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INTEGRATION OF CODING AND AI IN ISLAMIC EDUCATION CURRICULUM MANAGEMENT: A CONCEPTUAL STUDY

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Abstract:

This paper aims to explore the integration of programming (coding) and artificial intelligence (AI) in the management of Islamic education curriculum, with a focus on maintaining traditional Islamic values. This paper uses a conceptual approach to develop a theoretical understanding of how technology can be applied in Islamic education without ignoring religious principles. The results of the study indicate that coding and AI have great potential in improving the quality of teaching, accessibility of education, and supporting independent learning. In the context of Islamic education, this technology can be used to enrich the learning experience, such as the development of AI-based Al-Quran learning applications and coding-based interactive teaching applications. The integration of coding and AI in the Islamic education curriculum should be carried out through a holistic planning process, which includes identifying needs, integrating technology into curriculum content, and designing lessons that are in line with Islamic values. Therefore, technology not only increases the effectiveness of learning but also helps shape students' character in accordance with Islamic teachings. This paper provides recommendations for developing a curriculum that combines technology with Islamic principles, making it relevant to the development of the times while maintaining the spiritual aspect of education.

Keywords: *Artificial Intelligent, Coding,* Curriculum Management, Islamic Education

INTRODUCTION

The learning curriculum is one of the essential elements in educational institutions that functions as a guide to determine the material to be taught, regulate the mechanism of the learning process, and become a benchmark in assessing the success and quality of educational outcomes. Curriculum management is one aspect that influences the success of learning in education (Ismiatun et al., 2022) . Curriculum management includes the entire process of collective efforts aimed at facilitating the achievement of learning objectives, with a primary focus on efforts to improve the quality of interaction in the teaching process (HU, 2023) .

In Islamic Education, Curriculum Management plays a role as a process of planning, implementing, and evaluating a curriculum that integrates Islamic values and principles into the education system (Minabari et al., 2024) . The goal is to create an effective learning environment, both in academic aspects and in the formation of moral, spiritual, and social character in accordance with Islamic teachings (Fitria, 2023) . Through this approach, Islamic education functions as a means to equip the younger generation with knowledge and life values that are in harmony with religious teachings, so that they can face the challenges of the times wisely.

Amidst the rapid development of the current digital era, technologies such as coding and artificial intelligence (AI) have become an integral part of the world of education. Coding is the process of writing instructions using a programming language to tell a computer how to perform certain tasks, such as creating applications, analyzing data, or managing systems (Yulhendri, 2023) . Meanwhile, Artificial Intelligence (AI) is a technology that allows computers or machines to imitate human thinking abilities, such as learning, making decisions, and solving problems based on data (Farwati et al., 2023) . The existence of this technology not only provides ease of access to information but also opens up new opportunities in more interactive and adaptive learning methods (Salsabila et al., 2024) . In Indonesia, the Ministry of Education, Culture, Research, and Technology (Kemendikbudristek) has issued a policy that makes coding and AI optional subjects at the elementary and junior high school levels, as an effort to prepare the younger generation to face the challenges of the increasingly complex digital world (Savitri, 2024) .

This policy emphasizes the importance of technology integration in the national education curriculum, as a strategic step to improve the quality of education in Indonesia. By including coding and AI in the curriculum, it is hoped that students will not only acquire technical skills that are relevant to the development of the times, but can also develop critical, creative, and innovative thinking skills. This integration aims to create graduates who are ready to face the dynamics of future technology, and are able to utilize artificial intelligence wisely and productively.

Previous research conducted by (Zaelani et al., 2023) discussed Digital transformation in Islamic religious education to improve the quality of learning through technology and data management. This study uses a literature study to explore the role of digitalization in Islamic education. The results show the need to develop skills relevant to the digital era to produce an adaptive generation. Furthermore, research on the use of technology to improve teacher performance in the digital era in Islamic education management using e-learning, blended learning, and classroom management applications. The challenges include the digital divide, religious values, training, and data security (Sholeh & Efendi, 2023) . This further study examines the Islamic learning curriculum in Islamic boarding schools in facing the 4.0 era through a literature study. Although Islamic boarding schools are often considered closed and focused on classical yellow books, research shows that the typology of salafiyah, khalafiyah, and convergence Islamic boarding schools is able to adapt the curriculum to prepare students to remain relevant in the digital era (Fiandi et al., 2023) .

