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Availability of technological innovations in the classrooms and their impact on developing the competencies of faculty members in Jordanian Universities

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Abstract---The study aimed to reveal the effectiveness of technological innovations in developing the Competencies of faculty members at Jordanian universities, in addition to revealing the impact of demographicVariables of faculty members on the effectiveness of technological innovations in developing their Competencies. The descriptive approach was used through a questionnaire which consisted of forty items distributed among 3 areas: the availability of technological innovations in classrooms, the employment of the technological innovations in the teaching process, and the faculties, members' competence in using technological innovations was built to measure the effectiveness and its main areas from faculty members' perspective. Both validity and reliability of the questionnaire were verified. The sample of the study consisted of 400 faculty members out of 4,269faculty members in public and private universities (Jordan university, Yarmouk University, The Hashemite University, Mua'ta, private universities; Middle East, AL-Ahliya Amman University, Applied Sciences, Jerash and Al-Zaytona university) who were selected with the stratified cluster method.

Keywords---Effectiveness, Technological Innovations, Competencies.

1. Introduction

In recent decades, the world has witnessed a great knowledge, scientific and technical revolution, which prompted man to develop his experiences and skills in all its aspects. This development has played, and still is, an essential role in the progress and prosperity of nations. The educational system was not isolated from development, and the educational process became a requirement for research on new educational methods and models that are capable of facing challenges and keeping pace with the updates imposed by the knowledge revolution. Accordingly,

it was natural for the emergence of technological innovations, which caused a qualitative shift in the desired educational methods, concepts, and objectives.

And since universities are one of the bodies responsible for the progress and renaissance of countries, they are the indispensable tributary to bring about scientific development in societies through the educational services they provide, and therefore, they must be able to fulfill their obligations towards society, in terms of Preparing cadres capable of keeping pace with the requirements of the constantly changing and developing labor market on the one hand, as well as graduating generations capable of leading countries to higher qualifications (Badrakhan et al., 2020).

In this direction, Al-Omran and Al-Salal (2009) emphasized that the educational system should shift its focus from the cognitive content of the curricula to the processes through which learning takes place and from the approach of separate study courses to the integrative approach to knowledge. From the transmission and production of knowledge This change in educational concepts necessarily requires the use of technological innovations in the educational process. Using technological innovations in education is an integrative process that takes care of all the elements and components of the educational program, including objectives, content, evaluation, and methods of providing information, to create an interactive learning environment between the learner and the educational material (Seven, 2011). Badia and others (Badia et al., 2014) indicate that using technological innovations in the educational process creates innovative solutions to education problems, improves the level of its outputs, and encourages learners to be creative and innovative. Learning, developing educational activities, assessment methods, and teaching-learning practices.

Technological innovations may be employed at more than one level. Each level has its own circumstances under which employment is taking place, at the level of the classroom, such as using a new educational program to teach a specific lesson or course, in which planning and implementation are carried out at the level of a faculty member or educational institution. The application is subject to ministerial regulations and regulations, and technological innovations can be employed at the comprehensive national level and in national education strategies, such as e-school and distance education, and then planning will be at the ministry level and national strategies (Al-Haroun, 2020).

The importance of using technological innovations in the educational process is evident through its contribution to overcoming the problem of crowded classrooms and addressing the huge increase in human knowledge in contrast to the low level of competencies of some faculty members; in addition to that, technological innovations can support education by supporting and strengthening curricula. Study, making it useful and purposeful, increasing the effectiveness of education by providing more than one method and source for it, facilitating the integration of knowledge and diversity of its sources, and developing self-learning, continuous and flexible for learners (Al-Dariwish and Abdel-Alim, 2017).

2. Study problem and questions

The current era is described as the era of informatics, and recent years have witnessed a huge scientific boom in the field of educational technology at the level of concepts and applications, including what is related to the field of education, because of its positive repercussions on the educational process as a whole. The Baborikar study (2016) indicated that the use of technological innovations in the educational process contributes to raising the professional competence of the faculty member and provides him with skills to help him choose the appropriate decision for the educational environment. The Olayan study (2019) also indicated that the use of the digital revolution provided new horizons for the faculty member and the student together to obtain information accurately and in less time, which would improve the university's reputation.

