

The Role of Using Artificial Intelligence Applications in Developing Digital Educational Content for Academic Courses at the University of Jordan

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This study aimed to identify the role of using artificial intelligence applications in developing digital educational content for academic courses at the University of Jordan. The study adopted a descriptive-analytical approach, and a questionnaire was developed as the main instrument for collecting the data required for the study. The study sample consisted of 184 academic leaders at the University of Jordan. The results showed a high level of use of artificial intelligence applications in developing digital educational content, as well as positive attitudes among academic leaders toward adopting and utilizing these applications to develop academic courses and improve the quality of the educational process. The results also indicated that artificial intelligence applications contribute to saving time and effort, enhancing the effectiveness of educational content design and production, and supporting the continuity of the educational process. Conversely, the results indicated the existence of some challenges and concerns associated with the increasing use of these applications, most notably the decline of some traditional academic roles and the possibility of affecting students' critical thinking skills. The study recommended providing specialized training programs for faculty members and developing clear policies, governance frameworks, and ethical guidelines to regulate the use of artificial intelligence applications in higher education, thereby ensuring optimal benefit from them while maintaining the quality of educational outcomes and academic integrity.

Keywords: Role, Educational Content, Artificial Intelligence, University of Jordan, Academic Courses, Digital.

Introduction- The twenty-first century has witnessed rapid developments in the technological field, whose effects have extended

to various aspects of life, particularly higher education institutions, which have increasingly relied on smart technologies to develop their

academic and administrative processes and improve their educational outcomes. These technologies have become an essential part of the modern university environment, particularly as universities move toward digital transformation and seek to enhance the quality of education, scientific research, and community service. In this context, the Hashemite Kingdom of Jordan, through its national education framework, has emphasized the importance of technological skills as among the essential skills that learners should possess in the twenty-first century. It has focused on skills associated with future jobs, such as artificial intelligence, cloud computing, the Internet of Things, virtual reality, and robotics. The state also adopts a strategic direction toward integrating artificial intelligence applications across different levels of the educational system, beginning with smart classroom management, continuing through the development of digital curricula, and extending to empowering faculty members to design and develop digital learning experiences that correspond to learners' individual needs, abilities, inclinations, and attitudes, thereby contributing to improving the efficiency of the educational process, enhancing its outcomes, and achieving its educational objectives (Al-Shatti et al., 2024).

Within this context, higher education is undergoing rapid transformations as a result of the significant development of artificial intelligence applications, which have contributed to advancing methods of preparing educational content, producing educational materials, and presenting them in a more flexible and effective manner. These applications enable the design of learning experiences suited to learners' needs and individual characteristics, the development of academic courses and enrichment through diverse media, and the preparation of educational activities and digital media in ways that correspond to students' needs and the requirements of the digital age (Al-Azzam, 2020). This, in turn, positively affects the quality of the educational process and the efficiency of its outcomes and enhances universities' ability to

achieve excellence and innovation in education and scientific research (Zahra, 2024).

The importance of artificial intelligence applications stems from their ability to increase performance efficiency, improve the accuracy of task completion, reduce human errors, automate routine processes, and support decision-making, thereby enhancing productivity and improving the utilization of resources within institutions (Abdullah, 2019). In education, these applications contribute to providing interactive learning environments, supporting self-directed learning, facilitating access to digital knowledge resources, developing teaching methods, and enhancing interaction among the parties involved in the educational process. This positively affects the quality of education and its outcomes and strengthens the learner's role as an active partner in knowledge construction (Ahmad, 2020).

The production of digital educational content is considered one of the most important contemporary technological skills that faculty members and education professionals should possess, given its pivotal role in developing the educational process and improving the quality of its outcomes. Moreover, the rapid developments in information and communication technologies, together with the accompanying knowledge and digital revolution, require formal educational institutions to pay attention to developing digital content production skills and providing continuous training in them. This enables education-sector personnel to design engaging and effective educational content that takes learners' needs into account, enhances their motivation to learn, and encourages them to remain engaged in various educational activities, which positively affects achievement and sustainable learning (Alaywi, 2023).

Digital content is also characterized by a number of features that enhance its effectiveness and dissemination, most notably the rapid access to and immediate exchange of information, lower production and dissemination costs compared with traditional means, and ease of access through various digital devices at any time and place. It also has a strong capacity to attract

learners through the use of interactive, visual, and auditory elements that increase engagement and interest. In addition, its forms vary from electronic texts and audio and video clips to interactive materials delivered through various digital platforms, making it more suitable for learners' needs in the digital age (Al-Judai, 2021).

