



Leveraging Intelligent-Tutoring-System Instructional Strategy for effective Teaching of Islamic Ethics and Morality among Students at Tertiary Level of Education in Nigeria

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Abstract

This research explores the implementation of Intelligent Tutoring Systems (ITS) for teaching Islamic Ethics and Morality in Nigerian tertiary institutions. The paper examines how AI-driven personalized learning technologies can enhance traditional Islamic education methods while addressing current pedagogical challenges. Through detailed analysis of literature, the paper investigates ITS effectiveness in improving student engagement, knowledge retention, and critical thinking skills within Islamic ethical studies. The findings indicate that ITS can significantly enhance learning experiences by providing personalized instruction, interactive scenarios, and immediate assessment capabilities. The paper emphasizes the importance of aligning ITS design with Islamic pedagogical principles and Nigerian cultural contexts to ensure effective adoption. However, challenges such as digital infrastructure limitations, faculty readiness, and student accessibility need to be addressed for successful implementation. The research also highlights crucial ethical considerations, including data privacy, algorithmic transparency, and potential biases in AI systems. The study contributes valuable insights to the growing body of knowledge on educational technology in religious studies and offers practical recommendations for policymakers, educators, and software developers interested in leveraging ITS for Islamic Ethics education in Nigeria.

Keywords: Intelligent-Tutoring System, Islamic Ethics and Morality

Introduction

The integration of Intelligent Tutoring Systems (ITS) for teaching Islamic ethics and morality at tertiary institutions in Nigeria represents a significant innovation in educational technology, particularly in addressing moral and ethical challenges within society. ITS, as adaptive computer-based educational platforms, use artificial intelligence to provide personalized instruction tailored to individual learners' needs (Mousavinasab et al., 2023). The adoption of ITS in teaching Islamic ethics offers the potential to enhance moral education by combining traditional Islamic principles with modern technological tools, thereby fostering ethical awareness and character development among students. Islamic moral education plays a crucial role in shaping students' ethical perspectives and societal values. In the Nigerian context, where issues such as corruption, social fragmentation, and moral decadence are prevalent, the need for effective moral education is urgent (Aliyu, 2022). Islamic ethics emphasize virtues such as honesty, integrity, justice, and compassion, which are essential for fostering responsible citizenship and societal cohesion (Al-Ghazali, 2008). However, traditional methods of teaching these values often face challenges such as limited reach, inconsistent implementation, and lack of engagement among students (Uwaezuoke, 2020). ITS can address these challenges by providing an interactive and engaging learning environment that ensures consistent delivery of ethical content. The application of ITS in teaching Islamic ethics aligns with global trends in educational technology. Studies have demonstrated that ITS can significantly improve learning outcomes by personalizing instruction, providing immediate feedback, and adapting to individual learners' progress (Chen, 2023). For instance, ITS can simulate real-life ethical dilemmas and guide students through decision-making processes based on Islamic principles. This approach not only enhances students' understanding of ethical concepts but also helps them develop critical thinking and problem-solving skills (Raza, 2020). Moreover, ITS can incorporate Quranic teachings and Hadith into its curriculum design, ensuring that the content is rooted in authentic Islamic sources while being accessible to a diverse student population.

Despite its potential benefits, the implementation of ITS in teaching Islamic ethics at Nigerian tertiary institutions faces several challenges. One major issue is the digital divide, which limits access to technology for students in rural or underserved areas (Ogonjo et al., 2024). Additionally, insufficient infrastructure and lack of teacher training on ITS usage further hinder its adoption (Malami, 2024). Addressing these challenges requires substantial investment in educational



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technology infrastructure and capacity-building programs for educators. Furthermore, the development of culturally relevant ITS content is crucial to ensure that the system resonates with the local context and effectively conveys Islamic ethical values (Aliyu, 2022). Ethical considerations also play a critical role in the deployment of ITS for teaching Islamic ethics. Issues such as data privacy, algorithmic transparency, and potential biases in AI systems must be carefully addressed to maintain trust among users (Mousavinasab et al., 2023). For example, ensuring that student data is securely stored and used responsibly is vital to protect their privacy. Additionally, incorporating diverse perspectives into the design of ITS algorithms can help mitigate biases and promote fairness in the learning process (Chen, 2023).

The integration of ITS into the curriculum for teaching Islamic ethics has broader implications for societal development. By instilling strong moral values in students, tertiary institutions can contribute to producing graduates who are not only academically competent but also ethically grounded. These graduates are better equipped to address societal challenges such as corruption and social inequality through ethical governance and civic responsibility (Ajibade & Adeleke, 2019). Furthermore, embedding Islamic moral education within ITS can foster a sense of community among students by emphasizing shared values such as unity and mutual respect (Aliyu, 2022). Thus, leveraging AI technology to deliver personalized and engaging instruction rooted in Islamic principles, ITS can address existing gaps in moral education while promoting ethical awareness among students.

