.

Apart from that, the literature also highlights the implementation of Internet of Things (IoT) technology in Arabic language learning in the Society 5.0 era. With internet-connected devices, students have unlimited access to learning resources, allowing them to learn Arabic outside the classroom. IoT-based learning provides flexibility of time and place, which expands the reach of Arabic language education. Students can access learning content, interact with intelligent AI, and measure their progress in real-time, resulting in more effective and measurable learning.

However, the literature also notes several challenges that need to be overcome in adopting AI technology in Arabic language education. Sustainability issues and teacher training to integrate AI in the curriculum are some of the obstacles faced[12]–[14]. The successful implementation of AI in Arabic language education depends on teachers' ability to understand and manage this technology. Therefore, comprehensive training and continuous support for educators is necessary to ensure the successful implementation of AI technology in Arabic language learning.

Overall, the literature shows that AI-Powered Arabic Language Education in the Age of Society 5.0 promises significant innovation in the way Arabic language education is delivered. While there are still challenges that need to be overcome, the use of artificial intelligence and IoT technology opens the door to more personalized, adaptive and efficient education, supporting students in developing their Arabic language skills in this increasingly connected and transformed era.

3. Findings

Artificial intelligence (AI) is a subdiscipline of computer science that allows machines to solve complex problems with high accuracy and perform tasks that generally require human intelligence. AI is able to adapt to human needs, enabling decision making, cognition, and learning. The use of AI in education, especially in Arabic language learning, is becoming increasingly profound in the Society 5.0 era[15]–[19]. As a learning medium, AI helps teachers and educators convey material in a more efficient and meaningful way. Artificial intelligence is not just a learning tool; it is able to understand and respond to students' individual needs, creating a more interactive and immersive learning environment.

The application of artificial intelligence in Arabic language education has proven to be very relevant in the Society 5.0 era. In the context of language learning, AI functions as a

learning medium that supports teachers in providing lessons and facilitating students' understanding. Through qualitative research methods involving literature reviews from various sources, it has been revealed that there are several applications of AI that push Arabic language learning in a more progressive direction. Among these are the use of an Intelligent Tutoring System (ITS), Voice Assistant, Personalized Learning, Virtual Mentor, Smart Content, Automatic Assessment, and Educational Games. By using these technologies, Arabic language education relies on the principles of Society 5.0 which combines humans and technology in an adaptive and interactive learning approach.

This research highlights the significance of the use of AI in Arabic language education in the Society 5.0 era, showing that AI not only helps Arabic language learning become more efficient, but also supports personalized and responsive learning. In the context of AI-Powered Arabic Language Education in the Era of Society 5.0, this research confirms that the application of artificial intelligence technology involves various learning methods and tools that support students in achieving deep and sustainable understanding in Arabic.

3.1 Voice Assistant

Voice assistant is a digital assistant technology that relies on voice recognition and natural language processing (NLP) to carry out commands given by the user. This system allows users, especially students, to search for learning materials, references, questions, journal articles and even digital books just by using their voice. Some examples of popular voice assistant applications include Google Assistant (Google), Siri (Apple), and Cortana.

a) Google Assistant

Google Assistant is a platform that utilizes voice to provide information to users, eliminating the need to type keywords. Users can search for various information, from music videos, weather forecasts, the latest news, to directions and traffic. Utilizing Google Assistant on smartphone devices makes it possible to fulfill information needs more effectively and easily for users.

b) Siri (Apple)

Siri is an application developed by leading companies such as Apple, which has been around since October 2011. Siri has various functions, from calling people, sending messages, scheduling agendas, opening applications or games, playing music, answering questions, to providing weather forecasts. This application is a very functional personal assistant for Apple device users.

c) Cortana

Cortana is a technology developed by adopting superior features from similar systems such as Google Now and Siri. Cortana can carry out commands such as recording meeting schedules, performing custom searches, playing music, or calling specific contacts. Bing, as a search engine that supports Cortana, enriches the performance of this assistant. In addition to its functionality, Cortana also has an entertainment element, allowing users to ask anything from the personal to the silly, and Cortana will provide unique and unexpected answers. In the context of the research "AI-Powered Arabic Language Education in the Era of Society 5.0," the use of voice assistants such as Google Assistant, Siri, and Cortana opens up new potential for more interactive and in-depth Arabic language learning.

3.2 Intelligent Tutoring System (ITS)

Intelligent Tutoring System (ITS) or known as Intelligent Learning System (SPC) is an application that utilizes artificial intelligence in a learning context. This system is designed to provide computer-based teaching that can be adapted to the individual characteristics and needs of students. According to Ong and Ramachandran, ITS aims to provide personalized

and interactive teaching, imitating human approaches in providing learning and answering students' questions. In the context of the research "AI-Powered Arabic Language Education in the Era of Society 5.0," ITS can present complex learning materials such as geometry and digital, nun sukun or tanwin law, as well as circle learning for class VIII junior high school students.

