



Exploring Student Perceptions on Artificial Intelligence Integration in Islamic Education: A Qualitative Study Based on Bloom's Taxonomy and The Technology Acceptance Model

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ARTICLE INFO	ABSTRACT
<p>Article History: Recieved : 17-Jul-2025 Revised : 05-Aug-2025 Accepted : 15-Sep-2025 Available online: 30-Sep-2025</p> <p>Keyword: Islamic Education; Artificial Intelligence; Technology Acceptance</p>	<p>The rapid development of Artificial Intelligence (AI) technology presents significant opportunities to enhance the quality of Islamic Religious Education (PAI). However, the implementation of AI in value-based education faces various technical, pedagogical, and ethical challenges that impact its effectiveness and sustainability. This qualitative phenomenological study explores students' perceptions of AI integration in PAI learning, focusing on their experiences, acceptance, and challenges encountered. Data were collected through in-depth interviews and analyzed using the Technology Acceptance Model (TAM) and Bloom's Taxonomy frameworks to understand acceptance levels and AI's contribution to learning outcomes. Findings reveal that AI has the potential to support more personalized, adaptive, and interactive learning, especially at the cognitive and analytical stages. Nevertheless, the role of teachers and religious scholars remains essential in guiding spiritual aspects and value evaluation, positioning AI as a complementary tool rather than a replacement. Key challenges include overreliance, information validity, and ethical concerns, requiring adequate supervision and technology literacy. The study recommends AI integration grounded in Islamic values, involving religious experts, and curriculum development emphasizing critical thinking and originality. Thus, AI can become a strategic partner in creating relevant, humanistic, and ethical PAI learning in the digital era.</p>

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INTRODUCTION

The rapid development of Artificial Intelligence (AI) technology presents a great opportunity to improve the quality of education, including in Islamic Religious Education (PAI) (Luan et al., 2025). However, currently the implementation of AI in Islamic education still faces serious obstacles that threaten its effectiveness and sustainability (Achruh et al., 2024). These challenges include the unpreparedness of technological infrastructure in many Islamic educational institutions, the lack of understanding and readiness of educators in integrating AI appropriately, and concerns about the potential clash between AI technology and Spiritual Values and Islamic ethical norms (Achruh et al., 2024).

If this condition is not addressed immediately, there will be a widening gap between technological advances and the quality of religious education that should be improved through AI (Qader Ismail Alnajem et al., 2024). The impact is not only the decline in the competitiveness of Islamic education in the digital era, but also the loss of opportunities to present personalized, adaptive, and interactive Learning Methods that are urgently needed by millennials and Z generations (Vanitha et al., 2024). Therefore, a quick and comprehensive solution in overcoming technical, educational, and ethical obstacles is very urgent so that the integration of AI in Islamic Religious Education can be carried out optimally and sustainably (Abubakari et al., 2024).

According to a UNESCO report (2023), only about 20% of educational institutions in developing countries have actively integrated AI in the learning process, and of that figure, very few come from religious-based institutions (Achruh et al., 2024). In Indonesia, a study by the Puslitjak of the Ministry of Education and Culture (2022) showed that out of 1,000 student respondents, only 34% felt that their learning was sufficiently enriched by AI-based technology, and more than 52% felt that lecturers were not ready to manage the technology in the context of religious learning (Hasanah & , Ririn Khairunnisa , Dhia Alfa Della, 2024). These findings show that there is a digital gap between the potential of technology and the reality of practice in the field, especially in value-based education such as PAI (Sunarya, 2024).

In addition, data from the Ministry of Communication and Information Technology (2023) notes that although the internet penetration rate among students reaches 87.2%, only 12.5% of them have ever used AI platforms in the context of religious or ethical learning (Kiely & Ainley, 2022). This inequality indicates that there are great opportunities that have not been taught, as well as showing the urgency of developing an inclusive and value-based technology implementation strategy (Siqi Yang, 2023).

Students as subjects as well as agents of change in the learning process have an important role in determining the success of Technology integration (Shanthana Lakshmi, 2021). Their perception of the use of AI in PAI learning reflects the level of acceptance, readiness, and potential resistance to the innovation (Darmawan et al., 2024). Therefore, Exploring the Perceptions of Students in depth is an important first

step to ensure that the application of AI in Islamic education can be done effectively, ethically, and contextually (Ahmed & Comair, 2024).