The Corona pandemic has significantly contributed to changing many practices, policies, and behaviors. Education was one of the sectors most affected by that change, as countries were forced to close their educational institutions, as they are one of the most crowded places and therefore one of the most vulnerable to the spread of the virus, so it was necessary From the search for solutions to complete the educational process, and the shift from face-to-face education to distance education, through e-learning platforms, which made the need to employ technological innovations more urgent. Accordingly, the roles of faculty members have changed, and the roles of students have changed, as has the nature of curricula and their presentation methods; therefore, it is evident that this employment will be reflected in the professional competencies of faculty members. Hence, the researcher had the idea of conducting this study, which examined the effectiveness of technological innovations in developing the competencies of faculty members in Jordanian universities, by answering the following two questions:

- 1) What is the effectiveness of technological innovations in developing the competencies of faculty members in Jordanian universities?
- 2) Are there statistically significant differences at the significance level ($\alpha = 0.05$) in the responses of the study sample members about the effectiveness of technological innovations in developing the competencies of faculty members in Jordanian universities due to the variables (gender, experience, university, College, academic qualification)?

3. Objectives of the study

The current study aimed to achieve the following objectives:

- 1) Identifying the effectiveness of technological innovations in developing the competencies of faculty members in Jordanian universities from the point of view of the study sample members.
- 2) Identifying the statistically significant differences in the responses of the study sample members about the effectiveness of technological innovations in developing the competencies of faculty members in Jordanian universities, which can be attributed to the effect of the variables (gender, experience, university, College, and academic qualification).

4. The significance of studying

The current study gained its theoretical importance from the importance of using technological innovations in the educational process, as well as from the importance of the professional competencies of faculty members in universities in improving the process and outcomes of the educational process. The researcher hopes that the current study will enrich theoretical literature related to its variables.

The current study also gained its practical importance through developing its tool, its results, and the discussion of its effects. The researcher hopes that each of the following will benefit from this:

- Planners, educators, and those in charge of the educational process, by increasing the activation of technological innovations in the educational process.
- Faculty members in universities, by raising their interest in using technological innovations in the educational process.
- Interested researchers by conducting similar studies on new societies.

5. Study Limits

The study included the following limits:

- Objective limit: the extent to which technological innovations are effective in developing the competencies of faculty members in Jordanian universities.

The human limit: the study was limited to faculty members in Jordanian universities.

Time limit: The study was conducted during the second semester of the year 2021-2022.

- Spatial boundary: Jordanian public and private universities.

6. Determinants of study

The following limitations determined the current study:

The validity and reliability of the study tool.

The comprehensiveness of the tool for the effectiveness of technological innovations.

The comprehensiveness of the study population and sample.

The accuracy and objectivity of the responses of the study sample.

7. Literature review

Husamou and Al-Abdullah (2011) conducted a study aimed at identifying the reality of e-learning at Tishreen University in Syria from the point of view of faculty members and students. The descriptive survey approach and questionnaires were used as tools for data collection. The study sample consisted of (113) faculty members and (774) fourth-year students. The results showed that there were no statistically significant differences on the axis of the extent of using e-learning, its pros, cons, and obstacles, according to the variables of scientific qualification, teaching experience, and specialization, and there were statistically significant differences in the negatives axis depending on the specialization variable in favor of literary specialization.

Al-Omari's study (2015) aimed to reveal the reasons for faculty members' reluctance to use the e-learning system on the Yarmouk University website from their point of view. The study used the descriptive survey method and the questionnaire as a tool for data collection. It was applied to a sample of (200) faculty members randomly selected from different university colleges. The results showed that the weak infrastructure prepared to use the system, the lack of many students' possession of the skills of using the system, and the large teaching load on the faculty member's responsibility was the lack of teaching staff. Due to the effect of the variables of scientific qualification, teaching experience, and attending training courses, differences were found in the college variable and in favor of the humanitarian colleges whose members were more reluctant.

The study of the invasion and Alimat (2016) aimed to know the degree to which faculty members in Jordanian universities practice technological competencies and the level of job performance from their point of view and private. The results showed that the degree of technical competency practiced by faculty members in Jordanian universities was to a large extent and that the level of the job performance of faculty members in Jordanian universities from their point of view was significantly higher. The results also showed statistically significant differences due to the effect of academic qualification in all areas of technological competencies and job performance and the absence of statistically significant differences due to the impact of specialization and university type in all areas of technological competencies and job performance.

