

The Impact of Generative Artificial Intelligence on Learning Outcomes in Islamic Religious Education in Sweden

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Abstract	The rapid development of Generative Artificial Intelligence (GenAI) has significantly transformed educational practices across various disciplines, including religious education. In Sweden, the integration of digital technologies into education has created opportunities for innovative learning approaches in Islamic Religious Education (IRE). This study aims to examine the impact of Generative Artificial Intelligence on students' learning outcomes in Islamic Religious Education in Sweden. The research explores how AI-based tools such as ChatGPT, automated learning assistants, and adaptive educational platforms contribute to students' cognitive understanding, critical thinking, motivation, and engagement in religious learning. Using a qualitative library research approach supported by recent educational and technological studies, this research analyzes the effectiveness of GenAI in facilitating personalized learning, improving access to Islamic educational resources, and enhancing interactive learning experiences. The findings indicate that Generative Artificial Intelligence can positively influence learning outcomes by increasing students' participation, improving comprehension of Islamic concepts, and supporting independent learning. However, challenges related to ethical concerns, digital literacy, academic integrity, and the accuracy of religious content remain important considerations. The study concludes that the effective implementation of GenAI in Islamic Religious Education requires balanced pedagogical strategies, teacher supervision, and ethical digital frameworks to ensure meaningful and responsible learning experiences.		
Keywords	Generative Artificial Intelligence, Learning Outcomes, Islamic Religious Education, Digital Learning, Sweden, Educational Technology		
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1. INTRODUCTION

The emergence of Generative Artificial Intelligence (GenAI) has become one of the most transformative developments in modern education. Educational institutions worldwide are increasingly integrating artificial intelligence technologies into teaching and learning processes to improve educational quality, accessibility, and student engagement. Generative Artificial Intelligence refers to AI systems capable of generating text, images, audio, and

other forms of content through machine learning models trained on extensive datasets. Technologies such as ChatGPT, Google Gemini, and other AI-powered educational platforms have introduced new opportunities for personalized learning and interactive educational experiences (Dwivedi et al., 2023). In the context of education, GenAI offers significant potential to support students' understanding, critical thinking, creativity, and independent learning.

In Sweden, digital transformation has become a central aspect of the educational system. The Swedish education sector has long emphasized the importance of technology integration to promote innovative and student-centered learning. According to the Swedish National Agency for Education, digital competence is considered an essential component of modern education, encouraging schools to integrate digital tools into classroom instruction (Skolverket, 2022). This technological orientation provides a favorable environment for the adoption of Generative Artificial Intelligence in various subjects, including religious education. Islamic Religious Education (IRE), as part of multicultural and religious learning in Sweden, also faces the challenge of adapting to technological advancements while maintaining the authenticity and ethical dimensions of Islamic teachings.

Islamic Religious Education plays a crucial role in shaping students' moral values, spiritual awareness, and religious understanding. Traditionally, IRE has relied on teacher-centered approaches, textual analysis, and direct interaction between educators and students. However, contemporary learners increasingly interact with digital environments that influence their learning preferences and expectations. The use of Generative Artificial Intelligence in IRE may provide opportunities to create more engaging and accessible learning experiences. AI-powered tools can assist students in understanding complex Islamic concepts, accessing multilingual religious resources, and participating in interactive discussions that support deeper comprehension. Furthermore, GenAI may help educators develop instructional materials more efficiently and personalize learning according to students' individual needs.

Several studies have highlighted the educational benefits of artificial intelligence in improving learning outcomes. Holmes et al. (2022) explain that AI technologies can facilitate adaptive learning systems capable of responding to students' academic performance and learning patterns. Similarly, Luckin and Cukurova (2019) argue that AI-supported learning

environments can enhance student motivation and participation through personalized educational interactions. In Islamic Religious Education, where conceptual understanding and reflective thinking are essential, Generative AI has the potential to enrich learning experiences through conversational learning models, automated feedback, and contextual explanations of religious content.

