Original article

The Future of Education in Libya: Weighing the Pros and Cons of AI Integration

Sana Shrif* , **Mona Jamoum**

Department of Computer Science, Faculty of Science, Gharyan University, Gharyan, Libya
Corresponding email. *sharifsana1987@gmail.com*

Abstract
The integration of Artificial Intelligence (AI) in education is progressively transforming teaching, learning, and administrative practices globally, with significant potential for application in Libya. the purpose of this research is to discuss and evaluate the benefits and risks of AI in the education system of Libya. To achieve this, a descriptive research approach was employed, using a questionnaire distributed to a selected group of educational professionals in Libya. The sample consisted of 1,000 participants, and the survey was conducted via the WhatsApp application. The results highlight that personalized learning received the highest mean score of 4.19, indicating strong agreement on its effectiveness. Automation of administrative tasks (mean 3.80) and data-driven decision-making (mean 3.98) also showed favorable perceptions, with low variances around 0.24–0.25, reflecting consistent responses. Improved student engagement had a mean of 3.91 and a standard deviation of 0.49, similar to others, suggesting overall positive and uniform attitudes. Additionally, most responses clustered around neutral to moderate agreement, with modes of 3 or 4, showing balanced or mildly supportive opinions. Variance values ranging from 1.39 to 1.48 suggest a moderate spread, indicating some disagreement among participants. Standard deviations around 1.18 to 1.21 confirm a consistent yet moderate level of variability, without extreme polarization The obtained results show strong agreement on the benefits of educational innovations, especially personalized learning, which had the highest mean, and all aspects scored highly with low variability, indicating consistent positive perceptions. At the same time, the conclusions reveal moderate concern among respondents about the cost and inequality issues related to AI in education, with variance and standard deviation values reflecting a consistent spread of opinions. This research contributes to the academic discourse on the impactful integration of AI in academic institutions and establishes positive perceptions for continual enhancement. Overall, funding infrastructure emerges as the most pressing challenge, with general agreement across participants.
Keywords. Artificial Intelligence, Education, Personalized Learning, Libya.

Introduction

Artificial Intelligence (AI) dates back to the 1960s, with the development of early intelligent tutoring systems as a transformative force in education, reshaping traditional teaching and learning paradigms (1). With its ability to process vast amounts of data, adapt to individual learning needs, and automate administrative tasks, AI offers new opportunities for a future learning revolution by enhancing educational outcomes, personalizing learning experiences, and improving institutional efficiency (2,3). The integration of AI technologies in educational settings ranges from intelligent tutoring systems (ITS) and personalized learning platforms to advanced data analytics and automation tools, each contributing to a more tailored, effective, and scalable education system (4).

One of the primary advantages of AI in education lies in its potential to offer personalized learning experiences. AI-driven platforms and software can analyze student behavior and performance in real time, adapting instructional content, pace, and feedback to meet the diverse needs of individual learners. This is especially effective in meeting the diverse needs of students by offering focused support to those who need it and extending challenges to those ready for more (5,6). Additionally, intelligent tutoring systems, powered by AI, provide students with personalized, on-demand support, simulating the experience of one-on-one tutoring that would otherwise be difficult to scale in traditional educational settings (7–9). Beyond the classroom, AI is also revolutionizing administrative and organizational functions within educational institutions. By automating time-consuming tasks such as grading, scheduling, and student data management, AI enables educators and administrators to focus on more impactful tasks, such as teaching and student engagement. Furthermore, AI-powered learning analytics can provide valuable insights into student performance, helping educators identify patterns, predict outcomes, and refine their teaching strategies to better support their students (10,11).

Despite the potential benefits, the adoption of AI in education is not without its challenges. Key concerns include the potential for algorithmic bias, issues related to privacy and data security, and the risk of exacerbating the digital divide. Moreover, while AI can provide valuable support to educators, it cannot replace the essential human elements of teaching, such as fostering social and emotional development, which are critical to holistic student growth. The ethical implications of AI's role in education must be carefully considered, and strategies must be developed to ensure that its integration does not unintentionally perpetuate existing inequalities (12,13).

