

El e-learning y su impacto en los resultados educativos durante la pandemia de COVID-19 desde la perspectiva de los estudiantes universitarios.

E-learning and its Impact on Educational Outcomes During the COVID-19 Pandemic from the Perspective of University Students

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Resumen: El estudio tuvo como objetivo identificar el aprendizaje electrónico y su impacto en los resultados educativos durante la pandemia de COVID-19 desde la perspectiva de estudiantes universitarios jordanos, y su relación con las variables de género y especialización académica. Para lograr los objetivos del estudio, se adoptó un enfoque descriptivo. La muestra del estudio consistió en (2000) estudiantes hombres y mujeres, que fueron seleccionados aleatoriamente durante el primer semestre del año académico (2021/2022). Estos estudiantes estudiaron a través del sistema de aprendizaje electrónico en universidades jordanas durante la pandemia de COVID-19. Los datos necesarios se recopilaron mediante un cuestionario compuesto por (16) ítems, que se administró a la muestra del estudio. El estudio concluyó que el impacto del aprendizaje electrónico en los resultados educativos universitarios durante la pandemia de COVID-19 fue bajo, con una media aritmética de (2,58) y una desviación estándar de (0,60). Tampoco reveló diferencias estadísticamente significativas atribuibles a las variables del estudio, a saber, género (hombre, mujer) y especialización académica (científica, humanidades).

Palabras clave: Aprendizaje electrónico, resultados educativos, pandemia de COVID-19, universidades jordanas, estudiantes universitarios, educación superior.

Abstract: The study aimed to identify e-learning and its impact on educational outcomes during the COVID-19 pandemic from the perspective of Jordanian university students, and its relationship to gender and academic major variables. To achieve the study objectives, a descriptive approach was adopted. The study sample consisted of (2,000) male and female students, who were selected randomly during the first semester of the academic year (2021/2022). These students studied through the e-learning system at Jordanian universities during the COVID-19 pandemic. The necessary data was collected using a questionnaire consisting of (16) items, which was administered to the study sample. The study concluded that the impact of e-learning on university educational outcomes during the COVID-19 pandemic was low, with an arithmetic mean of (2.58) and a standard deviation of (0.60). It also revealed no statistically significant differences attributable to the study variables, namely gender (male, female) and academic major (scientific, humanities).

Keywords: e-learning, educational outcomes, COVID-19 pandemic, Jordanian universities, university students, higher education.

1. INTRODUCTION

The contemporary epoch is distinguished by accelerated transformations and substantial advancements that have exerted a profound influence on diverse domains, including education, economics, society, and politics. In order to address these changes, it is essential to implement a clear and substantial reform in the field of education, with the objective of preparing individuals who are able to interact with these changes. It is evident that any modification to the educational system necessitates a concomitant transformation and refinement of the competencies and experiences of both teaching staff and students. This is imperative to enhance the system's efficacy in fostering creativity, innovation, and comprehensive development, within a meticulously articulated intellectual framework that manifests in enhanced student performance and cognitive outcomes (Al-Muhammadi, 2018; Maatuk et.al, 2021; Mukhtar et.al, 2020; Zeeshan et.al, 2025).

The World Health Organization has formally declared the ongoing outbreak of the novel coronavirus (SARS-CoV-2) a contemporary threat to global health, categorizing it as a pandemic (Al-Jamal, 2023). The present pandemic has resulted in the global cessation of a multitude of activities, including educational pursuits (Muhammad, 2023; Awas, 2016). This has resulted in the closure of educational institutions, including schools and universities, in numerous countries worldwide. Distance learning has been extensively promoted as a substitute for traditional learning during the course of the pandemic to ensure that students continue to receive an education from the comfort of their own homes. As school and university students are still developing their independence, schools, universities, teachers and families as a whole must collaborate to ensure the successful completion of distance learning and access to online resources (Abu Shakhdam, 2023; Ben Issa& Ben Aishi, 2023; Hawas, 2023).