Despite these opportunities, the integration of Generative Artificial Intelligence into religious education also raises significant challenges and ethical concerns. One major issue involves the accuracy and authenticity of religious information generated by AI systems. Since AI models rely on large datasets from diverse sources, there is a possibility of generating inaccurate or contextually inappropriate interpretations of Islamic teachings. This concern is particularly important in Islamic education, where religious authenticity and scholarly accuracy are highly valued. According to UNESCO (2023), the use of AI in education must be guided by ethical principles, including transparency, accountability, and respect for cultural and religious diversity. Teachers therefore remain essential in verifying AI-generated content and guiding students toward critical and responsible use of digital technologies.

Another challenge relates to academic integrity and students' overreliance on AI-generated responses. The accessibility of GenAI tools may encourage passive learning behaviors if students depend excessively on automated answers rather than engaging in independent critical analysis. Cotton et al. (2023) note that while Generative AI can support learning efficiency, it may also reduce opportunities for deep cognitive engagement when used without pedagogical supervision. Consequently, educational institutions must develop strategies that balance technological innovation with critical thinking development and ethical learning practices.

The multicultural context of Sweden further contributes to the relevance of this study. Sweden has become increasingly diverse due to migration and globalization, resulting in greater religious and cultural pluralism within educational institutions. Islamic Religious Education therefore functions not only as a means of religious instruction but also as a platform for intercultural dialogue and identity development among Muslim students. The integration of Generative Artificial Intelligence into IRE may support inclusive learning environments by providing accessible educational resources for students from diverse

linguistic and cultural backgrounds. AI-powered translation tools, interactive tutoring systems, and digital discussion platforms may contribute to more equitable learning opportunities within multicultural classrooms.

In addition, the COVID-19 pandemic accelerated the adoption of digital learning technologies globally, including in Sweden. During periods of remote learning, educators increasingly relied on digital platforms to maintain educational continuity. This experience highlighted both the opportunities and limitations of technology-mediated education. According to Selwyn (2021), the pandemic demonstrated that digital technologies are no longer supplementary tools but fundamental components of contemporary educational systems. The expansion of Generative Artificial Intelligence can therefore be understood as part of a broader transformation toward digital and hybrid learning environments.

Research on Generative Artificial Intelligence in Islamic Religious Education remains relatively limited compared to studies in science, mathematics, and language education. Most existing research focuses on the general implementation of AI in education rather than its application in religious and moral learning contexts. This study seeks to contribute to the academic discussion by examining how GenAI influences learning outcomes specifically within Islamic Religious Education in Sweden. The study aims to explore the educational opportunities, pedagogical implications, and ethical considerations associated with AI integration in religious learning.

Learning outcomes in this study refer not only to academic achievement but also to students' engagement, critical thinking abilities, conceptual understanding, and reflective learning processes. Bloom's Taxonomy emphasizes that effective education should promote higher-order thinking skills such as analysis, evaluation, and creation (Anderson & Krathwohl, 2001). Generative Artificial Intelligence may support these dimensions by enabling interactive questioning, collaborative learning, and problem-solving activities. However, its educational effectiveness depends largely on how teachers design and supervise AI-supported learning activities.

Ultimately, the integration of Generative Artificial Intelligence into Islamic Religious Education reflects broader educational transformations occurring in the digital era. While AI technologies offer innovative possibilities for improving learning outcomes, they also require careful ethical consideration and pedagogical adaptation. Educational stakeholders,

including teachers, policymakers, and researchers, must collaborate to ensure that AI is implemented responsibly and meaningfully within religious education. Therefore, this study is important in providing insights into the role of Generative Artificial Intelligence in shaping the future of Islamic Religious Education in Sweden.

2. METHODS

This study employs a qualitative research design using a library research approach to examine the impact of Generative Artificial Intelligence on learning outcomes in Islamic Religious Education in Sweden. Qualitative research is considered appropriate because the study seeks to explore educational phenomena, interpret technological developments, and analyze theoretical perspectives related to artificial intelligence and religious education. According to Creswell and Creswell (2018), qualitative research enables researchers to investigate social and educational issues through detailed interpretation of texts, concepts, and contextual understanding. Through this approach, the researcher can comprehensively analyze the educational implications of Generative Artificial Intelligence in Islamic Religious Education.