Al-Suwerki's study (2018) aimed to know the degree of possession of teaching competencies among faculty members in the Department of Arabic Language at King Abdulaziz University in Saudi Arabia from their point of view. The study sample consisted of (40) faculty members. The study followed the descriptive survey method and used a questionnaire. Study tool. The results of the study showed that the faculty members' possession of teaching competencies in all fields was highly, and it was in favor of the qualification of professor and in favor of their experience (20 years or more).

Al-Thaqafi (2019) conducted a study with the aim of identifying the professional competencies necessary for university faculty members specializing in curricula and methods of teaching Islamic education in the light of the executive framework for the renewal of teacher preparation programs in Saudi universities. The researcher used the descriptive approach, and the sample consisted of (83) faculty members in Saudi universities. A questionnaire designed by the researcher was used to collect data, and the results of the study showed that: The level of professional competencies among faculty members was high.

Al-Shammari's study (2019) aimed to identify the degree of availability of teaching competencies for faculty members in the faculties of education at Shaqra University in Saudi Arabia from the students' point of view, using the descriptive survey method, and the study sample consisted of (566) male and female students from three educational faculties at the University of Shaqra in the governorates of Dawadmi and Shaqra. And Afif, the questionnaire was used as a tool for the study. The results of the study showed that the degree of teaching competencies for faculty members in the faculties of education at Shaqra

University was high, and there were no statistically significant differences attributed to the variables of gender and College.

Amayreh's study (2019) aimed to identify the degree of availability of technological competencies for faculty members in Jordanian universities and the obstacles to their availability. Study tool. The results showed that the degree of availability of technological competencies for faculty members was at a high degree, that the practice of faculty members of technological competencies was at a high degree, and that the degree of the presence of computer sufficiency obstacles was low.

8. Methodology and procedures

Following is a description of the study's method, population, and sample, the tool used, the indications of its validity and reliability, the identification of the study's variables and procedures, and the statistical treatments used to answer its questions.

8.1. Study Approach

The descriptive approach was used to reveal the effectiveness of technological innovations in developing the competencies of faculty members in Jordanian universities. among faculty members in Jordanian universities, and to reveal the impact of their gender, universities, colleges, experience, and academic qualifications on the effectiveness of technological innovations in developing the competencies of faculty members in Jordanian universities and their axes.

8.2. Study population

The study population consisted of (4269) faculty members in public and private universities covered by the study (government universities; From the academic year 2021/2022 AD according to human resources statistics in each university covered by the study in the light of the correspondences of the Middle East University with the Ministry of Higher Education and Scientific Research.

The study individuals were selected by the cluster method, which has a size of (400) members of the teaching staff in the universities included in the study; Because the link to the questionnaire of the study tool produced using the Google Forms feature was distributed electronically to the university emails of all members of the study community obtained by the deanships of scientific research and computer centers in the universities covered by the study as shown in Table 1.

Table 1. Distribution of study population and sample according to gender, university, College, experience, and academic qualification

Variable	study population		study sample	
	The Frequency	percentage	The Frequency	percentage
Gender				
Male	Not mentioned in the community stats		256	64.0
Female			144	36.0
University				
Government	3395	79.5	261	65.3

Private	874	20.5	139	34.8
College				
Human	2049	48.0	171	42.8
Scientific	1488	34.9	179	44.8
Health	732	17.1	50	12.5
Experience				
less than five years	Not mentioned in the community stats		123	30.8
Between (5-10) years			114	28.5
More than ten years			163	40.8
Academic qualification				
Professor	1291	30.2	113	28.2
Associate professor	1352	31.7	83	20.8
Assistant Professor	1456	34.1	93	23.3
full-time lecturer	170	4.0	111	27.8

9. Content authenticity

The logical validity of identifying the effectiveness of technological innovations in developing the competencies of faculty members in Jordanian universities was verified among faculty members. By presenting it to a group of arbitrators consisting of fourteen academic staff members (Professor, Associate Professor, and Assistant Professor) with experience and expertise in the fields of (educational principles, educational technology, educational computer, curriculum and teaching, English language and translation, and educational administration).

