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El grado de empleo de tecnologías de inteligencia artificial en el proceso educativo desde el punto de vista de los estudiantes universitarios

Degree of employment artificial intelligence technologies in the educational process from the point of view of university students

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RESUMEN

El estudio tuvo como objetivo identificar el grado de empleo de técnicas de inteligencia artificial en el proceso educativo desde el punto de vista de los estudiantes universitarios jordanos y su relación con las variables de género y grado académico. Se utilizó un enfoque analítico descriptivo y la muestra del estudio estuvo compuesta por (10.000) estudiantes masculinos y femeninos de varias universidades jordanas. Los resultados del estudio concluyeron que el uso de técnicas de inteligencia artificial en las universidades fue moderado, y los resultados no indicaron diferencias estadísticamente significativas a nivel de significancia (α<0,05) en el grado de uso de técnicas de inteligencia artificial debido a la variable género. El estudio encontró diferencias estadísticamente significativas debido a la variable grado académico favoreciendo a los estudiantes de pregrado y posgrado.

PALABRAS CLAVE

Técnicas de inteligencia artificial; el proceso educativo; universidades; Educación Superior; estudiantes universitarios.

ABSTRACT

The study aimed to identify the degree of employment of artificial intelligence techniques in the educational process from the point of view of Jordanian university students and its relationship to the variables of gender and academic degree. The descriptive analytical approach was used, and the study sample consisted of

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(10,000) male and female students from various Jordanian universities. The study results concluded that the use of artificial intelligence techniques in universities was moderate, and the results indicated no statistically significant differences at the significance level (α<0.05) in the degree of use of artificial intelligence techniques due to the gender variable. The study found statistically significant differences due to the academic degree variable favoring undergraduate and postgraduate students.

KEYWORDS

Artificial intelligence techniques; the educational process; universities; Higher Education; university students.

1. INTRODUCTION

Higher education institutions seek to change and develop their programs and strategies. To keep pace with the rapid global changes in all fields, including the scientific and technological revolution, it decided to introduce and invest in artificial intelligence techniques in its activities. To achieve the three functions assigned to it: teaching, scientific research, or community service.

Educational institutions in general, and universities in particular, provide high-quality educational services to create an attractive educational environment and also seek to provide various activities aimed at developing and refining the student's personality. For the university to achieve its goals in keeping pace with new developments and challenges, and since the development process cannot be achieved without the process of measuring the quality of educational services provided to students to identify the strengths and weaknesses of the educational process, the development process should be built on clear rules (Al-Rubaie, 2011; Al-Mutairi,2022; Al-Muqiti, 2021; Al-Astal et al,2021).

Artificial intelligence technologies are among the modern strategic technologies concerned with producing knowledge by obtaining it, storing it, processing it, interpreting it, investing it in solving problems, providing new services, and seeking greater efficiency and new opportunities to achieve competitive advantage. It enables organizations to complete tasks quickly by supporting modern applications (expert systems, artificial neural networks, fuzzy logic systems, genetic algorithm systems) for decisions, especially administrative ones. The organization needs experience creating and managing AI solutions at scale to get the most out of it. An AI project also requires more than just hiring a data scientist. The role of organizations is to implement tools, processes, and management strategies to ensure the success of artificial intelligence technology in achieving its goals (Hajer, 2019; Akl, 2008; Al-Mutairi, 2019; Al-Lawzi, 2012; Yunus, 2023).

Previous studies have addressed this topic, including a study (Al-Masry, 2022) that aimed to reveal the role of artificial intelligence techniques in improving the quality of services provided to students at the University of Jordan from their point of view. The descriptive approach was used, and the study sample consisted of (410) male and female students. The results of the study concluded that by employing artificial intelligence techniques At the University of Jordan, the grade was average from the point of view of its students.

The study (Al-Atl et al., 2021) also aimed to identify the importance of artificial intelligence technology in the educational process from the point of view of students of the College of Basic Education in the State of Kuwait and the impact of variables (gender, academic year The study used the descriptive approach, and the study sample consisted of (229) male and female students. They were given a questionnaire that included (31) phrases. The results showed statistically significant differences between the averages of the study sample members regarding the importance of artificial intelligence technology in the educational process according to the academic year variable.