For Muslim students, understanding technology, including coding and artificial intelligence (AI), plays a very important role in facing the advancement of the digital world. This understanding must not be separated from the religious values that are the basis of the lives of Muslims. Therefore, Islamic education must be able to integrate technology with an approach that prioritizes moral and spiritual principles, so that it can produce individuals who are not only intelligent in terms of knowledge, but also have good morals.

This paper aims to explore how coding and AI can be integrated into the management of Islamic education curriculum while maintaining the values of Islamic tradition. A curriculum that combines technology with Islamic principles is expected to produce future generations who are not only superior in science and technology, but also have strong characters based on religious teachings. This integration will be an important basis in forming an education system that is relevant to the development of the times, but still prioritizes aspects of spirituality and morality in the teaching and learning process.

RESEARCH METHODS

This writing uses a conceptual study method that focuses on theoretical studies to identify and develop an understanding related to the integration of technology, especially coding and artificial intelligence (AI), in the management of Islamic education

curriculum. This method was chosen because the goal is to develop a strong rationale for how technology can be integrated into Islamic education without ignoring the religious values that are at the core of the curriculum.

The conceptual study aims to explore the main concepts and theories underlying the application of technology in education (Pratiwi & Binaan, n.d.) , as well as to identify relevant arguments related to the integration of coding and AI in Islamic education curriculum management. Therefore, this approach emphasizes more on understanding existing theories, synthesizing relevant literature, and developing ideas and concepts to address challenges that may arise when the technology is integrated in the context of Islamic education.

In the data collection process, this study relies on an in-depth literature review of various books, articles, and previous studies that discuss two main areas, namely educational technology and Islamic curriculum (Abdillah et al., 2021) . Literacy on the application of technology in education and learning based on Islamic values is the main focus of this study. Some relevant sources include studies that highlight the use of technology in education, the development of Islamic education curriculum, and studies on morality and ethics in technology-based education.

Through literature analysis, this study aims to formulate more concrete ideas and recommendations related to the implementation of coding and AI in Islamic education curriculum management. This analysis process not only aims to understand how technology can be applied effectively in teaching, but also to maintain and strengthen Islamic moral and ethical values in every aspect of technology-based teaching.

This conceptual study method provides an opportunity to build a solid framework of thought about the relationship between technology, Islamic education, and value-based teaching. Thus, the results of this writing are expected to contribute to designing an Islamic education curriculum that is responsive to technological developments, while still upholding the moral and spiritual principles of Islam that must be the basis of every learning process.

RESULTS AND DISCUSSION

Basic Understanding of Coding and AI in Islamic Education

Definition of Coding and AI in the Context of Islamic Education

Coding is the process of writing instructions in a programming language that allows electronic devices (such as computers or mobile phones) to perform specific tasks (Legito et al., 2023) . In the context of education, coding enables the creation of learning applications, analysis of educational data, and the development of more interactive learning aids. Coding teaches structured logical thinking, problem solving, and creativity, which are essential skills in the digital age.

Artificial Intelligence (AI) refers to systems that can learn, adapt, and solve problems as humans do (Masrichah, 2023) . AI in education can be applied in various ways, such as learning material recommendation systems, chatbots to help answer student questions, data analysis for learning personalization, and so on. AI enables the learning process to be more efficient, adaptive, and based on individual needs.

For elementary and junior high school students based on the policy of the Ministry of Education, Culture, Research and Technology, Holy Ichda Wahyuni, an Education Expert at the University of Muhammadiyah Surabaya (UM Surabaya), is of the opinion that Coding and AI can improve logical thinking skills, problem solving, and of course introducing technology to children from an early age will actually direct children to education on the use of technology appropriately and wisely (Sahal, 2024) . Important things that the government should do regarding this policy are socialization to educational institutions and more importantly, it can be conveyed to guardians of students so that they support each other for child development.

In the context of Islamic Education, both coding and AI can be used to enrich the learning experience without neglecting the underlying religious principles. For example, AI can be used to filter materials relevant to Islamic teachings or facilitate memorization-

based learning of the Qur'an using technology that is adapted to Islamic moral values. While coding can be used to build Islamic religious learning applications that support a more structured and interactive teaching and learning process.

Benefits of Coding and AI for Islamic Education

Improving the Quality of Teaching

Coding and AI can help create more interactive learning applications and tools (Alimuddin et al., 2023) , such as AI-based Quran learning or interpretation applications, which are able to adjust students' level of understanding in real-time. This makes learning materials more interesting and easier for students to understand, by providing a variety of teaching methods that are more varied and in accordance with current developments.