10. The sincerity of the internal consistency

A questionnaire on the effectiveness of technological innovations in developing the competencies of faculty members in Jordanian universities was applied to a pilot sample consisting of (30) faculty members from outside the study sample who work in the universities covered by the study. They are divided according to their gender into (15 males and 15 females); This is for calculating the Corrected item-total Correlation coefficients for the relationship of the paragraphs to the questionnaire and its axes; As indicators of the sincerity of the internal consistency of their questionnaire items, as shown in Table 2 (Lord and Novick, 1968).

Table 2. The values of the corrected correlation coefficients for the relationship of paragraphs with the effectiveness of technological innovations in developing the competencies of faculty members in Jordanian universities and their axes among faculty members

Axes Paragraph No.	The text of the paragraphs of the Availability of technological innovations in the classrooms and their impact on developing the competencies of faculty members in Jordanian universities	Paragraph Correlation Coefficient	
		Axis	Questionnaire
1	The university provides high-quality internet in the classrooms	0.68*	0.55*

2	Tools for Using educational technology (computers and their accessories, data show, interactive whiteboard, and tablets) are available in the classrooms.	0.77*	0.58*
3	The university provides a number of smart computer laboratories	0.73*	0.57*
4	The university provides modern multimedia in the classroom	0.80*	0.59*
5	The university provides technological innovations of all kinds in preparing electronic courses	0.76*	0.63*
6	The university provides computer simulation, deals with it, and employs it in the educational learning process	0.73*	0.58*

* Statistically significant ($\alpha = 0.05$); because its calculated value is greater than its critical value of (0.34734) at (28) degrees of freedom.

It is noted from Table 2 that the values of the corrected correlation coefficients for the relationship of the paragraphs of the availability of technological innovations in the classrooms axis ranged between (0.68-0.80), and their questionnaire ranged between (0.55-0.63). And the values of the corrected correlation coefficients for the relationship of the paragraphs of the axis of using technological innovations in the teaching process with its axis ranged between (0.44-0.80), and its questionnaire ranged between (0.42-0.68). And the values of the corrected correlation coefficients for the axis of the competency paragraphs of the faculty members in dealing with technological innovations with their axis ranged between (0.61-0.81), and their questionnaire ranged between (0.50-0.67).

11. Study procedures

To achieve the objectives of the study; The following steps were followed:

- 1) Determining the problem of the study and reviewing the educational literature and previous studies related to the subject of the study.
- 2) Determining the output of the study population included in the study and selecting the sample from the faculty members in Jordanian private and public universities.
- 3) 6. Distributing the link of the questionnaire of the study tool produced using the Google Forms feature in its final form to the university emails of the targeted study members in coordination with the scientific research deanships and computer centers in the universities covered by the study.
- 4) 7. Placing a cover sheet in the study tool's questionnaire link; It explains the purpose of the study to the study members and asks them to answer the paragraphs of the study tool as they see it, expressing their point of view and view in all honesty and objectivity, and informing them that their answers and answers will only be used for scientific research purposes.
- 5) 8. Analyzing the responses of the study sample and collecting them in an excel file format, and then analyzing these data using the Social Package (SPSS) program.

- 6) 9. Analyzing data using appropriate statistical methods, obtaining results, presenting, discussing, and interpreting the study results, using theoretical literature and previous studies, and making recommendations.

12. Results and Discussion

The study aimed to reveal the availability of technological innovations in the classrooms and their impact on developing the competencies of faculty members in Jordanian universities from their point of view, and the impact of their demographic variables on their estimates, by answering the following questions. What is the effectiveness of technological innovations in developing the competencies of faculty members in Jordanian universities from their point of view?

To answer the first study question; The arithmetic means and standard deviations of the effectiveness of technological innovations in developing the competencies of faculty members in Jordanian universities and their axes (the availability of technological innovations in the classrooms, the employment of technological innovations in the teaching process, and the competencies of faculty members in dealing with technological innovations) were calculated from their point of view as shown in Table 3

Table3. Availability of technological innovations in the classrooms and their impact on developing the competencies of faculty members in Jordanian universities and their axes from their point of view

Sr.	Availability of technological innovations in the classrooms and their impact on developing the competencies of faculty members in Jordanian universities	Means			SD
		Its value	It's qualification	Range	
1	Availability of technological innovations in the classrooms	3.23	3	Medium	0.91
Total questionnaire		3.64		Medium	0.61

It is noticed from Table 5 that the effectiveness of technological innovations in developing the competencies of faculty members in Jordanian universities from their point of view is within a medium range.

