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THE CONTRIBUTION OF ARTIFICIAL INTELLIGENCE APPLICATIONS IN HIGHER EDUCATION IN JORDAN IN TERMS OF ACADEMIC PERFORMANCE AND DEVELOPING THE EFFICIENCY OF LEARNING OUTCOMES: A COMPARATIVE STUDY BETWEEN STUDENTS OF THE FACULTY OF EDUCATION AT AMMAN ARAB UNIVERSITY AND THE UNIVERSITY OF JORDAN 2022-2026

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ABSTRACT

This study aims to highlight the role of artificial intelligence (AI) in enhancing the quality of university education and improving the academic experience of education students at Jordanian universities, in light of the rapid shift towards digital education and modern technologies. The study reviewed the state of higher education in Jordan before the advent of AI technologies, which relied on traditional education and basic digitization. It then witnessed significant development with the spread of e-learning platforms, particularly during the COVID-19 pandemic. The study also addressed the contributions of AI in supporting personalized student learning, diversifying teaching methods, and enhancing interaction within the educational process. Furthermore, it examined AI's role in addressing individual differences among learners and providing educational solutions for students with special needs. The study employed a descriptive-analytical approach, along with a comparative approach and a case study methodology, to provide a comprehensive and integrated analysis of the research topic from various perspectives. In the fieldwork, a questionnaire was administered to a sample of 129 male and female students from the faculties of education at two Jordanian universities. This allowed for the collection of accurate data reflecting students' opinions and actual experiences with AI applications in the educational process. The results showed that employing artificial intelligence applications in education contributes to increasing students' motivation to learn, improving academic performance, and developing their thinking and creative skills. It also supports collaborative learning and enhances the quality of higher education and academic accreditation standards. The study concludes that Jordanian universities must adopt clear strategies for employing artificial intelligence in both academic and administrative fields, provide training programs for faculty members, and encourage scientific research in this area. This will contribute to developing the higher education system and keeping pace with contemporary technological advancements.

KEYWORDS: Artificial Intelligence, Academic Performance, Learning Outcomes, Higher Education.

during the period 2022–2023? This main problem leads to the following sub-questions:

1. What is the level of academic achievement among education students in Jordanian universities under the traditional digital education model?
2. What is the level of academic performance of education students when artificial intelligence (AI) applications are used in the educational process?
3. What role do AI applications play in enhancing the quality of education and improving the academic experience for education students in Jordanian universities?
4. Are there significant differences in academic performance and the effectiveness of learning outcomes between education students at Amman Arab University and the University of Jordan that can be attributed to the use of AI applications?
5. What are the most important proposals and recommendations that can contribute to promoting the use of AI applications in higher education in Jordan?

1.2. Study Objectives

This study aims to explore the contribution of AI applications in higher education in Jordan to improving academic performance and developing the effectiveness of learning outcomes for education students, by comparing the experiences of Amman Arab University and the University of Jordan during the period 2022–2026. In addition, this study aims to assess the impact of using these applications on the quality of education and the digital learning experience, while identifying potential differences between the two universities in adopting artificial intelligence (AI) in the educational process.

1.3. Study Significance

To provide Jordanian universities with a scientific perspective on the extent to which AI applications contribute to improving academic performance and the efficiency of learning outcomes for students in the Faculty of Education during the period 2022–2026.

To identify the differences and variations between the experiences of Amman Arab University and the University of Jordan in adopting AI within the educational process, considering the difference between the two universities (one public and one private).

To highlight the methods and strategies for applying AI in educational education and to study its impact on developing students' skills and knowledge in a way that supports effective learning and academic quality.

1. INTRODUCTION

Artificial intelligence (AI) is the study of intelligent behavior in humans, animals, and machines. It also represents an attempt to find ways to introduce such behavior into artificial machines. Furthermore, AI is one of the most challenging and controversial topics for all of humanity (Witby, 2008).

The modern era is witnessing unprecedented acceleration in various aspects of life as a result of rapid scientific and technological advancements. This has made the ability to adapt to these transformations essential for keeping pace with the demands of the present and anticipating the future. In this context, universities are among the most important institutions that bear a pivotal role in addressing these changes. They represent centers for the production and development of knowledge and sources for preparing the competencies and human resources capable of leading society in intellectual, scientific, cultural, and administrative fields. These institutions also contribute to building the foundations of civilizational progress by qualifying and empowering members of society to contribute effectively to achieving the aspirations of nations and developing their capabilities in various fields.