In recent years, Arab countries have accelerated their adoption of advanced technologies, implementing institutions, standards, and strategic plans to localize and utilize AI. Since 2018, there has been a marked increase in research output, reflecting a shift from general e-learning tools to more specialized AI applications that support adaptive, personalized, and resilient educational practices through AI-powered learning platforms. These efforts have positively influenced their rankings in global innovation and technology indicators (14). The integration of AI technologies across various sectors in the Arab world is driving significant transformation. For instance, using Arabic language as a model through various software tools is helping bridge communication gaps and break down disability barriers in Arab society (15,16). Recent research highlights the application of AI in diverse fields such as education, programming, healthcare, environmental management, public transportation, business, entertainment, and more (17–19). Meanwhile, some other Arab nations are still in the early stages, making initial efforts to introduce AI subjects into school curricula to lay the groundwork for future development in this field (20).

Before 2023, the integration of AI into Libya's education system was limited. Initial efforts focused on promoting digital literacy and incorporating basic computer skills into school curricula. During this period, AI was largely viewed as a means to enhance administrative tasks, such as scheduling, managing student records, and automating routine processes. However, its influence on teaching methods and curriculum design was minimal. The limited infrastructure, both in terms of digital tools and educator training, meant that AI remained largely theoretical within the education sector (21,22). In recent years, however, there has been a noticeable shift toward incorporating AI more directly into educational practices. Two major initiatives have marked the significant steps taken toward AI adoption:

A key milestone in Libya's journey toward AI integration in education was the collaboration between the Islamic World Educational, Scientific, and Cultural Organization (ICESCO) and the Libyan Ministry of Education (23). In July 2024, ICESCO launched a targeted program to embed AI and strategic foresight into the national education system. Central to this initiative was a three-day training workshop aimed at equipping education officials with the skills needed to apply AI in educational planning and management. The training focused on practical applications such as developing predictive learning models, automating administrative processes, and creating personalized learning pathways for students. It also laid the groundwork for establishing a foresight unit within the Ministry of Education, intended to use AI to anticipate and respond to future educational demands. This initiative marked a significant advancement in building both the human expertise and digital infrastructure essential for effective AI adoption in Libyan schools and universities (https://icesco.org/en/).

In May 2023, the Libyan Ministry of Education partnered with UNICEF to explore AI's potential in transforming curriculum development, particularly for inclusive education. The project's primary focus was on incorporating AI into creating adaptive learning tools for students with disabilities, thus facilitating inclusive education. AI-driven tools were used to design learning materials that catered to various learning styles, helping educators meet the needs of diverse student populations. Additionally, Montessori rooms were installed in schools to provide a learning environment that leveraged AI technologies for personalized education. Educators received training on integrating AI strategies to adapt to the unique needs of students with learning disabilities, ensuring that the educational content was accessible and beneficial for all learners (https://libyareview.com/).

This paper explores the multifaceted role of AI in education, examining its current applications, potential benefits, and the challenges it presents. By analyzing the transformative impact of AI on teaching, learning, and administration, this paper aims to provide a comprehensive understanding of how AI is shaping the future of education, while also addressing the ethical and practical considerations that must accompany its adoption.

Methods

To collect data for this survey, a descriptive research approach was used to accurately depict the views and experiences of a specific group within the educational sector in Libya. The target population comprised educational cadres, which included teachers, administrators, and other educational professionals working in various institutions. The selected sample size consisted of 1,000 educational cadres, chosen to represent a broad spectrum of roles and geographical locations to ensure a comprehensive understanding of the educational landscape.

The questionnaire designed for this survey focused on specific aspects of the educational system, such as teaching methods, challenges faced by educators, and their perspectives on educational reforms. The WhatsApp application was chosen as the primary platform for distributing the survey. This decision was based on the widespread use and accessibility of WhatsApp among Libyan educational professionals, ensuring that the survey reached a large and diverse group of respondents.

The questionnaire was distributed through the app, and participants were able to fill it out conveniently on their smartphones. The survey also featured a variety of question types, including multiple-choice, Likert scale, and open-ended questions, to capture both quantitative and qualitative data. In order to ensure the reliability of the data collected, statistical methods were employed to filter and analyze the responses. These

methods helped identify patterns and trends within the data, allowing for meaningful conclusions to be drawn.

Results

Table 1 represents the analysis indicates that among the evaluated educational innovations, personalized learning stands out with the highest mean score of 4.19, reflecting strong positive sentiment. Other aspects, such as the automation of administrative tasks (3.80) and data-driven decision-making (3.98), also received favorable responses. The low variance values (around 0.24–0.25) and standard deviations (approximately 0.49–0.50) across all items suggest that participants responded consistently. Improved student engagement, with a mean of 3.91, also ranked well, further supporting the trend of general approval. These findings demonstrate a broadly shared positive outlook toward integrating technology and innovation in education.