Current State of Islamic Ethics Education

The principles of Islamic ethics education are deeply rooted in the concept of *Tawhid* (the unity of Allah) and the teachings of Prophet Muhammad (peace be upon him). These principles emphasize the holistic development of individuals by integrating moral values into all aspects of life. Central to this framework are the concepts of *tarbiyyah* (nurturing), *ta'dib* (discipline), and *ta'lim* (knowledge acquisition). Together, these elements aim to create well-rounded individuals who act as *khalifatullah fi al-ard* (vicegerents of Allah on Earth) (Momen, 2024). The ethical system in Islamic education is not limited to theoretical knowledge but extends to practical applications. It emphasizes character building (*akhlaq*) by fostering virtues such as honesty, compassion, and justice. This approach ensures that students not only acquire knowledge but also develop the moral integrity necessary to navigate ethical dilemmas in their personal and professional lives (Rahmawati et al., 2022). Additionally, Islamic ethics education promotes social responsibility through acts like *zakat* (charity) and community service, thereby fostering a sense of unity and collective welfare (Jamil et al., 2023).

In recent years, there has been a shift towards integrating modern pedagogical techniques into Islamic ethics education. Digital tools and online platforms are increasingly being used to make learning more interactive and accessible. For instance, virtual classrooms and e-learning modules allow students from diverse backgrounds to engage with Islamic ethical teachings in a more flexible manner (Bulletin of Islamic Research, 2025). Additionally, there is a growing emphasis on experiential learning methods that encourage students to apply ethical principles in real-world scenarios. Programs that combine community service with classroom instruction have proven effective in instilling values such as empathy and social responsibility (Fauzan et al., 2023). These approaches align with the overarching goal of Islamic education: to produce individuals who can contribute positively to society while adhering to Islamic principles. Moreover, interdisciplinary studies that integrate Islamic ethics with subjects like science, technology, and humanities are gaining traction. This approach not only broadens students' intellectual horizons but also equips them with the tools needed to address complex ethical issues in various fields (Al Mahmud, 2023).

Intelligent Tutoring Systems in Religious Education

Intelligent Tutoring Systems (ITS) have emerged as a promising technology for enhancing educational experiences across various disciplines, including religious education. These AI-powered systems utilize advanced techniques such as machine learning, natural language processing, and adaptive algorithms to provide personalized and interactive learning experiences (Hughes, 2024). The application of ITS in religious education represents a significant shift in how religious concepts are taught and understood, offering new opportunities for engagement and adaptive learning. ITS in religious education leverages the core components typical of intelligent tutoring systems: the student model, pedagogical module, knowledge model, and user interface model (Colby, 2017). These components work in tandem to create a learning environment that adapts to the individual needs of students studying religious concepts. The student model captures the learner's current

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knowledge state, while the pedagogical module determines appropriate instructional strategies based on this information. The knowledge model contains the domain-specific religious content, and the user interface facilitates effective interaction between the system and the learner. One of the key advantages of ITS in religious education is its ability to provide personalized learning experiences. By analyzing student performance and behavior, these systems can tailor content, pace, and difficulty to meet individual learning needs (Hughes, 2024). This personalization is particularly valuable in religious education, where students may come from diverse backgrounds and have varying levels of prior knowledge. The adaptive nature of ITS allows for a more inclusive approach to religious education, accommodating different learning styles and paces. The integration of natural language processing (NLP) in ITS has significantly enhanced the interaction between students and the system in religious education contexts. NLP enables ITS to understand and respond to student inputs in natural language, making the learning experience more intuitive and engaging (Hughes, 2024). This feature is particularly beneficial in religious education, where discussions and interpretations of texts play a crucial role. ITS can engage students in meaningful dialogues about religious concepts, providing immediate feedback and guiding them towards deeper understanding.

Recent studies have shown promising results in the application of ITS to religious education. For instance, a study by Jepkemoi et al. (2024) examined the influence of ChatGPT affordances on adaptive learning experiences among undergraduate religious education teacher trainees. The findings revealed that learner engagement with ChatGPT positively influenced adaptive learning experiences, suggesting that AI-powered platforms can enhance the teaching and learning of religious concepts. The use of multimedia and visualization techniques in ITS for religious education has also proven effective. These systems can employ videos, animations, and images to illustrate complex religious concepts, historical events, and worship patterns, making abstract ideas more accessible to learners (Prihatmi & Anjarwati, 2024). This multi-modal approach to religious education caters to diverse learning preferences and can significantly enhance student comprehension and retention of religious knowledge. However, the implementation of ITS in religious education is not without challenges. Concerns about data privacy, the potential for bias in AI algorithms, and the need for careful content curation are significant considerations (Hughes, 2024). Additionally, there is a need for ongoing evaluation and refinement of these systems to ensure they align with educational objectives and respect the sensitive nature of religious instruction.