In the realm of theory, the Bloom Taxonomy approach is used to understand how AI can support the achievement of cognitive goals in PAI learning, from basic knowledge levels to evaluation and creation (Elim, 2024). Meanwhile, the Technology Acceptance Model (TAM) is a framework to analyze the extent to which students accept new technologies based on their perception of usability and ease of use (Alsulami et al., 2024).

This research aims to reveal students' perceptions of the integration of AI in PAI learning with a qualitative approach. The main focus is directed at the experiences, views, and factors that influence the acceptance of technology by students in the context of Islamic educational values. By combining a strong theoretical framework and an exploratory approach, this study is expected to contribute to the development of technology-based PAI learning strategies that are more relevant, humanistic, and responsive to the challenges of the times.

METHOD

This study uses a qualitative method with a phenomenological approach to explore in depth the perception of Islamic Religious Education students regarding the integration of artificial intelligence (AI) in the learning process (Faraon et al., 2023). By selecting purposive respondents from students who already have experience using digital technology in learning, this study explores their views on the benefits, challenges, and acceptances of AI (Hazaimah & Al-Ansi, 2024).

Data dikumpulkan melalui wawancara terbuka yang memberikan ruang bagi responden menyampaikan pengalaman dan harapan mereka secara jujur dan detail (Indah, 2022). Analisis data dilakukan dengan fokus pada pola-pola makna alami dari narasi mahasiswa (Saglam, 2024), yang kemudian dikaitkan dengan Technology Acceptance Model (TAM) dan Taksonomi Bloom untuk memahami tingkat penerimaan dan kontribusi AI terhadap capaian pembelajaran (Achruh et al., 2024).

This approach allows researchers to capture the balance between technological innovation and spiritual values in religious education, while highlighting the importance of the role of teachers as companions in maximizing the benefits of AI (Habiballa et al., 2025). The findings of this study are expected to provide strategic insights in the development of more adaptive, humanistic, and ethical PAI learning in the digital era.

DISCUSSION

1. Perceptions of AI in PAI Learning

The three speakers agreed that artificial intelligence (AI) is not just a sophisticated technology, but a tool that has great potential to revolutionize the

learning process of Islamic Religious Education (PAI). The first speaker emphasized that AI plays an important role as a bridge that is able to help students understand the material more clearly and according to their individual needs. With AI capabilities that can adjust the delivery of material based on the level of Student Understanding, the learning process becomes more effective and efficient (Garcia et al., 2024).

Furthermore, the second and third speakers reinforced this view by describing AI as a smart and responsive "learning companion". AI does not just provide access to information, but also creates an interactive and dynamic learning atmosphere. This is very important in the context of PAI learning, which has often been considered static and conventional (Foo et al., 2021). With AI support, students can broaden their horizons flexibly, anytime and anywhere, without space and time limitations (Morales-Sánchez et al., 2021).

In this context, AI plays a role as an intelligent tutoring system that is able to increase the Personalization of learning (Al-Zahrani & Alasmari, 2025). This technology accelerates access information and adaptively adapts teaching methods to each student's learning style—in line with the concepts of adaptive learning and personalized learning that are now increasingly becoming standard in modern education (Xiong & Luo, 2025). Thus, AI is not only a conveyor of information, but also a learning companion that accommodates the unique needs of each individual, so that the PAI learning experience becomes more meaningful and relevant (Aleisa et al., 2022).

In addition, AI also opens up opportunities to expand access to religious materials through digital platforms that present content of Qur'an interpretation and hadith in an interactive and interesting manner (Andri Nirwana et al., 2025). Through features such as verse visualization, context explanations, and interactive quizzes, PAI learning can run in a more modern and engaging way for the younger generation living in the digital age (Matsui & Kawai, 2022). This makes Religious Studies not only an obligation, but also a pleasant and motivating experience (Skandali et al., 2024).

However, behind all the advantages of technology, the three speakers wisely reminded that the spiritual and moral aspects of religious learning still require a human touch, especially scholars and teachers who have a deep understanding and experience in guiding. AI, although intelligent, has not been able to replace the important role of human guidance in instilling the values of faith and morals that can only be transmitted through direct interaction and real examples. Therefore, the integration of AI in PAI learning should be seen as a complement and reinforcer, not a substitute for the role of teachers and scholars.