Table 1. Survey of educational innovations

Statements	Mean	Mode	Variance	Sta. Div.
Personalized Learning	4.19	4.1	0.25	0.5
Automation of Administrative Tasks	3.8	3.8	0.24	0.49
Data-Driven Decision Making	3.98	4.1	0.24	0.49
Improved Student Engagement	3.91	3.8	0.24	0.49

The histograms illustrate the distribution of responses for each category, with the x-axis representing response values and the y-axis indicating response density (Figure 1). For personalized learning, the majority of ratings fall between 4.0 and 5.0, indicating strong support. Most respondents believe that AI significantly contributes to personalized learning, with a high level of agreement. This is followed by data-driven decision making, where responses are concentrated between 3.5 and 4.5, peaking around 4.0 to 4.2. Although generally positive, this category shows slightly more variability in opinion. Both automation of administrative tasks and improved student engagement show moderate to high levels of agreement, with most responses falling between 3.5 and 4.5 and peaking at approximately 4.0. However, there is a slightly wider variation in responses for improved student engagement compared to the other categories, suggesting more diverse perspectives in this area.
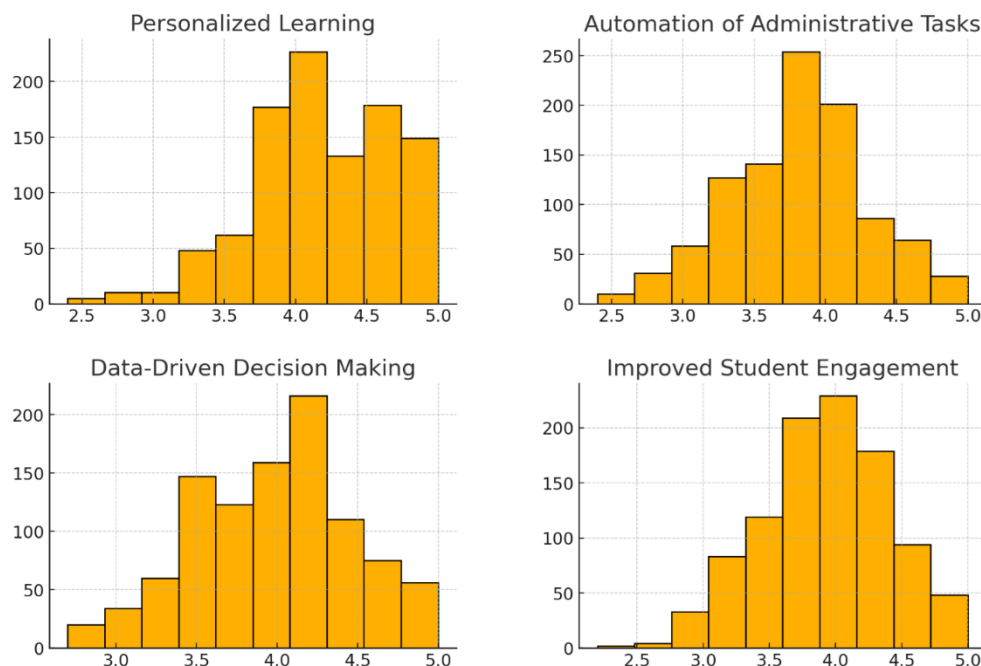

Figure 1. Histogram Distribution of Rating for each category
The image contains four histograms showing the distribution of responses to four different categories related to the use of AI in education.

The pie charts presented in Figure 2 illustrate the percentage distribution of ratings for each AI application area in education. In Figure 2a, which represents personalized learning, the most common ratings fall between approximately 4.0 and 4.5. Responses are highly clustered toward the upper end. The estimated mode is 4.1, the mean is 4.2, and the standard deviation is relatively low (~0.4–0.5). In contrast, Figure 2b, showing automation of administrative tasks, indicates moderate agreement with some variation. Where AI is generally perceived as helpful in this area. The estimated mode is 3.8, the mean is approximately 3.8–4.0, and the standard deviation is moderate (~0.4–0.5). While Figure 2c, depicting data-driven decision making,

it shows a strong central tendency around a mode of 4. The estimated mean is 4.1, with a medium standard deviation of approximately 0.5. Finally, Figure 2d, representing improved student engagement, reveals mode 3.8, mean 3.9, and the standard deviation is moderate (~0.4–0.5) as well, indicating diverse but mostly favorable opinions.