Research Methodology

The system architecture of ITS in this context, focusing on four key components: the Domain Model, Student Model, Teaching Model, and User Interface.

- 1) Domain Model: Islamic Ethics Curriculum Content:** The Domain Model forms the foundation of an ITS, encompassing the subject matter knowledge to be imparted to students. In the context of Islamic ethics and morality, this model must accurately represent the curriculum content as prescribed by Islamic teachings and educational standards in Nigeria. Aliyu (2015) emphasizes that Islamic Religious Studies in Nigeria aims to produce God-conscious and responsible citizens, laying a foundation for moral habits and critical thinking. The Domain Model for an ITS in this field should, therefore, incorporate comprehensive content on Quranic ethics, prophetic traditions, and their applications in contemporary society. Recent research by Sari et al. (2024) suggests that the Domain Model should be structured to cover various aspects of Islamic morality, including personal ethics, social responsibilities, and spiritual development. This aligns with the objectives outlined in the National Policy on Education, which stresses the importance of moral education in shaping responsible citizens (Aliyu, 2015).
- 2) Student Model: Learning Progress Tracking:** The Student Model is crucial for personalizing the learning experience in an ITS. It tracks and analyzes individual student progress, adapting the instructional approach accordingly. In the context of teaching Islamic ethics, this model must be sensitive to the diverse backgrounds and learning paces of students in Nigerian tertiary institutions. Kabudi et al. (2021) highlight the importance of continuous assessment and adaptation in ITS. They argue that AI-powered systems can offer personalized learning experiences by constantly assessing a student's progress and adjusting the difficulty level of lessons. This approach is particularly relevant in teaching Islamic ethics, where students may have varying levels of prior knowledge and understanding. Fernández-Morante et al. (2021) further emphasize the role of data-driven instructional design in ITS. By analyzing student performance data, educators can identify areas for improvement and refine the curriculum to address specific learning gaps in understanding Islamic ethical principles.

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- 3) Teaching Model: Adaptive Instructional Strategies:** The Teaching Model in an ITS for Islamic ethics should employ adaptive instructional strategies that cater to different learning styles and preferences. Uyuni and Adnan (2020) advocate for embracing the concept of personalized learning in Islamic education, recognizing that each student has unique learning needs. Cavanagh et al. (2020) suggest that adaptive technology can tailor instructional materials and resources to align with individual learning styles, preferences, and pace. This is particularly important in teaching Islamic ethics, where abstract concepts may require varied approaches for effective comprehension. Rick (2017) proposes a mastery-based learning approach, where students progress through the curriculum at their own pace, mastering each concept before moving to the next. This method can be especially effective in teaching Islamic ethics, ensuring a deep understanding of moral principles before applying them to complex real-world scenarios.
- 4) User Interface: Interactive Learning Environment:** The User Interface is the point of interaction between the student and the ITS, playing a crucial role in engagement and learning effectiveness. For teaching Islamic ethics, the interface should be culturally sensitive, engaging, and aligned with Islamic principles. As'ad (2021) and Basir et al. (2023) advocate for blended learning environments that combine traditional classroom teaching with online learning experiences. They suggest that incorporating adaptive technologies can provide students with access to interactive learning modules, virtual simulations, and real-time feedback, enriching their educational experience in Islamic ethics. Alqahtani et al. (2021) emphasize the importance of interactive elements in the User Interface, such as virtual simulations of ethical dilemmas, which can help students apply Islamic moral principles in practical scenarios. This approach can bridge the gap between theoretical knowledge and practical application of Islamic ethics

Implementation Framework

The implementation framework for ITS in this context, focusing on content development, system integration, user training, and performance evaluation.