2. THE STUDY PROBLEM AND ITS QUESTIONS

Universities play an essential role in improving the quality of their educational services to achieve student satisfaction, which raises their aspects of excellence and competitiveness in the future by adopting artificial intelligence techniques that support improving the quality of services provided to their students. It also stimulated the researcher's familiarization with previous studies that dealt with the topic of artificial intelligence (Al-Masry, 2022) and study (Al-Atl et al., 2021) and study (Filgueiras, 2023) and study (Tarah, 2023) and study (Al-Sharqawi, 2011) to carry out this study and investigation of the degree of employment of Artificial.

intelligence techniques in the educational process In Jordanian universities. The researcher noticed through his studies at the mosque in Jordanian Different levels of study, whether at the bachelor's level Or in Postgraduate programs, in addition to his current work as a faculty member. The educational services provided to students contain strengths and weaknesses. To avoid weaknesses and turn them into strengths, it was necessary to activate artificial intelligence techniques to improve and develop the educational process.

Therefore, the study seeks to answer the following questions:

1. What is the degree of employment of artificial intelligence techniques in Jordanian universities? From the student's point of view?
2. Are there any statistically significant differences at the significance level? $\alpha \leq 0.05$) In the Degree of employing artificial intelligence techniques in Jordanian universities, from the student's point of view, which consoled for a variable Sex(male Female)?
3. Are there any statistically significant differences at the significance level ($\alpha \leq 0.05$) Degree of employing artificial intelligence techniques in Jordanian universities, the student's point of view which is attributed to a variable Academic Degree (Intermediate Diploma, Bachelor's, Postgraduate)?

3. OBJECTIVES OF THE STUDY

The study sought to achieve the following objectives:

1. Revealing the Degree of employment of artificial intelligence technologies in Jordanian universities from students' perspective.
2. Identifying statistically significant differences at the significance level ($\alpha \leq 0.05$) attributed to gender variables and academic degree.

The importance of studying

1. The importance of this study lies in its attempt to reveal the degree of employment of Artificial intelligence techniques in the educational process in universities. The importance of the study appears through the following aspects:
2. Theoretical importance: This study is one of the relatively new studies in artificial intelligence, so it is...! A contribution to enriching the Arab library and global. It may also open broad horizons for researchers to address this topic from various aspects to reach more comprehensive studies that contribute to supporting theoretical literature in general.
3. Practical importance: This study may be useful in revealing...Degree of employment in the Artificial intelligence techniques in the educational process In Jordanian universities, from this point of view, Students.

4. DEFINITIONS CONVENTIONALITY AND PROCEDURAL TO STUDY

This study included a number of terms and concepts:

Artificial intelligence: Science that contains computer programs with specific characteristics that mimic the ability of humans, including the ability to learn (Mirah & Katea, 2019).

What defines artificial intelligence techniques procedurally is that he is the degree to which he got it. The student responds to Paragraphs on the Recruitment score tool and Artificial intelligence techniques developed by the researcher for this purpose.

The limits of the study

This study examined the degree of employment of artificial intelligence technologies in the educational process from the point of view of university students. This is within the following limits:

Time limits: The results of this study were determined by the time context in which it was conducted. The second semester of the university year (2022/2023)

Human and spatial boundaries: The results of this study were limited to students from various Jordanian universities with various specializations, academic degrees, and educational levels.

Objectivity border: The results of this study are determined by the validity and reliability of the tool used. It and its characteristics psychometrics.

Method and field procedures:

Study methodology: This study relied on the descriptive approach for its suitability for this type of study.

Study population and sample:

The study population consisted of all university students of different genders and their academic degrees, which numbered approximately (332,000 (male and female students for the academic year) 2022/2023). According to the Jordanian Ministry of Higher Education and Scientific Research statistics, this is true. According to the ministry's official website, the study sample consisted of (10,000) Male and female students who were chosen randomly. This was done by distributing an electronic questionnaire to them using social media such as Facebook and sending it to the pages and groups of Jordanian university students. The table next to No. (1) Shows the distribution of the study sample according to variables in the study.

