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The Role of Artificial Intelligence in Shaping Modern Education in the Kurdish Region: Mediating Role of Smart Learning

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Abstract

This aspect requires the attention of researchers and policymakers as modern education has become a requirement for global societies to compete in the global marketplace. Consequently, this article investigates the impact of artificial intelligence and innovation on modern education in Kurdish educational institutions. The study also investigates the role of smart learning as a mediator between artificial intelligence, innovation, and contemporary education in Kurdish educational institutions. Using questionnaires, the study collected primary data from students of higher education institutions. Using smart PLS, the article also investigates the relationship between the constructs. The results suggested that artificial intelligence and innovation positively correlate with modern education in Kurdish educational institutions. The results also revealed that smart learning considerably mediates the relationship between artificial intelligence and innovation and modern education in Kurdish educational institutions. The article advises policymakers on adopting artificial intelligence and innovation in modern education.

Keywords: *Artificial intelligence, innovation, modern education, educational institutions, smart learning, the Kurdish region*

Introduction

The educational system is one of the most essential aspects of every community. It has important connections with and effects on all other economic spheres. Education is, therefore, essential for all social classes, despite their differences. Rapid advancements in AI have made it evident that this technology has the potential to alter numerous facets of contemporary life substantially (Reis, Santo, & Melão, 2019). Using Artificial Intelligence (AI) in the classroom can transform instruction delivery while enhancing student engagement and performance. According to Okonkwo and Ade-Ibijola (2021), educators and institutions in the digital age must comprehend and investigate the impact

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of artificial intelligence on the development of modern education. For example, numerous academics are interested in the challenges the education sector has encountered during covid-19. Access to education, barriers to entering physical classrooms, and economic issues are persistent societal problems. There will be various solutions to the problems, but this study concentrates on the technological solution provided by artificial intelligence (AI).

When it comes to teaching and learning, traditional school systems typically employ a one-size-fits-all approach that disregards children's requirements (Ganasan et al., 2023). This approach may cause students to lose interest in their studies, leading to disparities in their learning outcomes. Recent advances in AI, however, present an opportunity to revolutionize the educational system by delivering flexible, individualized programs that meet the requirements of each student (Al Mansoori, Salloum, & Shaalan, 2020). Many people now believe that AI will usher in the fourth educational revolution and is an integral element of the fourth industrial revolution. AI education has also made its way into the classroom. Television and computers were also hailed as innovative teaching tools; however, they have only increased students' access to information without altering the educational process's fundamental components (Reis et al., 2019). However, teachers should investigate the current state of AI and consider how it can benefit their students' education. (Okonkwo & Ade-Ibijola, 2021).

The education sector in the Kurdistan Region of Iraq (KRI) has expanded rapidly over the past two decades, but there has been no oversight of the educational system's quality. Despite the young civilization of the Kurdistan Region, education is highly valued and continues to play an important role in society. Since there was only one university in the KRI. Before 1992, the education system was considered to be quite immature. Since then, the government's development strategy has encouraged substantial investment in the industry, emphasizing establishing new educational institutions (Kakbra & Sidqi, 2013). There are currently 15 private universities and 14 state institutions in the KRI. The government has also made technological investments, such as Artificial Intelligence, to improve the quality of education, and in 2010 it introduced a comprehensive system of accreditation and quality control. This includes evaluating the performance of all academic personnel and institutions, which ultimately formed the basis for the annual KRI university rankings (Faeq, Garanti, & Sadq, 2021). Despite this investment, the region's education quality has been deteriorating, partly due to recurrent political and economic problems.

The term "education system" refers to all the elements collaborating to educate university students, such as policies, rules, laws, resource allocations, human resources, physical facilities, and instructional materials (Poulis, 2023). In a high-quality learning environment that values and supports effective instruction, the educational system equips students with the knowledge, skills, and transferable competencies necessary for post-graduation success. The educational system of the Kurdistan Region is considered to be of low quality for various reasons, and most academic staff members and university administrators are opposed to it (Salah, 2022). This opinion is primarily based on the fact that the region's education system does not adequately address the region's current or future labor market needs and lacks appropriate methods for serving academics and the community.