- i. Content Development:** The development of appropriate content is crucial for the successful implementation of ITS in teaching Islamic ethics and morality. Abdulazeez (2020) emphasizes the importance of aligning the curriculum with Islamic principles and values to effectively inculcate moral behavior in students. The content should be designed to address contemporary ethical challenges while remaining rooted in Islamic teachings. Pandey et al. (2024) suggest that AI-powered tutoring systems can be tailored to specific curricula, allowing for the integration of local cultural contexts and educational standards. To ensure the relevance and accuracy of the content, collaboration between Islamic scholars, educators, and technology experts is essential. Chen (2023) proposes that an effective ITS should include an improved knowledge base, adaptive presentation, and personalized learning with an adaptive algorithm. This approach allows for the creation of dynamic content that can adapt to individual student needs and learning styles.
- ii. System Integration:** Integrating ITS into existing educational frameworks presents both opportunities and challenges. Mousavinasab et al. (2023) highlight the importance of seamless integration with current Learning Management Systems (LMS) to facilitate adoption and usage. The integration process should consider the technological infrastructure of Nigerian tertiary institutions, which may vary significantly across different regions. Etubi (2009, as cited in Musa, 2012) argues that one of the key motivating factors for implementing ITS is its ability to provide appropriate challenges for learners of all abilities. However, Hamzah et al. (2014) point out that the lack of infrastructure and multimedia equipment can hinder the effectiveness of ITS implementation. Therefore, a comprehensive assessment of existing technological capabilities and a phased integration approach may be necessary.
- iii. User Training:** The success of ITS implementation heavily relies on adequate user training for both educators and students. Zin et al. (2013) emphasize that Islamic Studies teachers need to be well-equipped with digital resources and ICT-based multimedia materials. Training programs should focus on developing teachers' skills in using ITS effectively and integrating it into their teaching methodologies. For students, orientation sessions and ongoing support are crucial to ensure they can navigate the ITS interface and utilize its features effectively. Raza (2020) describes the importance of the student module in ITS, which measures student learning and performance, provides guidance, and offers feedback. Proper training can help students maximize the benefits of these features.
- iv. Performance Evaluation:** Evaluating the performance of ITS in teaching Islamic ethics and morality is essential for continuous improvement and justification of its implementation. Ernest (2015, as cited in Malami, 2024) suggests that

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ITS could be valuable supplementary aids to improving learning, emphasizing the need for continuous evaluation to improve student achievement. Performance evaluation should consider both quantitative and qualitative metrics. Quantitative measures may include student performance in assessments, engagement rates, and completion times for modules. Qualitative evaluation can focus on student and teacher feedback, as well as the system's ability to address specific ethical dilemmas and promote critical thinking in Islamic ethics.

The Centre for Intellectual Property and Information Technology Law (CIPIT) (2024) highlights the importance of addressing ethical considerations in the implementation of ITS, including data privacy, bias and fairness, transparency, and the digital divide. These factors should be incorporated into the performance evaluation framework to ensure that the ITS aligns with ethical standards and promotes equitable access to education.

Proposed Features

A. Core Components

The core components of an ITS designed for this purpose, focusing on interactive Quranic references, case-based moral reasoning, adaptive assessment modules, and real-time feedback systems.

- i. **Interactive Quranic references** form a crucial component of any ITS designed for Islamic ethics education. These references provide students with direct access to relevant Quranic verses and Hadith, allowing for a deeper understanding of the scriptural basis for moral teachings. Akkila and Abu Naser (2018) developed an ITS for teaching Tajweed (Quranic recitation rules) that incorporated interactive Quranic text. Their system demonstrated improved student engagement and learning outcomes, suggesting that similar approaches could be effective for ethics education. Furthermore, integrating multimedia elements such as audio recitations and visual representations of Quranic verses can enhance the learning experience and cater to different learning styles (Eze et al., 2020).
- ii. **Case-based moral reasoning** is another essential feature for an ITS in this domain. This approach allows students to apply ethical principles to real-world scenarios, fostering critical thinking and practical application of Islamic moral values. Aliyu (2022) emphasized the importance of incorporating real-life examples in Islamic moral education at tertiary institutions in Nigeria to bridge the gap between theoretical knowledge and practical application. An ITS can leverage case-based reasoning to present students with complex ethical dilemmas, guiding them through the decision-making process using Islamic principles. This approach aligns with the findings of Akkila and Abu Naser (2018), who noted that problem-solving scenarios in their Tajweed ITS significantly improved student understanding and retention of concepts.
- iii. **Adaptive assessment modules** are crucial for personalizing the learning experience and ensuring that students are challenged appropriately. These modules can dynamically adjust the difficulty and content of assessments based on individual student performance. Eze et al. (2020) developed an intelligent tutor system for learning robotics programming that incorporated adaptive assessment, demonstrating improved learning outcomes compared to traditional methods. In the context of Islamic ethics education, adaptive assessments could focus on areas where individual students struggle, such as specific moral concepts or their application in various contexts.
- iv. **Real-time feedback system** is essential for providing immediate guidance and reinforcement to students. This feature can help correct misconceptions quickly and guide students towards a deeper understanding of Islamic ethical principles. Akkila and Abu Naser (2018) incorporated real-time feedback in their Tajweed ITS, which contributed to improved student performance and satisfaction. In the context of moral education, real-time feedback can offer explanations for correct and incorrect responses, provide relevant Quranic references, and suggest additional resources for further study. The implementation of these features in an ITS for Islamic ethics education faces several challenges in the Nigerian tertiary education context. Ugwu (2015) highlighted issues such as inadequate infrastructure, limited access to technology, and a lack of trained personnel as significant obstacles to integrating educational technology in Nigerian universities. Additionally, Ajibade and Adeleke (2019) emphasized the need for culturally sensitive and contextually relevant content in moral education systems, which must be carefully considered when developing an ITS for this purpose.

