

Research Article

Cite this article: Al-Taai, S., Kanber, H., Al-Dulaimi, W., & Jassim, K. (2025). The Role of Artificial Intelligence Applications in Improving Blended Learning in Iraqi Universities. *Educational Process: International Journal*, 17, e2025409. <https://doi.org/10.22521/edupij.2025.17.409>

Received June 16, 2025

Accepted August 13, 2025

Published Online August 24, 2025

Keywords: Artificial Intelligence, Blended Learning, E-Learning, Traditional Education, Iraqi Universities

Author for correspondence:

Huda Abbas Kanber

✉ huda.abbas@ircoedu.uobaghdad.edu.iq

✉ University of Baghdad / College of Islamic Sciences, Iraq

The Role of Artificial Intelligence Applications in Improving Blended Learning in Iraqi Universities

Suaad Al-Taai^{id}, Huda Abbas Kanber^{id}, Waleed Al-Dulaimi^{id},
Khalid Jassim^{id}

Abstract

Background/Purpose: This study examines the role of artificial intelligence (AI) applications in enhancing blended learning within Iraqi universities. The rapid advancement of AI technologies and the shift toward hybrid education models, accelerated by the COVID-19 pandemic, necessitate an evaluation of their impact, challenges, and potential in Iraq's higher education sector. The research aims to clarify key concepts of AI and blended learning, assess their advantages and disadvantages, and provide actionable recommendations to optimize their integration.

Materials/Methods: A descriptive-analytical approach was employed, utilizing a closed-ended questionnaire distributed to 150 professors across 20 Iraqi universities from January 8 to 22, 2025. The sample included equal gender representation and diverse academic specializations. Data were analyzed to identify trends in AI adoption, perceived benefits, and institutional challenges.

Results: Adoption Trends: AI-powered Learning Management Systems (LMS) were the most prevalent (60%), while advanced technologies like VR/AR had minimal uptake (4%). AI significantly improved virtual classroom management (63.3%) and personalized learning (56.7%). Over 86% of respondents affirmed AI's role in enhancing blended learning. Weak technical infrastructure (93.3%) and lack of faculty training (80%) were major barriers. Ethical concerns (33.3%) and resistance to change (34%) were secondary issues.

Conclusion: AI holds transformative potential for Iraqi universities by improving educational quality, personalization, and efficiency. However, success depends on addressing infrastructural deficits, investing in faculty training, and fostering policies that support technological integration. The study advocates for partnerships with tech firms and curriculum reforms to embed AI tools, ensuring alignment with Iraq's educational goals.



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1. Introduction

Educational institutions are among the most critical sectors affected by the COVID-19 pandemic around the world. Millions of students have faced significant difficulties in receiving their education, prompting stakeholders to actively seek alternatives and new methods to address the disruption and stagnation of the educational process (UNESCO, 2023). In this field, numerous initiatives have emerged to transform most smart electronic applications covering all aspects of life into distance learning platforms, employing them to confront the challenges of the present and shape the future, based on a foundation that takes into account time and effort savings and adheres to health prevention (Ghalem & Samir, 2022).

Under these circumstances, the features of traditional education, based on direct communication between the teacher and students, and their presence in the same place and time during the semester, have emerged. Traditional education alone is no longer able to meet the requirements of educational institutions and keep pace with their development. This has necessitated the search for, development of, and adoption of new learning methods (OECD, 2020). However, comprehensive technological progress and awareness of the need to provide development requirements, which in turn has created a new reality, has prompted a reconsideration of the nature of the work of educational institutions in terms of their strategy, curricula, and methods, ensuring their success factors, and studying all the expected future possibilities in the phase of coexistence with the conditions of this pandemic and its current and future requirements.

2. Literature Review

Zhao and Yang (2019) discuss how artificial intelligence leads to an opportunity to improve learning processes and develop innovative approaches to education, such as blended teaching. Based on this, the researcher has made preliminary suggestions on how to apply blended teaching to English reading courses aided by artificial intelligence technology. The aim of this is to improve the quality of teaching and learning for this course, which benefits both instructors and students (Zhao & Yang, 2019). In their study, Saber and Saber (2021) aimed to explore the future of blended learning in Iraqi universities and assess the effectiveness of E-learning in teaching physics at the University of Basra. Findings indicated the difficulty of relying solely on E-learning without blending it with traditional methods. Challenges included instructors' limited technological skills and weak internet infrastructure. The study recommends improving digital infrastructure and providing training for instructors on modern technologies (Saber & Saber, 2021). Al-Maliki (2023) sought to clarify the role of artificial intelligence in enhancing educational strategies in higher education and reviewed its administrative, instructional, and research benefits. It adopted a narrative review methodology across twenty studies. Results showed that AI enhances instructors' roles, improves student performance, and increases learning efficiency. The study also stressed the urgent need to raise awareness of AI's importance and overcome technical and cultural barriers to its implementation (Al-Maliki, 2023). Al-Sabab (2023) examined the relationship between blended learning and active student participation during the COVID-19 pandemic, involving a sample of 940 students from scientific and humanities fields. Results showed a high level of blended learning among students, with no significant gender differences. However, there were significant differences by field of study, favoring scientific disciplines. A positive correlation was also found between blended learning and student engagement (Al-Sabab, 2023). Hamidi and Kazim (2024) measured the awareness of blended learning requirements among Iraqi university instructors using a questionnaire distributed to 400 participants. Findings revealed a moderate overall level of awareness, with statistically significant differences based on years of service. Awareness of scientific and technical requirements varied by experience level. The study recommends targeted training programs for less experienced faculty to enhance their digital and pedagogical competencies (Al-Hamdi & Al-Husseini, 2020).