There is a great deal of literature on the education system and AI; however, the current investigation addresses a number of voids in the literature. 1) The model, which includes

a modern education system, artificial intelligence, innovation, and smart learning, has not been evaluated in the Kurdish region in recent years. 2) Popenici and Kerr (2017) investigated the relationship between AI and the education system in different countries and at different times. The current study will also examine this relationship, along with other variables such as innovation and smart learning, with a new sample set focusing on the Kurdish region. 3) Elrehail et al. (2018) investigated the relationship between innovation and the modern education system in various countries and eras; however, the current study will also examine this relationship, along with other variables such as AI and smart learning, using a new sample set. 4) Akour et al. (2023) investigated the mediating effect of smart learning with different variables in different countries at different times; however, the current study will also employ it in the relationship between AI, innovation, and the modern education system, especially in the Kurdish region, using a new sample set.

Review of Literature

AI refers to a broad field of computer science and engineering that seeks to imitate human intelligence in both the outward behavior of machines and the tasks they can perform (Reis et al., 2019). Artificial intelligence (AI) has the potential to revolutionize education by creating more effective, efficient, and individualized learning environments. Artificial intelligence (AI) has the potential to be an advantageous educational technology for both students and instructors. Opportunities abound for the advancement of AI applications in education, particularly when recent changes in the field, such as the digitization of educational resources, gamification, and personalized learning experiences, are considered. Thurzo et al. (2022) have developed an intelligent tuition system (ITS) that exploits the modeling potential of AI approaches to create reactive and adaptive tutorials for developing personalized learning environments.

Artificial intelligence (AI) is the ability and development of computer systems or other technologies based on information technology to carry out tasks that ordinarily require human intelligence and logical deduction. Even if AI has the potential to better the world, it has its problems. Literature suggests that AI and education are interconnected. In this context, Ma and Siau (2018) examined the possibility of a connection between AI and contemporary higher education. The study's findings confirmed a significant positive relationship between AI and contemporary higher education. Similarly, Chatterjee and Bhattacharjee (2020) investigated whether AI is connected with contemporary higher education. The investigation was conducted on the Indonesian populace. The research was conducted in India. The sample for the research consisted of 329 respondents. Using questionnaires, a representative sample of data was collected. For analysis, the UTAUT model was utilized in the study. The results of the analysis confirmed the existence of a significant and positive relationship between AI and contemporary higher education. Literature suggests five primary objectives of AI implementation in higher education systems. 1) increase the outcomes, 2) increase access to education, 3) increase retention, 4) reduce the cost of education, and 5) decrease completion time. Bates et al. (2020) examined whether AI can transform higher education in this context. The study's findings confirmed a significant positive relationship between AI and contemporary higher education. Enhance its impact on the transformation of the higher education system. To meet the new challenges posed by the digital society, institutions of higher education, i.e., universities, must drastically alter their rigid educational canons. Artificial

intelligence-based learning formats promise to significantly improve education at all levels by accurately personalizing students' learning experiences based on their needs and fusing diverse human interaction and information and communication technologies. In this context, Ocaña-Fernández, Valenzuela-Fernández, and Garro-Aburto (2019) examined whether artificial intelligence has any implications for contemporary higher education. The study results confirmed a significant positive relationship between AI and contemporary higher education. Additionally, AI has significant implications for education. In addition, Popenici and Kerr (2017) investigated the impact of artificial intelligence on teaching in contemporary higher education. According to many industry specialists, the rapid pace of technological advancement and the resulting job displacement indicate that teaching in higher education requires reevaluating instructors' roles and pedagogical approaches. With the current use of technical solutions such as "learning management systems" or IT solutions to identify plagiarism, the question of who determines the teaching and learning agenda in corporations and higher education institutions arises. Thus, the hypothesis derived from the preceding discussion is as follows:

H1: *There is a significant nexus between AI and modern education.*

Artificial intelligence (AI) is a swiftly developing field that blurs the lines between numerous academic disciplines, such as mathematics, engineering, computer science, philosophy, and language. AI technologies have four primary educational applications: machine learning, intelligent instruction systems, educational data mining, and learning analytics. Machine learning algorithms enable more individualized educational opportunities by analyzing vast amounts of data, identifying patterns, and making predictions (Ledro, Nosella, & Vinelli, 2022). Intelligent tutoring systems employ AI to provide individualized lessons and assistance to each pupil, adapting to their specific needs as they learn. Using educational data mining and learning analytics, which employ data-driven methodologies to extract relevant insights from educational data (Holmes & Tuomi, 2022), enables evidence-based decision-making and predictive modeling.