In this context, the Hashemite Kingdom of Jordan seeks to keep pace with global transformations in modern technology, particularly artificial intelligence (AI), recognizing its importance in supporting development and enhancing competitiveness across various sectors. In recent years, Jordanian universities have begun adopting numerous academic initiatives and programs aimed at integrating AI technology into the educational process and scientific research. These universities are also working to develop curricula, establish specialized disciplines and research centers, and encourage students and researchers to conduct studies and projects related to this field. This trend reflects the commitment of academic institutions in Jordan to preparing qualified scientific personnel capable of meeting the demands of the digital age and contributing to building a knowledge-based economy founded on innovation and technology

1.1. Study Problem

Based on the foregoing background, the main research problem is defined by the following key question:

To what extent do AI applications in higher education in Jordan contribute to improving academic performance and developing the efficiency of learning outcomes for students in the Faculty of Education, through a comparative study between students at Amman Arab University and the University of Jordan

outcomes through a specific set of activities and events, along with specific assessment methods designed to measure the extent to which these outcomes are achieved. Essentially, they refer to what the learner is expected to acquire by the end of a particular lesson or educational program (Al-Hasnawi, 2025).

The University of Jordan: A public university established in 1962 by Royal Decree, it is the first and largest university in the Hashemite Kingdom of Jordan. Located in the heart of Amman, the capital city, the university has developed into a leading global educational institution known for its commitment to academic excellence and the diversity of its educational programs. According to the 2026 QS World University Rankings, the University of Jordan is ranked among the top 350 universities worldwide. (University website: https://www.ju.edu.jo/ar/arabic/Pages/AboutUJ.aspx)

Amman Arab University: A private university established in 1997 by Higher Education Council Resolution No. (1476) dated November 24, 1997, as a non-profit private university specializing in postgraduate studies, under the name "Amman Arab University for Graduate Studies," making it the first Jordanian university specializing in Master's and Doctoral programs. On September 30, 1998, the Higher Education Council granted the university approval to commence teaching with Resolution No. (1625), and the university welcomed its first cohort of students at the beginning of the second semester of the 1999/2000 academic year. (University website: https://www.aau.edu.jo/ar/page/n-aljamt).

1.6. Previous Studies

1. Al-Masri (2021) conducted a study entitled "The Reality of Using Artificial Intelligence Applications to Support the Transformation of Jordanian Public Universities into Productive Universities from the Perspective of Academic Leaders." 1. This study aimed to determine the current state of AI applications in supporting the transformation of Jordanian public universities into productive institutions, and to identify the degree of need for these applications based on variables such as gender, experience, and academic qualifications.

2. Al-Muheeti (2022) conducted a study titled "The Reality of AI Employment and its Relationship to the Quality of Performance in Jordanian Universities from the Perspective of Faculty Members." The study aimed to investigate the relationship between AI employment and the quality of performance in Jordanian universities from the faculty members' perspective, determine the degree of AI

To enrich scientific research in Jordan with a new contribution on AI applications in higher education, especially in educational disciplines, and to link its findings to digital transformations and the modern time period of 2022–2026. Study Limitations:

1.4. Study Limitations

Human Limitations: This study was limited to students in the Faculty of Education at both the University of Jordan and Amman Arab University, as they were the target group for understanding the impact of artificial intelligence (AI) applications on academic performance and the effectiveness of learning outcomes.

Spatial Limitations: The study focused on two specific university environments: the University of Jordan, a public educational institution, and Amman Arab University, a private educational institution, to examine the differences in the adoption and use of AI applications in the educational process.

Time Limitations: The study covered the period from 2022 to 2023 to monitor the impact of integrating AI applications during this time period on the academic performance and learning experience of students in the Faculty of Education.

1.5. Study Terminology

Artificial Intelligence (AI): This is the ability of a machine to mimic the human mind and its workings, such as its capacity for thinking, discovery, and learning from past experiences. Since the development of computers in the mid-20th century, it has been discovered that computers can perform more complex tasks than previously thought. They can discover and prove complex theories, and even play chess with considerable skill. Artificial intelligence is intelligence created by humans. AI systems are designed to resemble complex machines that utilize computer characteristics and perform many tasks much like humans. Generally, these machines possess senses similar to humans, and it is accurate to consider that they react and have a deeper sensory capacity than humans. In short, human intelligence has been integrated into machines, resulting in artificial intelligence (Saleem, 2023).