Table 1. Distribution of study sample members according to study variables

variable	Category	Repetition	The ratio (%)
Sex	male	4364	44%
	female	5636	56%
the total		10000	100%
Class Scientific H	Intermediate diploma	2648	26%
	Bachelor's	5864	59%
	Postgraduate	1488	15%
the total		10000	100%

Study tool

To achieve the study objectives and answer the study questions, development The study tool, which was a questionnaire, was developed through the use of previous relevant studies (Al-Masry, 2022) and a study(Al-Shawara, 2019) and study (Saif et al, 2014) and study (Caspari-Sadeghi, 2023) and study (Mejia & Sargent, 2023) and study (Davies et al,2021) and (Gellai, 2022), and using a five-point Likert scale based on individual assessment in selecting answers. The questionnaire consists of two sections. The first includes the student's personal information, which is gender and degree. Scientific The second includes related phrases and artificial intelligence techniques, which are 20). A paragraph is divided into four areas: quality of curricula and teaching, andarea Decision making, andarea Distance learning, andarea training.

Validity and reliability of the instrument

Firstly, The validity of the tool:

The validity of the study tool was confirmed by following the following methods:

1. Honesty of arbitrators:

   The study tool presented a number of arbitrators with expertise and knowledge in the fields of educational sciences and artificial intelligence from faculty members in Jordanian universities. Various universities, such as the University of Jordan, the Jordanian University of Science and Technology, and Al-Balqa Applied University, number (10) specialists. They were asked to express their opinion on the suitability of the tool's phrases in measuring the trait to be measured. In addition, to make any appropriate amendments, including merging, deleting, and adding to some paragraphs, a percentage of (85%) or higher was given as the percentage of an agreement to accept the paragraph, and it was done. Make some amendments to the Questionnaire paragraphs according to the comments and suggested amendments. Deleting and merging some paragraphs the questionnaire was reformulated in its final form to include a number of paragraphs. The questionnaire as a whole has 16 items that measure artificial intelligence technologies.

2. Internal consistency validity:

   The internal consistency of the study tool items was calculated on a survey sample of (30) Male and female students in different Jordanian universities from the same study population but from outside its sample by calculating the correlation coefficients between the score of each item and the total score of the tool, and the following table No. (2) shows this:

Table 2. The correlation coefficient and the level of significance between each item of the tool and its total score.

Artificial intelligence technologies					
M.	**Correlation coefficient**	**value (Sig.)**	**M.**	**Correlation coefficient**	**value (Sig.)**
1	**0.547	0.000	9	**0.492	0.000
2	**0.496	0.000	10	**0.448	0.000
3	**0.531	0.000	11	**0.552	0.000
4	**0.556	0.000	12	**0.509	0.000
5	**0.542	0.000	13	**0.447	0.000
6	**0.436	0.000	14	**0.547	0.000
7	**0.590	0.000	15	**0.497	0.000
8	*0.520	0.000	16	**0.430	0.000

** The correlation is significant at the significance level of 0.01

From the previous table, No. (2), it appears that all probability values were less than the significance level (0.05), indicating that the correlations are statistically significant. Therefore, the study scale and its items have good internal consistency.

Secondly, the stability study tool:

Tested stability Study tool via application Cronbach's alpha coefficient for related statements B Artificial intelligence techniques, as the reliability coefficient for this questionnaire reached (0.92), Which indicates that the study tool has a high-reliability coefficient.

Statistical treatment used:

After collecting the study data, the researcher reviewed it in preparation for entering it into the computer. It was entered into the computer by giving it specific numbers, that is, by converting the verbal answers into digital ones. A five-point Likert scale was adopted: I answer "strongly agree" five degrees, the answer "agree" four degrees, the answer "neutral" three degrees, the answer "disagree" two degrees, and the answer "strongly disagree" one degree.

The data was statistically processed by extracting arithmetic means, standard deviations, t-test, and one-way analysis of variance One Way ANOVA and Cronbach's Alpha Reliability Equation, a test Regression analysis Multimeter, and satisfactory test (Scheffe)And The overlap coefficient and finding values (VIF) and the permissible variance values (Tolerance)Using the Statistical Package for Social Sciences program SPSS 21).