In recent years, numerous international educational experiences and projects have emerged that have employed artificial intelligence applications in designing and developing digital educational content, with the aim of making learning more interactive and better suited to learners' needs. Among the most prominent of these projects is Duolingo, which relies on artificial intelligence algorithms to personalize language learning according to the learner's level and learning style; and Khan Academy, which uses smart tools to provide immediate feedback and guide students during learning (Al-Zuhairi, 2025). SMART Learning Suite also provides interactive learning environments that contribute to personalizing educational content according to learners' different needs, while Squirrel AI Learning offers individualized learning pathways based on analysis of learner performance and abilities. EdX is likewise considered one of the leading platforms that invests in artificial intelligence technologies to provide interactive courses and personalize learning experiences for learners (Brian, 2024).

These international experiences confirm that employing artificial intelligence in developing and enhancing digital educational content contributes to improving learning quality, increasing interaction, and enhancing students' motivation for active participation in the educational process, as it enables the design of interactive educational content that corresponds to learners' needs and individual characteristics. It also helps personalize content according to students' levels and abilities and provide diverse educational activities that enhance interaction and participation within the educational environment (Khalifa, 2020). Artificial intelligence also contributes to providing immediate feedback on students' performance, helping them improve

their learning and continuously address areas of weakness. In addition, its tools enable the analysis of educational data and the extraction of indicators that contribute to developing teaching methods and making more effective educational decisions. Accordingly, employing artificial intelligence applications in developing digital educational content enhances the quality of the educational process and increases students' motivation and participation, which positively affects learning outcomes and the achievement of desired educational objectives (Abdel Salam, 2021).

Numerous studies have shown that artificial intelligence applications contribute to developing learners' skills and abilities and enhance opportunities for self-directed learning and effective interaction within digital educational environments. Among these is the study by Al-Jriwi (2020), which confirmed positive effects of using artificial intelligence applications in supporting learning and improving academic performance. The topic of employing artificial intelligence in higher education has received increasing attention in recent educational literature. Rahma's (2025) study aimed to identify artificial intelligence applications in higher education and the opportunities and challenges associated with their use. The results showed numerous opportunities related to improving educational quality and academic performance efficiency, alongside challenges concerning faculty preparation and the requirements for effective use of these applications. Al-Zuhairi's (2025) study indicated that artificial intelligence technologies have become influential factors in the development of higher education by supporting the development and personalization of digital educational content according to learners' needs. The results showed that these technologies contribute to improving educational content quality, enhancing immediate feedback, and supporting self-directed and distance learning, while challenges remain concerning data protection and faculty preparation. The study recommended developing digital skills and establishing effective strategies for employing

artificial intelligence in the educational process. Similarly, Hassiba and Abdel Razek's (2025) study demonstrated the importance of artificial intelligence applications in higher education and their role in improving the learning experience and increasing efficiency among students and faculty members, emphasizing the need for universities to adopt these technologies to enhance educational quality and prepare students for future requirements. In the same context, Al-Muqaiti's (2025) study aimed to conduct a systematic review of the challenges and opportunities associated with using artificial intelligence technologies in education. Its findings indicated technical, ethical, and organizational challenges, most notably data privacy, algorithmic bias, and inadequate training, alongside substantial opportunities to improve the learning experience and personalize educational content. Ali et al.'s (2024) study highlighted the importance of identifying the effectiveness of artificial intelligence applications in the instructional design of digital content. Its findings showed that these applications contribute to developing instructional design processes, improving digital content quality, and developing the skills of educational technology specialists. The present study benefited from this literature in constructing its theoretical framework, formulating its questions, interpreting its findings, and identifying the dimensions of the role of artificial intelligence applications in developing digital educational content in the university environment.

Statement of the Problem and Research Questions

Despite the rapid development of artificial intelligence applications and the promising capabilities they offer for developing digital educational content and improving the quality of the educational process in higher education institutions, the extent to which these applications are employed in developing course content remains variable across universities and faculty members. The process of employing artificial intelligence in university education also faces a range of challenges related to

technological readiness, digital infrastructure, and the availability of the competencies and skills required to use these applications, in addition to ethical and organizational issues associated with educational content quality and academic integrity. In light of the University of Jordan's orientation toward digital transformation and the use of modern technologies in education, there is a need to identify the role of using artificial intelligence applications in developing digital educational content for academic courses and to determine the extent to which they contribute to developing the educational process from the perspective of academic leaders, as those responsible for planning, development, and academic decision-making. Accordingly, the problem of the study is defined by the following main question: **What is the role of using artificial intelligence applications in developing digital educational content for academic courses at the University of Jordan from the perspective of academic leaders?** The following questions branch from it:

1. What is the degree of use of artificial intelligence applications in developing digital educational content for academic courses at the University of Jordan from the perspective of academic leaders?
2. What is the role of artificial intelligence applications in developing digital educational content and improving the quality of academic courses at the University of Jordan?
3. What are the main challenges facing the use of artificial intelligence applications in developing digital educational content at the University of Jordan?
4. Are there statistically significant differences at the significance level ($\alpha \leq 0.05$) in the responses of the study participants regarding the role of using artificial intelligence applications in developing digital educational content attributable to demographic variables (gender, academic rank, and years of experience)?

Study Objectives

This study aims to:

1. Identify the degree of use of artificial intelligence applications in developing digital educational content for academic courses at the University of Jordan from the perspective of academic leaders.
2. Examine the role of artificial intelligence applications in developing digital educational content and improving the quality of academic courses at the University of Jordan.
3. Identify the main challenges facing the use of artificial intelligence applications in developing digital educational content for academic courses at the University of Jordan.
4. Identify statistically significant differences in the responses of the study participants regarding the role of using artificial intelligence applications in developing digital educational content according to demographic variables (gender, academic rank, and years of experience).

Significance of the Study

The significance of this study stems from the growing importance of artificial intelligence applications in higher education institutions and the opportunities they provide for developing digital educational content and improving the quality of the educational process. In light of the rapid digital transformation taking place in contemporary universities, the use of artificial intelligence applications has become one of the fundamental pillars for developing teaching and learning methods and enhancing the efficiency of designing and producing educational materials in line with the requirements of the digital age. The study derives its significance from its effort to identify the role of using artificial intelligence applications in developing digital educational content for academic courses at the University of Jordan from the perspective of academic leaders, as they are the group most closely involved in planning, development, and academic decision-making processes. The study findings also provide scientific information that can be used to support the university's directions toward digital transformation and the adoption of modern technologies in the educational process. Scientifically, the study is also significant in

enriching the educational literature related to artificial intelligence applications in higher education, particularly in the field of digital educational content development, which is relatively new in the Arab context. Its findings may open the way for future studies addressing other dimensions of employing artificial intelligence in universities. The findings are also expected to benefit academic leaders, faculty members, and decision-makers at the University of Jordan by helping them understand the current reality of using artificial intelligence applications in developing digital educational content, identify the requirements needed to enhance their benefits, and address challenges that may arise from their use. They may also contribute to developing policies and training plans that support the effective and responsible use of artificial intelligence applications in ways that achieve educational quality and efficiency of outcomes.

Conceptual and Operational Definitions

- Role: Role refers to the extent of contribution or influence produced by a particular factor or variable in achieving specific objectives or bringing about desired changes in a given field. In this study, role refers to the degree to which artificial intelligence applications contribute to developing digital educational content for academic courses, improving it, and enhancing its quality at the University of Jordan, as perceived by the study participants from among academic leaders. It is measured through their responses to the items of the study instrument.

- Artificial Intelligence: Artificial intelligence is a branch of computer science that aims to develop systems and programs capable of simulating human cognitive abilities, such as learning, thinking, reasoning, decision-making, problem-solving, and natural language processing, through data analysis, pattern extraction, and prediction of future outcomes (Zarouqi, 2020). Operationally, artificial intelligence in this study is defined as a set of intelligent systems, programs, and applications based on algorithms, machine learning technologies, and natural language processing,

which are used to develop, update, and enhance digital educational content for academic courses, thereby contributing to improving the quality of the educational process and increasing the efficiency of designing and producing educational materials at the University of Jordan. It is measured through the study participants' responses to the items of the study instrument related to the use of artificial intelligence applications in developing digital educational content.

- Artificial Intelligence Applications: Artificial intelligence is viewed as an advanced algorithmic system capable of simulating certain human cognitive abilities, such as learning, reasoning, decision-making, and natural language processing, as well as analyzing data, producing knowledge, generating content, and performing tasks that normally require human cognitive abilities (Al-Habib, 2022). Operationally, artificial intelligence applications in this study are defined as a set of applications, tools, programs, and intelligent systems based on algorithms, machine learning technologies, and natural language processing that faculty members can employ and benefit from in designing, producing, developing, and updating digital educational content for academic courses. This includes preparing educational texts, interactive presentations, multimedia, activities, and electronic assessments, thereby contributing to improving the quality of the educational process and achieving its objectives. This concept is measured through the study participants' responses to the items of the study instrument concerning the role of using artificial intelligence applications in developing digital educational content at the University of Jordan.