The emergence of the novel corona virus has had a profound impact on the economies of numerous countries, with repercussions for healthcare systems. The virus has hindered transmission and led to the suspension of air travel, engendering a

sense of global entrapment (Chenari et.al, 2024; Ashour et.al, 2021; Mishra, 2023; Hao et.al, 2024). Individuals have been compelled to endure a state of terror, panic, fear, anxiety and tension on a vast scale, the likes of which humanity has not previously experienced. A series of administrative decisions were taken, stipulating the cessation of economic activities, including those related to the education sector (Asamoah et.al, 2023; Raza et.al, 2020). The latter is now responsible for implementing a series of precautionary measures and procedures, with the objective of ensuring the continuity of the educational process in the context of the exceptional epidemic that is currently being experienced on a global scale (Aldhafeeri& Alotaibi, 2023; Esawe et.al, 2022).

This instigated a series of considerations into substitute educational approaches that would facilitate the maintenance of physical distance between learners, utilising educational methodologies that are capable of surmounting the aforementioned circumstances and thus ensuring the completion of their education by those who have been deprived of this opportunity (Abu Touqa& Al-Dallo, 2023). In the contemporary era, innovative and modern patterns have emerged that are appropriate for the modern changes in society. The most prominent of these patterns is distance education, which has become an educational necessity that complements traditional education. Since its emergence, distance education has achieved positive and effective results in the educational and pedagogical field (Elzainy et.al, 2020).

In the context of the ongoing pandemic, numerous countries have adopted distance education as a means of ensuring the continuity of education while simultaneously safeguarding students and educators (Maazouz, 2023; Demuyakor, 2020; Almaiah et.al, 2020)

Distance learning constitutes a viable alternative that can ensure the continuity of the educational process in the event of circumstances such as political unrest, natural disasters and emergency conditions that result in the closure of educational and university institutions (Rao& Vijayalakshmi, 2021; Maity et.al, 2021; Lama, 2024). This is the sequence of events that occurred during the novel coronavirus pandemic crisis, which swept the entire world. The advent of the virus necessitated a comprehensive transformation of distance learning systems in educational institutions globally. This was driven by the imperative to safeguard students and to ensure the uninterrupted continuity of the educational process. The advent of distance learning platforms has engendered a paradigm shift in the modality of education, whereby students now have the option to participate in virtual classes, access electronic curricula, submit assignments and undertake various assessments (Aldhafeeri& Alotaibi, 2023; Raza et.al, 2020; Chenari et.al, 2024).

Despite the considerable challenges it faced, including technological, economic and other issues associated with this mode of education, the Hashemite Kingdom of Jordan was among the countries that resorted to distance learning in the aftermath of the Corona pandemic. In addition to the absence of technological infrastructure and the considerable intricacies involved in delivering education to all school and

university students online (Essiam et.al, 2024), the Corona pandemic also exposed the deficiencies, imperfections and confusion inherent in Jordanian education. The pandemic resulted in the cessation of movement and the compulsion to distance ourselves, leading to the closure of all educational institutions (Ulerio et.al, 2024; Ndibalema, 2022).

Indeed, e-learning was not a novel concept within the domain of education; however, the advent of the pandemic precipitated a resurgence in the demand for this pedagogical approach. The present situation with regard to education is such that immediate action is required in order to implement solutions. The utilisation of educational technology tools has enabled educators to maintain the educational process, thereby facilitating the continuity of education during periods of lockdown (Cone et.al, 2021; Azim, 2023). It is evident that a multitude of learning platforms are equipped with advanced functionalities that facilitate the effective management of content delivery, fostering interaction with students, and enabling the execution of assessments and other academic activities from the comfort of their own homes. It is imperative to acknowledge the pivotal role that students' attitudes and their acceptance of this pedagogical approach play in the efficacy of the learning process. Should these measures fail to reflect the interests and needs of students, the educational process will be deemed unsatisfactory, as the student is ultimately the goal. It is imperative to acknowledge that prioritising the success of e-learning has become an indisputable necessity. This approach is crucial for attaining educational objectives and averting the potential loss of an entire generation (Michał et.al, 2020; Fallatah, 2022).

In consideration of the prevailing circumstances, this study endeavours to ascertain the efficacy of e-learning in the context of the ongoing Corona pandemic. The investigation will explore the impact of this educational paradigm shift on academic outcomes among Jordanian university students.