Overall, AI opens up new horizons in the learning process of Islamic Religious Education, combining The power of technology with human wisdom to create a more effective, personalized, and relevant learning experience in the digital era (Mesa et al., 2025). With the right utilization, AI has the potential to inspire younger generations to delve deeper into religion in a way that fits their

world, without eliminating the spiritual values that are at the core of PAI learning. (Andri Nirwana et al., 2025).

2. Acceptance and Ease of Use of AI (TAM Framework)

The discussion on the acceptance and ease of use of artificial intelligence (AI) in the context of Islamic Religious Education (PAI) learning shows that AI is increasingly accepted as an effective tool (Al-Abdullatif, 2024). In practice, AI provides significant convenience, especially in accelerating reference search, compiling material summaries, and helping to work on tasks more efficiently. This is an important factor that encourages users—in this case students—to be more open to accepting this technology as part of their learning process (Aldraiweesh & Alturki, 2025).

In terms of ease of use, Narasumber 2 places special emphasis on modern aspects of AI interfaces, such as chatbots. According to him, the interface is very intuitive and easy to operate even for users who are trying it for the first time, so it is not a major obstacle in the application of this technology. However, he also reminded that for more complex and technical AI features, a deeper understanding is still needed for users to maximize their benefits. This condition shows that the level of perceived ease of use is one of the key factors in increasing AI acceptance, in accordance with the Technology Acceptance Model (TAM) framework (Osman & Yatam, 2024).

Furthermore, the motivation of users to adopt AI is not only driven by time efficiency, but also by the desire to learn independently and broad access to knowledge resources. Resource Persons 1 and Resource Persons 3 highlight how AI provides students with the freedom to explore material in a more personalized and flexible way, which has been difficult to achieve in traditional learning systems. They said that this strengthens the perceived usefulness aspect in TAM, where users feel that AI provides real benefits in supporting their learning process.

Nevertheless, obstacles still arise among users. Concerns about over-reliance on AI are an issue that is often raised, especially by Resource Person 3, who emphasized the importance of maintaining critical thinking and creativity without relying too much on machine aid. In addition, the validity of AI-generated information is also in the spotlight because there is still a risk of data errors or less credible sources. The issue of plagiarism is also a concern, considering that the ease of access and reproduction of AI-generated content can pose challenges in maintaining the originality of academic works (Sulaiman et al., 2022).

Overall, the acceptance of AI in PAI learning is greatly influenced by ease of use and perceived benefits, but must be accompanied by awareness and risk management so that this technology can be optimized in a sustainable manner (Hasanah & ,Ririn Khairunnisa, Dhia Alfa Della, 2024). Intelligent AI integration with adequate supervision will encourage the creation of a Learning Ecosystem that is more effective, efficient, and adaptive to the times (Rong et al., 2025).

3. Relation to Learning Outcomes (Bloom's Taxonomy)

In the learning process of Islamic Religious Education (PAI), Artificial Intelligence Technology (AI) is increasingly showing its role as an effective tool, especially in the early stages of mastery of the material (Chere & Wayi-Mgwebi, 2024). AI makes it easier for students to remember basic concepts that are often complex and abstract, as well as helps in creating structured summaries of extensive material. Thus, students can understand the core of Lesson Points more easily and efficiently (Fang et al., 2025). One of the speakers said that the existence of AI like this accelerates the process of remembering and understanding, so that students no longer feel burdened by the pile of information that must be mastered.

Furthermore, AI is also considered to make a positive contribution in the analysis stage. This technology allows the presentation of information comparatively, for example by presenting various different views of scholars in one study. This not only enriches students' insights, but also trains their critical analysis skills against a variety of sources of thought. A similar opinion was expressed by other speakers who emphasized that AI helps provide diverse data and broadens the horizons of students' understanding, so that they can be more careful in comparing and assessing religious arguments.

Even so, when it comes to the deeper evaluation of Islamic values and spiritual aspects, AI has not been able to fully replace the role of humans. This aspect requires critical reflection, life experience, and hands-on guidance that only teachers and intensive social interaction can provide. One of the speakers emphasized the importance of the human touch in guiding a holistic process of religious understanding, which includes not only cognitive aspects, but also emotional and spiritual aspects. This is in line with Bloom's taxonomic theory, which suggests that high-level cognitive skills such as evaluation and creation require deep critical and reflective thinking processes, which cannot yet be fully surrendered to technological tools. Therefore, the integration of AI in PAI learning must be placed as a support, not a replacement, of the role of teachers and the process of social interaction in shaping the character and spirituality of students.