This research stands apart from prior studies by explicitly tackling both the theoretical and methodological shortcomings identified in the literature. On the theoretical side, it offers an integrated framework that clarifies how artificial intelligence can be employed to strengthen blended learning. It further elaborates on the concept of AI, detailing its applications, impacts, and benefits within education, while also defining blended learning and outlining its tools, merits, guiding principles, and various levels. On the practical side, the study applies a descriptive survey approach to gather and analyze the perspectives of Iraqi university instructors regarding the role of AI in enhancing blended learning, alongside the advantages and challenges associated with its use. Through combining a well-defined conceptual foundation with empirical evidence rooted in the Iraqi higher education context, this work closes the gap between research on AI and blended learning, providing practical and theoretical contributions that can inform future educational policies and practices.

3. Methodology

This study investigates the role of artificial intelligence (AI) applications in enhancing blended learning in Iraqi universities. The central research problem is encapsulated in the question: What is the role of artificial intelligence applications in improving blended learning in Iraqi universities? The study aims to define and clarify the concept of artificial intelligence, its applications, effects, and advantages in education; to explain the concept of blended learning, including its tools, benefits, principles, and implementation levels; and to identify the critical success factors and obstacles associated with blended learning. Additionally, it explores how AI can contribute to blended learning, analyzes the associated benefits and challenges, and offers practical recommendations for more effective use of AI technologies within Iraqi higher education institutions. The significance of the study lies in its contribution to improving the quality of blended education through the strategic use of AI tools. Methodologically, the study employs a descriptive analytical approach. Data were collected using a closed-ended questionnaire distributed to a sample of university professors across Iraqi universities over two weeks from January 8 to January 22, 2025. Additional data were obtained from both paper-based and electronic academic sources. The data were analyzed statistically based on percentages.

4. Theoretical Framework

4.1. Artificial Intelligence

Artificial intelligence (AI) is one of the modern technologies developed on computers in order to assist administrators and technicians in the decision-making and implementation process. Artificial intelligence technology helps in finding the necessary solutions to the problems and difficulties facing the implementation of administrative companies' tasks. This is done by carrying out the process of thinking, analysis, and inference, just like the human mind. However, it has not reached great potential and capabilities in thinking, analysis, inference, deduction, reasoning, etc. (Anwar, 2012, p. 39; Abbas, 2020, p. 368; Zakariya, Kanber, & Jassim, 2025). Artificial intelligence can be defined as the study of intellectual abilities through the use of computer models, which is concerned with the method of simulating human thinking. It is known as the science that studies how to make the computer perform most of the tasks that humans perform, but in a way that is less capable than them (Asi, 2015, p. 44). Artificial intelligence is the industry of intelligent machines and software capable of simulating human mental abilities, especially the ability to learn, find solutions to problems, innovate, explain, interpret, justify, and other difficult processes (Abdullah, 2020, p. 16).

Researchers define artificial intelligence (AI) as a branch of technology that empowers computer systems to emulate human cognitive functions, including learning, reasoning, problem-solving, and decision-making. Through the processing of large datasets and the identification of patterns, AI

systems are capable of executing complex tasks, automating processes, and delivering intelligent solutions across a wide range of fields and applications.

4.2. Advantages of Using Artificial Intelligence in Education

The most important advantages of using artificial intelligence in education are as follows (Abdul Khaliq, 2020, pp. 258-259) (Kadhim & Jassim, 2019, pp. 301-302)

- a. Non-digital coding is more complex than regular computers that rely on ones and zeros. That is, it can make important and complex decisions. In addition, artificial intelligence programs can reach solutions to problems even if the data is incomplete. Rather, it can deal with contradictory and sometimes conflicting data.
- b. Artificial intelligence contributes to saving time and effort while providing an alternative reality for students, as it helps students learn to confront and keep pace with modern technology and apply it in their reality.
- c. Artificial intelligence contributes to presenting questions to students by revealing and identifying students' weaknesses and their mental abilities, and revealing their skills and methods.
- d. Artificial intelligence helps students choose accurate and appropriate questions, and it is also an outlet for them. Practical experiments have proven that students are more capable and bolder in dialogue away from their teacher.

4.3. Blended Learning

Education and training programs are known by several names such as: (Blended Learning), (Hybrid Learning), (Mixed Learning), (Integrated Learning), (Dual Learning) and others (Abdul Amir, 2020, p. 234; Hassan A.-M., 2016, p. 439; Al-Imam & Aziz, 2018, p. 125; Al-Subaie & Al-Qabati, 2020, p. 558). It is considered a complement to the known educational teaching methods and a major tributary to the most common traditional university education that relies on lectures. As Information Technology IT, which deals with all electronic computer software, is not a goal or an end in itself. Rather, it is a means of conveying knowledge and achieving the goals of education. It contributes to preparing the learner to face the requirements of life, which are increasingly based on information technology (Jassim, 2024, p. 112). Accordingly, blended learning relies upon regular teaching to support it in an easier, faster, and clearer manner (Al-Thiabat, 2013, p. 187; Jassim, 2024, p. 112). Blended learning relies on an effective set of multiple presentation instruments, teaching methods, and other educational styles that facilitate the learning process. This is based on the integration of traditional methods in which students meet (face-to-face) with (E-learning) methods that transform education from the stage of indoctrination to creativity, interaction, and skill development (Al-Hamdi & Al-Husseini, 2020, p. 202; Majeed, 2023, p. 164). It uses interconnected means of communication to learn a specific subject. These methods include a combination of direct lectures in the lecture hall, communication via the Internet, and self-learning. Thus, Blended Learning constitutes a complementary education to traditional attendance-based education. It uses the Internet, auxiliary programs, and presentations, in addition to the partial employment of some e-learning instruments to support, facilitate, and improve the efficiency of traditional face-to-face education (Ahmed & Ibrahim, 2020, p. 287; Barhoumi, 2022, p. 459). Blended learning is characterized by its vital integration to improve teaching and learning by providing an effective educational environment in which the teacher and students participate through face-to-face education as well as distance education. This helps students develop their learning management skills and achieve better educational outcomes (Al-Tamimi, 2019, p. 188; Salman, 2020, p. 135).