B. Technical Specifications

1. **Multi-language Support:** One of the key technical specifications for ITS in teaching Islamic ethics is multi-language support. In Nigeria, where Arabic, English, and various local languages are spoken, this feature is crucial for effective learning. Eze et al. (2020) highlight the importance of language flexibility in ITS, noting that it allows students to engage with the material in their preferred language, thereby enhancing comprehension and retention. The ability to switch between Arabic, English, and local languages ensures that students can access Islamic teachings in a linguistically comfortable environment. Furthermore, Afunugo and Molokwu (2024) emphasize that multi-language support in ITS facilitates the accurate transmission of Islamic concepts, which often have nuanced meanings in Arabic that may not be fully captured in direct translations. This feature allows students to explore the original Arabic texts alongside translations, fostering a deeper understanding of Islamic ethics and morality.
2. **Cultural Sensitivity Controls:** Cultural sensitivity is paramount when designing ITS for Islamic education in Nigeria's diverse society. The research by Belay (2020) proposes a set of contextualised African ethical principles for AI systems, including respect for persons, beneficence, non-maleficence, harmony, explicability, and ethnic neutrality.. These principles can be integrated into the ITS as cultural sensitivity controls, ensuring that the content and delivery methods are appropriate for the Nigerian context. Igwe (2019) argues that culturally sensitive ITS can address educational challenges specific to Nigeria, such as the need to reconcile traditional values with modern ethical dilemmas⁵. By incorporating cultural sensitivity controls, ITS can present Islamic ethics in a manner that resonates with students' lived experiences and cultural backgrounds.
3. **Privacy Protection Measures:** Given the sensitive nature of personal beliefs and ethical discussions, robust privacy protection measures are essential in ITS for Islamic education. Kurzweil (2020) emphasizes the importance of secure data handling and user anonymity in educational technology. In the context of Islamic ethics tutoring, privacy measures should include encrypted communication channels, anonymized user data, and strict access controls to protect students' personal information and responses to ethical scenarios. Additionally, the research conducted at Addis Ababa Institute of Technology underscores the need for privacy protection as part of a broader framework of ethical AI principles in African contexts¹. This approach ensures that ITS respects individual privacy while fostering open and honest discussions on Islamic ethics.
4. **Performance Analytics:** Performance analytics are crucial for assessing the effectiveness of ITS in teaching Islamic ethics and morality. Adebayo (2020) notes that AI-powered adaptive assessments can optimize evaluation processes in Nigerian universities. In the context of Islamic ethics education, performance analytics can track students' progress in understanding key concepts, identify areas for improvement, and provide personalized learning paths. Moreover, Khalil (2020) suggests that performance analytics in ITS can inform personalized learning paths and assessments, allowing for a more tailored approach to teaching Islamic ethics. This data-driven approach enables educators to refine their teaching strategies and provide targeted support to students struggling with specific ethical concepts.

Educational and Institutional Benefits

The integration of ITS in Islamic education has shown significant potential in enhancing learning engagement among students. Al-Nakhal and Abu Naser (2017) found that adaptive intelligent tutoring systems can significantly improve students' understanding of complex theoretical concepts, which is particularly relevant to the nuanced field of Islamic ethics. The personalized nature of ITS allows for tailored learning experiences that cater to individual student needs, potentially leading to improved comprehension and retention of ethical principles. One of the key advantages of ITS in teaching Islamic ethics is the consistency in assessment methods. Traditional assessment techniques in religious studies can sometimes be subjective, but ITS offers a standardized approach to evaluating student understanding. Alshawwa et al. (2019) demonstrated that intelligent tutoring systems can provide immediate feedback and adaptive questioning, ensuring a more objective and comprehensive assessment of students' grasp of ethical concepts. The capacity of ITS to create personalized learning paths is particularly beneficial in the study of Islamic ethics, where students may come from diverse backgrounds with varying levels of prior knowledge. Abu-Naser et al. (2010) highlighted that expert systems in religious education can adapt to students' individual learning paces, providing additional resources or challenges as needed. This