Figure 2a

Figure 2b
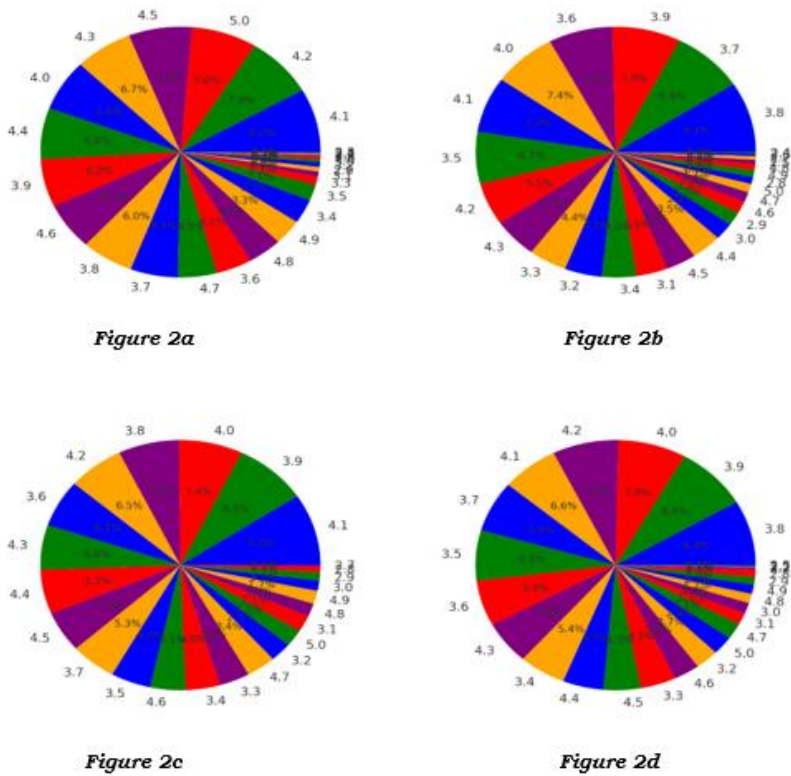
Figure 2c

Figure 2d

Figure 2. represents Statistical calculations for survey 1
The image indicates the percentage distribution of ratings for each AI application area in education.

Table. 2 responses to fifteen Questioner while the five main key statements about AI in education: "AI tools are too expensive for many schools," "Funding AI infrastructure is a major challenge," "High costs limit AI adoption in education," "Not all students have equal access to AI-powered tools," and "AI may increase inequality in education." Mean scores slightly above 3 show moderate agreement with these concerns, while modes of 3 or 4 reflect mostly neutral to agreeing views. Standard deviations between 1.18 and 1.21 indicate consistent, moderately varied opinions, with funding infrastructure emerging as the most agreed-upon challenge.

Table 2. Represents statistical calculations for survey 2

Statement	Mean	Mode	Variance	Sta. Div.
AI tools are too expensive for many schools.	3.11	3.00	1.48	1.22
Funding AI infrastructure is a major challenge.	3.18	4.00	1.47	1.21
High costs limit AI adoption in education.	3.16	3.00	1.45	1.21
Not all students have equal access to AI-powered learning.	3.10	3.00	1.40	1.18
AI may increase inequality in education.	3.13	3.00	1.39	1.18
Schools in rural areas struggle with AI integration.	3.15	3.00	1.44	1.20
AI in education raises privacy concerns.	3.12	3.00	1.44	1.20
AI could lead to the misuse of student data.	3.09	3.00	1.42	1.19
Ethical guidelines for AI in education are unclear.	3.10	3.00	1.37	1.17
Overreliance on AI can reduce teacher involvement.	3.13	3.00	1.34	1.16
AI might replace traditional teaching methods.	3.18	3.00	1.44	1.20
Students may become too dependent on AI tools.	3.19	3.00	1.48	1.22
Many teachers lack training in AI tools.	3.14	3.00	1.41	1.19

Schools do not provide enough AI training programs.	3.12	3.00	1.48	1.22
Teachers struggle to integrate AI into their lessons.	3.16	3.00	1.43	1.20