- Digital Educational Content: Digital educational content refers to all educational materials and resources that are produced, organized, or delivered using digital technologies and media. These include electronic texts, interactive presentations, educational videos, electronic tests, digital educational activities, and other resources delivered through e-learning platforms or digital educational environments

with the aim of supporting and improving the effectiveness of teaching and learning processes (Al-Badri, 2020). In this study, digital educational content refers to all educational materials and resources related to academic courses that are designed, developed, or updated using artificial intelligence applications, including educational texts, interactive presentations, multimedia, activities, and electronic assessments, which are provided to students through e-learning systems or digital platforms at the University of Jordan. It is measured through the "Digital Educational Content Development" domain of the study instrument.

Study Delimitations

- Subject-matter delimitation: The study was limited to identifying the role of using artificial intelligence applications in developing digital educational content for academic courses, the degree of their use, and the challenges associated with them at the University of Jordan.

- Human delimitation: The study was limited to academic leaders at the University of Jordan, represented by college deans, vice deans, and heads of academic departments.

- Geographical delimitation: The study was limited to the University of Jordan.

- Temporal delimitation: The study was conducted during the summer semester of the 2025/2026 academic year.

Study Methodology

The study adopted the descriptive-analytical approach because it is appropriate to the nature and objectives of the study.

Study Population and Sample

The study population consisted of all academic leaders at the University of Jordan, numbering 220 academic leaders. The researcher used a census sampling approach in selecting the sample, whereby the study included all members of the original population. A total of 220 questionnaires were distributed, of which 184 valid questionnaires were retrieved for statistical analysis, representing a response rate of 84%,

which is considered appropriate for the purposes of the study and the achievement of its objectives. Table (1) presents the demographic

characteristics of the study sample according to the study variables.

Table (1): Distribution of the Study Sample Members According to the Study Variables

Variable	Variable Levels/Categories	Frequency	Percentage
Gender	Male	122	66
	Female	62	34
	Total	184	100
Academic Rank	Assistant Professor	57	31
	Associate Professor	72	39
	Professor	55	30
	Total	184	100
Years of Experience	15 years or less	88	48
	15 years or more	96	52
	Total	184	100

Study Instrument

The study relied on a questionnaire as the main instrument for collecting data from the study participants. The questionnaire was developed based on the theoretical literature and previous studies related to artificial intelligence and digital educational content in higher education institutions. In its final form, it consisted of 15 items distributed across three main domains, as follows:

1. Degree of Use of Artificial Intelligence Applications in Developing Digital Educational Content:

This domain consists of 5 items and measures the level of employing artificial intelligence applications in designing, producing, and updating educational materials.

2. Role of Artificial Intelligence Applications in Developing Digital Educational Content and Improving Its Quality:

This domain consists of 5 items and measures the contribution of artificial intelligence applications to enhancing the effectiveness of educational content and improving the outcomes of the educational process.

3. Challenges Facing the Use of Artificial Intelligence Applications in Developing Digital Educational Content:

This domain consists of 5 items and measures the technical, administrative, and academic obstacles associated with using these applications.

The questionnaire items were formulated according to a five-point Likert scale, with the alternatives ranging from: (5 = Strongly Agree, 4 = Agree, 3 = Neutral, 2 = Disagree, 1 = Strongly Disagree).

Validity and Reliability

The validity of the study instrument was verified by presenting the questionnaire to a group of experts specializing in artificial intelligence, digital education, educational technology, and measurement and evaluation, with the aim of ensuring the appropriateness of its items to the study objectives and domains, the soundness of their linguistic formulation, and the extent to which each item belonged to the field it measured. In light of the reviewers' comments and suggestions, the necessary modifications were made until the instrument reached its final

form. The reliability of the study instrument was also verified using the internal consistency coefficient (Cronbach's alpha). The results showed that the instrument had a high degree of reliability and consistency, with an overall reliability coefficient of 0.926, while the reliability coefficients for the subdomains ranged from 0.773 to 0.812. These values indicate that the study instrument has good reliability and consistency and falls within statistically

acceptable limits, confirming its suitability for application to the original sample and for achieving the study objectives efficiently. To ensure ease of access to the study participants and accuracy in data collection, the questionnaire was administered electronically to the sample of academic leaders at the University of Jordan, ensuring standardized administration procedures and improving the efficiency of data collection and analysis.