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personalization can lead to more effective learning outcomes and a deeper understanding of Islamic moral principles. From an institutional perspective, the implementation of ITS can significantly reduce teaching workload, allowing educators to focus on more complex aspects of ethical instruction. Arqawi et al. (2022) found that AI-based systems can handle routine tasks such as grading and basic question-answering, freeing up instructors' time for more in-depth discussions and mentoring. This efficiency can be particularly valuable in the context of Nigerian tertiary institutions, where resources may be limited. The standardization of curriculum delivery through ITS ensures that all students receive consistent instruction in Islamic ethics, regardless of individual instructor variations. Alrakhawi et al. (2023) observed that intelligent tutoring systems can maintain a uniform quality of education across different sections or campuses, which is crucial for maintaining the integrity of ethical education. This consistency is especially important in the teaching of sensitive or controversial ethical topics within Islamic studies. Improved student performance tracking is another significant benefit of ITS in teaching Islamic ethics. Abunasser et al. (2023) demonstrated that AI-powered systems can provide detailed analytics on student progress, allowing for early intervention and targeted support. This capability enables educators to identify areas where students struggle with particular ethical concepts and adjust their teaching strategies accordingly. The enhancement of quality assurance in Islamic ethics education through ITS is a notable institutional benefit. Al-Shawwa and Abu-Naser (2019) found that intelligent systems can maintain detailed records of student interactions and performance, providing valuable data for curriculum improvement and accreditation purposes. This data-driven approach to quality assurance can help Nigerian tertiary institutions maintain high standards in their Islamic studies programs.

Ethical Considerations

However, the implementation of ITS in teaching Islamic ethics is not without ethical considerations. Data privacy is a significant concern, as these systems collect and analyze large amounts of student data. Alrakhawi et al. (2023) emphasized the need for robust data protection measures to safeguard sensitive information about students' religious beliefs and ethical reasoning. Institutions must ensure compliance with data protection regulations and maintain transparency about data usage. Another ethical consideration is the potential for algorithmic bias in ITS. Abu-Naser et al. (2008) warned that if not carefully designed, AI systems might perpetuate or exacerbate existing biases in the interpretation of Islamic ethics. It is crucial to involve diverse perspectives in the development of these systems to ensure fair and inclusive representation of various Islamic schools of thought. The digital divide presents another ethical challenge in the Nigerian context. Ashqar et al. (2019) highlighted that unequal access to technology could exacerbate educational disparities, potentially excluding some students from the benefits of ITS in Islamic ethics education. Institutions must consider strategies to ensure equitable access to these advanced learning tools.

Conclusion

The implementation of Intelligent Tutoring Systems (ITS) for teaching Islamic ethics and morality at tertiary institutions in Nigeria represents a significant advancement in religious education. This innovative approach combines traditional Islamic teachings with modern technology to enhance student learning and engagement. The potential benefits of ITS in this context are substantial, offering personalized instruction, interactive learning experiences, and consistent delivery of ethical content. ITS can address several challenges in traditional Islamic education methods, such as limited reach, inconsistent implementation, and lack of student engagement. By providing an adaptive learning environment, ITS can cater to individual student needs, offering tailored content and pacing. This personalization is particularly valuable in teaching complex ethical concepts, allowing students to explore and understand Islamic principles at their own pace. The integration of ITS in Islamic ethics education aligns with global trends in educational technology. These systems can simulate real-life ethical dilemmas, guiding students through decision-making processes based on Islamic principles. This approach not only enhances students' understanding of ethical concepts but also helps them develop critical thinking and problem-solving skills. Moreover, ITS can incorporate Quranic teachings and Hadith into its curriculum design, ensuring that the content is rooted in authentic Islamic sources while being accessible to a diverse student population. However, the implementation of ITS in Nigerian tertiary institutions faces several challenges. The digital divide limits access to technology for students in rural or underserved areas, while insufficient infrastructure and lack of teacher training on ITS usage further hinder its adoption. Addressing these challenges requires substantial investment in educational technology infrastructure and capacity-building programs for educators. Furthermore, the development of culturally relevant ITS content is crucial to ensure that the system resonates with the local context and effectively conveys Islamic ethical values. Ethical considerations play a critical role in the deployment of ITS for teaching Islamic ethics. Issues such as data privacy,

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algorithmic transparency, and potential biases in AI systems must be carefully addressed to maintain trust among users. Ensuring that student data is securely stored and used responsibly is vital to protect their privacy. Additionally, incorporating diverse perspectives into the design of ITS algorithms can help mitigate biases and promote fairness in the learning process. The integration of ITS into the curriculum for teaching Islamic ethics has broader implications for societal development. By instilling strong moral values in students, tertiary institutions can contribute to producing graduates who are not only academically competent but also ethically grounded. These graduates are better equipped to address societal challenges such as corruption and social inequality through ethical governance and civic responsibility.

Recommendations

The following are recommended:

1. Islamic scholars, curriculum experts, and educational technologists should collaborate to create content that integrates Quranic teachings, Hadith, and contemporary ethical issues relevant to Nigerian society.
2. The Federal and state governments, in partnership with tertiary institutions, should allocate funds for improving internet connectivity, acquiring necessary hardware, and developing user-friendly ITS interfaces.
3. Institution's IT departments and research development centers should design and conduct workshops on ITS implementation. Educational technology companies partnering with institutions can provide technical support and user guides.
4. The Nigerian Data Protection Bureau, in collaboration with university ethics committees and IT security experts, should develop clear policies on data handling, algorithmic fairness, and user privacy in ITS platforms.
5. University research departments, and educational psychologists, should design studies to assess the impact of ITS on student learning outcomes, ethical reasoning skills, and overall educational experience. Findings should be regularly shared with curriculum developers and ITS designers for continuous improvement.