The bar charts illustrated in Figure 3 display the distribution of survey responses related to the challenges and concerns of AI integration in education, with the x-axis representing response values and the y-axis indicating response density. For cost and infrastructure challenges, most respondents selected mid to high levels of agreement (values 3–4), with the highest density centered around these values. Similarly, responses concerning equity and access also leaned toward agreement (3–4), with few strong disagreements. Privacy and ethical concerns showed a comparable pattern, with responses clustering around the neutral to agreement range (3–4). Moderate concern was also observed regarding the potential pedagogical impact of AI. In contrast, responses related to training and support demonstrated a stronger level of concern, with a noticeable peak at response value 4, indicating a high level of agreement that this is a significant barrier.
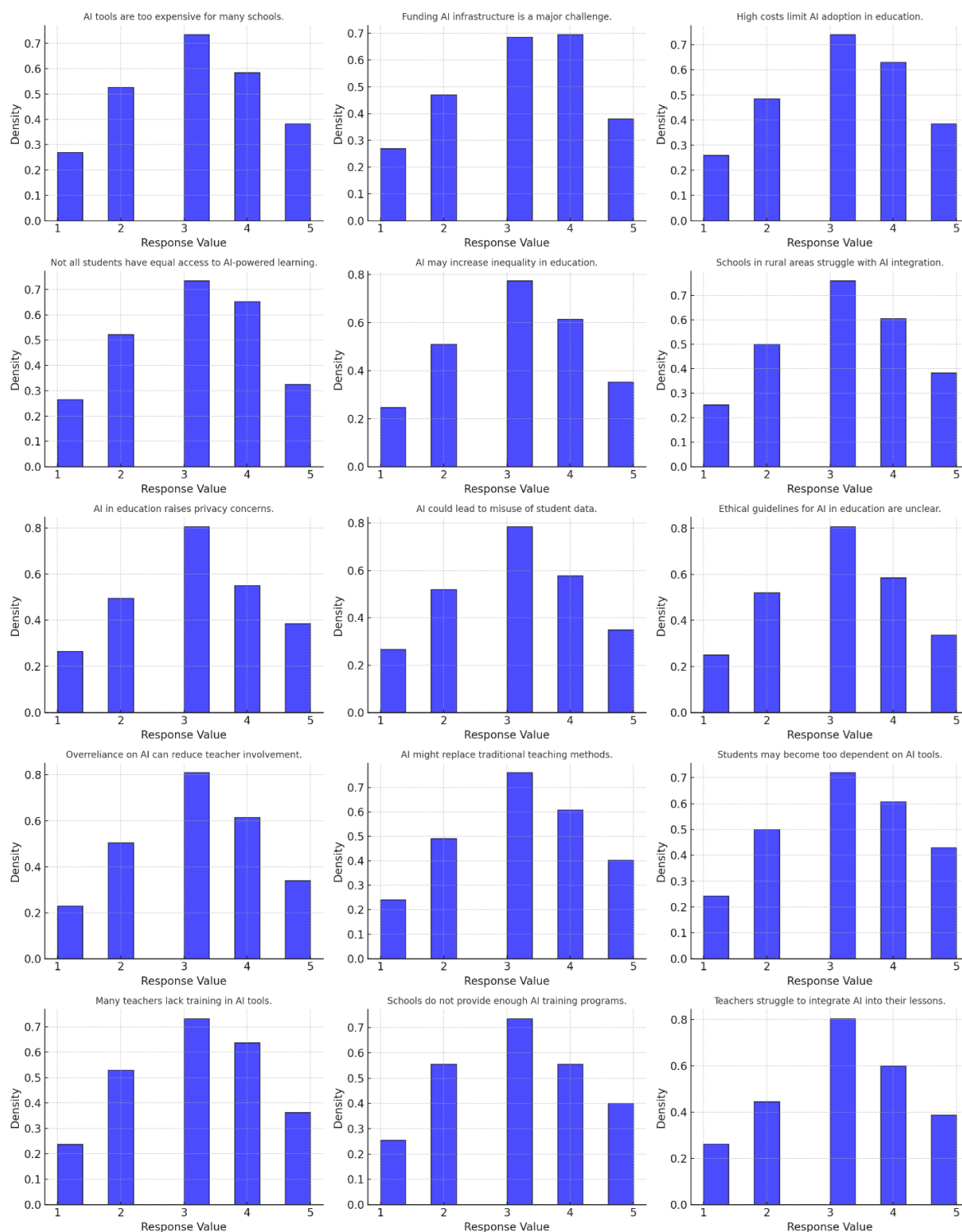
Figure 3. Distribution of Survey Responses