5. STUDY RESULTS AND DISCUSSION

This part deals with a presentation of the results reached by the researcher through the response of the study sample members about the degree of intelligence technologies and the educational process, according to the study questions. The arithmetic mean value of the expressions in the study tool can be interpreted as shown in the Schedule Next no (3):

Schedule (3): The significance of the arithmetic mean.

high	middle	low
3.68-5	2.34-3.67	1-2.33

Results related to answering the question The first is for study: "What is the degree of use of artificial intelligence technologies in the mosque? At Jordanian from the students' point of view?

To answer this question, arithmetic means, standard deviations, and the rank for the paragraphs of each field of Artificial intelligence technologies were extracted. As shown in the following table, No. (4):

Schedule (4): Arithmetic averages and standard deviations for items in the fields of artificial intelligence techniques. They are arranged in descending order according to their arithmetic averages.

Rank	Paragraphs/fields	SMA	standard deviation	Class
1	The university provides grants and sends students for training in leading universities in the field of applying artificial intelligence techniques in the field of education and providing student services	3.61	0.68	Medium
2	Training students to prepare research and projects related to community problems using artificial intelligence techniques	3.57	0.72	Medium

Rank	Paragraphs/fields	SMA	standard deviation	Class
3	The university provides smart databases for use in decision-making	3.49	0.58	Medium
4	Providing the appropriate educational environment for the use of artificial intelligence technologies in education and research	3.49	0.52	Medium
5	Providing specialized programs and courses based on artificial intelligence that suit the needs of students according to their performance and skills	3.47	0.57	Medium
6	Artificial intelligence applications at the university contribute to solving problems and saving time and effort	3.31	0.63	Medium
7	Training students to use artificial intelligence techniques to carry out the routine administrative procedures that students need at the university	3.29	0.58	Medium
8	The university provides smart technology used in decision-making	3.14	0.55	Medium
9	The university provides an effective website for distance teaching and student evaluation	3.04	0.71	Medium
10	Providing Internet service for students and allowing programs, courses, and calendars to be downloaded onto students' phones	2.93	0.73	Medium
11	It provides an electronic library that meets students' needs for references and research to develop self-learning	2.76	0.59	Medium
12	The university provides opportunities to provide electronic assessments while imposing monitoring systems subject to artificial intelligence	2.52	0.65	Medium
13	Providing self-training programs based on artificial intelligence that encourage innovation among students	2.32	0.69	Low
14	The university provides training to its students and employees on artificial intelligence techniques in the field of decision-making	2.26	0.69	Low
15	Academic leaders rely on artificial intelligence to make academic decisions	2.18	0.52	Low
16	Building smart training websites and programs that define student learning styles and methods	2.06	0.61	Low

It turns out from the previous table No. (4) (12) items obtained an average score. Fields of artificial intelligence technologies(4) items received a weak score, where It came in first place paragraph Which states: "The university provides scholarships and sends students for training in leading universities in the field of applying artificial intelligence techniques in the field of education and providing student services," with a mathematical average of (3.61) and a standard deviation (0.68) and to a degree Medium, followed by In second place And With an arithmetic

average (3.57) and standard deviation (0.72)Paragraph Which stipulates "training students to prepare research and projects related to societal problems using artificial intelligence techniques," with a moderate degree, while it came in penultimate place. Paragraph Which states, "Academic leaders rely on artificial intelligence to make academic decisions," with an arithmetic average (of 2.18(and standard deviation) of 0.52) and to a degree Low. At the same time, it came in last place, paragraph Which stipulates "building smart training websites and programs that determine student learning styles and methods" with an arithmetic average (2.06) and standard deviation (0.61) and to a low degree.