Academic Performance: This term refers to the extent to which a student, teacher, or institution achieves their short-term or long-term educational goals. It is measured either by continuous assessment or cumulative grade point average (GPA) (Hailu Mickiale, 2024). Learning Outcomes: These are statements describing the expected final results of the educational process, which are demonstrated by the learner in terms of knowledge, understanding, and performance. The program aims to achieve these

Support Their Learning in Mathematics Courses and the Challenges Related to This." The study aimed to identify the challenges students encounter when using these applications.

9. Al-Shanti's (2026) study, titled "The Impact of Using Artificial Intelligence Tools on the Quality of Educational Outcomes: An Applied Study on Accounting Professors and Students in Jordanian Universities," aimed to analyze the impact of using artificial intelligence tools by demonstrating their proficiency in using them, the role of competitiveness in learning outcomes, and identifying the components of successful application of these tools in the quality of the educational process.

1.7. Commentary on the Previous Studies

Previous studies addressing artificial intelligence in Jordanian higher education have shown a growing interest in analyzing the impact of these technologies on various dimensions of the educational process, whether from the perspective of institutional performance, quality of services, or student skills. For example, Al-Muheety's study (2022) focused on the relationship between AI employment and university performance from the faculty perspective, while Al-Masry (2021) analyzed the current state of AI application use in supporting the transformation of Jordanian public universities into productive institutions, highlighting the impact of demographic variables such as gender, experience, and academic qualifications. Studies like those by Al-Masry Nour Othman (2022) and Hazaymeh (2025) analyzed the impact of AI on the quality of services provided to students and the development of professional skills, while Al-Shanti (2026) and Mashaat (2025) focused on AI applications in specific disciplines such as accounting and mathematics, emphasizing the efficiency of using these tools and the challenges of their implementation.

Recent studies focusing on digital education and artificial intelligence (AI) applications, such as those by Abu Muqaddam (2024), Al-Ma'ayta (2024), and Alam (2024), have explored the extent to which students use AI applications for self-learning and their awareness of tools like ChatGPT. This has provided an initial understanding of student behaviors and the challenges associated with digital learning. While these studies are strong in highlighting the reality of AI use and identifying challenges and statistical differences between various variables, they have often focused on:

General aspects such as institutional performance or student services, without directly linking AI to improved individual academic performance and learning outcomes in educational disciplines.

implementation in administrative work, and identify statistically significant differences.

3. Nour Othman (2022) conducted a study titled "The Role of AI Technology in Improving the Quality of Services Provided to Students at the University of Jordan from their Perspective." The study aimed to reveal the role of AI technologies in improving the quality of services provided to students at Jordanian public universities, and to identify statistically significant differences related to variables such as gender, academic program, and type of study.

4. Abu Muqaddam (2024) submitted a master's thesis titled "The Degree of AI Application Use in Self-Learning among Graduate Students at Jordanian Universities." The study aimed to reveal the extent to which graduate students use artificial intelligence applications in self-learning, focusing on tools such as ChatGPT.

5. Al-Ma'ayta's study (2024), titled "The Role of Digital Education in Enhancing the Educational Process at the Faculty of Educational Sciences, University of Jordan," aimed to identify the role of digital education in enhancing the educational process at the Faculty of Educational Sciences and to reveal the advantages and disadvantages of digital learning from the perspective of graduate students.

6. Islam Ahmed Abdel Wahab (2024) presented a master's thesis titled "The Level of Awareness of Jordanian University Students Regarding ChatGPT in Light of the Artificial Intelligence Revolution." The study aimed to investigate the level of students' awareness of using ChatGPT, analyzing its dimensions, uses, advantages, obstacles, and challenges from their perspective.

7. Hazaymeh (2025) conducted a study titled "The Impact of Artificial Intelligence on Developing Professional Skills among Jordanian University Students." The study aimed to identify the impact of artificial intelligence on developing students' professional skills and to reveal the most prominent challenges they faced while using artificial intelligence technologies in professional education. 8. Researcher Mashat (2025) conducted a study titled "Attitudes of Mathematics Students in Jordanian Public and Private Universities Towards the Use of Artificial Intelligence Applications to Support Their Learning in Mathematics Courses and the Challenges Related to This." The study aimed to identify the challenges students encounter when using these applications.