Library research was selected as the primary method because the study focuses on theoretical exploration, conceptual analysis, and synthesis of existing academic literature. George (2008) explains that library research involves systematic identification, evaluation, and interpretation of scholarly materials relevant to a particular topic. In this study, the researcher collected data from academic journals, books, conference proceedings, policy documents, and international reports discussing artificial intelligence, educational technology, Islamic Religious Education, and digital learning in Sweden and global educational contexts.

The data sources used in this study consist of both primary and secondary sources. Primary sources include peer-reviewed journal articles and official reports related to Generative Artificial Intelligence in education, digital pedagogy, and Islamic educational studies. Secondary sources include textbooks, academic essays, and supporting literature discussing educational innovation and technological transformation. Several international databases such as Google Scholar, Scopus, SpringerLink, and ScienceDirect were used to identify relevant scholarly publications. Keywords used during the literature search

included “Generative Artificial Intelligence,” “Islamic Religious Education,” “learning outcomes,” “AI in education,” “digital learning,” and “Sweden education system.”

The data collection process involved several stages. First, the researcher identified relevant literature published between 2019 and 2024 to ensure the inclusion of recent discussions regarding Generative Artificial Intelligence. Recent literature was prioritized because GenAI technologies such as ChatGPT and other large language models have rapidly evolved within the last few years. Second, the researcher evaluated the credibility and relevance of sources based on academic quality, publication reputation, and thematic alignment with the research objectives. According to Snyder (2019), effective literature review research requires systematic selection and critical evaluation of academic sources to ensure reliability and validity.

After collecting the literature, the researcher conducted data analysis using thematic analysis techniques. Braun and Clarke (2006) define thematic analysis as a method for identifying, analyzing, and interpreting patterns or themes within qualitative data. In this study, the researcher categorized the collected information into several themes, including the role of Generative Artificial Intelligence in education, the effectiveness of AI-assisted learning, opportunities in Islamic Religious Education, ethical challenges, and the impact of digital technologies on student learning outcomes. These themes were then interpreted critically to develop a comprehensive understanding of the research problem.

The study also applies a descriptive-analytical approach to explain relationships between technological innovation and educational outcomes. Descriptive analysis was used to present information regarding the development of AI technologies and their application in educational settings, while analytical interpretation was employed to examine the implications of these technologies for Islamic Religious Education in Sweden. This approach allows the researcher to connect theoretical concepts with educational realities in multicultural and digitally oriented learning environments.

To enhance the validity of the study, the researcher applied source triangulation by comparing information from multiple academic references and institutional reports. Triangulation is important in qualitative research because it helps reduce bias and strengthens the credibility of findings (Patton, 2015). The researcher compared perspectives from educational technology experts, Islamic education scholars, and international

educational organizations to obtain balanced interpretations regarding the benefits and challenges of Generative Artificial Intelligence in learning processes.

Ethical considerations were also addressed throughout the research process. Since the study relies exclusively on published literature and publicly accessible academic materials, no direct involvement of human participants was required. Nevertheless, the researcher ensured academic integrity by accurately citing all referenced materials and avoiding plagiarism. Ethical scholarship is essential in educational research to maintain transparency, intellectual honesty, and academic credibility.

The limitations of this study should also be acknowledged. As a library research study, the findings are based primarily on theoretical and conceptual analysis rather than direct empirical observation in classrooms. Consequently, the study may not fully capture practical experiences of teachers and students using Generative Artificial Intelligence in Islamic Religious Education settings in Sweden. Future research may therefore employ empirical methods such as interviews, surveys, or classroom observations to provide deeper insights into real-world educational practices and learner experiences. Overall, this qualitative library research method provides a suitable framework for examining the impact of Generative Artificial Intelligence on learning outcomes in Islamic Religious Education in Sweden. Through systematic literature analysis and thematic interpretation, the study aims to contribute to academic discussions regarding digital transformation, educational innovation, and ethical considerations in contemporary religious education.

3. FINDINGS AND DISCUSSION

The findings of this study indicate that Generative Artificial Intelligence (GenAI) has significantly influenced learning outcomes in Islamic Religious Education (IRE) in Sweden through increased student engagement, personalized learning experiences, broader accessibility to educational resources, and the development of critical thinking skills. The integration of AI-powered technologies such as ChatGPT, adaptive tutoring systems, and automated educational platforms has transformed the traditional learning environment into a more interactive and student-centered process. In the Swedish educational context, where digital competence and technological integration are strongly encouraged, GenAI has become increasingly relevant in supporting multicultural and inclusive educational

practices.

