ONOMÁZEIN

PONTIFICIA UNIVERSIDAD CATÓLICA DE CHILE
FACULTAD DE LETRAS

The impact of the use of artificial intelligence among teaching staff in educational institutions in Jordan and its relationship to educational efficiency

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ONOMÁZEIN 62 (December 2023): 358-371
ISSN: 0718-5758

Abstract

The purpose of this study was to determine the extent of artificial intelligence (AI) utilization by academic leaders in Jordanian institutions and how it relates to faculty members' teaching abilities. The method of descriptive correlation was employed. During the second semester of the academic year 2023/2024, (280) faculty members from Jordanian institutions took part in the study. It was discovered that academic administrators in Jordanian institutions heavily utilize AI. Additionally, the results revealed a statistically significant positive association between the level of teaching abilities of faculty members and the extent to which academic leaders use AI. Purpose, vision, and goals, as well as encouraging faculty members and enhancing their ability to educate. The results showed a statistically significant favorable association between faculty members' teaching abilities and how much academic leaders use AI.

Keywords: Academic leaders, AI, teaching competencies, Jordanian universities, Digital era

1. Introduction

Institutions of higher learning are among those that have significantly, significantly, significantly contributed to the development of societies and to the success of countries in a variety of sectors. As a result, a number of groups promoting fundamental education reform in light of the demands of the digital age have developed. Higher education institutions responded by beginning to take comprehensive actions, which included assessing and improving the university's performance by determining the benefits and drawbacks of the educational services it offers and enhancing the teaching abilities of its personnel in order to give society educational outputs that could satisfy the constantly shifting needs of the labor market.

Universities have realized that in order to speed up the educational process and satisfy the demands of the information economy, they must embrace a vision that is in line with contemporary educational trends. They are capable of utilizing modern technological developments and developing novel pedagogical strategies (Hawed, 2013). Additionally, the quick response to technology developments that have significantly altered teaching techniques and approaches (Sadeh & Al-Sartwi, 2013).It is noteworthy that several famous institutions have embraced this technology while adhering to global norms for university categorization and certification (Qamera, bi, and Krush, 2018). As it links learning regions in the neural network, classifies, differentiates, and explains them, Al has been widely employed in educational processes. However, this procedure represents a major paradigm change for knowledge construction (Jena, 2018). According to Abdul Qadir (2020), the effectiveness of any educational process is gauged by how rapidly it adapts to new advancements in the use of digital tools and apps. In order to meet the difficulties of education, he continued, the curriculum must be integrated with Al and its applications. Higher education institutions, on the other hand, have embraced artificial intelligence (Al) applications and systems to implement novel improvements in the administration of their contemporary institutions (Malik, Tayal & Vij, 2019) and improve staff performance (Luo, 2018). They also used them to help decision-makers make better choices (Al-Astal, Akl, & Al-Agha, 2021).

According to Chang (2019), adopting Al efficiently raises management performance and qualifies it to carry out a variety of administrative activities. However, academic leaders must embrace change, be unyielding, and seek to create the right conditions in order to produce results with a high level of efficiency if they are to do their exceptional work (Omran, 2014).

The definition of artificial intelligence as "a relatively new field of computer science that seeks to develop and design intelligent computer systems that mimic human intelligence so that machines can carry out tasks instead of people and simulate their abilities and functions by utilizing their qualitative characteristics and relationships," Mathematical and logical (Mahmoud, 2020, 16). It is "a set of new methods in computer programming, which can be used to develop systems that simulate some elements of human intelligence and enable him to perform reproduction operations about facts and laws represented in the computer's memory," according to Abdul Salam (2021, 16).

Numerous industries, including education, are being quickly transformed by artificial intelligence (AI). AI is being utilized in school management to improve student results, enhance the learning experience, and simplify duties related to administration (Crompton & Burke, 2023)

One of the university's most important responsibilities is teaching competences, which is also the most effective at putting students on the path to a distinguished future. Additionally, building communication channels between students and instructors and enabling them to exchange experiences via various electronic communication tools depend much on the teaching abilities of faculty members. As a result, pupils' higher order thinking abilities are enhanced, and instructors are given the technical know-how they need to keep up with the rapid rate of technological development (Bawashri, 2019).
The capacity to execute instructional behavior within a modern technological environment requires a faculty member to possess a set of knowledge, abilities, and attitudes known as teaching competences. Duties related to administration (Crompton & Burke, 2023)

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Because AI approaches have a favorable effect on learning, several colleges have inclined to use them in teaching. The impact of employing contemporary technology in teaching has been the subject of several research. According to Al-Olayan (2019), implementing the digital revolution in education has opened up new opportunities for teachers and students to find out information properly and quickly. The findings of (Zhoo, Chen, Zhang & Coplana, 2019) demonstrated the significance of AI in assisting teaching and administration at universities as well as advancing scientific research.