The higher education sector confronts various challenges, including those caused by technological advancement, political concerns, and new and unorthodox demands on the world's education systems. All of these factors make the higher education industry an attractive research topic. Literature suggests that there is a significant link between innovation and contemporary education in the form of the country's higher education system. In this context, Elrehail et al. (2018) examined whether there is a connection between innovation and leadership, specifically in the country's higher education system. The investigation was conducted on Jordan's populace. The research was empirical. The sample for the research consisted of 173 respondents. Using questionnaires, a representative sample of data was collected. For analysis, the investigation utilized SEM analysis. The analysis affirmed the existence of a significant and positive relationship between innovation and leadership, particularly in the higher education system. The efficacy of a country's education system is directly proportional to its potential for improvement. The higher the quality of their higher education institutions, the higher the quality of their education system. In this context, (Rehman & Iqbal, 2020) examined the relationship between innovation and the educational performance of higher education institutions. The investigation was conducted on the Pakistani populace. The research was empirical. The sample for the research consisted of 312 faculty members. Using questionnaires, a representative sample of data was collected. For analysis, the investigation utilized SEM analysis.

The analysis confirmed a significant and positive relationship between innovation and the educational performance of higher education institutions. Occasionally, innovation impacts any education-based relationship in the form of a moderator or mediator. Such moderation or mediation is associated with positive outcomes. Literature suggests that innovation is an important mediator between education and training. In this context, Sahibzada et al. (2023) examined whether innovation is a significant mediator in the relationship between leadership and the educational performance of higher education institutions.

The investigation was conducted on the Chinese populace. The research was empirical. The sample for the research consisted of 237 academic staff members. Using questionnaires, a representative sample of data was collected. For purposes of analysis, the study employed the Smart PLS method. The analysis confirmed that innovation is a significant mediator in the relationship between leadership and the educational performance of higher education institutions. Thus, the hypothesis derived from the preceding discussion is as follows:

H2: *There is a significant nexus between innovation and modern education.*

The education system of the world is becoming more modern as time passes. The education system is a significant distinction between developed and developing nations. The education system is incorporating modern technologies such as artificial intelligence. In the not-too-distant future, AI will be a fundamental requirement of the education system. Various factors, including institutional support and learning technologies, influence the relationship between AI and education. Alemayehu and Chen (2021) examined whether learning can mediate the relationship between motivation and learning engagement.

The investigation was conducted on Taiwan's populace. The research was empirical. As a sample, the study utilized the information of 354 students. Using questionnaires, a representative sample of data was collected. For analysis, the investigation utilized SEM analysis. The analysis revealed that learning can significantly mediate the relationship between motivation and learning engagement.

Similarly, Akour et al. (2023) examined whether intelligent learning can serve as a significant mediator in the relationship between AI and education system performance. The UAE population was the subject of the investigation. The research was empirical. The sample for the research consisted of 195 respondents. Using questionnaires, a representative sample of data was collected. The PLS-SEM analysis method was utilized for analysis in this study. The analysis confirmed that clever learning can significantly mediate the relationship between AI and education system performance. Thus, the hypothesis derived from the preceding discussion is as follows:

H3: *Smart Learning significantly mediates the nexus between AI and modern education.*

The ultimate goal of any nation's educational reforms is to modernize its education system. The nations ensure the adoption of contemporary tools to facilitate learning. Innovation and contemporary education are influenced by variables such as intelligent learning. In this context, Rahman, Uddin, and Dey (2021) examined whether online learning can serve as a significant Pandemic mediator. The investigation was conducted on the Bangladeshi populace. The research was empirical. The sample for the research

consisted of 442 respondents. Using questionnaires, a representative sample of data was collected. For analysis purposes, the study utilized the Smart PLS 3.0 analysis technique. The analysis results confirmed that online education could serve as an effective mediator in the Pandemic situation, particularly in Bangladesh. In addition, Aragón, Jiménez, and Valle (2014) investigated whether organizational learning can mediate between training and performance. The investigation was conducted on Spain's populace. The research was empirical. As a sample, the research utilized information from 1,600 Spanish companies. Using questionnaires, a representative sample of data was collected. The PLS-SEM analysis method was utilized for analysis in this study. The analysis confirmed that organizational learning can significantly mediate the relationship between training and performance. Thus, the hypothesis derived from the preceding discussion is as follows:

H4: *Smart Learning significantly mediates the nexus between innovation and modern education.*

Research Methods

The article investigates the impact of artificial intelligence and innovation on contemporary education and the mediating function of smart learning between artificial intelligence, innovation, and contemporary education in Kurdish educational institutions. Using questionnaires, the study collected primary data from students of higher education institutions. The variables are measured with questions extracted from previous literature, including artificial intelligence, which is measured with five questions taken from Wang and Wang (2022), innovation, which is measured with four items extracted from Heij et al. (2020), smart learning, which is measured with six questions adapted from Lin (2019), and modern education, which is measured with five questions extracted from Abbas (2020).