Table (2): Reliability Coefficients (Cronbach's Alpha and Test-Retest Reliability) of the Study Instrument and Its Domains

Domain	Number of Items	Cronbach's Alpha	Test-Retest Reliability
Degree of Use of Artificial Intelligence Applications in Developing Digital Educational Content	5	0.812	0.93
Role of Artificial Intelligence Applications in Developing Digital Educational Content and Improving Its Quality	5	0.809	0.92
Challenges Facing the Use of Artificial Intelligence Applications in Developing Digital Educational Content	5	0.773	0.92
Questionnaire as a Whole	5	0.926	0.92

Study Results

The study aimed to identify the role of using artificial intelligence applications in developing digital educational content for academic courses at the University of Jordan from the perspective of academic leaders, by identifying the degree of use of artificial intelligence applications in developing digital educational content and their role in developing digital educational content and improving the quality of academic courses. To achieve the study objectives, the data were analyzed and the study questions were answered as follows:

First: Results of the First Question: "What is the degree of use of artificial intelligence

applications in developing digital educational content for academic courses at the University of Jordan from the perspective of academic leaders?"

To answer this question, arithmetic means, standard deviations, and relative weights were calculated, and the items of the domain concerning the degree of use of artificial intelligence applications in developing digital educational content were ranked according to their arithmetic means to identify the level of use of these applications in developing digital educational content for academic courses. Table (3) presents the results.

Table (3): Ranking of the Items of the Domain of the Degree of Use of Artificial Intelligence Applications in Developing Digital Educational Content According to Arithmetic Means.

Rank	Item No.	Items	Arithmetic Mean	Standard Deviation	Degree
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1	3	I use artificial intelligence tools to produce educational content.	3.39	1.09	Moderate
2	2	I use artificial intelligence to formulate educational objectives.	3.36	1.03	Moderate
3	5	I benefit from artificial intelligence in generating interactive questions for electronic tests.	3.30	1.04	Moderate
4	4	I integrate artificial intelligence tools into interactive learning activities.	3.14	1.14	Moderate
5	1	I use multiple artificial intelligence tools in designing educational content.	3.10	1.13	Moderate
Overall domain score			3.40	0.70	3.26

The results presented in Table (3) show that the overall arithmetic mean of the study participants' estimates regarding the degree of use of artificial intelligence applications in developing digital educational content was 3.26, with a standard deviation of 0.70, indicating a moderate degree of use. This indicates that the level of use of artificial intelligence applications in developing digital educational content for academic courses at the University of Jordan, from the perspective of academic leaders, was moderate. Item (3), "I use artificial intelligence tools to produce educational content," ranked first, with an arithmetic mean of 3.39 and a standard deviation of 1.09, representing a moderate degree of use. This reflects the study participants' recognition of the importance of artificial intelligence applications in supporting the processes of producing and preparing educational content. Item (2), "I use artificial intelligence to formulate educational objectives," ranked second, with an arithmetic mean of 3.36 and a standard deviation of 1.03, representing a moderate degree of use, indicating the use of these applications to support educational content planning and the formulation of learning outcomes. Item (1), "I use multiple artificial intelligence tools in designing educational content," ranked last, with an arithmetic mean of 3.10 and a standard deviation of 1.13, representing a moderate degree of use.

This finding can be interpreted as indicating that academic leaders recognize the importance of artificial intelligence applications and their potential for developing digital educational content; however, the actual degree of use remains moderate. This may be attributed to the novelty of these applications in the university environment, the need for further training and qualification, and the existence of technical and organizational challenges that limit their optimal use in designing and developing digital educational content. This finding is consistent with Rahma's (2025) study, which indicated substantial opportunities for using artificial intelligence applications in higher education and improving educational quality and academic performance, alongside challenges related to faculty preparation and the requirements for effective use of these applications. The finding is also consistent with the results of Al-Muqaiti's (2025) study, which identified technical, ethical, and organizational obstacles, such as privacy issues and inadequate training, despite the opportunities these technologies provide for improving the learning experience and personalizing educational content. It is also consistent with Ali et al.'s (2024) study, which showed that artificial intelligence applications contribute to improving the instructional design of digital content and enhancing its quality, reflecting the need to strengthen university readiness and provide a supportive environment

for expanding the use of these applications and benefiting from their capabilities more effectively.

Second: Results of the Second Question: What is the role of artificial intelligence applications in developing digital educational content and improving the quality of academic courses at the University of Jordan from the perspective of academic leaders?

To answer this question, arithmetic means, standard deviations, and relative weights were calculated, and the items of the domain concerning the role of artificial intelligence applications in developing digital educational content and improving its quality were ranked according to their arithmetic means, in order to identify the level of contribution of artificial intelligence applications to developing digital educational content and improving the quality of academic courses. Table (4) presents the results.