4. Obstacles, Challenges, and Ethics

The development of artificial intelligence (AI) technology in the world of education brings various opportunities as well as challenges that cannot be ignored. Especially in the context of Islamic Religious Education (PAI), the use of AI raises deep concerns regarding its impact on the quality of learning and intellectual integrity of students. The risk of dependence on AI is a major concern for a number of parties, because if not managed properly, it has the potential to weaken the ability to think critically and reflectively which should be the main foundation in the religious learning process. Students who rely too much on AI can lose the habit of analyzing, evaluating, and deeply absorbing religious teachings.

In addition, the validity and accuracy of the information generated by AI is also in the spotlight. In PAI, the source of knowledge is very crucial because it

relates to revelation and interpretation that requires comprehensive understanding. Inaccuracies, biases, or misinterpretations of AI data can lead to misinformation that has serious impacts, both academically and spiritually. Several speakers emphasized the importance of caution in using AI so that there is no deviation in understanding the verses of the Qur'an and hadith, which can lead to the misuse of this technology for negative purposes.

Furthermore, the ethical aspect is also part of the concerns that arise. AI, if not strictly monitored, has the potential to pose a risk of misinterpretation of sacred texts and religious values, and even threatens the authenticity and originality of students' academic work. This requires a strict supervision and control mechanism in its use so that AI is not only a tool, but also maintains moral and intellectual integrity in the learning process.

The role of lecturers in the learning ecosystem that is increasingly influenced by AI has also shifted. Lecturers no longer play the role of the only source of knowledge, but instead turn into facilitators and curators who guide students in using AI wisely. The resource person said that lecturers must be able to direct students not to just rely on AI, but to use it as a tool to strengthen understanding, hone character, and form good morals. Thus, the presence of AI is expected to enrich the teaching and learning process without eliminating the essential values of religious education.

The three speakers agreed that although AI offers ease of access and various practical benefits, there needs to be a shared awareness to maintain a balance between technology and profound scientific values. The use of AI must be accompanied by ethics, supervision, and the development of critical thinking capacity so that students do not lose their intellectual and spiritual identity. With the right approach, AI is not a threat, but can actually be a strong supporter in future PAI education.

5. Recommendations and Expectations

The development of artificial intelligence (AI) in Islamic religious education (PAI) opens up great opportunities to create more innovative and adaptive learning methods. AI technology can be optimized as a tool that is able to improve the quality of the teaching and learning process with features such as intelligent postulate search assistants, adaptive learning that is tailored to individual needs, an interactive quiz system that provides direct feedback, to a permanent teaching material generator through human curation to suit religious values. In addition, interactive religious ritual simulations can also enrich students' learning experiences in a practical and in-depth way.

However, the use of AI in the realm of PAI cannot be separated from ethical and scientific challenges. In order for this technology to function effectively without causing value distortion, the involvement of religious experts in the development process is required. This is important to ensure that the algorithms used have transparency and adhere to Islamic principles, so that the results of AI outputs can be accounted for in sharia and do not cause confusion or misunderstanding among the people. The opinions of the speakers

emphasized that AI should not be a substitute for teachers and scholars as the main figures in religious education, but rather play a role as a supporter who helps the learning process while still going through the verification and validation process of information generated by AI.

In the practical context of higher education and related institutions, the speakers made a number of important recommendations. First, AI literacy and ethics of its use must be an integral part of the curriculum so that students can understand the opportunities as well as limitations of this technology. Furthermore, lecturers need to design assignments and evaluation methods that encourage critical thinking skills and originality, so that the use of AI is not only a shortcut to get answers, but also a means of developing deeper understanding. Special training on the use of AI and the preparation of ethical guidelines are also highly recommended so that all parties involved can use this technology responsibly. The resource person also emphasized the importance of developing a curated and collaboration-based religious education AI platform between IT experts and religious experts, so that the content and features presented are always relevant and in accordance with Islamic values.

Furthermore, AI in PAI education has great potential to integrate with the concept of Intelligent Tutoring Systems which highlights the practical usefulness and ease for users in accepting new technologies. The responsible use of AI will strengthen the role of teachers and scholars as the main guides, not replace them. Thus, AI integration must always adapt to Islamic scientific principles and modern learning needs. This approach not only encourages the advancement of education, but also keeps the spiritual values and character of students maintained in this fast-paced digital era.