Respondents to the study were selected from higher education institutions. The students were selected based on a basic random sample. The surveys were distributed to students through personal visits to educational institutions. 566 questionnaires were sent out, but only 295 valid responses were received. These valid responses have a response rate of approximately 52.12%. Using smart PLS, the article also investigates the relationship between the constructs. Even though the authors used sophisticated frameworks and large data sets, they yielded the best results (Hair Jr, Howard, & Nitzl, 2020). In addition, innovation (INO) and artificial intelligence (AIN) were utilized as independent variables. In addition, one mediating variable, such as clever learning (SLN), and one dependent variable, such as modern education (MED), were included in the study. These structures are illustrated in Figure 1.

Research Findings

The article examines the correlation between items using factor loadings values greater than 0.50, Alpha values greater than 0.70, average variance extracted (AVE) values greater than 0.50, and composite reliability (CR) values greater than 0.70. These values indicated a strong relationship between variables. Table 1 contains these values.

Figure 1: Theoretical model

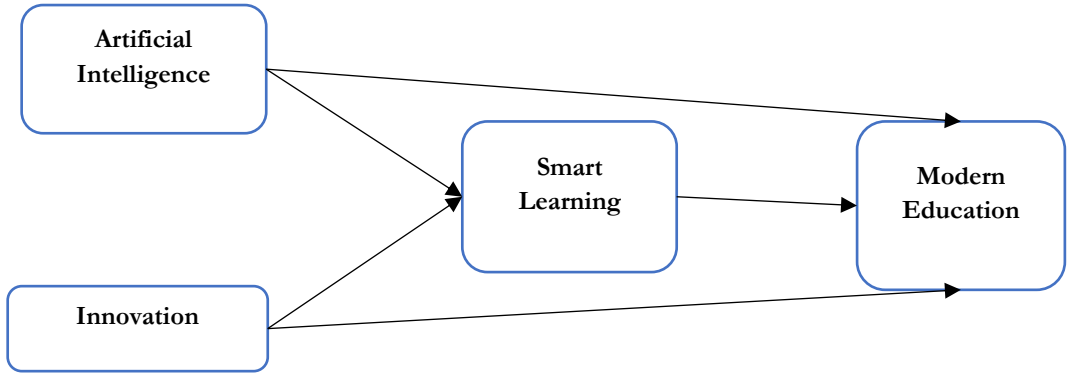


Table 1: Convergent validity

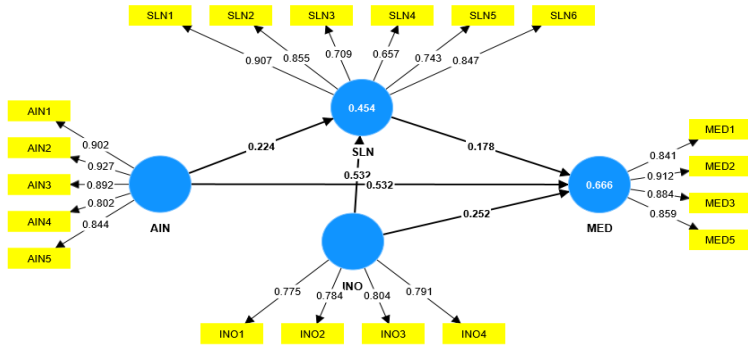
Constructs	Items	Loadings	Alpha	CR	AVE
Artificial Intelligence	AIN1	0.902	0.923	0.942	0.765
	AIN2	0.927			
	AIN3	0.892			
	AIN4	0.802			
	AIN5	0.844			
Innovation	INO1	0.775	0.798	0.868	0.622
	INO2	0.784			
	INO3	0.804			
	INO4	0.791			
Modern Education	MED1	0.841	0.897	0.928	0.765
	MED2	0.912			
	MED3	0.884			
	MED5	0.859			
Smart Learning	SLN1	0.907	0.878	0.908	0.626
	SLN2	0.855			
	SLN3	0.709			
	SLN4	0.657			
	SLN5	0.743			
	SLN6	0.847			

With the aid of the Heterotrait Monotrait (HTMT) ratio, the article examines the correlation between variables referred to as discriminant validity; values are below 0.90. A low correlation was indicated by these values between variables. Table 2 contains these values.