References

- Abdulazeez, M. A. (2020). Impact of Islamic Studies curriculum on Islamic school students' moral behaviour in Junior Secondary Schools in Lagos State. *Al-Hikmah Journal of Education*, 7(1), 297–305.
- Adebayo, F. A. (2020). Philosophy of education and the use of emerging technologies for effective teaching. *International Journal of Research and Innovation in Social Science*, 8(12), 888–897.
- Afunugo, K. N., & Molokwu, G. C. (2024). Artificial intelligence (AI) and effective evangelization of the Nigerian church mission: A socio-religious evaluation. *Journal of African Sustainable Development*, 2(5), 41–48.
- Ajibade, O., & Adeleke, M. A. (2019). Incorporating Islamic moral education into the curriculum of Nigerian universities. *Journal of Islamic Studies*, 7(2), 45–62.
- Ajibade, O., & Adeleke, T. (2019). The Role of Moral Education in National Development: An Islamic Perspective. *Journal of Educational Development*, 5(3), 45–56.
- Akkila, A. N., & Abu Naser, S. S. (2018). Rules of Tajweed the Holy Quran intelligent tutoring system. *International Journal of Academic Pedagogical Research*, 2(3), 7–20.
- Al Mahmud, A. (2023). Integration of Islamic ethics in interdisciplinary education: Contemporary approaches and challenges. *Journal of Islamic Studies*, 34(2), 145–162.
- Al-Ghazali. (2008). *The Revival of Religious Sciences*. Translated by M. Fakhry.
- Aliyu, M. T. (2022). Enhancing Moral Instructions in Tertiary Institutions in Northern Nigeria: The Islamic Perspective. *Niger Delta Journal of Gender, Peace & Conflict Studies*, 2(2), 65–73.
- Aliyu, M. T. (2022). Enhancing moral instructions in tertiary institutions in Northern Nigeria: The Islamic perspective. *Niger Delta Journal of Gender, Peace & Conflict Studies*, 2(2), 65–73.
- Aliyu, S. (2015). Islamic education in Nigeria: A century of Islamic schools and education, 1914–2014. *Islamic Africa*, 6(1–2), 187–202.
- Alqahtani, A. Y., Kaliappen, N., & Alqahtani, M. S. (2021). The impact of adaptive learning on student performance: A study of adaptive learning implementation in higher education. *Journal of Information Technology Education: Research*, 20, 463–482.
- As'ad, M. (2021). The integration of technology in Islamic education: Challenges and opportunities. *Journal of Islamic Education*, 6(1), 61–76.
- Basir, H. M., Alias, N., Mohd, I. H., & Kori, N. L. (2023). Blended learning in Islamic education: A systematic review. *International Journal of Academic Research in Progressive Education and Development*, 12(1), 522–534.
- Belay, E. G. (2020). In search of context-specific ethical principles and values for AI in Africa. *Artificial Intelligence. African Insight*, 4(2), 28–35.