The axes of the effectiveness of technological innovations in developing the competencies of faculty members in Jordanian universities from their point of view are in the following order: Medium range, then the availability of technological innovations in classrooms qualification third within a medium range.

The axis's arithmetic means and standard deviations were calculated for the availability of technological innovations in the classrooms from their point of view, as shown in Table 4.

Table 4. The arithmetic means of the paragraphs of the axis of the availability of technological innovations in the classroom from their point of view

Paragraph No.	The text of the paragraphs focuses on the availability of technological innovations in the classrooms	Means			SD
		Its value	It's qualification	Range	
3	The university provides a number of smart computer laboratories	3.44	1	Medium	1.02
1	The university provides high-quality internet in the classrooms	3.39	2	Medium	1.13
5	The university provides technological innovations of all kinds in preparing electronic courses	3.25	3	Medium	1.06
2	Tools for using educational technology (computers and their accessories, data show, interactive whiteboard, and tablets) are available in the classrooms.	3.23	4	Medium	1.13
6	The university provides computer simulation, deals with it, and employs it in the educational learning process	3.08	5	Medium	1.12
4	The university provides modern multimedia in the classroom	3.01	6	Medium	1.13

It is noticed from Table 8 that the paragraphs on the axis of availability of technological innovations in the classrooms came from their point of view within an average range of the paragraphs (with numbers: 3, 1, 5, 2, 6, 4) with arithmetic means that ranged between (3.44-3.01).

The results of the impact of gender on the Availability of technological innovations in the classrooms and their impact on developing the competencies of faculty members in Jordanian universities and their axes from their point of view

The t-test of independent samples of the two arithmetic means of the effectiveness of technological innovations in developing the competencies of faculty members in Jordanian universities and their axes (the availability of technological innovations in the classrooms, the employment of technological innovations in the teaching process, and the competencies of faculty members in dealing with technological innovations) was used from the point of view of Considering them in light of the two standard deviations of each according to their gender as shown in table 5

Table5. The results of the (t) test of the two arithmetic mean of the availability of technological innovations in the classroom and their axes from their point of view in light of their respective standard deviations according to the university

Gender	Mean		SD	t	Degree of freedom			Probability of error	
Availability of technological innovations in classrooms									
Male	3.18		0.95	-1.73	398			0.08	
Female	3.34		0.83						
Total questionnaire									
Male	3.64		0.63	-0.19	398			0.85	
Female	3.65		0.57						
University	Mean		SD	t	Degree of freedom			Probability of error	
Availability of technological innovations in classrooms									
Government	3.02		0.91	-6.88*	398			0.00	
Private	3.64		0.76						
Total questionnaire									
Government	3.53		0.61	-5.40*	398			0.00	
Private	3.86		0.55						
College	Mean	SD	Contrast source	Sum of squares	Degree of freedom	Mean sum of squares	F	Error probability	
Availability of technological innovations in classrooms									
Humane	3.11	0.95	Between groups	4.75	2	2.38	2.89	0.06	
Scientific	3.31	0.89	Within groups	326.04	397	0.82			
Health	3.38	0.77	Total	330.79	399				
Total questionnaire									
Humane	3.57	0.63	Between groups	1.78	2	0.89	2.41	0.09	
Scientific	3.71	0.62	Within groups	146.84	397	0.37			
Health	3.69	0.48	Total	148.62	399				
Experience	Mean	SD	Contrast source	Sum of squares	Degree of freedom	Mean sum of squares	F	Error probability	
Availability of technological innovations in classrooms									
less than five years	3.39	0.81	Between groups	4.41	2	2.20	2.68	0.07	
Between (5-10) years	3.21	0.89	Within groups	326.38	397	0.82			
More than ten years	3.14	0.99	Total	330.79	399				
Total questionnaire									
less than five years	3.66	0.61	Between groups	0.13	2	0.07	0.17	0.84	
Between (5-	3.62	0.56	Within	148.49	397	0.37			