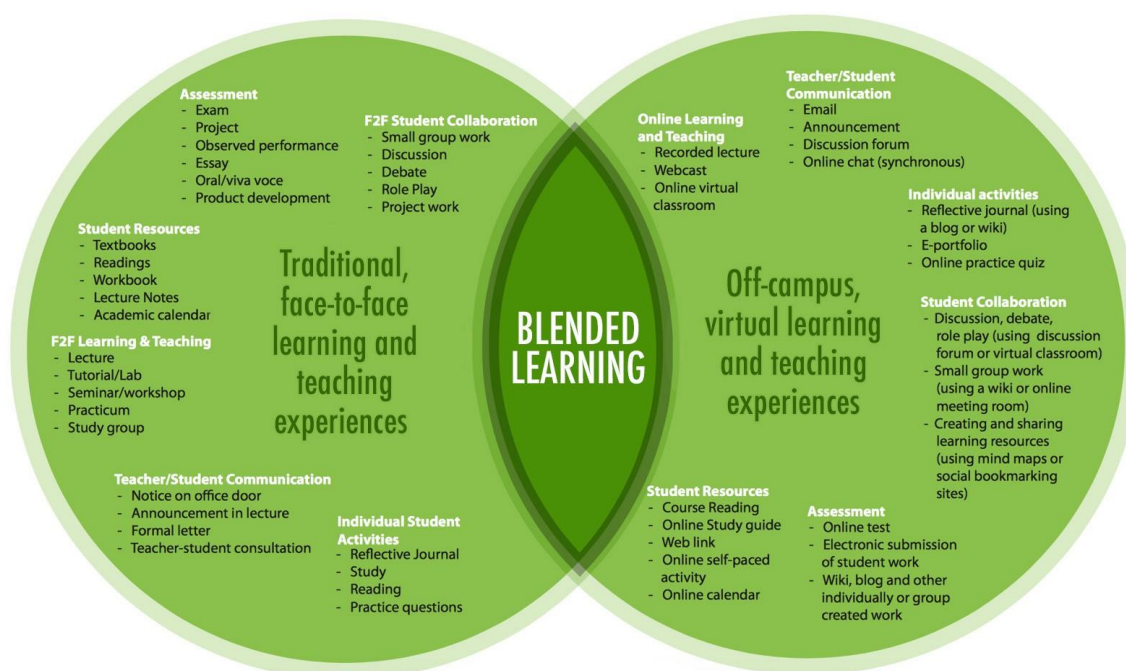


Figure 1. Blended Learning Environment (Bath, 2010, p. 4)

Researchers define Blended learning as an educational approach that combines traditional face-to-face instruction with e-learning, integrating technological tools with in-person lectures to enhance the quality of education. This method employs various tools such as the internet, live lectures, and self-learning, which help develop students' skills, creativity, and engagement. Blended learning serves as a supportive method that improves the efficiency of university education and prepares learners for the demands of modern life in the digital age.

4.4. Advantages and Levels of Blended Learning

Blended learning is distinguished by its ability to provide a learning environment that helps students focus and take greater responsibility for their own learning, while enhancing interaction and offering new learning opportunities that are more flexible and accessible. Among its most notable advantages, according to several studies (Al-Tamimi, 2019, p. 186; Hamdi & Algharbawi, 2020, p. 618), are its usefulness in teaching subjects that are difficult to deliver entirely online, such as developing manual skills and conducting complex experiments; enabling lectures to be delivered even during holidays or emergencies; providing flexibility in classroom teaching through communication and information technologies; serving as a model for active learning that combines traditional education with computer- and internet-based instruction; reducing dropout rates; enabling access to content anytime and anywhere; integrating the curriculum with multimedia supervised by the teacher; achieving longer-lasting educational effects than self-learning; reducing costs compared to e-learning; strengthening direct communication and social bonds; and meeting students' individual needs and diverse learning styles.

The levels of blended learning are manifested in four main patterns (Al-Subaie & Al-Qabati, 2020, p. 559): the composite level, which links information delivery tools to content through dual or triple-component models that mix e-learning and face-to-face learning with feedback; the integrated level, which employs various e-learning elements such as internet resources, discussion groups, and online assessment; the collaborative level, which combines traditional and online teachers with learning groups in the classroom or online; and finally, the expansion and dissemination level, which merges traditional classroom instruction with offline e-learning resources such as email, electronic media, software, and mobile devices.