Discussion

Artificial Intelligence (AI) in education has emerged as a transformative force, offering solutions to challenges across various contexts and educational levels. Its integration into higher education is particularly impactful, with the potential to significantly enhance teaching and learning practices, while also bringing to light both positive perceptions and critical concerns(24). Qualitative insights from faculty and students further underscore AI's potential to improve learning outcomes across a range of academic disciplines (25,26). In this digital era, higher education is undergoing substantial change, largely driven by advances in AI technology. A growing body of literature explores educators' and academics' perceptions, intentions, and the perceived barriers to AI integration in higher education (27,28). These developments pose new challenges, demanding a fundamental transformation in educational processes to prepare professionals capable of navigating and shaping the evolving technological landscape. Moreover, the implementation of advanced AI-driven programs holds the promise of significantly improving education across all levels(29–31).

In the current work, the combination of modern data collection methods and statistical analysis contributed significantly to the overall success of the survey, providing valuable insights into the perspectives of Libya's educational professionals. Quantitative data, collected from 1,000 participants, shows that a majority of participants hold optimistic views on AI's effectiveness in enhancing educational processes and project-based activities. Concerning the first survey aimed to gather opinions on the use of AI in educational contexts. It is organized into four main categories, with participants asked to select one response per statement. The survey offers a concise and targeted tool to measure educational stakeholders' attitudes toward AI. Furthermore, it covers both pedagogical and administrative aspects of AI use, including individual learning customization and autonomy, streamlining educator responsibilities and communication, improving decision-making and educational outcomes through analytics, and perceptions of AI's impact on student engagement. The histogram distributions of the ratings showed favorable responses, centered around a score of 4.0. The most enthusiastic ratings and strongest perceptions were observed in the areas of personalized learning and data-driven decision making. In contrast, the categories of automation of administrative tasks and student engagement exhibited broader distributions, indicating more varied opinions. Despite this variation, all categories scored at or above 4.0, reflecting an overall positive perception of AI's impact in education. The highest level of confidence was noted in AI's role in personalized learning, whereas automation of administrative tasks was still viewed positively but with slightly more reservations. Our statistical calculations indicate a high level of consensus and reflect a strong belief in AI's ability to enhance personalized learning, while automation of administrative tasks is not as strong as for personalized learning. On the other side, consistent agreement on AI's role in improving decision-making was reported. Generally positive sentiment for improved student engagement was noticed, though with slightly more variability than the other categories.

The second survey was designed to capture educators' perceptions of the major obstacles to the widespread implementation of AI in educational settings. Key barriers identified include cost-related challenges, which hinder adoption across many academic sectors. Equity is also a major concern, particularly for rural students who are disproportionately affected by limited access to AI tools. Additionally, without proper ethical frameworks, AI implementation poses significant risks related to data privacy and responsible use. Furthermore, excessive reliance on AI may undermine the role of educators and hinder students' cognitive development. However, concerns were raised about the ethical implications, high costs, data privacy, and the complexity of AI tools. The majority of responses reflect moderate to strong concern across these areas. Cost-related barriers emerged as a major issue, suggesting that many educators view financial constraints as a significant obstacle to AI adoption. Responses related to equity and access reflect a widespread recognition of the digital divide, particularly affecting rural and underserved communities. Privacy and ethical concerns centered on potential data misuse and the absence of clear ethical guidelines suggest that many schools may lack adequate governance frameworks. Educators also expressed caution about the pedagogical implications of AI, including reduced student-teacher interaction and a shift away from traditional teaching methods. Unlike the previous categories, responses concerning training and support peaked more strongly at value 4, underscoring an urgent need for professional development and institutional backing to ensure effective AI integration in classrooms.

Throughout this paper, our findings offer valuable insights for educators, helping them navigate practical and ethical challenges while supporting the effective integration of AI into the education system.

Conclusion

In summary, this article reviews AI technologies and their applications, highlighting both the strengths and concerns of current implementations in education. It aims to bridge the gap between technological innovation and educational practice, offering practical examples and inspiration for both developers of AI technologies and educators leading AI integration in learning environments. Additionally, the article provides in-depth discussions on practical implications and challenges for future research was predominant.