In other words, the presence of AI in the world of PAI education is not just about technology, but about how to align innovation with tradition and ethics, so that AI really becomes a partner that empowers teachers, scholars, and students in creating a richer, meaningful, and more useful religious learning experience.

CONCLUSION

Artificial intelligence (AI) has great potential in revolutionizing Islamic Religious Education (PAI) learning by providing a more personalized, adaptive, and interactive learning experience. AI acts as a tool and companion that supports the learning process through adjusting materials according to student needs, fast access to information, and interesting educational features. However, the role of teachers and scholars as spiritual and moral guides remains irreplaceable, so AI should be used as a complement, not a replacement. The acceptance of AI in PAI learning is strongly influenced by ease of use and perceived benefits, but it also requires managing risks such as overdependence, information validity, and ethics of use. In the context of learning outcomes, AI is effective in assisting with the basic mastery and analysis stages, but human involvement is important for aspects of value evaluation and character building. Key challenges include maintaining intellectual integrity,

information validity, and ethics in the use of AI. Therefore, the integration of AI in PAI must be supported by the involvement of religious experts, technological literacy, strict supervision, and curriculum development that encourages critical thinking and originality. With a thoughtful approach, AI can be a partner that empowers teachers, scholars, and students, creating a more effective, relevant, and ethical religious learning process in the digital age.

REFERENCES

- Abubakari, M. S., Shafik, W., & Hidayatullah, A. F. (2024). Evaluating the potential of artificial intelligence in islamic religious education: A SWOT analysis overview. In *AI-Enhanced Teaching Methods* (pp. 216–239). IGI Global. <https://doi.org/10.4018/979-8-3693-2728-9.ch010>
- Achruh, Rapi, M., Rusdi, M., & Idris, R. (2024). Challenges and Opportunities of Artificial Intelligence Adoption in Islamic Education in Indonesian Higher Education Institutions. *International Journal of Learning, Teaching and Educational Research*, 23(11), 423–443. <https://doi.org/10.26803/ijlter.23.11.22>
- Ahmed, S., & Comair, C. (2024). Embracing Innovation for Sustainable Design Education: Exploring AI Integration Among Female Architects. In *Studies in Systems, Decision and Control* (Vol. 537, pp. 179–189). Springer Science and Business Media Deutschland GmbH. https://doi.org/10.1007/978-3-031-62106-2_15
- Al-Abdullatif, A. M. (2024). Modeling Teachers' Acceptance of Generative Artificial Intelligence Use in Higher Education: The Role of AI Literacy, Intelligent TPACK, and Perceived Trust. *Education Sciences*, 14(11). <https://doi.org/10.3390/educsci14111209>
- Al-Zahrani, A. M., & Alasmari, T. M. (2025). A comprehensive analysis of AI adoption, implementation strategies, and challenges in higher education across the Middle East and North Africa (MENA) region. *Education and Information Technologies*. <https://doi.org/10.1007/s10639-024-13300-y>
- Aldraiweesh, A. A., & Alturki, U. (2025). The Influence of Social Support Theory on AI Acceptance: Examining Educational Support and Perceived Usefulness using SEM analysis. *IEEE Access*, 13(January), 18366–18385. <https://doi.org/10.1109/ACCESS.2025.3534099>
- Aleisa, M., Alshahrani, M., Beloff, N., & White, M. (2022). TAIRA-BSC - Trusting AI in Recruitment Applications through Blockchain Smart Contracts. *Proceedings - 2022 IEEE International Conference on Blockchain, Blockchain 2022*, 376–383. <https://doi.org/10.1109/Blockchain55522.2022.00059>
- Alsulami, S. G., Albeladi, A. A., Kouchay, S. A., Altammam, A. A., Afifi, M. Y., & Al-Qahtani, R. T. M. (2024). Integration of TAM and ISSM into Student Satisfaction with AI Learning Intervention: Empirical Evidence from Islamic Studies. *Pakistan Journal of Life and Social Sciences*, 22(2), 6356–6366. <https://doi.org/10.57239/PJLSS-2024-22.2.00479>
- Andri Nirwana, A. N., Rifai, A., Ali, M., Ali Mustofa, T., Nur Vambudi, V., Nur Rochim