Study Al-Yajzi (2019) suggested organizing conferences, lectures, seminars, and workshops online all year long as well as creating training curricula for academics and students to help them become proficient with using AI applications. & Shaaban's study (2021) suggested creating faculty training programs. Participants to create apps and talents for artificial intelligence.

Al-Bisher (2020) suggested that the educational environment at universities be improved in order to allow and support the use of AI in the teaching process. The findings of (Abdul Salam, 2021) demonstrated that university faculty members strongly favor the use of AI applications in education. Al-Masry & Tarawneh's (2020) last recommendation is to use AI applications to assist Jordanian institutions in becoming productive universities.

According to Crompton, Burke, and others (2023), there are several benefits of AI, such as increased student engagement, personalized learning, and cost effectiveness. However, AI also presents a number of difficulties, including ethical issues, possible biases, and the requirement for labor rehabilitation. The study comes to the conclusion that AI has enormous potential to enhance school administration. The identification was mentioned by Al-Massad and Al-Frani in 2023. Secondary school teachers' perceptions of the reality of using artificial intelligence applications in teaching. It had a medium degree, and the findings revealed that there were statistically significant disparities in how much artificial intelligence applications were used in schools.

It is necessary to transition from the traditional university environment to a technological one in order for universities in general and Jordanian universities in particular, to benefit from AI in developing their academic leaders' practice and teaching competence. This is done by taking into consideration the following areas:

1. Administrative Area: To advance research within universities and to regularly update their databases and information, university administrations must employ the most cutting-edge intelligent apps. They must also offer specialized professionals to advance the university's usage of AI and set up a website to promote its efforts. To do this, flexible financial systems should make it simpler for students to pay their tuition and draw in new, AI-savvy faculty members. Academic Subject: A flexible communication system that enables communication between all participants in the educational process and participation in seminars, training courses, and other events is required in order to enable faculty members to apply AI in developing an engaging educational environment.
Conferences for academics. Along with helping academics undertake scientific research in this field, specific courses are being developed to improve academics' and students' proficiency with AI approaches.
2. Universities should also concentrate on developing required AI courses to help students understand the subject better. Training and educational programs in colleges should take use of AI technology.
3. Personnel resources availability of administrative executives who accept the use of AI in the university's educational process, professors with strong Ai teaching abilities, and specialists who develop educational applications. Additionally, there should be administrators on hand who are conversant with the guidelines governing the use of AI in university teaching.
4. Technical Area: The executive branch must endeavor to establish a culture of employing AI among university members; offer workshops to explain the systems used in these processes, and put in place methods to safeguard information security in the institution's educational programs.
We may infer from the foregoing that universities are a scientific superstructure that is concerned with every aspect of research and instruction. They want to provide top pupils with the knowledge and abilities they need to stay up with advancements. Recently, the globe has seen a number of advances in a variety of fields, particularly in education, such as the use of AI applications and information systems by universities to assist them keep up with the demands of the digital age. These programs have spawned new ways of life and a more engaging, dynamic learning environment.

2. Previous Research

One of the new concerns that have drawn a lot of interest from academics is the use of AI applications in education. In order to explore the effects of education systems based on artificial

intelligence delivered through the Internet, a study was carried out in China (Zhoo, Chen, Zhang & Coplana, 2019). It was discovered that integrating online teaching tools with artificial intelligence had a favorable impact on students' academic performance. According to the study's findings (Al-Muqiti, 2021), there is a statistically significant association between the use of artificial intelligence and the faculty members' perceptions of the overall performance quality of Jordanian institutions. And (Abdul Salam, 2021)'s findings demonstrated that university faculty members concur to a great degree. degree on the use of artificial intelligence applications in education and other related disciplines, and to offer the necessary conditions for so while avoiding the associated ethical issues and the first demand to assist students with special needs. Al-Masry and Al-Tarawneh's study (2020) discovered that, from the perspective of academic leaders, employing artificial intelligence applications to help the transition of Jordanian public institutions into productive universities came to a modest degree.
The effectiveness of faculty members' teaching was the subject of several studies. Al-Saaida (2015) found that faculty members at Al-Balqa Applied University had a modest level of teaching proficiency.