4.5. Factors of Success and Challenges in Implementing Blended Learning

Blended learning plays a crucial role in enhancing learning outcomes, raising students' academic levels, and achieving predetermined educational goals through the effective use of technological innovations. It contributes to improving teachers' professional competence, mastering teaching methodologies, saving time and effort, and adopting support strategies based on diverse learning experiences in the most effective ways (Al-Thiabat, 2013, p. 187). Key success factors include placing the student at the center of the educational process; increasing interaction between teacher and student, between peers, with learning content, and with external resources; and integrating formative and summative assessment mechanisms for both teachers and students (Zahid, Ghada Shahata Ibrahim, & Issa, 2018, p. 105)

However, implementing blended learning presents several challenges. Teachers often face difficulties transitioning from traditional lecture-based methods to modern approaches and dealing with learners untrained in self-directed learning. The process may require greater effort and financial investment to prepare scientific content electronically, while some institutions lack sufficient computer devices, robust digital infrastructure, or affordable internet access—factors that hinder training continuity and assignment preparation. Additionally, issues such as reliance on certification over skill acquisition, persistence of rote learning, absence of supportive e-learning legislation, and insufficient infrastructure (e.g., servers, workstations) pose obstacles. There is also a shortage of teacher training for curriculum development that supports innovative teaching methods, a lack of serious institutional adoption of blended learning as a strategy to improve educational outcomes, difficulty in using English-based tools, and the prevalence of paper-based curricula that must be digitized for easier access (Hassan A., 2016, pp. 446-447; Ayada, 2017, p. 171; Al-Subaie & Al-Qabati, 2020, p. 563).

5. Results and Discussion

5.1. Validity of the Study Instrument

The term validity means the ability of the instrument form to measure the research variables that the instrument was designed to measure. Comprehensiveness was taken into account in its absorption of the research variables and the absence of duplication in it. Therefore, in order to verify the face validity of the instrument, a copy of the questionnaire was presented to a number of specialized jury members (Appendix 1). The questionnaire received the agreement of the majority of the jurors at a rate of 100%. The jurors' comments were taken regarding correcting some phrases and formulating some of them more appropriately.

5.2. Population and Sample Selection and Analysis of Questionnaire Data

The study population represents the Iraqi university professors. A random sample of 150 professors was selected from 20 Iraqi governmental and Iraqi universities. An equal number was selected in terms of Gender of the sample (75) males and (75) females. Table 1. shows the study sample:

Table 1. Work and Place of the Study Sample University and College

No.	University Name	No.	Percentage
1	University of Baghdad / Ibn Rushd College of Education / College of Islamic Sciences / College of Education for Girls / College of Engineering / College of Arts / College of Science)	24	16
2	University of Anbar (College of Science / College of Education for Humanities / College of Agriculture)	12	8

No.	University Name	No.	Percentage
3	University of Babylon (College of Pharmacy / College of Medicine)	12	8
4	Al Mustansiriyah University (College of Arts / College of Education)	12	8
5	University of Mosul (College of Arts / College of Islamic Sciences)	12	8
6	University of Basra (College of Arts / College of Engineering)	12	8
7	Technological University (Electromechanical Engineering / Computer Sciences)	8	5
8	University of Iraq (College of Arts / Education)	8	5
9	Tikrit University (Political Sciences / Islamic Sciences)	6	4
10	University of Kufa (College of Jurisprudence / College of Administration and Economics)	6	4
11	University of Diyala (College of Islamic Sciences / College of Education for Humanities)	6	4
12	University of Karbala (College of Administration and Economics / College of Law)	6	4
13	University of Al-Qadisiyah (College of Arts / College of Sciences)	6	4
14	University of Wasit (College of Education for Humanities)	6	4
15	Middle Technical University (Institute of Administration Al-Rusafa)	4	3
16	Imam Al-Aazam University College	2	1
17	Imam Al-Kadhim University College	2	1
18	Al-Turath University College	2	1
19	Al-Mustaqbal University College	2	1
20	Dijlah University College	2	1
Total		150	100

5.3. Descriptive Information of the Study Sample

As Table 2 reveals, the highest percentage of sample subjects in terms of academic title was Assistant Professor (34.7%). While the percentages of the titles of Professor and Assistant Instructor were 25.3%, Instructor (9.3%, and other titles (5.3%, respectively. In terms of academic specialty, the largest percentage (53.4%) was gained by the Humanities, Social Sciences, and Educational Sciences, while Administrative and Economic Sciences obtained the lowest percentage (6.0%). The highest percentage (84%) revealed by the above table was gained by those who had previous experience with blended learning. The reason for this is the spread of the Coronavirus from the end of 2019 until the present time, when they use traditional education and E-learning through educational platforms. The percentage (74.6%) was obtained by those who had knowledge of artificial intelligence applications in education.

Table 2. Descriptive Information of the Study Sample

Series No.	Demographic Characteristics of The Sample	Categories	No.	Percentage
1	Academic Title	Professor	38	25.3
	Academic Specialization	Assistant Professor	52	34.7
	Do you have previous experience with blended learning?	Lecturer	14	9.3
		Assistant Lecturer	38	25.3
		Other	8	5.3
2	Academic Title	Humanities, Social and Educational Sciences	80	53.4
	Academic Specialization	Applied and Engineering Sciences	23	15.3
		Medical and Health Sciences	18	12.0
		Administrative and Economic Sciences	9	6.0
		Others	20	13.3
3	Do you have previous experience with blended learning?	Yes	86	57.3
		Somewhat	40	26.7
		No	24	16.0
4	Do you have knowledge of artificial intelligence applications in education?	Yes	47	31.3
		Somewhat	65	43.3
		No	38	25.3

5.4. The Impact of Artificial Intelligence on Blended Learning

As Table 3 shows, the most common application among the respondents is Learning Management Systems (LMS) at 60% (90 participants). This indicates that it is the most common in blended learning, given its significant role in organizing and managing educational content and academic activities through artificial intelligence. Virtual reality and augmented reality (VR/AR) represent the lowest percentage at 4% (6 participants). This reflects the weak spread of this technology in blended learning environments, perhaps due to high costs or the lack of appropriate infrastructure.