Accessibility of Education

This technology allows Islamic education to be accessed anywhere and anytime, even in remote areas (Mustari, 2022) . AI-based learning applications can provide complete learning modules, allowing students to access teaching materials without being tied to time or place. This is very relevant to the need for inclusive education in the digital era.

Enhancing Independent Learning

Coding and AI-based technologies can also facilitate independent learning (Tarumasely et al., 2024) , either through e-learning platforms and applications that can be accessed by students at any time. This supports a character-based learning approach that teaches students discipline, responsibility, and independence in undergoing the educational process.

Integrated Islamic Education Curriculum Management with Technology

Curriculum Planning Integrating Coding and AI

Curriculum planning in Islamic education that is integrated with technology such as coding and AI is an important step in preparing students to face future challenges (Alimuddin et al., 2023) . The curriculum designed by integrating technological elements not only focuses on teaching Islamic material, but also on developing students' technical skills and character. This curriculum planning needs to be carried out with a holistic approach, namely covering various aspects that support the achievement of ideal Islamic education goals, including:

i. Identification of Learning Needs and Objectives
   Curriculum planning must begin with a needs analysis to integrate coding and AI in learning, with the aim that students understand Islamic values while mastering relevant technological skills to face the development of the times.
ii. Integration of Coding and AI Technology in Islamic Religious Curriculum
   The integration of coding and AI in the Islamic religious curriculum can be done by compiling modules or subjects that combine the two. For example, teaching about digital ethics and programming based on Islamic values, such as creating applications that facilitate learning the Qur'an , developing AI-based systems to assist the interpretation process, or creating a technology-based Islamic learning platform.
iii. Learning Design Involving Technology
   Curriculums involving coding and AI need to be designed to systematically introduce students to these technologies, from basic introduction to practical applications. For example, students can be taught programming languages such as Python or JavaScript that are used in developing Islamic-based applications, and integrated with Islamic values, such as prayer time scheduling applications or AI-based e-learning that facilitates learning the Quran.

Technology-Based Curriculum Implementation Strategy

After curriculum planning that includes coding and AI, the next step is the implementation or execution of a technology-based curriculum. In order for the application of technology in the Islamic education curriculum to run effectively, several implementation strategies are needed that prioritize blended learning, e-learning, and project-based learning (Widyanto et al., 2020) . The following are some strategies that can be used in the implementation of a technology-based curriculum:

Blended Learning (Mixed Learning)

Blended learning is a learning model that combines face-to-face learning with online learning (De Bruijn-Smolders & Prinsen, 2024) . In the context of Islamic education, this method can be applied by using digital technology to enrich students' learning experiences. For example, after students learn the basic theories of coding and AI, they can work on practical tasks or online discussions about the application of technology in the context of Islamic education. Face-to-face learning can be used to teach moral and spiritual values in Islam, followed by technology-based discussions or exercises. E-learning platforms such as Google Classroom, Moodle, or AI-based applications can be used to distribute materials, conduct exams, and provide real-time feedback.

Project Based Learning (PBL)

In project-based learning, students are given the opportunity to develop projects that integrate coding and AI with Islamic values. For example, students can be asked to create an AI-based application that helps the process of learning the Qur'an or create a machine learning-based information system to analyze Islamic interpretation or history. This project will teach students practical skills in programming while deepening their understanding of practical applications in the context of Islam (Colim et al., 2022) .

E-Learning (Online Learning)

E-learning is a learning method that uses information and communication technology, especially through the internet, to provide flexible access to learning materials, interaction, and evaluation, allowing the teaching and learning process to take place independently, collaboratively, or in a structured manner without time and location constraints (Fahim et al., 2022) . By using video tutorials, interactive learning modules, and AI-based quizzes, students can master the material independently or in groups. In addition, e-learning can reduce the limitations of access that often occur in conventional formal education, such as limitations of space and time. This is very useful for Islamic education, where religious materials and technological applications can be learned flexibly.

Challenges in Integrating Coding and AI in Islamic Education

Digital Divide in Islamic Education

The digital divide is one of the main challenges in integrating coding and AI in Islamic education, especially in Islamic educational institutions.

Human Resources

The availability of teachers skilled in coding and AI is also a major obstacle. Many teachers in Islamic boarding schools and educational institutions do not yet have competency in educational technology or are not trained to teach technical skills such as programming or AI-based data analysis.