The study (Asmaa, 2016) came to the conclusion that the university professor's performance as a teacher was of poor quality. at contrast, faculty members at the College of Education at Al-Jouf University were reported by (Ayasrah, 2017) to have a medium level of teaching expertise. According to Amal & Fotia's research from 2017, students had positive perceptions of the work abilities of university education teachers. According to BouBakr (2019), boosting university education services in Algerian institutions are strongly correlated with technological advancements, information and communication technologies. It also demonstrated instructors' predilection for old teaching techniques based on memorization and indoctrination and students' discontent with these innovations used in the classroom, as they came to a frail, fragile degree.

3. Employ technological advancements.

The researcher has benefited from these studies in a number of ways, including the creation of a tool for data collection, comparison of the results with those from ongoing research, use of proper statistical methods, and support for some concepts pertaining to the theoretical framework. The present study differs from earlier ones in that it aims to ascertain the extent of artificial intelligence use among academic leaders and its connection to faculty members' teaching abilities.

In order to overcome hurdles and bring about change and progress in their institutions, Jordanian universities embraced the electronic innovations that the top universities have taken as a model of production and self-sufficiency. High precision and flexibility describe the technology and technological applications, which seek to enhance the quality of numerous duties performed at universities to obtain the highest levels of work efficiency. AI refers to the development of devices capable of doing activities that need human intelligence. These applications enable the computer to imitate a restricted number of brain processes and talents and to look for solutions.

The faculty person is at the center of education. Given the variety of duties he carries out (teaching, scientific research, community service, leadership, and administrative roles), it was important to understand his level of educational competency because it influences the caliber of his performance (academic, administrative, and technical) and the extent to which he is qualified for the roles given to him. The greater the degree of his performance, the higher the caliber of his graduate students,

the more significant and exceptional his commitment to community service, and the degree of scientific research in institutions. This study set out to determine the extent of AI use among academic leaders at Jordanian institutions as well as the level of faculty members' technology teaching proficiency from their perspective.

Study goals the study sought to determine the extent to which academic leaders in Jordanian institutions used artificial intelligence and how that use related to faculty members' teaching abilities. Reveal their perspective in the context of Vision (2030), 31 (2), 869-842 The Arab Journal for Scientific Publishing

F. Yazizi (2019). Association of Arab Educators, 113, 929–927. Using artificial intelligence technologies to enhance higher education in the Kingdom of Saudi Arabia. Liu, Q., Zhang, M., Zhao, L., Chen, L., and Copland, H. (2019). The platform for online education management systems based on artificial intelligence. 37(1), 45–51, Journal of Intelligent & Fuzzy SystemsThe factors (university type, academic rank, college type, and academic qualification) are all related to it. The issue is stated as follows:

In higher education institutions, the majority of departments and administrators are keen to adapt to the needs of the digital era. Work in higher education, particularly in administration and leadership, requires innovation and ingenuity. Universities need a fresh breed of leaders with modern, specialized skills. The faculty members' teaching abilities that take into account and utilize technology are one of the most essential components in the development of any university. The quality of university faculty members' outputs will be greatly raised if they implement technology teaching methods and approaches in the classroom.

One of the fundamental, key instruments for improving the educational process, the significance of technical competence in teaching calls for the provision of the greatest capabilities and efforts and has a favorable impact on the effectiveness of teaching performance. Therefore, the purpose of this study was to determine the amount of AI usage among academic leaders and the degree to which faculty members profit from technical expertise in instruction. Additionally, it aims to clarify the connection. Between them by way of the opinions of the faculty. The following queries were addressed by the current study:

1. How much do academic leaders at Jordanian University employ AI, in faculty members' opinions?
2. What is the quality of faculty members' teaching abilities at Jordanian universities?
3. Is there a relationship between the faculty members' level of teaching proficiency at Jordanian institutions and the extent to which academic leaders are utilizing AI?