Table 3. Artificial Intelligence Applications in Blended Learning Utilized by Study Sample or Heard About It

Series No.	Artificial Intelligence Applications in Blended Learning	No.	Percentage
1	AI-Powered Learning Management Systems – LMS	90	60.0
2	AI Chat GPT & Copilot	60	40.0
3	Speech Recognition & NLP	34	22.7
4	Automated Assessment Systems	20	13.3

Series No.	Artificial Intelligence Applications in Blended Learning	No.	Percentage
5	AI-Powered Proctoring Systems	19	12.7
6	Adaptive Learning	17	11.3
7	Learning Analytics & Predictive Analytics	10	6.7
8	AI-Powered Educational Robots	8	5.3
9	Deep Learning & Smart Recommendations	8	5.3
10	Virtual Reality & Augmented Reality - VR/AR	6	4.0

5.5. The Role of Artificial Intelligence in Improving Blended Learning

As Table 4. Indicates that most of the respondents (86.7%) believe that artificial intelligence contributes to a large or very large extent to improving blended learning. This will make these technologies as well-trusted ones. A small percentage (12.0%) believes that its impact is limited. This indicates that potential challenges may be related to the actual application and not to the principle of using artificial intelligence itself. Moreover, a percentage of (0%) of the sample said that it "does not affect". This means that all respondents believe that artificial intelligence plays a role in blended learning, albeit to varying degrees.

Table 4. Opinions of the Study Sample on the Role of Artificial Intelligence in Improving Blended e-Learning

Series No.	The Role of Artificial Intelligence in Improving Blended E-Learning	No.	Percentage
1	Very much	66	44.0
2	To a great extent	64	42.7
3	To a moderate extent	18	12.0
4	To a small extent	2	1.3
5	Does not affect	-	0.0
Total		150	100

5.6. Main Benefits of Artificial Intelligence in Improving Blended Education

As Table 5. shows 95) respondents had indicated improving the management of virtual classrooms, with a percentage of (63.3%) in terms of teaching. This indicates that artificial intelligence is widely used in organizing and managing digital classrooms. This facilitates interaction and contributes to improving the quality of blended education. The least (50) respondents indicated, with a percentage of 33.3%, in terms of teaching benefit, the development of smart and accurate assessment tools. This reflects that this benefit did not receive the same priority compared to other benefits, perhaps due to the challenges of actually applying these tools or the continued reliance on classical assessment methods. They indicated that other benefits as improving personal interaction by customizing content based on the student's learning style, mobile education via smart applications that allow access to content anytime and anywhere, data analysis and performance improvement to monitor student performance, providing customized solutions, enhancing collaborative education via interactive platforms that support group learning, improving access to education for people with special needs and finally improving academic management such as registration and scheduling using artificial intelligence.

Table 5. Responses of the Study Sample on the Main Benefits of Artificial Intelligence in Improving Blended Education

Series No.	Who Benefits from The Rise of The Brain in Improving Blended Education	No.	Percentage
1	Improving virtual classroom management	95	63.3
2	Increasing student engagement through smart educational applications	90	60.0
3	Improving the individual learning experience and adapting content to students' needs	85	56.7
4	Providing continuous educational support through smart assistants	67	44.7
5	Developing smart and accurate assessment tools	50	33.3
6	Other	4	2.7

5.7. The impact of Artificial Intelligence on Various Aspects of Blended Learning

As Table 6 reveals, the highest number (132 about the impact of artificial intelligence on blended learning represents the customization of educational content according to the student's level. This reflects the importance of artificial intelligence in providing customized educational content that meets the different needs of students, and then enhancing students' skills in self-learning, with the responses of 131 teachers. This reflects the role of artificial intelligence in encouraging students to learn independently and develop their abilities. The least impact of the answer was on developing teaching strategies based on data analysis. This indicates that these aspects may need further development to achieve the maximum benefit from artificial intelligence.

Table 6. Responses of the Study Sample on the Impact of Artificial Intelligence on Various Aspects of Blended Learning

No.	The Impact of Artificial Intelligence on Various Aspects of Blended Learning	Very Great Impact	Great Impact	Moderate Impact	Slight Impact	No Impact
1	Improving student-faculty interaction	66	56	14	14	-
2	Personalizing educational content according to student level	43	89	9	9	-
3	Developing teaching strategies based on data analytics	70	47	19	14	-
4	Reducing teaching load through automation	70	56	19	5	-
5	Enhancing students' self-learning skills	70	61	14	5	-
Total		319	309	75	47	-

5.8. Main Challenges Facing the Application of Artificial Intelligence in Blended Education

As Table 7 shows, the highest percentage (93.3%) is the weakness of the technical infrastructure in universities. This indicates that the lack of technological capabilities constitutes the biggest

obstacle to the adoption of artificial intelligence in blended education. Then, a lack of training for faculty members on the use of modern technologies (80.0%). This indicates the urgent need to develop teachers' skills in dealing with artificial intelligence tools.

The lowest percentage of the challenge is ethical concerns related to the collection and use of data, which recorded a percentage of 33.3%. This indicates that concerns about privacy and data security exist. However, it is not the biggest challenge compared to infrastructure and training. They indicated the existence of other challenges (2.7%), which represented the difficulty of integrating artificial intelligence technologies with traditional educational content. Cybersecurity issues and the risk of cyber-attacks on educational systems based on artificial intelligence. There is an absence of clear regulations governing the use of artificial intelligence in education.