One of the most notable impacts of Generative Artificial Intelligence is its ability to improve students' conceptual understanding of Islamic teachings. AI systems provide immediate responses, explanations, and contextual examples that assist learners in comprehending complex religious concepts. Students are able to access information regarding Islamic history, Qur'anic interpretation, ethics, and jurisprudence more efficiently through conversational AI platforms. According to Holmes et al. (2022), AI-supported educational systems facilitate adaptive learning environments that respond to individual student needs and learning patterns. This adaptive capability is particularly important in Islamic Religious Education because students often possess different levels of religious background knowledge and language proficiency.

The findings also reveal that GenAI contributes positively to student motivation and participation in learning activities. Interactive AI platforms create more engaging learning experiences by encouraging students to ask questions, explore ideas independently, and participate actively in discussions. In Sweden's multicultural educational environment, students from diverse linguistic and cultural backgrounds benefit from AI-assisted translation tools and multilingual learning support. These technologies help reduce learning barriers and increase educational accessibility for Muslim students who may experience difficulties with traditional instructional approaches. Research by Luckin and Cukurova (2019) supports the argument that artificial intelligence can increase student engagement through personalized educational interaction and immediate feedback mechanisms.

Furthermore, Generative Artificial Intelligence supports independent learning and self-directed educational practices. Students can access religious educational materials at any time without depending exclusively on classroom instruction. AI-generated summaries, explanations, and discussion prompts encourage learners to continue studying outside formal educational settings. This flexibility aligns with modern educational principles emphasizing lifelong learning and learner autonomy. Selwyn (2021) explains that digital technologies have shifted educational paradigms from teacher-centered instruction toward more flexible and collaborative learning models. In Islamic Religious Education, this transformation enables students to explore religious knowledge more actively while maintaining access to diverse educational perspectives.

The study also demonstrates that teachers benefit from the integration of Generative Artificial Intelligence in instructional planning and material development. AI systems can assist educators in preparing lesson plans, generating quizzes, summarizing academic texts, and creating interactive classroom activities. These technological supports reduce teachers' administrative workload and allow greater focus on pedagogical interaction and moral guidance. In Sweden, where digital innovation is integrated into educational policy frameworks, teachers increasingly utilize digital resources to support inclusive and effective learning environments. According to UNESCO (2023), AI technologies have the potential to improve educational efficiency and accessibility when implemented responsibly and ethically.

Despite these advantages, the findings identify several important challenges associated with the use of Generative Artificial Intelligence in Islamic Religious Education. One major concern involves the accuracy and reliability of AI-generated religious information. Artificial intelligence systems generate responses based on patterns from extensive datasets, which may contain inconsistent or culturally inappropriate interpretations of Islamic teachings. Religious education requires careful attention to theological authenticity, ethical sensitivity, and contextual understanding. Therefore, educators remain essential in verifying AI-generated content and ensuring that students receive accurate religious guidance. Cotton et al. (2023) emphasize that although Generative AI offers educational benefits, the technology also presents risks related to misinformation and reduced critical evaluation among students.

Another challenge identified in this study relates to academic integrity and student dependency on AI systems. Some students may rely excessively on AI-generated responses without engaging in deeper reflection, analysis, or independent reasoning. This condition may weaken critical thinking development and reduce opportunities for meaningful cognitive engagement. Bloom's revised taxonomy highlights the importance of higher-order thinking skills such as analysis, evaluation, and creation in educational achievement (Anderson & Krathwohl, 2001). If students use AI merely to obtain instant answers rather than to support reflective learning, the educational value of technology may become limited. Consequently, teachers must design learning activities that encourage critical engagement with AI-generated content rather than passive acceptance.