Table (4): Ranking of the Items of the Domain of the Degree of Use of Artificial Intelligence Applications in Developing Digital Educational Content and Improving Its Quality According to Arithmetic Means.

Rank	Item No.	Items	Arithmetic Mean	Standard Deviation	Degree
1	7	I consider artificial intelligence a supportive tool in the educational process.	3.53	1.02	High
2	9	I believe that artificial intelligence will bring a qualitative transformation to university education.	3.48	1.03	High
3	10	I believe that artificial intelligence saves time and effort for faculty members.	3.42	1.19	High
4	8	I believe that artificial intelligence enhances my professional competence.	3.42	1.01	High
5	6	I believe in the necessity of integrating artificial intelligence into the future strategies of universities.	3.13	1.08	Moderate
Overall domain score			3.40	0.70	High

The results presented in Table (4) show that the overall arithmetic mean of the study participants' estimates regarding the role of artificial intelligence applications in developing digital educational content and improving its quality was 3.40, with a standard deviation of 0.70, indicating a high level of rating. This indicates that academic leaders recognize the importance of artificial intelligence applications and their role in developing digital educational content and improving the quality of academic courses.

Item (7), "I consider artificial intelligence a supportive tool in the educational process," ranked first, with an arithmetic mean of 3.53 and a standard deviation of 1.02, with a high level of rating, reflecting the study participants' conviction of the importance of artificial intelligence as a supporting tool for the educational process. Item (9), "I believe that artificial intelligence will bring a qualitative transformation to university education," ranked second, with an arithmetic mean of 3.48 and a standard deviation of 1.03, with a high level of rating, indicating that the study participants

expect qualitative developments in higher education as a result of employing artificial intelligence technologies. Item (10), "I believe that artificial intelligence saves time and effort for faculty members," ranked third, with an arithmetic mean of 3.42 and a standard deviation of 1.19, followed by Item (8), "I believe that artificial intelligence enhances my professional competence," with an arithmetic mean of 3.42 and a standard deviation of 1.01; both were rated at a high level.

Item (6), "I believe in the necessity of integrating artificial intelligence into the future strategies of universities," ranked last, with an arithmetic mean of 3.13 and a standard deviation of 1.08, with a moderate level of rating.

These results indicate positive attitudes among academic leaders toward the role played by artificial intelligence applications in developing digital educational content and improving its quality by supporting the educational process, increasing faculty members' efficiency, and saving time and effort in designing and producing educational materials, in line with universities' orientations toward digital transformation and the development of modern learning environments. This finding can be explained by the increased awareness among academic leaders of the importance of artificial intelligence and its ability to support innovation in education and enhance the effectiveness of educational content by providing greater opportunities for interaction, personalization, and immediate feedback, in addition to its role in improving the efficiency of planning, teaching, and assessment. The global expansion in the use of artificial intelligence technologies in educational institutions has also contributed to forming positive perceptions among academic leaders regarding the value of employing these

applications and their future potential for developing university education. This finding agrees with Al-Zuhairi's (2025) study, which confirmed that artificial intelligence contributes to developing digital educational content by supporting personalized learning and improving content quality, feedback, and distance learning. It is also supported by the findings of Hassiba and Abdel Razek's (2025) study, which confirmed the importance of adopting artificial intelligence applications in higher education institutions because of their impact on improving educational efficiency and the learning experience. It is also consistent with Ali et al.'s (2024) study, which showed that artificial intelligence applications contribute to developing the instructional design of digital content and improving its quality, thereby reinforcing academic leaders' conviction of the importance of employing these applications to develop digital educational content and achieve higher levels of quality and effectiveness in the educational process.

Third: Results of the Third Question: What are the main challenges facing the use of artificial intelligence applications in developing digital educational content at the University of Jordan from the perspective of academic leaders?

To answer this question, arithmetic means, standard deviations, and relative weights were calculated, and the items of the domain concerning the challenges facing the use of artificial intelligence applications in developing digital educational content were ranked according to their arithmetic means, in order to identify the main challenges and obstacles associated with using artificial intelligence applications in developing digital educational content. Table (5) presents the results.

+Table (5): Ranking of the Items of the Domain of Challenges Facing the Use of Artificial Intelligence Applications in Developing Digital Educational Content According to Arithmetic Means.