Table 7. Responses of the Study Sample on the Main Challenges Facing the Application of Artificial Intelligence in Blended Education

Series No.	Challenges Facing the Application of Artificial Intelligence in Blended Learning	No.	Percentage
1	Weak technical infrastructure in universities	140	93.3
2	Lack of awareness of the importance of artificial intelligence in teaching	68	45.3
3	Lack of training for faculty members on the use of modern technologies	120	80.0
4	High costs of developing and implementing artificial intelligence systems	79	52.7
5	Ethical concerns related to data collection and use	50	33.3
6	Resistance of some professors and students to change teaching methods	51	34.0
7	Other	4	2.7

5.9. The Importance of Training Programs for Teaching Staff Members in Integrating Artificial Intelligence into Blended Learning

As Table 8 reveals, the great importance and medium importance were the highest percentages (89.3%). This indicates that the majority of the study sample believes that training programs for teaching staff members are necessary for the success of integrating artificial intelligence into blended learning. No importance was recorded as the lowest percentage (10.0%). This indicates that there are only a few numbers of subjects who do not see the need for these training programs.

Table 8. Responses of the Study Sample on The Importance of Training Programs for Teaching Staff Members in Integrating Artificial Intelligence into Blended Learning

Series No.	The Importance of Training Programs for Faculty Members in Integrating Artificial Intelligence into Blended Learning	No.	Percentage
1	Very Important	104	69.3
2	Medium Important	31	20.7
3	No Importance	15	10.0
Total		150	100

5.10. The Most Important Suggestions for Developing the Use of Artificial Intelligence in Blended Education

As Table 9. Shows the highest percentage 91.3%) was to provide intensive training programs for professors on the use of artificial intelligence in teaching. This means that most participants or sample subjects believe that training professors on the use of artificial intelligence in teaching is an essential step to developing blended education. The lowest percentage (36%) was recorded for the suggestion to establish partnerships between universities and technology companies to develop advanced educational tools. This indicates that sample subjects or participants prefer to focus on improving the internal capabilities of universities rather than relying on external partnerships. They indicated that there were other suggestions , which included holding workshops and practical seminars to clarify the importance of using artificial intelligence in education, increase students' and teaching staff members' awareness of its applications and its role in improving the educational process, support instructors interested in employing artificial intelligence, provide training opportunities to enhance their skills, and introduce artificial intelligence education technology at Iraqi universities. The above will raise academic cadres' awareness about the importance of artificial intelligence applications. Finally, artificial intelligence applications aim to facilitate scientific achievement and are not a substitute for developing human intelligence.

Table 9. The Most Important Suggestions for Developing the Use of Artificial Intelligence in Blended Education Research

Series No.	What are The Most Important Suggestions That You Think Will Help Develop the Use of Artificial Intelligence in Blended Learning? (You Can Choose More Than One Answer)	No.	Percentage
1	Providing intensive training programs for professors on the use of artificial intelligence in teaching	137	91.3
2	Developing policies that support the use of technology in university education	71	47.3
3	Encouraging scientific research in the field of artificial intelligence and blended learning	67	44.7
4	Investing in improving the technological infrastructure of universities	61	40.7
5	Establishing partnerships between universities and technology companies to develop advanced educational tools	54	36.0
6	Other	1	0.7

6. Conclusion

Based on the analysis of the study results, the researchers have come to the following conclusions:

a. Intelligent Learning Management Systems (LMS) are the most common among the study sample. This indicates a high reliance on these systems in blended learning. This is due to their effective role in organizing and managing educational content.

b. The existence of weak technical infrastructure in Iraqi universities. This is the biggest challenge facing the application of artificial intelligence in blended learning. This indicates the need to improve technological capabilities to facilitate the use of these technologies in education.

c. Blended learning was surrounded by some obstacles, especially the lack of awareness and an integrated vision of e-learning among some parties to the educational process on the one hand, and the difficulty of dealing with learners who are not trained in self-learning and the lack of a sufficient number of computer devices at Iraqi educational institutions on the other hand.

d. The great confidence in the role of artificial intelligence in improving blended learning. The study sample confirmed that artificial intelligence contributes to a large or very large extent to improving blended learning. This reflects the high confidence in the ability of these technologies to improve the quality of education.

e. The study sample showed the need for faculty members to train and develop professionally on the use of artificial intelligence, which is essential for the successful integration of these technologies into blended learning. This highlights the importance of continuous education.

f. There are multiple benefits of artificial intelligence in improving blended e-learning, such as improving the management of virtual classes and increasing interaction through smart educational applications. This demonstrates the positive impact of artificial intelligence in improving interaction and learning quality.

7. Suggestion

a. Iraqi universities should invest more in improving the technological infrastructure, including providing high-speed internet and advanced devices.

b. Iraqi Universities should provide intensive and integrated training programs for teaching staff members that aim at qualifying those members to use artificial intelligence technologies in e-learning.

c. Introducing Artificial Intelligence technologies as part of the curricula so that students learn how to use these technologies in their academic fields.

d. Providing tools or instruments that stimulate continuous interaction between students and teachers through blended learning platforms using artificial intelligence.

e. Improving the use of Artificial Intelligence to customize educational content based on the different needs of students and enhance self-learning.

f. Iraqi universities are recommended to develop clear policies that support the use of AI in blended learning while ensuring a balance between technology and the human side.

g. Enhancing cooperation between Iraqi universities and technology companies to develop innovative educational tools based on AI.

h. Iraqi universities should encourage scientific research in the field of AI and its uses in blended learning.