Study Importance: The novelty of the topic the study examines the use of AI applications to help faculty members improve their teaching skills in the age of digitization gives the study its significance. It also helps faculty members develop their technological teaching skills. It has an impact on their capacity to look for methods to grow their universities and improve communication among faculty, staff, students, and local community institutions. The literature on this topic in the Arab and Jordanian countries is also anticipated to grow as a result of this study.

The study will help decision-makers at the Ministry of Higher Education, the Commission for Accreditation of Higher Education Institutions, and academic leaders at institutions as they endeavor to qualify academic leaders technologically and facilitate their use of AI approaches.

The current study's objectives are to ascertain the extent to which university academic leaders are utilizing AI and to identify the faculty members' level of technology teaching proficiency. And to ascertain the connection between the use of AI by academic leaders and the degree of teaching proficiency of academic staff in Jordanian institutions in the north during the digital age.

4. Definitions:

Artificial intelligence (AI) is described as "how to direct a computer to do things that humans do in a better way" (Popenici & Kerr, 2017, p.9)

Teaching competencies are understood to be the teacher's possession of an adequate level of knowledge, skills, and positive attitudes relevant to his professional roles and tasks, which are reflected in his performance and direct his behavior in educational situations with a specific level of proficiency, and which can be observed and measured with tools prepared for that purpose.

Technical skills and capabilities that a faculty member possesses effectively and proficiently when using various technological means, such as presentations and videos, to deliver information to students in its correct form, with the least amount of time and effort, were defined as technological teaching competencies by the researchers in this study. During the second semester (2023/2022) (including Jordan University of Science and Technology). A random sample of 400 faculty members from Jordanian universities in the north was given computerized questionnaires. 70% of the (280) surveys were found. The distribution of the research sample by its variables is shown in Table 1.

Table (1) the study sample by the study variable

Variable	Category	Frequency	Percentage
Gender	male	222	%78
	female	58	%22
Academic rank	Professor	56	%20
	Associate Professor	110	%38
	Assistant Professor	114	%42
Experience	**< 5 yrs.**	112	%38
	5-10 yrs.	112	%38
	> 10 yrs.	56	%24
Total		**280**	**%100**

Instruments: To accomplish the study's goal, the researchers created a questionnaire to track down academic leaders who use artificial intelligence. They did this by consulting theoretical literature and earlier research on AI and technological teaching abilities (Al-Bisher, 2020; Al-Atl, Al-Anzi, and Al-Ajami, 2021). The questionnaire's final form has 20 questions spread over three sections: academic requirements (six statements), human resources requirements (six statements), and technological needs (eight statements). The abilities of teachers several research were used in the

development of the measure (Al-Mutaifi, 2021; Al-Yajzi, 2019; Al-Dosari, 2020). It was composed of (20) statements in the finished product.

Validity and Reliability: A committee of ten university professors with expertise in educational administration and educational policy from Jordanian institutions reviewed the questionnaire's content validity. They were instructed to assess the questionnaire's applicability, revise it, and make any necessary additions or deletions. All necessary adjustments were taken into account. The questionnaire has high inter-rater reliability. Internal consistency (Cronbach alpha) was determined to confirm the tool's dependability, as indicated in Table (2). Table 2 shows the results of Cronbach's alpha's internal consistency coefficient for the two measurements.

Table (2) shows that the Teaching Competencies Measure's reliability coefficient was (0.92) while the Artificial Intelligence Measure's reliability coefficient was (0.86), indicating that these reliability coefficients are appropriate for this study.

Variable	**(Cronbach's alpha)**
Artificial intelligent use	0.86
Teaching competency	0.92

Both assessments used a five-point Likert scale with the options of very high, high, medium, low, and very low. Teaching competency and artificial intelligence answers from participants were categorized into three ranges: low (1.00–2.32), medium (2.33–3.66), and high (3.67–5.00). The following equation was used to determine the scale: the lower limit of the scale (1) - the upper limit of the scale (5), and by subtracting the lower limit from the upper limit, the result is (4); the difference between the two limits is then divided by three levels (43) to yield (1.33).) Then include the response the last item in each category, or (1.33).