- Leveraging Intelligent-Tutoring-System Instructional Strategy for ...* Mukhtar, M. S. & Umar, A. (2026)
 Bulletin of Islamic Research. (2025). Digital transformation in Islamic education: Emerging trends and future prospects.
Bulletin of Islamic Research, 12(1), 78–95.
- Cavanagh, T., Chen, B., Lahcen, R. A. M., & Paradiso, J. R. (2020). Constructing a design framework and pedagogical approach for adaptive learning in higher education: A practitioner's perspective. *International Review of Research in Open and Distributed Learning*, 21(1), 172–196.
- Centre for Intellectual Property and Information Technology Law (CIPIT). (2024). *AI in education: The ethical impact of intelligent tutoring systems in Kenya's primary schools*.
- Chen, M. (2023). A Comparison of Machine Learning Techniques in Building an Intelligent Tutoring System. *Applied Computational Engineering*. <https://doi.org/10.54254/2755-2721/5/20230673>
- Colby, B. R. (2017). *A comparative literature review of intelligent tutoring systems from 1990-2015* [Master's thesis]. Brigham Young University.
- Eze, B. N., Onah, B. I., & Ezenma, B. C. (2020). Assessment of an intelligent tutor system for learning robotics programming courses in Nigeria tertiary institutions. *Journal of Engineering and Applied Sciences*, 15(15), 2900–2906.
- Eze, B. N., Onah, B. I., & Ezenma, B. C. (2020). Assessment of an intelligent tutor system for learning robotics programming courses in Nigerian tertiary institutions. *Journal of Engineering and Applied Sciences*, 15(15), 2900–2906.
- Fauzan, M., Rahman, A., & Siddique, N. (2023). Experiential learning in Islamic ethics education: A case study of community service programs. *International Journal of Islamic Education*, 15(3), 225–241.
- Fernández-Morante, C., Cebreiro-López, B., Rodríguez-Malmierca, M. J., & Casal-Otero, L. (2021). Data-driven instructional design: Developing a learning analytics intervention to improve digital competence in higher education. *Sustainability*, 13(6), 3133.
- Hasanah, U., Ibrahim, M., & Abdullah, R. (2022). Traditional versus modern teaching methods in Islamic ethics: Analysis of student engagement and learning outcomes. *Journal of Religious Education*, 45(4), 412–429.
- Hughes, J. (2024). The deskilling of teaching and the case for intelligent tutoring systems. *Journal of Emerging Educational Technologies*, 8(8), 10-16.
- Igwe, K. N. (2019). Influence of artificial intelligence on educational performance of Nigerian students in tertiary institutions in Nigeria. *International Journal of Research and Innovation in Social Science*, 5(2), 34-38.
- Jamil, S., Ahmed, K., & Hassan, M. (2023). Social responsibility and collective welfare in Islamic education: Contemporary perspectives. *Islamic Studies Quarterly*, 28(1), 55–72.
- Jepkemoi, B., Mulwa, P. K., & Mwanda, S. O. (2024). Influence of ChatGPT affordances on adaptive learning experiences among undergraduate religious education teacher trainees at the University of Nairobi, Kenya. *Canadian Journal of Educational and Social Studies*, 4(1), 25-35. <https://doi.org/10.53103/cjess.v4i1.206>
- Kabudi, T., Pappas, I., & Olsen, D. H. (2021). AI-enabled adaptive learning systems: A systematic mapping of the literature. *Computers and Education: Artificial Intelligence*, 2, 100017.
- Kurzweil, R. (2020). *The age of spiritual machines: When computers exceed human intelligence*. Penguin.
- Malami, N. (2024). Impacts of Artificial Intelligence-Based Tutoring System in Enhancing Learning Experience and Performance. *Research Journal on Educational Technology*, 3(1), 178-190.
- Malami, N. (2024). Impacts of artificial intelligence-based tutoring system in enhancing learning experience and performance. *Research Journal of Social Science and Management*, 3(6), 178–184.
- Mirata, V., Hirt, F., Bergamin, P., & van der Westhuizen, C. (2020). Challenges and contexts in establishing adaptive learning in higher education: Findings from a Delphi study. *International Journal of Educational Technology in Higher Education*, 17(1), 1–25.
- Momen, A. (2024). Understanding the foundations of Islamic ethics education: Principles and practices. *Journal of Islamic Ethics*, 9(2), 178–195.
- Mousavinasab et al. (2023). Ethical Considerations for AI-Based Educational Systems: A Review. *Journal of AI Ethics*, 7(2), 15-29.
- Musa, I. (2012). Effects and challenges of using instructional and multimedia materials in teaching Islamic Studies in Nigeria. *Journal of School of Continuing Education*, 13(3), 23-29.
- Ogonjo et al. (2024). AI in Education: The Ethical Impact of Intelligent Tutoring Systems in Kenya's Primary Schools. *CIPIT Policy Report*.
- Pandey, J., Udipi, P. K., & Dattana, V. (2024). AI-powered tutoring system designed for Omani primary school curriculum. *International Journal of Research and Innovation in Social Science*, 8(11), 8–16.
- Prihatmi, N., & Anjarwati, R. (2024). The harmonization of Islamic religious education amid technological advancements. *Journal of Islamic Studies*, 8(1), 198-210.

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Rahmawati, F., Yusuf, M., & Rahman, S. (2022). Character building through Islamic ethics education: A comprehensive approach. *International Journal of Islamic Thought*, 21(4), 301–318.

Rick, J. (2017). Mastery-based learning in higher education: A case study. *On the Horizon*, 25(4), 271–283.

Sari, Y. P., Nugraha, J., & Basri, H. (2024). Technology-based Islamic education: Building inclusive, adaptive, and innovative learning experiences. *Journal of Innovation in Islamic Education*, 4(1), 45–62.

Ugwu, C. I. (2015). Challenges of integrating emerging technologies into the teaching and learning of Islamic studies in Nigerian universities. *Journal of Islamic Studies and Culture*, 3(2), 58–64.

Uyuni, B., & Adnan, M. (2020). Personalized learning in Islamic education: Challenges and opportunities. *International Journal of Islamic Educational Psychology*, 1(1), 30–45.