8. Researcher Mashat (2025) conducted a study titled "The Attitudes of Mathematics Students in Jordanian Public and Private Universities Towards the Use of Artificial Intelligence Applications to

specializations and academic levels. The sample included students from various academic years to obtain a comprehensive picture of the use of artificial intelligence tools in the educational process.

2.2. Study Instrument

A standardized questionnaire was designed to evaluate the use of three artificial intelligence tools (Canva AI, Padlet, and Socratic) and examine their impact on students' academic performance. The questionnaire included statements categorized by dimension:

- Generative tool (Canva AI)
- Interactive tool (Padlet)
- Educational/learning aid tool (Socratic)

The researcher used a 4-point Likert scale (1=Disagree, 2=Neutral, 3=Agree, 4=Strongly Agree) to evaluate each statement.

2.3. Instrument Validity

Content validity was confirmed by presenting the questionnaire to a group of faculty members from the College of Education and specialists in educational technology to review the statements and ensure their alignment with the study's objectives.

A pilot study was also conducted with a limited number of students to ensure the clarity and comprehensibility of the questions and to make any necessary adjustments before applying the questionnaire to the main sample.

2.4. Study Themes

This study comprised two main frameworks: the theoretical framework and the applied framework.

The theoretical framework addressed several themes related to the study's topic. The first theme examined academic achievement in Jordanian universities during the traditional digital education phase. This theme aimed to provide an overview of the state of education in Jordanian universities before the widespread adoption of artificial intelligence (AI) applications, specifically during the period prior to 2022, which served as the starting point for this study.

The second theme addressed the academic performance of education students within the context of AI applications. It discussed the most important AI applications and platforms used by education students at both the University of Jordan and Amman Arab University, clarifying the extent to which these applications contribute to supporting and improving students' academic performance.

The third theme explored the role of AI in enhancing the quality of education and improving the academic experience for education students. This theme addressed the second variable of the study by

University leaders or faculty members as the target audience, rather than the students themselves, which limits understanding the direct impact on students' academic experience.

Studies are more scattered across technical or computational disciplines than educational ones, with limited comparative studies between Jordanian public and private universities.

1.8. Herein lies the novelty of this study

Its focus on students in the Faculty of Education, a segment underrepresented in previous research, thus enabling an understanding of the impact of artificial intelligence (AI) on developing academic performance and learning outcomes in educational disciplines.

It employs a comparative study between the University of Jordan (a public university) and Amman Arab University (a private university) to highlight potential differences in AI applications between two educational institutions that differ in their management and technological policies.

It covers the period 2022–2026, making the study contemporary and directly relevant to the recent digital transformations in Jordanian higher education.

It focuses on the direct relationship between AI applications and individual academic performance and the effectiveness of learning outcomes, an aspect that previous studies have not addressed comprehensively and comparatively.

Therefore, this study fills a significant knowledge gap, combining chronological relevance, an educational approach, and a comparative analysis between universities to provide a clear vision of the role of AI in improving the quality of higher education in Jordan from the students' own perspective.

2. STUDY METHODOLOGY

The study employed a descriptive-analytical methodology to examine the use of AI tools and their impact on the academic performance of students in the Faculty of Education. A comparative approach was also used to identify differences in the use of these tools among various student groups. In addition, the study employed a case study methodology to examine students' behaviors and interactions with smart learning tools in detail.

2.1. Study Population and Sample

Study students from the Faculty of Education at Amman Arab University and the University of Jordan during the current semester, along with some graduates from previous cohorts. A total of 129 students were selected using convenience random sampling to ensure good representation of different

known as traditional digitization using computers, transforming information sources from paper to digital.

Then, with the onset of the COVID-19 pandemic, universities in the Hashemite Kingdom moved further towards the digital revolution. The Jordanian Ministry of Education activated distance learning platforms as official university platforms, thus employing a flexible learning approach using cutting-edge technologies and online information networks. This approach relies on multi-directional communication and the delivery of educational materials that emphasize interaction between learners, faculty, expertise, and software, anytime and anywhere (Ben Na'ja, 2022).

2.6. The Academic Performance of Education Students in Light of Artificial Intelligence Applications

Regarding the rise of artificial intelligence in higher education, particularly in the Hashemite Kingdom of Jordan, and given that this study focuses on the faculties of education at both the University of Jordan and Amman Arab University, we can demonstrate, after conducting a survey of faculty and students at both universities, that we were able to observe and understand the academic teaching process within the context of artificial intelligence technology. We concluded that students' academic performance in light of artificial intelligence is evident in several aspects, including:

2.7. Artificial Intelligence in Academic Performance as a Tool for Research, Analysis, and Content Creation

1- Chat GPT Platform: An artificial intelligence platform, it is an AI-enhanced language model developed by OpenAI in November 2022. It was trained on a large dataset of textual data, enabling it to understand and generate text in a variety of contexts and styles, allowing it to generate rapid responses to a wide range of questions and conversations (Abu Safi, 2024).