- Maksum, M., & Umar Budihargo, M. (2025). SWOT Analysis of AI Integration in Islamic Education: Cognitive, Affective, and Psychomotor Impacts. *Qubahan Academic Journal*, 5(1), 476–503. <https://doi.org/10.48161/qaj.v5n1a1498>
- Chere, M., & Wayi-Mgwebi, N. (2024). Integration of Generative Artificial Intelligence in Higher Education: Pedagogy Factors and Best Practices. In *Redefining Education and Development: Innovative Approaches in the Era of the Sustainable Development Goals* (pp. 93–112). Springer Nature. https://doi.org/10.1007/978-3-031-69954-2_7
- Darmawan, E., Rahman, T. K. A., & Thamrin, N. R. (2024). Evaluating Readiness and Acceptance of Artificial Intelligence Adoption Among Elementary School Teachers. *Jurnal Online Informatika*, 9(2), 228–237. <https://doi.org/10.15575/join.v9i2.1385>
- Elim, E. H. S. Y. (2024). Promoting cognitive skills in AI-supported learning environments: the integration of bloom's taxonomy. *Education 3-13*. <https://doi.org/10.1080/03004279.2024.2332469>
- Fang, W., Na, M., & Alam, S. S. (2025). Usage Intention of AI Among Academic Librarians in China: Extension of UTAUT Model. *Sustainability (Switzerland)*, 17(7). <https://doi.org/10.3390/su17072833>
- Faraon, M., Granlund, V., & Rönkkö, K. (2023). Artificial Intelligence Practices in Higher Education Using Bloom's Digital Taxonomy. *2023 5th International Workshop on Artificial Intelligence and Education (WAIE)*, 53–59. <https://doi.org/10.1109/WAIE60568.2023.00017>
- Foo, C.-C., Cheung, B., & Chu, K.-M. (2021). A comparative study regarding distance learning and the conventional face-to-face approach conducted problem-based learning tutorial during the COVID-19 pandemic. *BMC Medical Education*, 21(1). <https://doi.org/10.1186/s12909-021-02575-1>
- Garcia, M. B., Goi, C. L., Shively, K., Maher, D., Rosak-Szyrocka, J., Happonen, A., Bozkurt, A., & Damaševičius, R. (2024). Understanding student engagement in AI-powered online learning platforms: A narrative review of key theories and models. In *Cases on Enhancing P-16 Student Engagement With Digital Technologies* (pp. 1–30). IGI Global. <https://doi.org/10.4018/979-8-3693-5633-3.ch001>
- Habiballa, H., Kotyrba, M., Volna, E., Bradac, V., & Dusek, M. (2025). Artificial Intelligence (ChatGPT) and Bloom's Taxonomy in Theoretical Computer Science Education. *Applied Sciences (Switzerland)*, 15(2). <https://doi.org/10.3390/app15020581>
- Hasanah, U., & , Ririn Khairunnisa , Dhia Alfa Della, T. A. A. (2024). Opportunities, Challenges and Ethics of Artificial Intelligence Implementation in Teaching Islamic Religious Education in Public Universities: A Case Study in South Kalimantan. *JMPI (Jurnal Manajemen, Pendidikan, Dan Pemikiran Islam)*, 2(2), 144–154.
- Hazaimah, M., & Al-Ansi, A. M. (2024). Model of AI acceptance in higher education: arguing teaching staff and students perspectives. *The International Journal of*