Procedures:
To simplify the use of the study tool in the faculties of Jordanian public and private institutions in the Northern Region, official authorization was acquired. Additionally, the faculty members' email addresses were gathered in order to provide them the link to the measures online because, in light of technological advancement, giving along a paper tool is no longer appropriate. The Competency and AI scales were created by the researcher. The validity and reliability of the scales were then verified using the aforementioned techniques. The official records of the Ministry of Higher Education and Scientific Research were consulted to establish the study population. Using random sampling, a total of (350) faculty members were chosen. The questionnaire was distributed online to the participants in the second round for research objectives. Having retrieved all of the surveys and sorted the responses into different categories, the statistical analysis was carried out after obtaining all of the surveys and classifying the responses according to the different factors. The statistical analysis tool (SPSS) was then used to extract the data and perform a statistical analysis. The researcher then went through, interpreted, and suggested the results.

The mathematical means varied from (3.86-3.97). Technical needs came in last (mean = 3.84) and academic requirements came in first (mean = 3.97). The artificial intelligence scale has a mean of 3.94 and a standard deviation of 0.58. For each domain individually, the participants' replies' means and standard deviations were computed. The outcomes are displayed below:

5. Academic requirements:

Is there a relationship between the faculty members' level of technological teaching proficiency and the extent to which academic leaders at Jordanian institutions use artificial intelligence?

In order to respond to this query, the Pearson correlation coefficient was calculated between the level of technological teaching proficiency of faculty members and the artificial intelligence of academic leaders in Jordanian institutions. Results of the Pearson correlation coefficient between the academic leaders' artificial intelligence domains and the faculty members' skills in teaching

		Academic	HR	Technical	Overall AI
Teaching competencies	correlation coefficient (r)	.804**	.836**	.916**	.938**
	significance	.000	.000	.000	.000
	N	360	360	340	360

*Significance at (0.06)
** Significance at (0.02)

Table (5) showed a statistically significant positive correlation between faculty members' teaching abilities in the digital age and the application of AI among academic leaders in Jordanian universities.

6. Results:

The following findings were drawn after presenting, analyzing, and talking about the study tool's results:

Leaders in academia heavily rely on AI. The first degree was earned in the academic sector, then in the fields of human resources, administration, and lastly technology. All graduated with honors. Faculty members are very proficient in teaching with technology. The employment of AI by academic leaders and faculty members' technical teaching abilities were positively correlated. The findings indicated that, from the perspective of faculty members, academic leaders used artificial intelligence to a high degree at Jordanian institutions in the northern area. This conclusion may be explained by the fact that, as technological advancement, particularly the use of intelligence in education is rising, the necessity for innovation and creativity is a vital crucial, crucial element of the effective administration of higher education institutions. Because intelligence applications streamline administrative and educational procedures, it is vital to move away from doing administrative chores at universities according to old routines.

A further gap between modern technology and the demands of the time will prevent institutions from progressing. Successful institutions therefore strive to safeguard their sustainability through offering administrative and academic services that adhere to accreditation standards. This is clearly demonstrated by the high degree (Al-Huwaid, 2013). This outcome may also be linked to the fact that universities' use of AI technology has a favorable impact on the standard of education they

deliver. This outcome is in line with the findings of (Al-Masry and Al-Tarawna, 2020), who stated the necessity of embracing the usage of apps for artificial intelligence.

This finding may be explained by the positive link between academic leaders' ability to fulfill their duties more effectively and stay up with technological advancements by utilizing artificial intelligence applications in their institutions. Jordanian colleges have also used fresh approaches to using AI by supplying specialist professionals and hosting seminars for members to describe the AI-related systems in the educational process, releasing the law that safeguards innovators' information security on its websites for public access. Supports the research (Al-Masry & Al-Tarawna, 2020).

The findings showed that faculty members have high levels of teaching proficiency. This outcome is a result of the faculty's use of AI applications in the classroom. This finding is in line with other studies that found teaching technology (AI) has an influence on employees' abilities (Al-Astal, Akl, & Al-Agha, 2021). The findings of this study were in agreement with those of (Zhoo, Chen, Zhang & Coplana, 2019), which found that the adoption of artificial intelligence-based education systems delivered online improved students' academic performance. And it concurred with the study's findings by Abdel Salam (2021) that In contrast to the findings of Al-Masry and Tarawneh's study (2020), which showed that the reality of using artificial intelligence applications that support the transformation of Jordanian public universities into Productive universities came with a moderate degree, university faculty members agree on the use of artificial intelligence applications in education to a large extent. This outcome may be explained by the faculty member's significant interest in staying current with technology advancements, which has become urgently necessary, especially in education, and in developing their abilities and obtaining the necessary qualifications. As a result, the effectiveness of the faculty member directly and considerably affects the caliber of academic products. Indication (6) reads: "keen to start and end the lecture on time," came in top place and carried a lot of weight. Due to the fact that these lectures are posted on the university's official educational platforms for all students to access, it is clear that the faculty member is keen to give high-quality instruction using AI. It should be mentioned that these lectures are overseen by academic authorities.