Education Infrastructure

Inadequate educational infrastructure can also be an obstacle in integrating technology into the curriculum. Many Islamic educational institutions are not equipped with sufficient digital equipment, such as computers, smartboards, or projectors needed

to support technology-based teaching.

Recommendations for Islamic Education Curriculum Management with the Implementation of Coding and AI Technology

Adaptive and Inclusive Curriculum Development

Adaptive and inclusive curriculum development is essential to ensure that technologies such as coding and AI can be integrated well into Islamic education without neglecting religious values. Here are some recommendations for developing an appropriate curriculum:

i. Understanding Local and Global Contexts: Islamic education curriculum involving coding and AI must be designed with attention to local needs and global developments in technology. Islamic education not only teaches religious knowledge but also prepares students to adapt to technological developments. Therefore, the curriculum must combine technology learning that can be used practically in everyday life, while still being based on Islamic moral and ethical principles.

ii. Maintaining a Balance between Technology and Islamic Teachings, although technological developments are inevitable, the Islamic education curriculum must still maintain the basic teachings of Islam. This includes teaching about faith, morals, and worship. In other words, technology should be seen as a tool to improve the quality of religious learning, not replace these basic values (Achmad, 2024) . For example, using AI applications in teaching the Qur'an or hadith, or developing a technology-based learning platform that facilitates understanding of Islamic teachings more effectively and attractively for students.

iii. Focus on Collaborative and Interdisciplinary Learning: Islamic education curriculum should teach students to collaborate and work in teams, which are essential skills in the modern world. A curriculum that brings together different disciplines, including technology, religion, and the humanities, can provide a broader perspective on how AI and coding can be used in social and religious contexts.

Collaboration between Government, Educational Institutions, and Technology Industry

For the successful integration of coding and AI in the Islamic education curriculum, there needs to be collaboration between the government, educational institutions, and the technology industry. Here are some forms of collaboration that can be done:

i. Provision of Technology Infrastructure
The importance of providing adequate infrastructure can be seen from the capacity of technology to support flexible and accessible digital learning platforms. Good infrastructure allows coding and AI learning to be carried out effectively and allows students to learn in a more interactive and practical way. With fast and stable internet access, as well as appropriate digital devices, students can access digital educational resources anytime and anywhere, making education more inclusive and not limited by space and time.

ii. Joint Curriculum Development
The curriculum developed jointly by the government and educational institutions must take into account the needs of the job market and the latest technological developments, while adhering to the core teachings of Islam. This collaboration will

produce a comprehensive curriculum, covering topics related to coding and AI, while maintaining Islamic moral and ethical principles. This includes a basic understanding of coding and algorithms, the use of AI in everyday life, and the integration of aspects such as social justice and ethics in AI-based programming, which are in line with Islamic teachings.

iii. Digital Learning Platform Development
An effective digital learning platform not only provides learning materials but also provides space for students to interact, collaborate, and get real-time feedback. For example, AI-based applications can be used to customize learning to each student's ability level, provide additional exercises, or even answer questions that arise during the learning process.

iv. Internship and Scholarship Programs
Internship programs that collaborate with technology companies or institutions that are experts in coding and AI provide students with the opportunity to gain hands-on experience in software development, programming, and the application of technology in everyday life. Through these internships, students can also understand how Islamic values are applied in a professional context, such as in the development of ethical and sustainable technology. In addition, scholarships provided to study coding and AI can motivate students to continue their higher education without being burdened by financial problems, while supporting them to study at institutions that focus on technology and innovation in Islamic education. With these internship and scholarship programs, students are expected to be able to contribute to technological progress in line with Islamic principles, while gaining skills that increase their competitiveness in the global job market.

CONCLUSION

To implement coding and AI in the Islamic education curriculum, a comprehensive approach is needed, which includes synergistic collaboration between the government, educational institutions, and the technology industry. This collaboration will ensure that the technology applied in learning is widely accessible and well-received by all elements of education. Furthermore, it is important to maintain that Islamic values remain the main foundation in education, even though the integration of technology aims to improve the quality and accessibility of learning. In this context, technology is not only a tool, but also a means to strengthen the deep teachings of Islam, such as morality and ethics. With this approach, students not only gain technical knowledge in coding and AI, but are also equipped with an understanding of how to apply religious values in technological developments. This will prepare them to face the challenges of an increasingly digital and technology-based world, while ensuring that they adhere to Islamic principles in every aspect of their professional and personal lives
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