- Information and Learning Technology*, 41(4), 371–393.
<https://doi.org/10.1108/IJILT-01-2024-0005>
- Indah, R. (2022). Qualitative Interview With Sensitive Partipants. *Jurnal Pendidikan Kedokteran Indonesia: The Indonesian Journal of Medical Education*, 11(1), 22.
<https://doi.org/10.22146/jpki.64308>
- Kiely, R., & Ainley, M. (2022). The impact of blended learning on student engagement and achievement in higher education. *Journal of Computer Assisted Learning*, 38(2), 118–130.
- Luan, L., Lin, X., & Dai, Y. (2025). Bridging the Gap: ChatGPT's Role in Enhancing STEM Education. *Open Praxis*, 17(1), 108–128.
<https://doi.org/10.55982/openpraxis.17.1.685>
- Matsui, Y., & Kawai, Y. (2022). Development of a Human Flow Visualization System Using Video Streams from Fixed Point Cameras. *LifeTech 2022 - 2022 IEEE 4th Global Conference on Life Sciences and Technologies*, 606–608.
<https://doi.org/10.1109/LifeTech53646.2022.9754877>
- Mesa, M. D. M., Valor, D., Montes, A., & García-Casas, I. (2025). Energy under debate: Fostering critical thinking in chemical engineering through in-class debates. *Education for Chemical Engineers*, 51, 121–132.
<https://doi.org/10.1016/j.ece.2025.03.002>
- Morales-Sánchez, M. I., Martín-Villarreal, J. P., & Coca-Ramírez, F. (2021). Booktubers in the classroom: Teaching experiences on the dynamics of online literary criticism. *OCNOS*, 20(2), 68–79.
https://doi.org/10.18239/OCNOS_2021.20.2.2426
- Osman, Z., & Yatam, M. (2024). Enhancing Artificial Intelligence-Enabled Transformation Acceptance among Employees of Higher Education Institutions. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 14(2), 289–303. <https://doi.org/10.6007/ijarafms/v14-i2/21322>
- Qader Ismail Alnajem, A. A., Abdulrazak Al-Kubaisi, A. A., Mahfuri, M., Radhi, A. D., Abdulrahman, M. M., & Almajed, R. (2024). Integrating Informatics and Business Administration: Bridging the Gap for Developed Organizational Performance. *2024 International Conference on Decision Aid Sciences and Applications, DASA 2024*. <https://doi.org/10.1109/DASA63652.2024.10836615>
- Rong, K., Shi, X.-W., & Lyu, R.-M. (2025). Empowering the sustainable development of the AI industry ecosystem with the “i7C” framework. *Studies in Science of Science*, 43(1), 197–204. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85216900652&partnerID=40&md5=f0369c6a506be38e1e93b9d40380da53>
- Saglam, Y. (2024). Which Data Gathering Method is Superior: An Open-Ended Questionnaire or a Semi-Structured Interview? *International Journal on Studies in Education*, 6(3), 375–386. <https://doi.org/10.46328/ijonse.220>
- Shanthana Lakshmi, S. (2021). The Smart Set: A Study on the Factors that Affect the Adoption of Smart Home Technology. In J. A., K. M., & G. N. (Eds.), *Lecture Notes in Networks and Systems* (Vol. 141, pp. 443–450). Springer Science and Business

- Media Deutschland GmbH. https://doi.org/10.1007/978-981-15-7106-0_44
- Siqi Yang. (2023). The Role of AI in Achieving Inclusive Education Siqi. *Proceedings of 3rd International Conference on Interdisciplinary Humanities and Communication Studies, 0*, 193–197. <https://doi.org/10.54254/2753-7064/64/2024.19654>
- Skandali, D., Magoutas, A., & Tsourvakas, G. (2024). Consumer Behaviour Analysis for AI Services in the Tourism Industry. *Malaysian Journal of Consumer and Family Economics, 32*, 332–362. <https://doi.org/10.60016/majcafe.v32.13>
- Sulaiman, S., Purwoko, A. A., & Purwaningsih, D. I. (2022). Pengembangan Sistem Informasi untuk Akreditasi Program Studi. *Edukasi: Jurnal Pendidikan, 20*(2), 329–343. <https://doi.org/10.31571/edukasi.v20i2.4577>
- Sunarya, U. (2024). Kendala Penggunaan Teknologi Informasi Dalam Proses Pengembangan Materi Pembelajaran Pai Di Madrasah Tsanawiyah. *EPISTEMIC: JURNAL ILMIAH PENDIDIKAN, 3*(1), 149–165. <https://doi.org/https://doi.org/10.70287/epistemic.v3i1.195>
- Vanitha, K., R. M. T., Sree, S. S., & Guluwadi, S. (2024). Deep learning ensemble approach with explainable AI for lung and colon cancer classification using advanced hyperparameter tuning. *BMC Medical Informatics and Decision Making, 24*(1). <https://doi.org/10.1186/s12911-024-02628-7>
- Xiong, Y., & Luo, Z. (2025). How can individuals develop critical thinking skills to evaluate online information. In *Signal and Image Processing Techniques for Defense, Security, and Healthcare* (pp. 165–186). IGI Global. <https://doi.org/10.4018/979-8-3693-6675-2.ch006>