The Chat GPT platform contributes to enhancing the academic performance of education students by improving their writing skills, content organization, and access to information resources, thus improving teaching efficiency. This tool enables students to automatically create high-quality articles or reports based on topics or keywords (Haider, 2026).

2- Quillbott: A web-based platform and application, Quillbott is an artificial intelligence tool that utilizes cutting-edge technology. Its primary function is to reorganize and rephrase texts, replacing individual words with powerful vocabulary while preserving the answering the research question concerning the role of AI applications in improving the quality of education and enhancing the academic experience for students at both universities. The applied framework involved analyzing the study sample using the research tools described, focusing on identifying differences in academic performance and learning outcomes between students at the Faculty of Education at Amman Arab University (a private university) and the University of Jordan (a public university). It also included presenting a set of proposals, findings, and final recommendations aimed at enhancing the use of artificial intelligence applications in higher education in Jordan.

2.5. Academic Achievement in Jordanian Universities in the Traditional Digital Education Phase

Since the establishment of the Emirate of Transjordan in 1921, education has been considered a system with a vital role in the development of Jordanian society across all its civilizational changes, in a gradual manner that adheres to its roots in Arab-Islamic civilization while remaining open to contemporary human civilization (Nasser, 2010).

Higher education in Jordan has received special attention from its leadership, which has given the sector significant and distinctive care. This care has been demonstrated through numerous meetings with university presidents and students, as well as through messages addressed to government officials. These messages, which have been communicated to successive leaders and governments, outline the vision for building and modernizing a model Jordan. One such message stated: "Our vision for building a model Jordan is based on fundamental pillars that collectively constitute the requirements for achieving economic and social development, and providing an environment characterized by justice, freedom, and a dignified life. We remain firmly convinced that the Jordanian people are the driving force and cornerstone of the development process. Our focus has been, and will continue to be, on investing in the Jordanian people through education and training, equipping them with the skills and expertise that will enable them to excel continuously, God willing" (Khasawneh, 2014).

The Jordanian government's educational policy has focused on ensuring the quality of higher education outcomes. Before the artificial intelligence revolution that swept across all sectors, including higher education, education relied on lectures, printed materials, and physical resources such as books and other publications. These methods evolved with the Jordanian education sector's transition to what is now

https://www.researchrabbit.ai/about-us).

Based on the study samples, the tool contributed to the academic performance of students in the College of Education at both universities. They confirmed their use of this tool in their academic research, as it facilitated the process of searching for references and exploring relevant research papers. Some students also noted that the tool reduced the time and effort required compared to traditional research. Research Rabbit gives researchers the opportunity to manage their research by tracking citations, creating paper summaries, and helping them stay organized and make the most of their time (Sabti, 2024).

2.8. Artificial Intelligence in Academic Performance as an Interactive, Generative Educational Tool

1- Canva AI: This is a cloud-based, web-based graphic design tool that uses a drag-and-drop interface, allowing non-specialist users to create visual content using ready-made templates and elements (Al-Faleh, 2025).

Canva AI enhances the academic performance of education students by helping them create interactive educational materials, whether for presentations and educational projects, or by simplifying the understanding of certain topics. This was emphasized by education students, particularly those in the Department of Teaching Methods and Curricula, who confirmed their use of this tool as it enhances their ability to deliver information effectively.

Canva AI enables students to teach the material taught by their instructors more easily, as Canva can display text, video, images, audio, animations, pictures, diagrams, and more as needed. Its clear and engaging interface also helps increase student focus during learning activities. The Canva application can help you create designs without needing to download it, and it has diverse features that can combine different forms of artistic design (Qadeer, 2024).

2- Padlet: A simple and effective interactive tool that helps students exchange ideas, provide examples, participate in learning, and easily share educational resources. It is used to promote interactive and collaborative learning, enabling students and interested parties to work together. This tool represents a digital wall and is one of the outstanding and effective collaborative web tools. It is a free, multimedia wall that does not require any application installation, is easy to use without training, and is interactive and can be viewed and collaborated on from anywhere in the world (Saleh, 2022).