Rank	Item No.	Items	Arithmetic Mean	Standard Deviation	Level
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1	15	I am concerned about losing control over content quality if it is produced by artificial intelligence.	3.71	1.17	High
2	13	I find it difficult to employ artificial intelligence tools to overcome the logistical challenges associated with preparing educational content.	3.57	1.17	High
3	11	I am concerned that artificial intelligence will replace faculty members in the future.	3.51	1.11	High
4	14	I believe that weak technical infrastructure limits the effectiveness of employing artificial intelligence applications in developing digital educational content.	3.43	1.09	High
5	12	I believe that excessive reliance on artificial intelligence weakens academic credibility.	3.34	1.11	Moderate
Overall domain			3.50	0.78	High

The results presented in Table (5) show that the overall arithmetic mean of the study participants' estimates regarding the challenges facing the use of artificial intelligence applications in developing digital educational content was 3.50, with a standard deviation of 0.78, indicating a high level. This indicates the existence of a number of challenges that limit the optimal use of artificial intelligence applications in developing digital educational content at the University of Jordan from the perspective of academic leaders.

Item (15), "I am concerned about losing control over content quality if it is produced by artificial intelligence," ranked first, with an arithmetic mean of 3.71 and a standard deviation of 1.17, indicating a high level. This reflects academic leaders' concern with ensuring the quality and reliability of educational content when relying on artificial intelligence applications to produce it.

Item (13), "I find it difficult to employ artificial intelligence tools to overcome the logistical challenges associated with preparing educational content," ranked second, with an arithmetic mean of 3.57 and a standard deviation of 1.17, indicating a high level. This indicates the existence of practical and technical obstacles that may affect the efficiency of using these

applications to produce educational content. Item (12), "I believe that excessive reliance on artificial intelligence weakens academic credibility," ranked last, with an arithmetic mean of 3.34 and a standard deviation of 1.11, indicating a moderate level.

These results indicate that academic leaders recognize the importance of artificial intelligence applications in developing digital educational content, while at the same time perceiving challenges related to content quality, technical infrastructure, and mechanisms for effectively employing these applications, in addition to certain concerns associated with the future of academic roles within higher education institutions. This finding can be explained by the fact that successful use of artificial intelligence does not depend solely on the availability of technological applications; rather, it requires an integrated institutional environment that includes advanced digital infrastructure, clear policies for use, and human competencies capable of employing these technologies effectively. The rapid shift toward artificial intelligence applications also raises concerns among some academic leaders regarding ensuring educational content quality, protecting data, and preserving

the central role of faculty members in the educational process, which explains their heightened awareness of the challenges associated with these applications. This finding is consistent with Al-Muqaiti's (2025) study, which explained that the use of artificial intelligence in education faces technical, ethical, and organizational challenges, most notably data privacy, algorithmic bias, and inadequate training, challenges that may limit the optimal use of these technologies.

Fourth: Results of the Fourth Question: “Are there statistically significant differences at the significance level ($\alpha \leq 0.05$) in the

responses of the study participants regarding the role of using artificial intelligence applications in developing digital educational content attributable to demographic variables (gender, academic rank, and years of experience)?

To answer this question, the arithmetic means and standard deviations of the study sample's estimates of the extent of use of artificial intelligence applications in developing digital educational content were calculated according to gender, academic rank, and years of experience, as shown in Table (6).

Variable	Variable Levels/Categories	Statistic	Degree of Use of AI Applications	Role of AI Applications	Main Challenges	Overall Scale
Gender	Female	Arithmetic Mean	3.39	3.34	3.55	3.47
		Standard Deviation	0.83	0.81	0.86	0.68
	Male	Arithmetic Mean	3.53	3.39	3.66	3.56
		Standard Deviation	0.76	0.79	0.86	0.66
Academic Rank	Assistant Professor	Arithmetic Mean	3.47	3.35	3.59	3.48
		Standard Deviation	0.76	0.79	0.84	0.65
	Associate Professor	Arithmetic Mean	3.50	3.39	3.62	3.54
		Standard Deviation	0.83	0.83	0.89	0.73
	Professor	Arithmetic Mean	3.53	3.41	3.66	3.58
		Standard Deviation	0.80	0.80	0.87	0.67

Years of Experience	15 years or less	Arithmetic Mean	3.52	3.45	3.69	3.63
		Standard Deviation	0.80	0.84	0.84	0.80
	15 years or more	Arithmetic Mean	3.49	3.32	3.58	3.39
		Standard Deviation	0.77	0.75	0.87	0.80

The results presented in Table (6) show apparent differences in the arithmetic means of the study participants' responses according to gender, academic rank, and years of experience across the different study domains.