Conflicts of Interest

There are no financial, personal, or professional conflicts of interest to declare.

References

1. Newell A. Intellectual issues in the history of artificial intelligence. Artificial Intelligence: Critical Concepts. 1982;25–70.
2. Batirovich AZ. Adapting educational paradigms with ICT and artificial intelligence: A study on transformative learning models. BBC. 2024;6:53.
3. Lytras MD, Serban AC, Alkhaldi A, Aldosemani T, Malik S. Transformative Learning for Future Higher Education: The Artificial Intelligence-enabled Learning Revolution 2035. In: Lytras MD, Serban AC, Alkhaldi A, Malik S, Aldosemani T, editors. Digital Transformation in Higher Education, Part B [Internet]. Emerald Publishing Limited; 2024 [cited 2025 May 10]. p. 231–41. Available from: https://doi.org/10.1108/978-1-83608-424-220241009
4. Luckin R, Holmes W. Intelligence Unleashed: An argument for AI in Education [Internet]. UCL Knowledge Lab: London, UK. London, UK: UCL Knowledge Lab; 2016 Feb [cited 2025 May 10]. Available from: https://www.pearson.com/content/dam/corporate/global/pearson-dot-com/files/innovation/Intelligence-Unleashed-Publication.pdf
5. Ahmad K, Iqbal W, El-Hassan A, Qadir J, Benhaddou D, Ayyash M, et al. Data-Driven Artificial Intelligence in Education: A Comprehensive Review. IEEE Transactions on Learning Technologies. 2024;17:12–31.
6. Wang J, Wang F. Utilizing Artificial Intelligence Technology to Construct an Online Learning Monitoring and Student Behavior Tracking Model. Procedia Computer Science. 2024 Jan 1;247:795–804.
7. Baker RS, Inventado PS. Educational Data Mining and Learning Analytics. In: Larusson JA, White B, editors. Learning Analytics: From Research to Practice [Internet]. New York, NY: Springer; 2014 [cited 2025 May 10]. p. 61–75. Available from: https://doi.org/10.1007/978-1-4614-3305-7_4
8. Li Y. Deep Reinforcement Learning: An Overview [Internet]. arXiv; 2018 [cited 2024 Sep 9]. Available from: http://arxiv.org/abs/1701.07274
9. Matos T, Santos W, Zdravevski E, Coelho PJ, Pires IM, Madeira F. A systematic review of artificial intelligence applications in education: Emerging trends and challenges. Decision Analytics Journal. 2025 Jun 1;15:100571.
10. Daud A, Aljohani NR, Abbasi RA, Lytras MD, Abbas F, Alowibdi JS. Predicting Student Performance using Advanced Learning Analytics. In: Proceedings of the 26th International Conference on World Wide Web Companion [Internet]. Republic and Canton of Geneva, CHE: International World Wide Web Conferences Steering Committee; 2017 [cited 2025 May 10]. p. 415–21. (WWW '17 Companion). Available from: https://doi.org/10.1145/3041021.3054164
11. Dietz-Uhler B, Hurn JE. Using Learning Analytics to Predict (and Improve) Student Success: A Faculty Perspective.
12. Holmes W, Bialik M, Fadel C. Artificial Intelligence in Education Promises and Implications for Teaching and Learning [Internet]. (1st ed.). Center for Curriculum Redesign: MA, USA. (2019). MA, USA: Center for Curriculum Redesign; 2019 [cited 2025 May 10]. 244 p. Available from: https://circls.org/primers/artificial-intelligence-in-education-promises-and-implications-for-teaching-and-learning
13. Lakshmi K, Khan S, Kumar PA, Wagh V, Vasanti G. AI-Powered Learning Analytics: Transforming Educational Outcomes Through ICT Integration. | EBSCOhost [Internet]. Vol. 44. 2024 [cited 2025 May 10]. p. 17910. Available from: https://openurl.ebsco.com/contentitem/gcd:180918834?sid=ebsco:plink:crawler&id=ebsco:gcd:180918834
14. Alasmari T. Artificial Intelligence and M-Learning in Arabic Countries: Innovations, Trends, and Regional Perspectives. International Journal of Interactive Mobile Technologies [Internet]. 2025 [cited 2025 May 10];19(5). Available from: https://search.ebscohost.com/login.aspx?direct=true&profile=ehost&scope=site&authtype=crawler&jrnl=186 57923&AN=183783624&h=L44fde6xIsjaoeOZoYSerPpymGyjh12oVX7uFc5GQ35g%2F6u15PVx2GyuImp2kgLc sRAkbdLncHHHH7hXSGg7CQ%3D%3D&crl=c
15. Alshareef N, Abobake R, Aljalil AA. Arabic Sign Language Recognition in Real Time Using Transfer Deep Learning. AlQalam Journal of Medical and Applied Sciences. 2024 Aug 5;730–9.
16. Khalatia MM, Al-Romanyb TAH. Artificial intelligence development and challenges (Arabic language as a model). Artificial Intelligence. 2020;13(5):83–105.
17. Adrees S, Abdulrazeg A, Shuaieb W. Implementation of Artificial Neural Networks on Field-Programmable Gate Arrays. AlQalam Journal of Medical and Applied Sciences. 2024 Oct 2;927–33.
18. Aldali M, Salama M, Almssmari H. Artificial Intelligence Applications in Healthcare. AlQalam Journal of Medical and Applied Sciences. 2024 Jul 28;597–605.
19. Altalhe E, Khalid A, Mohammed N, Mansour H, Ahmed K. Advancements in Seismic Wave Monitoring Technologies Using Artificial Intelligence. AlQalam Journal of Medical and Applied Sciences. 2025 Apr 16;637–45.
20. Merouane B. The future of artificial intelligence in the Arab world The experience of some Arab countries. International Journal of Economic Performance. 2023 [cited 2025 May 10]; Available from: https://cnrs.hal.science/hal-04183436/
21. Emran HAA, Elhony FM. Challenges of employing artificial intelligence in Libyan higher education. International Journal of Science and Research (IJSR). 2024;13(8):1247–9.
22. Mohsen AHS. Artificial Intelligence in Educational Institutions With Some Cases from Libya. مجلة Faculty of Arts Journal- Tripoli university. 2025 [cited 2025 May 22]; Available from: https://uot.edu.ly/journals/index.php/faj/article/view/1680