Table 2: Discriminant validity

	AIN	INO	MED	SLN
AIN				
INO	0.575			
MED	0.808	0.747		
SLN	0.535	0.762	0.668	

Figure 2: Measurement model assessment



In addition, the study examines the direct relationship between variables. The results indicated that artificial intelligence and innovation have a positive relationship with modern education in educational institutions in the Kurdish region; therefore, H1 and H2 can be accepted. These relationships are shown in Table 3.

Table 3: Direct path analysis

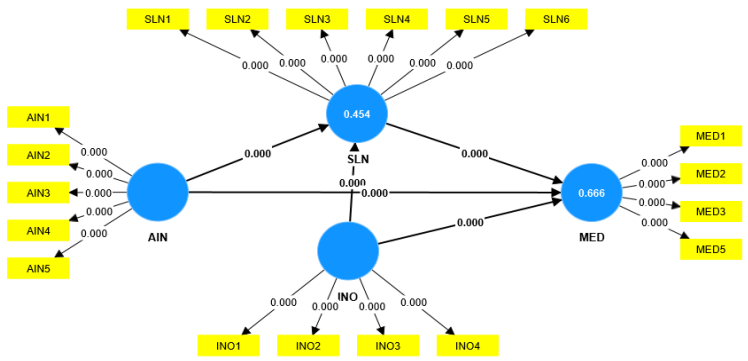
Relationships	Beta	Standard deviation	T statistics	P values
AIN -> MED	0.532	0.039	13.505	0.000
AIN -> SLN	0.224	0.044	5.053	0.000
INO -> MED	0.252	0.040	6.285	0.000
INO -> SLN	0.532	0.039	13.700	0.000
SLN -> MED	0.178	0.050	3.585	0.000

The study also examines the indirect association between variables. The results also demonstrated that smart learning mediates between artificial intelligence and innovation and modern education in Kurdish educational institutions and accepts hypotheses H3 and H4. These relationships are shown in Table 4.

Table 4: Indirect path analysis

Relationships	Beta	Standard deviation	T statistics	P values
AIN -> SLN -> MED	0.040	0.014	2.897	0.004
INO -> SLN -> MED	0.095	0.028	3.433	0.001

Figure 3: Structural model assessment



Discussions

The investigation found that artificial intelligence has a positive relationship with contemporary education. These findings are consistent with Kong (2020), which examines the function of artificial intelligence in contemporary education. The study asserts that using artificial intelligence by tutors enhances their instructional materials and student interaction skills. These instructors can create a more effective learning environment for the students to acquire knowledge of contemporary principles, lifestyle, and reasoning. Consequently, AI facilitates modern education for students. These findings are supported by Kuleto et al. (2021), which suggest that when institutions employ artificial intelligence via digital devices such as Google Search and chatbots, etc., they can design an effective curriculum that meets the needs of the modern era. Thus, artificial intelligence advances contemporary education.

The study's findings also revealed a positive relationship between innovation and contemporary education. These findings are supported by Akhmedov (2023), who argues that an institution's propensity to apply innovation when implementing plans results in a slight but significant improvement in teachers' knowledge and social and instructional skills when interacting with students. They can more effectively instill a modern curriculum and shape students' thinking. Therefore, innovation benefits modern education. These findings support Nancy, Parimala, and Livingston (2020) assertion that when innovation is incorporated into educational tools, students can learn how to develop modern ideas, adopt a modern lifestyle, and utilize modern technology. Therefore, innovation contributes to modern student education.

In addition, the results indicated that intelligent learning is a bridge between artificial intelligence and contemporary education. These results are consistent with Sevgi et al. (2023), who states that when students have access to artificial intelligence and the ability to use it, they may develop analytical, problem-solving, and good decision-making skills. These skills initiate intelligent learning in students. Students with intelligent learning are more likely to receive a contemporary education. These findings concur with Dilmurod and Fazliddin (2021) assertion that artificial intelligence enhances smart learning and contributes to modern education.