With regard to gender, the results show higher arithmetic means among males than females across all domains. The overall arithmetic mean for males was 3.56 compared with 3.47 for females, indicating that males had higher estimates of the degree of use of artificial intelligence applications, their role, and the challenges associated with them.

Regarding academic rank, the results showed that the arithmetic means increased progressively with higher academic rank. Professors obtained the highest overall mean of 3.58, followed by associate professors with a mean of 3.54, and assistant professors with a mean of 3.48. This may indicate that individuals with higher academic ranks have greater awareness of the role of artificial intelligence applications in developing digital educational content and the challenges associated with their use.

With regard to years of experience, the results showed that study participants with 15 years of experience or less recorded a higher overall mean of 3.63, compared with those with more than 15 years of experience, whose mean was 3.39. This may reflect a greater tendency among those with less experience to accept and engage with artificial intelligence applications compared with those with longer experience.

To verify the statistical significance of the differences between the arithmetic means, appropriate statistical tests were conducted according to the study variables (gender, academic rank, and years of experience) to determine whether there were statistically significant differences in the study participants' responses concerning the degree of use of artificial intelligence applications in developing digital educational content, their role in developing digital educational content and improving its quality, and the main challenges facing their use at the University of Jordan, as shown in Table (7).

Table (7): Results of the Four-Way Analysis of Variance of the Effect of the Study Variables on the Degree of Use of Artificial Intelligence Applications in Developing Digital Educational Content, Their Role in Developing Digital Educational Content and Improving Its Quality, and the Main Challenges Facing Their Use at the University of Jordan

Source of Variance	Sum of Squares	Degrees of Freedom	Mean Square	F Value	Statistical Significance
Gender	1.746	1	1.746	4.027	0.045
Academic Rank	0.601	1	0.601	1.385	0.240
Years of Experience	1.707	1	1.707	3.937	0.048
Error	191.709	181	0.434		
Total	195.823	184			

*Statistically significant at the 0.05 level.

The results presented in Table (7) indicate the following:

1. There are statistically significant differences at the significance level ($\alpha \leq 0.05$) in the study participants' responses concerning the degree of use of artificial intelligence applications in developing digital educational content, their role in developing digital educational content and improving its quality, and the main challenges facing their use at the University of Jordan, attributable to gender. The F value was 4.027 at a significance level of 0.045, which is lower than the adopted significance level of 0.05, indicating statistically significant differences between males and females.

2. There are no statistically significant differences at the significance level ($\alpha \leq 0.05$) attributable to academic rank. The F value was 1.385 at a significance level of 0.240, which is greater than the adopted significance level of 0.05, indicating similarity in the responses of study participants across their academic ranks.

3. There are statistically significant differences at the significance level ($\alpha \leq 0.05$) attributable to years of experience. The F value was 3.937 at a significance level of 0.048, which is lower than the adopted significance level of 0.05, indicating differences in the study participants' responses attributable to differences in years of experience.

Referring to the arithmetic means presented in Table (6), the differences related to gender were in favor of males, whose overall response mean was 3.56 compared with 3.47 for females. The

differences related to years of experience were also in favor of study participants with 15 years of experience or less, whose overall response mean was 3.63 compared with 3.39 for those with more than 15 years of experience.

These results indicate that males, as well as less-experienced academic leaders, showed higher levels in their assessment of the use of artificial intelligence applications, their role, and their challenges compared with others, whereas academic rank did not have a statistically significant effect on the study participants' responses.

Study Findings

In light of the findings reached by the study, it was found that the degree of use of artificial intelligence applications in developing digital educational content at the University of Jordan was moderate, indicating an orientation toward employing these applications in the educational process; however, the actual level of use still requires further support and development.

The results also showed that academic leaders recognize the significant role of artificial intelligence applications in developing digital educational content and improving its quality, with their assessments of this role being high, particularly with regard to supporting the educational process, improving faculty members' efficiency, and saving time and effort in preparing educational materials.

The results also indicated that there are substantial challenges facing the use of artificial

intelligence applications in developing digital educational content, represented by concerns about the quality of content produced by artificial intelligence, weak technical infrastructure, difficulty in using some tools effectively, and concerns related to the future effects of these applications on academic roles.

Recommendations

In light of the findings of the study, the study recommends the following:

1. Conduct specialized training programs for faculty members and academic leaders to develop skills in using artificial intelligence applications in developing digital educational content.
2. Develop the technical infrastructure and digital equipment supporting artificial intelligence applications at the University of Jordan.
3. Establish clear policies and standards to ensure the quality of educational content produced using artificial intelligence applications.

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