Declarations

Author Contributions. All authors contributed equally to the preparation of this manuscript. Their contributions include conceptualizing and writing both the theoretical and practical aspects of the research, as well as collecting, reviewing, and analyzing the relevant sources.

Conflicts of Interest. The authors declare that there are no conflicts of interest regarding the publication of this research.

Funding. The authors declare that no financial support or funding was received for this research.

Ethical Approval. The authors affirm their adherence to the principles of research integrity and publication ethics. This manuscript complies with the ethical standards of academic publishing.

Data Availability Statement. All data and sources related to this research are openly accessible on the internet..

Acknowledgments. The Researchers would like to thank all the lecturers at Iraqi universities who responded to the research questionnaire sent to them.

References

- Hamdi, W., & Algharbawi, F. (2020). The effectiveness of using blended learning from the viewpoint of students of the University of Sharjah in the light of the university's policies and strategies. *Al-Adab Journal*. <https://doi.org/10.31973/aj.v1i135.887>
- Zhao, X., & Yang, Y. (2019). IOP Conf. Ser.: Earth Environ.Sci. ., (p. 693). <https://doi.org/10.1088/1755-1315/693/1/012019>
- Abbas, R. (2020). The Attitude to Artificial Intelligence its Relationship with future Orientation Among university students. *Al-Adab Journal*(135). <https://doi.org/10.31973/aj.v1i135.1161>
- Abdul Amir, N. (2020). The Role of Digital Education in Improving Performance and Academic Achievement in Chemistry in Secondary Education. *Journal of Kut -University College for Humanities,A Special Issue for Research Papers of The Twenty-Ninth International Conference"Digital Education Between Need and Necessity" During period 11-19, November*.
- Abdul Khaliq, A. (2020, November 11-12). Patterns of Artificial Intelligence and Digital Transformation in Education,. *Journal of Kut University College for Humanities,Special Issue for The Research of the Twenty-Ninth International Conference Digital Education Between Need and Necessity*, pp. 255-259.
- Abdullah, N. (2020). The Linguistic Connotations of The Word "Light" In the Holy Quran, An Analytical Study of The Quranic Verses Using Artificial Intelligence Techniques,. *Al-Rafidain Journal of Computer Science and Mathematics*,(2), p. 16.
- Ahmed, R., & Ibrahim, B. (2020). The Impact of Digital Education on Student Academic Achievement, A Comparative Analytical Study of Fourth-Year Students in the Department of Financial and Banking Sciences at Al-Rasheed University College. *Journal of Kut University College for Humanities, Special Issue for Research Papers of the Twenty-Ninth International Conference "Digital Education Between Need and Necessity" for the period from November 11-19*.
- Al-Hamdi, A., & Al-Husseini, K. (2020). Towards blended learning in engineering specializations: Computer engineering programs as a model. *Journal of Kut University College for Humanities, aspecial issue for the research of the twenty-*.
- Al-Imam, S., & Aziz, A. (2018). Designing A Program Based on Blended Learning and its Impact on Cognitive Achievement and Retention for Some Gymnastic Devices Among Students of The College of Physical Education. *The First International Scientific Conference (Societies Advance Through Sports and Nations Flourish Through Peace)*, April 4-5. Iraq, Diyala.
- Al-Maliki, W. F. (2023). The Role of Artificial Intelligence Applications in Enhancing Educational Strategies in Higher Education (literature review). *Journal of Educational and Psychological Sciences*(5), pp. 93-107.
- Al-Sabab, A. M. (2023). Blended Learning And its Relationship to Effective Student Participation Among University Students in Light of The Corona Pandemic 2020-2021. *Journal of Arts*,(144), pp. 157-196.

- Al-Subaie, A., & Al-Qabati, A. (2020). The Reality of Using Blended Learning from the Perspective of Arabic Language Teachers in Teaching Primary School Students. *The Arab Journal of Scientific Publishing*.
- Al-Tamimi, A. (2019). The Effectiveness of The Blended Learning Strategy in The Achievement of Chemistry Among 3rd -Grade Intermediate Students,. *Journal of Educational and Scientific Studies*(14).
- Al-Thiabat, B. (2013). The Effectiveness of Programmed Learning Based on The Use of Blended Learning Methods & The Traditional Method in the Achievement of Tafila Technical University Students in The Subject of Teaching Methods for the 1st Grades and Their Attitudes Towards it. *An-Najah University Journal for Research (Humanities)*(1).
- Ali, A. (2016). The effect of employing blended learning in developing direct achievement in computer science among students of the College of Education at Samarra University. *Surra Man Ra'a*(46). Retrieved from <https://iasj.rdd.edu.iq/journals/uploads/2025/01/22/7b24c9d54b0d8895998b68c8c9cce42f.pdf>
- Anwar, S. (2012). Using Artificial Intelligence Technology in Re-Engineering Processes,. *Future Research Journal* , pp. 39-44.
- Asi, R. (2015). The Role of Artificial Intelligence in Achieving Green Production, A Survey Study of The Opinions of Managers in A Sample of Industrial Companies Operating in Nineveh Governorate, . *Journal of Administrative and Economic Sciences*(1), pp. 44-47.
- Ayada, A. R. (2017). The Effect of Blended Learning on The Achievement of Second-Grade Intermediate Students in Physics and The Development of Their Science Process Skills and Their Tendency Towards Physics,. *Al-Fath Journal*(13).
- Barhoumi, W. (2022). he reality of using Blended Learning in Arab UniversitiesA case study on students of the University of Sharjah in the United Arab Emirates and students of the University of Hailin the Kingdom of Saudi Arabia(Analytical Comparative Study). *Al-Adab journal*. <https://doi.org/10.31973/aj.v1i140.1618>
- Bath, D. B. (2010). *Getting Started with Blended Learning*. Brisbane: Griffith University.
- Ghalem, I., & Samir, B. (2022). E-Evolution in Digital Education in the Arab countries in light of the Corona crisis:methods and difficulties. *Proceedings of the First International Conference on Digital Education in Light of the Coronavirus Pandemic* (pp. 63-76). Baghdad: Al-Iraqia University.
- Hassan, A.-M. (2016). The Effect of Employing Blended Learning in Developing Direct Achievement in Computer Science Among Students of The College of Education at Samarra University. *Sirr Man Ray Journal*(46).
- Jassim, K. J.-T. (2024). Academic Problems Among Iraqi University Professors: An Analytical Study. *Journal of Ecohumanism*, 3(6), pp. 109-134. <https://doi.org/10.62754/joe.v3i6.3988>
- Meera, A., & Kati, T. (2019). Applications of Artificial Intelligence in Education from the Perspective of University Teachers,. *Proceedings of the First International Scientific Conference on Humanities Studies, Intelligence and Mental Abilities*, / 18-12. Psychological Research Center, Wednesday. Retrieved from <https://kiqp.net/bibliography/173177>