The study revealed that intelligent learning mediates between innovation and contemporary education. These results are consistent with Stecula and Wolniak (2022) findings, which imply that if institutions have a policy to implement innovation and make the education system conform to parental expectations, students can develop smart learning with innovation and consequently acquire a modern education. According to Chang et al. (2021), innovation enhances intelligent learning, a step toward modernizing education.

Implications

The study is significant in academics, as its contributions guide scholars. Using a combined research survey, the study investigates the effects of artificial intelligence and innovation on contemporary education. With its analysis of smart learning as a bridge between artificial intelligence, innovation, and contemporary education, this article also contributes significantly to the body of knowledge. In analyzing the role of artificial intelligence and innovation in smart learning and modern education in the Kurdish region, the present article also makes an exception.

The present investigation has empirical significance as well. It provides education institutions and the education ministry in the Kurdish region and worldwide with guidelines for promoting

modern education. To promote modern education, the study recommends that institutions adopt artificial intelligence for administrative and instructional purposes. There is a suggestion that education processes should incorporate innovation to promote modern education. The article advises policymakers on implementing modern education by adopting artificial intelligence and innovation. In addition, the study recommends that education administrators implement artificial intelligence to advance students toward smart learning and modern education with positive outcomes. In addition, the study suggests that both institutions and students should embrace innovation for modern education.

Conclusion

This research aims to investigate the effects of artificial intelligence and innovation on contemporary education. The authors were also curious about the function of intelligent learning in the relationship between artificial intelligence, innovation, and contemporary education. Education institutions in the Kurdish region provided the necessary quantitative data for artificial intelligence, innovation, and contemporary education. The findings demonstrated that artificial intelligence and innovation positively impact contemporary education. According to the study's findings, in institutions where artificial intelligence is used to administer the system and teach students, students are more likely to obtain a modern education in both curricular and extracurricular methods. The results also demonstrated that institutions that not only rely on established principles and traditional methods of instruction but also permit their staff to embrace innovation can successfully provide modern education following the needs of the public. The research article also concluded that intelligent learning significantly mediates artificial intelligence, innovation, and contemporary education. The results indicated that when students are introduced to artificial intelligence and trained on them, they have smart learning, and with smart learning, students can receive a modern education. In addition, if innovation is introduced into the education process, students can acquire a modern education by developing intelligent learning.

Limitations

The present study has some remaining limitations. Future researchers are encouraged to recognize these limitations and attempt to eliminate them. First, only two factors have been considered as catalysts for promoting modern education for students in this article. In this regard, the responsibilities of parents, tutors, and learning materials are also crucial, but the authors gave them no consideration. To broaden the scope of their research, authors must also include these crucial factors. Smart learning practices stimulate interest in artificial intelligence and innovation, advancing modern education. Therefore, intelligent learning can be a stronger moderator between artificial intelligence, innovation, and contemporary education. Thirdly, the authors have examined the relationships between these factors within the Kurdish education system. Future researchers must generalize the study's implications and expand the model's scope.

References

Abbas, J. (2020). HEISQUAL: A modern approach to measure service quality in higher education institutions. *Studies in Educational Evaluation, 67*, 1-13. https://doi.org/10.1016/j.stueduc.2020.100933

Akhmedov, B. A. (2023). Innovative pedagogical technologies in the modern educational system. *World Bulletin of Social Sciences, 19*, 107-112. https://scholarexpress.net/index.php/wbss/article/view/2205

Akour, I. A., Alshurideh, H. M., Alzoubi, H. M., Alshurideh, M. T., & Antouz, Y. A. (2023). Integrating Artificial Intelligence in Improving Educational System: The Mediating role of Smart Learning. In *2023 International Conference on Business Analytics for Technology and Security (ICBATS)* (pp. 3443-3463). IEEE. https://doi.org/10.1109/ICBATS57792.2023.10111284

Al Mansoori, S., Salloum, S. A., & Shaalan, K. (2020). The impact of artificial intelligence and information technologies on the efficiency of knowledge management at modern organizations: a systematic review. *Recent Advances in Intelligent Systems and Smart Applications, 2*, 163-182. https://doi.org/10.1007/978-3-030-47411-9_9

Alemayehu, L., & Chen, H.-L. (2021). The influence of motivation on learning engagement: The mediating role of learning self-efficacy and self-monitoring in online learning environments. *Interactive Learning Environments, 3*, 1-14. https://doi.org/10.1080/10494820.2021.1977962