Based on a student survey about this tool, they indicated that they found it effective in generating new ideas. These results support the use of Padlet in original meaning. This program was developed in 2017 (Nurmayanti, 202).

In an interview with female students at the Faculty of Education at the University of Jordan, some indicated using the Quillbot artificial intelligence tool to rewrite their texts, which they had written based on their own analyses and efforts, in order to improve their writing style. It is also used in academic performance by students in the Faculty of Education, particularly in preparing research papers for oral presentations, especially in English. This has helped students present their topics and projects and discuss ideas smoothly and easily, especially in debates between students and instructors.

3- ZOTERO AI Plugins: This is a citation management program created by the Roy Rosenzweig Center for History and the New Media at George Mason University in the United States. The first version of the program appeared in 2006. This program is designed to store and manage citations such as books and articles, and it is a powerful tool for collecting and organizing research information and sources (Bousmina, 2025).

This software was later developed and released in several versions until it was enhanced with artificial intelligence tools, known as AI plugins integrated with the ZOTERO program. The ZOTERO intelligent software has significantly improved the academic performance of students in the Faculty of Education, providing substantial support for studies and research. This program is highly beneficial for students, researchers, and all those involved in scientific research. Such programs save considerable time and effort in managing references, footnotes, and citations. They are also valuable tools for researchers due to their advanced capabilities in collecting, organizing, and searching various information and references. These programs record the references and sources used in the research in a database that is easy to cite, access, and add to the bibliography, with the ability to modify, change, or delete them. Scientific references are readily available to anyone who wishes to consult, read, or research knowledge. These references and scientific sources vary, including books, research papers, articles, links, etc. (Tamurtber, 2022).

3- Research Rabbit: This innovative tool for searching scientific literature based on citations aims to expedite the process of finding references when starting to write articles, small projects, or literature reviews. Its concept is based on selecting a research paper, called a "primary paper," and then the application finds additional research papers related to your topic of interest (the tool's website is

In light of this concept, we pose a fundamental question: To what extent does artificial intelligence contribute to enhancing entrepreneurial education and improving the quality of the academic experience for students in the Faculty of Education? 1- The Contribution of Artificial Intelligence to Students' Personalized Learning Motivation

Artificial intelligence applications are considered a fundamental and diverse tool for supporting personalized self-directed learning. AI and its applications have contributed to identifying students' individual needs, abilities, and interests by ensuring that the content, pace, and teaching style are tailored to each learner's unique profile. AI has recognized that one-size-fits-all teaching is often ineffective, given that learners have diverse backgrounds, prior knowledge, orientations, abilities, and learning motivations (Medon, 2024).

2- The Contribution of Artificial Intelligence to the Educational Process and the Development of Teaching Methods and Approaches for Students of the College of Education

The results of a survey conducted on two samples of students from the College of Education, including both current students and alumni, using a key comparative factor experiencing academic learning within an AI-enabled environment confirmed that approximately 76% of students receiving their education in an AI-supported environment affirmed that smart applications and platforms have significantly contributed to diversifying teaching methods and approaches compared to alumni who pursued their studies solely through traditional and traditional digital education.

AI applications have helped students move beyond a single teaching method, reduced the stress associated with trial and error in learning, and assisted them in making critical educational decisions. Furthermore, AI tools have helped students access and search for information while minimizing time and effort. Several studies agree on the contribution of artificial intelligence (AI) to the educational process and the development of teaching methods and curricula, theoretically, intellectually, and technically. AI technology is crucial in education, enabling students to learn anytime, anywhere in the world, as it is not bound by time and place constraints. It offers flexibility in presenting academic material to suit students' abilities and helps address individual differences. AI also plays a role in meeting the needs of students with special needs by providing them with appropriate programs. Programs supported by AI technologies focus on teaching students' essential skills. Furthermore, AI technologies reduce reliance higher digital education, as it promotes active student participation by creating a platform for collaborative work and the exchange of ideas, opinions, and knowledge, thus providing a valuable learning opportunity (Agavekar, 2026).

4- Socratic by Google: An intelligent platform that provides personalized educational support by offering individual tips and guidance for dealing with academic materials and understanding concepts through visual explanations, helping researchers progress in their studies and research and improve their effectiveness (Al-Omari, 2026). 85% of students indicated that the application helped them understand complex educational concepts and felt it provided clear steps for addressing educational issues. This intelligent interactive tool enabled students to understand educational questions through the modifications it offered.