Arithmetic means and standard deviations were extracted for every field of Artificial intelligence technologies. As shown in the following table, No. (5):

Schedule (5): Arithmetic averages and standard deviations for the fields of artificial intelligence technologies. They are arranged in descending order according to their arithmetic averages.

the number	the field	SMA	standard deviation	Class
1	Distance learning	3.48	0.76	Medium
2	Training	3.34	0.69	Medium
3	Quality of curricula and teaching	3.25	0.52	Medium
4	decision making	3.18	0.73	Medium
Artificial intelligence technologies as a whole		3.31	0.67	Medium

It can be seen from the previous table(5)Employing artificial intelligence techniques in the mosque at From the point of view of its students, the Jordanian standard came in at an average level, with an arithmetic average of (3.31) and standard deviation (0.67), where it came from area "Distance learning" ranked first, with an average of (3.48) and standard deviation (0.76) and to a moderate degree, while it came area "Training" ranked second, with an average of (3.34) and standard deviation (0.69) and to a moderate degree, followed by And in third place is the field "Quality of curricula and teaching" with an arithmetic average (3.25) and standard deviation (0.52) with a moderate degree, and came in last place area "Decision making" with arithmetic average (3.18) and standard deviation (0.73) and to a moderate degree, and these results are attributed to the interest of all universities to move towards activating the distance education system because of its great benefits for both the student and the teacher, as we have recently witnessed many lectures and training workshops being held remotely due to the large number of students or the inability to hold lectures in the usual way due to For the absence of a university professor or for some health conditions, especially for what We witnessed it Of emerging changes during Spread of a virus corona.

Results related to answering the fourth study's question: Are there any statistically significant differences at the significance level? $\alpha \leq 0.05$) in the degree of employing artificial intelligence techniques in Jordanian universities from students' perspective. Which is Attributable to gender variable (male Female)?

To answer this question, the t-test was used, and the arithmetic means, and standard deviations were extracted. As shown in the following table, No. (6):

Schedule (6): Test results(T)To indicate the differences in the degree of employing artificial intelligence technologies in Jordanian universities from the point of view of students, which is attributable to gender variable (male Female).

the field	Sex	the number	SMA	standard deviation	value (v)	Degrees of freedom	Significance level
Degree in employing artificial intelligence techniques	male	4364	3.48	0.74	0.382	325	0.769
	feminine	5636	3.41	0.68			

The previous table shows(6)There are no statistically significant differences between males and females in the degree of employing artificial intelligence techniques in Jordanian universities from the perspective of students, as the t value was (0.382, which means that it is not statistically significant at the significance level ($\alpha \leq 0.05$), and these results are due to that male and female students study in a similar and close university environment, and therefore no differences appear between them. This result may be logical, especially since male or female students view the process of applying artificial intelligence similarly.

Results related to answering the question Fifth To study which states. Are there any statistically significant differences at the significance level? $\alpha \leq 0.05$) in the degree of employing artificial intelligence techniques in Jordanian universities from students' perspective. Which attributed to a variable: The student's academic Degree (Intermediate Diploma, Bachelor's, Postgraduate)?

To answer this question, Arithmetic means, and standard deviations were extracted to the degree of employing artificial intelligence technologies in Jordanian universities from the student's point of view according to a variable Class Scientific. For the student and the results of one-way analysis of variance. As shown in the following tables (7-9):

Schedule (7): Arithmetic means and standard deviations to the degree of employing artificial intelligence technologies in Jordanian universities from the student's point of view according to a variable Class Science For the student (Intermediate Diploma, Bachelor's, Postgraduate)

the field	Class Scientific For the student	the number	SMA	standard deviation
Degree in employing artificial intelligence techniques	Intermediate diploma	2648	3.28	0.71
	Bachelor's	5864	3.61	0.66
	Postgraduate	1488	3.49	0.59

It is clear from the previous table (7) that There are apparent differences between the averages for the degree of employing artificial intelligence techniques in Jordanian universities from students' point of view according to a variable Class Scientific For the student. To determine whether these differences were statistically significant or not, a one-way analysis of variance was used. The following is a presentation of these results:

Schedule (8): Results of one-way analysis of variance to detect differences between means to the degree of employing artificial intelligence technologies in Jordanian universities from the student's point of view according to a variable Class Scientific For the student