Aragón, M. I. B., Jiménez, D. J., & Valle, R. S. (2014). Training and performance: The mediating role of organizational learning. *BRQ Business Research Quarterly, 17*(3), 161-173. https://doi.org/10.1016/j.cede.2013.05.003

Bates, T., Cobo, C., Mariño, O., & Wheeler, S. (2020). Can artificial intelligence transform higher education? *International Journal of Educational Technology in Higher Education, 17*(1), 1-12. https://doi.org/10.1186/s41239-020-00218-x

Chang, T.-Y., Hong, G., Paganelli, C., Phantumvanit, P., Chang, W.-J., Shieh, Y.-S., & Hsu, M.-L. (2021). Innovation of dental education during COVID-19 pandemic. *Journal of Dental Sciences, 16*(1), 15-20. https://doi.org/10.1016/j.jds.2020.07.011

Chatterjee, S., & Bhattacharjee, K. K. (2020). Adoption of artificial intelligence in higher education: A quantitative analysis using structural equation modelling. *Education and Information Technologies, 25*, 3443-3463. https://doi.org/10.1007/s10639-020-10159-7

Dilmurod, R., & Fazliddin, A. (2021). Prospects for the introduction of artificial intelligence technologies in higher education. *ACADEMICIA: An International Multidisciplinary Research Journal, 11*(2), 929-934. http://dx.doi.org/10.5958/2249-7137.2021.00468.7

Elrehail, H., Emeagwali, O. L., Alsaad, A., & Alzghoul, A. (2018). The impact of transformational and authentic leadership on innovation in higher education: The contingent role of knowledge sharing. *Telematics and Informatics, 35*(1), 55-67. https://doi.org/10.1016/j.tele.2017.09.018

Faeq, D. K., Garanti, Z., & Sadq, Z. M. (2021). The Effect of Total Quality Management on Organizational Performance: Empirical Evidence from the Construction Sector in Sulaymaniyah City, Kurdistan Region–Iraq. *UKH Journal of Social Sciences, 5*(1), 29-41. https://doi.org/10.25079/ukhjss.v5n1y2021.pp29-41

Ganasan, E., Mohd Yusoff, H., Azmi, A. A., Chia, P. W., Lam, S. S., Kan, S.-Y., Liew, R. K., Venkateswarlu, K., & Teo, C. K. (2023). Food additives for the synthesis of metal nanoparticles: a review. *Environmental Chemistry Letters, 21*(1), 525-538. https://doi.org/10.1007/s10311-022-01473-2

Hair Jr, J. F., Howard, M. C., & Nitzl, C. (2020). Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. *Journal of Business Research, 109*, 101-110. https://doi.org/10.1016/j.jbusres.2019.11.069

Heij, C. V., Volberda, H. W., Van den Bosch, F. A., & Hollen, R. M. (2020). How to leverage the impact of R&D on product innovation? The moderating effect of management innovation. *R&D Management, 50*(2), 277-294. https://doi.org/10.1111/radm.12396

Holmes, W., & Tuomi, I. (2022). State of the art and practice in AI in education. *European Journal of Education, 57*(4), 542-570. https://doi.org/10.1111/ejed.12533

Kakbra, J. F., & Sidqi, H. M. (2013). Measuring the impact of ICT and e-learning on higher education system with redesigning and adapting MOODLE system in Kurdistan Region Government, KRG-Iraq. In *Proceedings of the 2nd e-learning Regional Conference, At State of Kuwait*. https://erc2013.redsoft.org/Proceeding/Proceedings/p125.pdf

Kong, F. (2020). Application of artificial intelligence in modern art teaching. *International Journal of Emerging Technologies in Learning (iJET), 15*(13), 238-251. https://www.learntechlib.org/p/217610

Kuleto, V., P, M. I., Stanescu, M., Ranković, M., Šević, N. P., Păun, D., & Teodorescu, S. (2021). Extended reality in higher education, a responsible innovation approach for generation y and generation z. *Sustainability, 13*(21), 118-137. https://doi.org/10.3390/su132111814

Ledro, C., Nosella, A., & Vinelli, A. (2022). Artificial intelligence in customer relationship management: literature review and future research directions. *Journal of Business & Industrial Marketing, 37*(13), 48-63. https://doi.org/10.1108/JBIM-07-2021-0332