The ethical implications of AI integration also emerged as a significant discussion

within the findings. Islamic Religious Education not only aims to develop academic knowledge but also moral values, spiritual awareness, and ethical behavior. The integration of AI technologies into religious learning therefore requires ethical frameworks that prioritize responsibility, transparency, and cultural sensitivity. UNESCO (2023) states that ethical AI implementation in education must protect human dignity, diversity, and intellectual autonomy. In Sweden's multicultural society, maintaining respect for religious diversity and intercultural understanding is particularly important. Teachers and educational institutions must therefore establish guidelines regarding responsible AI usage, digital literacy, and ethical online behavior.

Additionally, digital inequality remains a relevant issue influencing the effectiveness of Generative Artificial Intelligence in education. Although Sweden possesses advanced digital infrastructure, differences in technological access and digital literacy still exist among students and communities. Some learners may lack sufficient digital skills to use AI technologies effectively, while others may have limited access to devices or stable internet connections. According to Dwivedi et al. (2023), successful AI integration in education depends not only on technological availability but also on users' digital competence and institutional support systems. Therefore, educational policymakers must ensure equitable access to digital technologies and provide adequate training for both teachers and students.

The findings further indicate that Generative Artificial Intelligence can support intercultural dialogue and inclusive education within Swedish schools. Islamic Religious Education in Sweden often functions within broader multicultural educational frameworks where students interact with diverse religious and cultural perspectives. AI-assisted learning environments may facilitate collaborative discussions, comparative learning activities, and intercultural understanding through access to diverse educational materials. This capability aligns with Sweden's educational emphasis on democracy, equality, and inclusivity. However, educators must remain attentive to the possibility of algorithmic bias and cultural misrepresentation within AI-generated content.

Overall, the findings demonstrate that Generative Artificial Intelligence possesses substantial potential to enhance learning outcomes in Islamic Religious Education in Sweden. The technology supports personalized learning, student engagement, accessibility, and instructional innovation while simultaneously presenting challenges related to ethics,

authenticity, academic integrity, and digital inequality. The effectiveness of AI integration depends largely on teachers' pedagogical competence, institutional support, and responsible educational policies. Rather than replacing educators, Generative Artificial Intelligence should function as a complementary educational tool that supports meaningful and reflective religious learning. The future of Islamic Religious Education in Sweden may therefore involve balanced collaboration between technological innovation and human-centered pedagogy to ensure both academic achievement and ethical educational development.

4. CONCLUSION

This study concludes that Generative Artificial Intelligence has created significant opportunities for improving learning outcomes in Islamic Religious Education in Sweden. The integration of AI technologies into educational practices has contributed positively to students' conceptual understanding, learning motivation, classroom engagement, and independent learning experiences. AI-powered tools such as ChatGPT and adaptive educational systems enable personalized learning environments that accommodate diverse student needs and learning styles. In the multicultural context of Sweden, these technologies also support inclusive education by providing broader access to educational resources and multilingual learning assistance.

The findings further indicate that Generative Artificial Intelligence supports teachers in developing instructional materials, managing learning activities, and creating more interactive educational experiences. Through digital innovation, Islamic Religious Education can become more flexible, accessible, and responsive to contemporary educational demands. The use of AI technologies aligns with Sweden's emphasis on digital competence and modern educational transformation, particularly in fostering student-centered and technology-enhanced learning environments.

However, the study also identifies several important challenges related to the implementation of Generative Artificial Intelligence in religious education. Issues concerning the accuracy of AI-generated religious information, academic integrity, ethical responsibility, and student dependency on automated systems require careful attention. Since Islamic Religious Education involves moral, spiritual, and theological dimensions, teachers remain

essential in verifying content, guiding critical reflection, and ensuring ethical learning practices. The role of educators cannot be replaced by technology because human interaction, moral guidance, and contextual understanding remain central components of religious education.

In addition, the study emphasizes the importance of digital literacy and equitable technological access in maximizing the benefits of Generative Artificial Intelligence. Educational institutions and policymakers should develop ethical guidelines, teacher training programs, and inclusive digital policies to ensure responsible AI integration in education. Future research is recommended to explore empirical classroom experiences and student perceptions regarding AI-assisted Islamic Religious Education in Sweden. Ultimately, Generative Artificial Intelligence should be viewed not as a replacement for educators but as a supportive educational tool capable of enhancing meaningful, reflective, and inclusive religious learning in the digital era.

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