23. Mehdioui A. Legislative Mechanisms to Combat Illicit Trafficking of Cultural Property in the Islamic World (Arab Region). Santander Art and Culture Law Review. 2024;10(2):329–38.
24. Zhou C. Integration of modern technologies in higher education on the example of artificial intelligence use. Educ Inf Technol. 2023 Apr 1;28(4):3893–910.
25. Bobrytska VI, Krasylnykova HV, Beseda NA, Krasylnykov SR, Skyrda TS. Artificial intelligence (AI) in Ukrainian Higher Education: A Comprehensive Study of Stakeholder Attitudes, Expectations and Concerns. International Journal of Learning, Teaching and Educational Research. 2024 Jan 30;23(1):400–26.
26. Lin H, Chen Q. Artificial intelligence (AI) -integrated educational applications and college students' creativity and academic emotions: students and teachers' perceptions and attitudes. BMC Psychol. 2024 Sep 16;12(1):487.
27. Kuleto V, Ilić M, Dumangiu M, Ranković M, Martins OMD, Păun D, et al. Exploring Opportunities and Challenges of Artificial Intelligence and Machine Learning in Higher Education Institutions. Sustainability. 2021 Jan;13(18):10424.
28. Mahmud MM, Wong SF, Mohd A'seri MS, Ahmad R, Yaacob Y, Qazi A, et al. Exploring Academic Perceptions and Challenges in AI Integration in Higher Education. In: Proceedings of the 2024 16th International Conference on Education Technology and Computers [Internet]. New York, NY, USA: Association for Computing Machinery; 2025 [cited 2025 May 25]. p. 167–72. (ICETC '24). Available from: https://dl.acm.org/doi/10.1145/3702163.3702410
29. Gunawan KDH, Liliasari, Kaniawati I, Setiawan W. The responses to artificial intelligence in teacher integrated science learning training program. J Phys: Conf Ser. 2021 Nov;2098(1):012034.
30. Maity S. Identifying opportunities for artificial intelligence in the evolution of training and development practices. Journal of Management Development. 2019 Sep 20;38(8):651–63.
31. Ocaña-Fernández Y, Valenzuela-Fernández LA, Garro-Aburto LL. Artificial Intelligence and Its Implications in Higher Education. Journal of Educational Psychology - Propositos y Representaciones. 2019;7(2):553–68.