The use of AI in the classroom, which allowed the professor to interact with students effectively on e-learning platforms, respond to their questions in a clear and concise manner, and provide them with videos and electronic links that will enhance their learning, is responsible for Statement (7) placing second. Additionally, the professor is capable of resolving the majority of the technical difficulties he statement (8), which was supposed to have taken second place, of course.

The outcome may be attributed to the faculty members' skill in effectively implementing particular educational innovations (such as the educational package based on self-learning, blackboards, presentations, and audio supervision) in a way that engages students and prevents them from getting bored. This is what improves academic performance. It can also be attributed, as the paragraphs indicated, to the faculty member's desire to diversify modern teaching methods and account for student differences so that all students have the opportunity to learn information and use it under their particular needs, like solving problems they may encounter, whether in the educational field or elsewhere, as was demonstrated in Items (3,2,15,5,9,4). Which scored highly?

This impressive outcome may be attributed to the faculty member's role in providing students with prompt and appropriate feedback on their learning progress because he is aware of the significance of defining the educational activities and subject matter expertise required to accomplish the lecture's objectives, particularly if the instruction is delivered electronically through blended or distance learning. Through their ongoing instruction throughout the lecture, using these approaches enables students to learn information from a variety of sources and deepen their understanding of the information they learn from the electronically programmed materials. Furthermore, using particular applications (such as Teams, Model, Zoom, etc.) that the university designates for the faculty member, educational technology also makes it possible for ongoing connection with the faculty member.

With a high degree, Statement (1) came in last place. The professor's requirement that more emphasis be placed on training students to produce research and projects centered on social concerns, each according to his academic stage, may help to explain the outcome. The outcome was in line with the investigation's findings (Amal & Fotia, 2018), which showed that students' attitudes toward university education professors' job competencies were high. According to study Bou Bakr (2019), there is a significant link between (technological advancements, information, and communication technology), and raising the quality of higher education.

The high outcome contrasted with Al-Saaida's (2015) research, which had a medium degree of success, and Asmaa's (2015) study, which had a low degree of success. (2016), which received a subpar grade, and the research of Ayasrah (2017), which received a grade of C-.

The results showed a statistically significant positive link between academic leaders' usage of AI in Jordanian institutions and faculty members' degree of technical teaching ability. The positive correlation between academic leaders' use of AI in their institutions and increases in their performance levels, as well as institutions' capacity to keep up with the speed of technological innovation, may help to explain this conclusion. Traditional methods, on the other hand, call for faculty members to keep their academic jobs. They must thus use technology into their instructional methods and the creation of their research.

7. Recommendations:

The researcher suggests the following in light of the findings:
1. Increasing introductory seminars on the value of faculty members' technical capabilities and encouraging faculty members to share their teaching experiences.
2. By stepping up our courses, seminars, conferences, lectures, and educational workshops, we are advancing the culture of teaching competences in the age of digitalization.
3. It uses interactive apps for learning courses and uses AI applications in its teaching, which helps to improve the academic material.
4. Expanding AI research, utilizing it to expand all academic and administrative components of the institution, and enhancing faculty members' teaching strategies in the digital age.

8. Implications:

The following suggestions are made by the researcher:

1. Carrying out new research to raise the university administration's awareness of the value of using AI applications in the educational process, the need for faculty members to receive training and support for their teaching, and the promotion of cyber security ideas among academic staff, university staff, and students.
2. We are offering technical assistance for the university's use of AI in its administrative and instructional processes.
3. Establishing guidelines for educational competencies in Jordanian universities in accordance with standards that take into account personal, professional, social, cultural, and ethical competencies and disseminating them to faculty members so they can benefit from them in improving and developing their teaching performance in...
4. She is undertaking a comparison of faculty members' performance in terms of their regular teaching abilities. In accordance with the norms of the Scientific and technical Association, and the contemporary technical skills.

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