One example of an SPC application that has been developed is Smartpilot, a platform that supports computer-based course development. Smartpilot provides interactive learning by providing direct feedback between the user and the program. This application not only corrects input text errors, but also uses an expert system (Expert-System) to manage the system's knowledge base and provide solutions to students. In addition, Smartpilot also integrates Backus-Naur Form (BNF) to correct input text, separate labels and statements, and form expression trees. By utilizing these components, Smartpilot facilitates interactive dialogue between instructors and users, encouraging students to be active in the learning process outside the classroom.

Within the framework of this research, the application of ITS such as Smartpilot confirms that the artificial intelligence-based approach in learning Arabic becomes more responsive and personalized. Through the integration of expert systems and text analysis methods, Smartpilot provides an in-depth learning experience and ensures that students can understand and respond to Arabic learning materials better, creating more effective and relevant learning.

3.3 Educational Games

Educational games are a category of games designed specifically for educational purposes, while still maintaining elements of entertainment and fun. Educational games involve various types of games that are created with the aim of providing a learning or educational experience through the content embedded in the game. In the context of the research "AI-Powered Arabic Language Education in the Era of Society 5.0," educational games show how the use of technology and innovative approaches in learning Arabic can be an interesting and effective experience for students, reflecting the adaptation of education in the increasingly connected era of Society 5.0.

3.4 Automatic Assessment

Currently, artificial intelligence (AI) is widely used for automatic assessment and question correction in the context of online learning[20], [21]. Using this feature helps teachers and tutors in preparing and implementing quizzes and tests in an efficient and practical way. Teachers and tutors no longer need to create and correct questions manually because the AI system can operate according to pre-programmed instructions, and can even learn from user or student behavior patterns. AI can also provide recommendations for material that needs to be re-studied and other suggestions based on the results obtained. In the context of the research "AI-Powered Arabic Language Education in the Society 5.0 Era," the implementation of AI in assessment and question correction highlights the potential of AI in increasing the efficiency and accuracy of the Arabic language learning evaluation process, illustrating the transformation occurring in education in the Society 5.0 era.

3.5 Smart Content

Smart Content is a breakthrough in artificial intelligence technology that makes it easier to share and search for digital content, especially in the creation and distribution of programming book material. The use of this technology has become a general standard in digital libraries[22], [23], found in schools, universities and public libraries. The presence of artificial intelligence enables quick and orderly identification and categorization of books,

providing a structured and efficient search experience for users. Smart Content covers various types of learning materials, from digital textbooks to interfaces that can be tailored to individual needs. In the context of the research "AI-Powered Arabic Language Education in the Era of Society 5.0," Smart Content technology provides insight into how artificial intelligence can increase the accessibility and distribution of Arabic learning materials effectively and efficiently[24]–[27].

3.6 Personalized Learning

Personalized Learning is a solution that overcomes the limitations of e-learning in the learning process. This Personalized Learning concept makes it possible to provide learning material with a level of difficulty tailored to the user's abilities and skills, as well as presenting material according to individual learning styles. Personalized Learning systems are designed to adjust learning displays to suit varying user characteristics, increasing learning effectiveness. Some applications that apply the Personalized Learning concept include Duolingo, Ruang Guru, Zenius, and other applications that support learning approaches tailored to individual needs and preferences. In the context of the research "AI-Powered Arabic Language Education in the Era of Society 5.0," Personalized Learning strengthens efforts to improve the quality of Arabic language learning with an approach that is responsive to student needs, illustrating how AI can provide a more personal and relevant learning experience.

3.7 Virtual Mentor

One application of artificial intelligence that is currently widely applied in various technology platforms, especially in the online-based sphere, is the ability of virtual mentors. Mentoring is a process in which a knowledgeable individual (mentor) guides another less knowledgeable individual (mentee) in achieving their learning goals. In this context, artificial intelligence has the ability to provide feedback on student learning activities, evaluate questions, and provide recommendations for material that needs to be studied, as is usually done by conventional teachers or tutors. Virtual Mentor is an e-learning environment integrated with various media, with an emphasis on personal interaction, content adaptation, and computational intelligence. In the research "AI-Powered Arabic Language Education in the Era of Society 5.0," this concept illustrates how artificial intelligence can enrich Arabic language learning through a responsive and immersive approach.

4. Conclusion

Artificial intelligence (AI) is a system that continues to develop in research, designed in the form of machines, computers and other artifacts that have the potential to solve complex problems, adapt and make decisions, and have the ability to learn. In the context of the research "AI-Powered Arabic Language Education in the Era of Society 5.0," the implementation of AI as a medium for learning Arabic has proven to be very useful. AI technology is able to overcome human limitations as teachers or tutors, providing important support in the learning process.

Through literature analysis from various sources such as books, journals and articles, this research identifies various applications of AI that can be used as a support or medium for learning Arabic in the Society 5.0 era. Some of them include Intelligent Tutoring System (ITS), Voice Assistant, Personalized Learning, Virtual Mentor, Smart Content, Automatic Assessment, and Educational Games. The findings from this research provide an in-depth view of the various methods that can be applied in Arabic language learning, providing innovative alternative learning media for educators and students. These findings also constitute a valuable contribution in developing our understanding of the potential of AI in the context of Arabic language education, paving the way for further research in the future.

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