In the same context, on October 27, 2025, as part of the initiatives of the National Council for Future Technology in the Hashemite Kingdom of Jordan, a collaboration was announced between the Ministry of Higher Education and Google that allows university students in Jordan to use the paid version of Google Gemini for free. Students will be able to access the Gemini 2.5 Pro model, which includes learning-specific features, such as in-depth search, the ability to generate content, texts, images, and videos, in addition to the Notebook LM tool useful for researchers, and two terabytes of storage space for files and photos on Google Drive and Google Photos for a full year (Ministry of Higher Education and Scientific Research website https://www.facebook.com/mohejordan/posts/pfbid02JbKNba8qk1BPHytaFp9Y1EkY3dnt38eLitV3jzN2yfQoEQXJTLffjYuXceyA37G7l).

3- The Role of Artificial Intelligence in Enhancing the Quality of Education and Improving the Academic Experience for Students in the Faculty of Education

The plans of the Ministry of Higher Education in the Hashemite Kingdom of Jordan aim to establish what is known as entrepreneurial education, a direction also adopted by the University of Jordan and Amman Arab University. Entrepreneurial education, in its broadest sense, comprises a set of activities that aim to cultivate entrepreneurial mindsets, attitudes, and skills. It also covers a wide range of other aspects, such as idea generation, initiation, growth, and innovation. Entrepreneurial education should develop students' values, beliefs, and attitudes so that they view entrepreneurship as an attractive career option (Tarawneh, 2022).

dynamic change to the best learning alternatives, helping students with special needs enhance their academic experience and giving them the impetus to embrace learning and overcome challenges (Kharshi, 2021).

5. Artificial intelligence (AI) has contributed to enhancing the quality of education through intelligent support for collaborative learning. The main features of collaborative learning involve organizing groups of four to six students from varying educational levels. The aim is to achieve a high level of understanding and comprehension, as well as effective communication, teamwork skills, and the achievement of educational objectives in assigned tasks. AI provides highly effective tools and techniques within this educational strategy, which are central to its success and the achievement of overall educational goals (Kharshi, 2021).

6. The contribution of AI to increasing the quality of higher education and academic accreditation standards in private and public universities in the Hashemite Kingdom of Jordan. AI is now among the tools, methods, and procedures aimed at achieving and maintaining quality within educational institutions, which is what the Kingdom's policy seeks to achieve. This is evident in the strategic plans for communication technology, digitalization, and AI, and in the agreements and projects established to align the Kingdom's sectors with global quality standards, including the global standard for quality in higher education (Zarouqi, 202

on textbooks. The importance of AI technologies extends beyond this; some studies have demonstrated its effectiveness in achieving several objectives, including improving learning achievement, retention, and correcting misconceptions among education students (Al-Atal, 2021).

Indeed, the Kahoot application, as an AI platform, has contributed to the generation, creation, and transformation of ideas from education students regarding curricula and teaching methods. Using this application has enabled them to build interactive quizzes and educational games, and to create educational content more quickly, helping them translate their theoretical vision into a tangible reality.
3. The contribution of artificial intelligence (AI) to enhancing the academic experience. This point was elaborated upon in the first section, which addressed a range of applications and clarified their role in the academic performance of students in the College of Education.

4. The contribution of AI to increasing student motivation to learn. AI platforms and applications have contributed to addressing individual differences among students and meeting the needs of students with special needs, thus ensuring a comprehensive and effective learning process. For students with special needs, adaptive learning is a beneficial educational solution. Adaptive learning, in its broadest sense, is a learning process in which the way content is presented changes based on the individual responses of each student. Digital learning systems are considered adaptive when they bring about a

Table 1. Analysis of Student Responses to the Use of Artificial Intelligence Tools in the College of Education