- Majeed, A. (2023). Blended learning and its relationship to effective student participation among university students in light of the Corona pandemic 2020-2021. *Al-Adab journal*. <https://doi.org/10.31973/aj.v2i144.3997>
- OECD. (2020, June 5). Education responses to COVID-19: shaping an implementation strategy. Retrieved from [https://one.oecd.org/document/EDU/EDPC/RD\(2020\)9/en/pdf](https://one.oecd.org/document/EDU/EDPC/RD(2020)9/en/pdf)
- Saber, A.-R., & Saber, M.-R. (2021). Blended Learning and the Future of Education in Iraqi Universities and Colleges. *Scientific Treasures Journal*(2), pp. 130-138.
- Salman, H. (2020). The Effect of The Blended Learning Strategy on The Scientific Sense of Third-Year Middle School Students in Biology,. *Journal of Educational and Scientific Studies*(15).
- UNESCO. (2023, April 20). *Education: From disruption to recovery*. Retrieved from <https://www.unesco.org/en/covid-19/education-disruption-recovery>
- Zahid, M., Ghada Shahata Ibrahim, M., & Issa, H.-S. (2018). The effectiveness of using E-Blended learning strategies for teaching learner-centered learning according to the VARC model on learning outcomes and motivation. *Journal of the Faculty of Education*(91).
- Zakariya, A., Kanber , H., & Jassim , K. (2025). Diagnosis of Diabetes Using Artificial Intelligence Programs. In *Recent Trends and Applications of Soft Computing in Engineering (RTASCE)—Sarajevo*. https://doi.org/10.1007/978-3-031-82881-2_15

About the Contributor(s)

Suaad Hadi Hassan Al-Taai, PhD, is Professor of History of the Mongols and the Islamic East at University of Baghdad Her main research interests include: History of India, China and Turkey, History of Islamic Civilization and Thought, Environmental Pollution, Human and Sustainable Development, Human Rights, E-Learning and Blended Learning
Scopus ID: <https://www.scopus.com/authid/detail.uri?authorId=57224948956>
Email: suaad.hadi@ircoedu.uobaghdad.edu.iq
ORCID: <https://orcid.org/0000-0002-8981-4339>

Huda Abbas Kanber, PhD, is Professor of Information and Libraries at the University of Baghdad Her main research interests include: Virtual Libraries, Research Methods, E-Learning, Blended Learning and Artificial Intelligence
Scopus ID: <https://www.scopus.com/authid/detail.uri?authorId=57779815100>
Email: huda.abbas@ircoedu.uobaghdad.edu.iq
ORCID: <https://orcid.org/0000-0002-6118-1613>

Khalid Jamal Jasim, PhD, is Professor of Evaluation and Measurement at the University of Baghdad, His research interests focus on developing psychological and educational measurement tools and analyzing the psychometric properties of tests.
Scopus ID: <https://www.scopus.com/authid/detail.uri?authorId=57218707835>
Email: khalid.jamal@ircoedu.uobaghdad.edu.iq
ORCID: <https://orcid.org/0000-0002-6218-8032>

Waleed Abood Mohammed al-Dulaimi, PhD is Professor in University of Baghdad/ College of Education Ibn Rushed for Humanities / department of History. Educational attainment: Doctorate in the modern and Contemporary history Accurate specialization: History of European - Arab Contemporary Relations. Research interests: Modern and Contemporary History of Japan; History

of International Relations; Human and Sustainable Development; Environmental Pollution; E-learning and blended learning.

Scopus ID: <https://www.scopus.com/authid/detail.uri?authorId=57224949507>

Email: waleed.abood@ircoedu.uobaghdad.edu.iq

ORCID: <https://orcid.org/0000-0003-3012-3880>

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Appendix I.

Table A1. List of Experts to Demonstrate the Validity of the Questionnaire

N.	Name	Specialty	Place of Work
1	Prof. Dr. Daoud Abdel Salam Sabry	Curricula and Teaching Methods	Ibn Rushd College of Education for Humanities / University of Baghdad
2	Professor Dr. Manal Mohamed Ibrahim	Curricula and Teaching Methods	Ibn Rushd College of Education for Humanities / University of Baghdad
3	Assistant Professor Dr. Gian Yahya Bilal	Measurement and Evaluation	Ibn Rushd College of Education for Humanities / University of Baghdad