10) years			groups					
More than ten years	3.65	0.65	Total	148.62	399			
Academy qualification	Mean	SD	Contrast source	Sum of squares	Degree of freedom	Mean sum of squares	F	Error probability
Availability of technological innovations in classrooms								
Professor	3.18	0.92	Between groups	5.98	3	1.99	2.43	0.06
Associate professor	3.05	0.96	Within groups	324.81	396	0.82		
Assistant Professor	3.25	0.90	Total	330.79	399			
full-time lecturer	3.41	0.85						
Total questionnaire								
Professor	3.53	0.61	Between groups	2.82	3	0.94	2.55	0.06
Associate professor	3.62	0.65	Within groups	145.80	396	0.37		
Assistant Professor	3.67	0.57	Total	148.62	399			
full-time lecturer	3.75	0.59						

Table 5 shows that there are no statistically significant differences ($\alpha = 0.05$) between the arithmetic circles for the effectiveness of technological innovations in developing the competencies of faculty members in Jordanian universities and their axes (the availability of technological innovations in the classrooms, the employment of technological innovations in the teaching process, and the competencies of faculty members in Dealing with technological innovations) from their point of view attributed to the College.

The table also shows that there are no statistically significant differences ($\alpha = 0.05$) between the arithmetic circles for the effectiveness of technological innovations in developing the competencies of faculty members in Jordanian universities and their axes (the availability of technological innovations in the classrooms, the employment of technological innovations in the teaching process, and the competencies of faculty members in Dealing with technological innovations) from their point of view is attributed to the academic qualification.

This result can be attributed to the joint cooperation between faculty members in Jordanian universities of different academic qualifications on the one hand and to their receiving enrichment training workshops commensurate with the specificity of the situation that academic institutions are going through in light of the Covid-19 pandemic by the departments of quality and performance development of faculty members, each in his university on the other hand; In order to overcome the negative effects of it on the teaching-learning process; Which led to overcoming their academic qualifications equally in activating technological

innovations in developing their competencies by exploiting the technological innovations available in the classrooms, exploiting their competencies in dealing with technological innovations, and using technological innovations in the teaching process.

13. Recommendations

In light of the results of the study; The researcher recommends the following:

- 1) Inviting the Public and Private Accreditation Commission for Academic Institutions in the Ministry of Scientific Research and Higher Education to impose more quality standards related to the need to provide technological innovations in classrooms in public and private academic institutions; In order to overcome the problem of mediating availability in the light of the results of the study.
- 2) Inviting the Public and Private Accreditation Commission for Academic Institutions in the Ministry of Scientific Research and Higher Education to impose more quality standards related to the need to provide technical and technical cadres in government and private academic institutions; In order to overcome the problem of mediating their availability in academic institutions.
- 3) Inviting government and private academic institutions to provide all aspects of technical support to their faculty members; To be able, in turn, to make more efforts to employ technological innovations in the teaching process; In order to overcome the problem of mediating employment in academic institutions.

14. Conclusion

The study aimed to reveal the extent of the effectiveness of technological innovations in developing the competencies of faculty members in Jordanian universities among faculty members in Jordanian universities and to reveal the impact of the demographic variables of faculty members in them and their axes. To achieve the study's objectives, the descriptive approach was used, whereby a questionnaire was built to measure effectiveness and its axes from their point of view. It consisted of forty paragraphs, distributed on three axes: the availability of technological innovations in classrooms, then the axis of employing technological innovations in the teaching process, then the axis of the competencies of faculty members in dealing with technological innovations. Where its validity and reliability were verified. The study sample consisted of (400) faculty members out of (4269) faculty members in public and private universities covered by the study (public universities; Jerash and Zaytuna) whose members were selected by cluster method.

The results showed the effectiveness of technological innovations in developing the competencies of faculty members in Jordanian universities from their point of view within a medium range. The questionnaire's axes came according to the following order: the competency of faculty members in dealing with technological innovations came in the first place within a high range, then the axis of employing technological innovations in the teaching process in the second place within a medium range, then the axis of the availability of technological innovations in classrooms in the third place within the medium range.

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