Item	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Means	SD
Canva AI helps students present educational materials in a flexible and engaging way.	50%	20%	15%	10%	10%	0.82	3.35
Padlet allows students to exchange ideas and participate in interactive discussions.	45%	25%	15%	9%	9%	0.80	3.30
Canva AI offers flexibility in presenting scientific material.	42%	23%	18%	10%	10%	0.83	3.28
Socratic helps students understand educational information according to each person's level.	40%	20%	20%	12%	12%	0.85	3.20
Quillbot reduces student stress caused by trial and error.	38%	20%	20%	12%	12%	0.87	3.18
Socratic reduces reliance on traditional textbooks	35%	20%	20%	13%	13%	0.88	3.12
ChatGPT and Padlet cater to the needs of students with special needs.	33%	20%	20%	14%	14%	0.89	3.10
Canva AI makes the teacher a facilitator of the educational process.	30%	25%	18%	13%	13%	0.86	3.15
Padlet helps students make appropriate educational decisions for themselves.	28%	25%	17%	15%	15%	0.90	3.08
Socratic provides an individualized learning style for each student according to their interests.	25%	25%	20%	15%	15%	0.91	3.05
Padlet and Canva AI are working to increase student motivation to participate in educational activities.	25%	25%	20%	16%	16%	0.89	3.07
ZOTERO AI Plugins encourage students to think about how to use information instead of just searching for it.	28%	22%	20%	17%	17%	0.88	3.10
Google Gemini offers significant support to education students in all their endeavors.	25%	25%	20%	15%	15%	0.90	3.06

on other characteristics inherent in the organization of the educational process, teaching methods, and assessment (Sabri, 2009).

However, the move towards an artificial intelligence revolution is not easy for the government, as the process requires financial resources, plans, and pre-established methodologies. Therefore, artificial intelligence within the Jordanian higher education sector faces a number of challenges. Among the challenges that must be addressed to achieve the effective use of information technology is preparing faculty members and researchers in educational settings. This can be achieved by conducting training courses for faculty members to equip them with the appropriate skills and educational opportunities to increase the efficiency and effectiveness of the learning process. Educational software also presents another challenge to some extent. Therefore, it is essential to emphasize the development and provision of high-quality software in the field of education to achieve more efficient teaching (Khasawneh, 2014).

RECOMMENDATIONS

Encourage Jordanian universities to develop clear plans to enhance the use of artificial intelligence in academic and administrative aspects, thereby contributing to improving the quality of education and developing institutional performance.

Adopt incentive strategies for both students and faculty members to encourage them to effectively integrate artificial intelligence tools and technologies into learning and teaching.

Provide incentives and continuous support to faculty members to employ artificial intelligence in scientific research, thereby fostering innovation and accelerating knowledge production in Jordanian universities. Conduct ongoing studies to assess the impact of artificial intelligence (AI) on academic performance and the quality of education, focusing on the challenges and obstacles from the perspectives of faculty members, university administrations, and the Ministry of Higher Education, in order to develop effective implementation strategies.

Encourage students to regularly use AI tools to enhance their interaction and personal understanding of educational concepts.

Systematically integrate AI tools into the academic teaching process.

Provide workshops and training courses to familiarize students and faculty with the latest AI tools.

Support the digital infrastructure to ensure easy access for students to these tools on campus.

Overall, the data shows that students in the College of Education view the use of artificial intelligence tools in the learning process as being generally positive. This can be seen through the moderate to high mean response scores (3.05 - 3.35) across a large number of items along with the significant number of students who selected either "Agree" or "Strongly Agree". The highest level of agreement regarding any item was found when asking about Canva AI, which students felt was extremely helpful/beneficial when presenting educational content in an innovative and engaging manner. This implies that there is value in having access to tools that will assist learners in being more creative and present content in an appealing way through visual means.

Furthermore, the findings demonstrate the importance of interactive/collaborative type tools for learners, particularly Padlet. Learners indicated that they felt Padlet provides them with an opportunity to share thoughts/ideas and participate in discussion compared to the traditional classroom setting; therefore, indicating that there is a need for the use of collaborative type learning environments for students within postsecondary education. Thus, this data indicates that learners are not just receiving information as a result of being taught; rather, they are engaged participants in the learning process. Finally, based on the high degree of agreement from learner ratings for items related to motivation and decision-making, these collaborative technology type tools encourage learners to be more engaged and independent within their ongoing learning.

FINDINGS

Canva AI tools enhance the ability to produce engaging and diverse educational content.

Padlet tools support interaction and group participation, increasing student motivation.

Socratic tools facilitate individual understanding and direct problem-solving in education.

4. CONCLUSIONS AND RECOMMENDATIONS

The private higher education sector in Jordan has witnessed rapid growth, becoming competitive at both the Arab and international levels and attracting more Arab and international students. The United Nations Development Programme's Arab Human Development Report, "Towards Building a Knowledge Society," indicates that private universities in Arab countries generally outperform public universities. The report also points out that the quality of education is not contingent on the availability of resources or even on the quantitative achievement in disseminating education, but rather

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