Lin, Y.-T. (2019). Impacts of a flipped classroom with a smart learning diagnosis system on students' learning performance, perception, and problem solving ability in a software engineering course. *Computers in Human Behavior, 95*, 187-196. https://doi.org/10.1016/j.chb.2018.11.036

Ma, Y., & Siau, K. L. (2018). Artificial Intelligence Impacts on Higher Education. *MWAIS 2018 Proceedings*, 42. http://aisel.aisnet.org/mwais2018/42

Nancy, W., Parimala, A., & Livingston, L. M. (2020). Advanced teaching pedagogy as innovative approach in modern education system. *Procedia Computer Science, 172*, 382-388. https://doi.org/10.1016/j.procs.2020.05.059

Ocaña-Fernández, Y., Valenzuela-Fernández, L. A., & Garro-Aburto, L. L. (2019). Artificial Intelligence and Its Implications in Higher Education. *Journal of Educational Psychology-Propositos y Representaciones, 7*(2), 553-568. http://revistas.usil.edu.pe/index.php/pyr/article/view/274

Okonkwo, C. W., & Ade-Ibijola, A. (2021). Chatbots applications in education: A systematic review. *Computers and Education: Artificial Intelligence, 2*, 100-116. https://doi.org/10.1016/j.caeai.2021.100033

Popenici, S. A., & Kerr, S. (2017). Exploring the impact of artificial intelligence on teaching and learning in higher education. *Research and Practice in Technology Enhanced Learning, 12*(1), 1-13. https://doi.org/10.1186/s41039-017-0062-8

Poulis, V. M. (2023). Evaluating the Context of Translation Courses in the Departments of English in Kurdistan Region, Iraq. *International Journal of Social Sciences & Educational Studies, 10*(1), 209-219. https://doi.org/10.23918/ijsses.v10i1p209

Rahman, M. H. A., Uddin, M. S., & Dey, A. (2021). Investigating the mediating role of online learning motivation in the COVID-19 pandemic situation in Bangladesh. *Journal of Computer Assisted Learning, 37*(6), 1513-1527. https://doi.org/10.1111/jcal.12535

Rehman, U. U., & Iqbal, A. (2020). Nexus of knowledge-oriented leadership, knowledge management, innovation and organizational performance in higher education. *Business Process Management Journal, 26*(6), 1731-1758. https://doi.org/10.1108/BPMJ-07-2019-0274

Reis, J., Santo, P. E., & Melão, N. (2019). Artificial intelligence in government services: A systematic literature review. *New Knowledge in Information Systems and Technologies, 1*(4), 241-252. https://doi.org/10.1007/978-3-030-16181-1_23

Sahibzada, U. F., Janjua, N. A., Muavia, M., & Aamir, S. (2023). Knowledge-oriented leadership and organizational performance: modelling the mediating role of service innovation, knowledge sharing quality. *Journal of Organizational Effectiveness: People and Performance, 4*, 61-79. https://doi.org/10.1108/JOEPP-10-2022-0296

Salah, R. M. (2022). The Impact of Virtual Learning Environments on the Digitalization of Higher Education in the Kurdistan Region-Iraq. *Science Journal of University of Zakho, 10*(3), 98-104. https://doi.org/10.25271/sjuoz.2022.10.3.875

Sevgi, U. T., Erol, G., Doğruel, Y., Sönmez, O. F., Tubbs, R. S., & Güngor, A. (2023). The role of an open artificial intelligence platform in modern neurosurgical education: a preliminary study. *Neurosurgical Review, 46*(1), 86-109. https://doi.org/10.1007/s10143-023-01998-2

Stecula, K., & Wolniak, R. (2022). Influence of COVID-19 pandemic on dissemination of innovative e-learning tools in higher education in Poland. *Journal of Open Innovation: Technology, Market, and Complexity, 8*(2), 89-106. https://doi.org/10.3390/joitmc8020089

Thurzo, A., Urbanová, W., Novák, B., Czako, L., Siebert, T., Stano, P., Mareková, S., Fountoulaki, G., Kosnáčová, H., & Varga, I. (2022). Where is the artificial intelligence applied in dentistry? Systematic review and literature analysis. *Healthcare, 10*(7), 1269. https://doi.org/10.3390/healthcare10071269

Wang, Y.-Y., & Wang, Y.-S. (2022). Development and validation of an artificial intelligence anxiety scale: An initial application in predicting motivated learning behavior. *Interactive Learning Environments, 30*(4), 619-634. https://doi.org/10.1080/10494820.2019.1674887