	Source of variance	Sum of squares	Degrees of freedom	Square of means	value (q)	Significance level
Degree in employing artificial intelligence techniques	Between groups	2.927	2	1.463	5.684	.005
	During groups	110.867	407	.272		
	the total	113.794	409			

It is evident from the table above(8) that There are statistically significant differences in the degree of employing artificial intelligence techniques from the student's point of view according to a variable Class Scientific For the student, where the value of F (5.684(It is not statistically significant at the significance level)α≤0.05), this can be interpreted as estimates students are a sample of the study The degree of employment of artificial intelligence techniques varies according to their academic degree As the student increases his academic degree and years of study at the university, the more he can distinguish the services provided and their quality, including artificial intelligence techniques, which are considered among the modern technologies in the educational process.

To determine the source of variation in categories Class Scientific For the student A satisfactory test was performed (Scheffe) to identify the source and the following table No. (9) It shows:

Schedule (9): Shaveh test results (Scheffe) to determine the source of the variance in statistical differences regarding the degree of employment of artificial intelligence techniques from the student's point of view according to a variable Class Scientific For the student

	Category (I)	Category (J)	The difference in the mean (IJ)	Standard error	Significance level
Degree in employing artificial intelligence techniques	Intermediate diploma	BSC	*.26485	.58468	.007
		Graduate Studies	.10035	.46924	.886

It can be seen from the previous table (9) that there are statistical differences in responses from Students in a sample of the study. The degree of employing artificial intelligence techniques from the student's point of view is attributed to a variable Class Scientific. This is according to the significance level of (0.007) for students' undergraduate and postgraduate studies.

Summary of results:

The results of the study can be summarized as follows:

1. The employment of artificial intelligence techniques in Jordanian universities, from the point of view of its students, came to a moderate degree, with an arithmetic mean (3.31) and a standard deviation (0.67). In contrast, the field of "distance learning" came in the first place, with an arithmetic mean (3.48) and a standard deviation (of 0.76) and a moderate degree, While the field of "training" came in second place, with a mean of (3.34) and a standard deviation of (0.69) and a moderate degree, it was followed in third place by the

field of "quality of curricula and teaching" with a mean of (3.25) and a standard deviation of (0.52) and a moderate degree, and the field of "industry" came in last place. Decision" with an arithmetic mean (3.18) and a standard deviation (0.73) with a moderate degree.

2. All areas of employing artificial intelligence techniques (quality of curricula and teaching, decision-making, distance learning, and training) have a statistically significant role in improving the educational process from the point of view of its students.
3. There are no statistically significant differences at the significance level ($\alpha \leq 0.05$) between males and females in the degree of employing artificial intelligence techniques.
4. There are statistically significant differences at the significance level ($\alpha \leq 0.05$) in the degree of employing artificial intelligence techniques attributed to a variable Class Scientific For the student and the benefit of bachelor's degree students and postgraduate studies.

6. RECOMMENDATIONS AND PROPOSALS

In light of the results reached, the study recommends the following:

1. Paying attention to equipping lecture halls and computer laboratories with the latest devices and equipment to keep pace with modern technological developments.
2. Make more efforts to respond to students' complaints and grievances quickly, effectively, and through modern technical means.
3. Conducting more field and survey studies for university students, whether in Jordan or other countries, whether Arab or international, with the aim of getting to know points Palaces And weaknesses In what the mosque offers at services and moving quickly to address them, in addition to identifying new trends in student services that students are looking forward to meeting and providing.

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ETHICS AND PARTICIPANT CONSENT STATEMENT

This study was conducted in full alignment with the ethical principles established by the Declaration of Helsinki, ensuring the utmost respect for participants' rights, safety, and well-being. Prior to inclusion in the study, all participants were thoroughly informed about the research objectives, methods, and any potential risks or benefits involved.

DECLARATION OF DATA ACCESSIBILITY AND AVAILABILITY

The data and content presented in this study are original and have been curated specifically for this research. All relevant materials are accessible within the manuscript or provided as supplementary documentation. For additional information or to request access to specific datasets or methodological details, interested researchers are encouraged to directly contact the corresponding authors. Or you can view it through the following link *https://zenodo.org/records/14549599*

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