Study problem:

The present situation in educational institutions across the globe is unprecedented due to the Corona pandemic. This has forced most of these institutions to close in order to limit the spread of this dangerous virus (Mukhtar et.al, 2020; Al-Jamal, 2023; Muhammad, 2023). Nevertheless, the desire and need for the continuation of education remained the primary concerns of governments during the pandemic (Zeeshan et.al, 2025; Al-Muhammadi, 2018; Awas, 2016). In the face of challenging global circumstances, educational institutions such as schools and universities persevered in their efforts to maintain operational continuity and deliver optimal learning experiences for their students (Maatuk et.al, 2021).

Consequently, e-learning has been utilised to facilitate the educational process on a global scale, encompassing both synchronous and asynchronous delivery methods (Ben Issa& Ben Aishi, 2023; Hawas, 2023; Chenari et.al, 2024). The advent of educational technology tools has engendered a paradigm shift in the realm of

learning, wherein the ability to learn at any time and from any location, at a minimal cost, has been made possible. This development is concomitant with the decentralisation of education (Hao et.al, 2024; Ashour et.al, 2021; Abu Touqa& Al-Dallo, 2023).

However, it is imperative to acknowledge that all constituents of the educational process must comprehensively grasp both the possibilities and constraints inherent in educational technology at this juncture. As we prioritise the continuity of the educational process, it is imperative that we also evaluate the efficacy of this continuity to ensure the maximisation of benefits for learners (Abu Shakhdam, 2023). It is evident that a significant number of educational institutions were not adequately prepared for this type of transformation in education. In numerous countries, educators in schools, faculty members in universities, students, and parents are not adequately prepared for distance learning. Furthermore, it is imperative to undertake continuous evaluation of the performance of technological tools to ensure that they fulfil their intended function in sustaining the educational process effectively at this juncture, whether in the immediate or long-term future (Asamoah et.al, 2023; Maazouz, 2023; Mishra, 2023).

It was imperative to address this issue in order to ascertain whether educational technology has the capacity to sustain the educational process in the context of the pandemic caused by the novel corona virus (SARS-CoV-2) and to determine the impact of e-learning on the educational process.

Accordingly, this study came in an attempt to answer the following questions:

1- What is the reality of e-learning and its impact on educational outcomes during the COVID-19 pandemic from the perspective of university students?

2- Are there statistically significant differences at the significance level ($\alpha=0.05$) in the reality of e-learning and its impact on educational outcomes during the COVID-19 pandemic from the perspective of university students, attributed to the gender variable (male, female)?

3- Are there statistically significant differences at the significance level ($\alpha=0.05$) in the reality of e-learning and its impact on educational outcomes during the COVID-19 pandemic from the perspective of university students, attributed to the variable of student's academic specialization (scientific, humanities)?

Significance of the Study:

The importance of the study can be summarized as follows:

Theoretical Significance:

The results of this study will benefit specialists and those in charge of Jordanian universities and higher education institutions in general, in understanding e-learning and its impact on educational outcomes during the pandemic. Furthermore, they will assist in enhancing the quality of e-learning in Jordanian universities by developing

various e-learning mechanisms. It is hoped that this study and its results will be an important resource and essential support for students, researchers and staff within Jordanian universities across various disciplines, contributing to enriching the Jordanian, Arab and international library with new studies related to this topic.

Practical importance:

The study provides the university administration with feedback, enabling it to leverage its findings to improve the performance of the e-learning system, develop various human resources, including students and faculty members, and develop financial capabilities. The objective of this initiative is twofold: firstly, to establish a framework for the future development of e-learning as a substitute for conventional, face-to-face learning methods; and secondly, to create a plan for the implementation of e-learning in educational settings.

Study objectives:

The present study aims to explore the reality of e-learning in Jordanian universities and its impact on educational outcomes during the pandemic of Coronavirus Disease 2019 (Covid-19), from the perspective of university students. The study's objective is twofold: firstly, to ascertain whether there are statistically significant differences in the reality of e-learning in Jordanian universities and its impact on educational outcomes during the pandemic; and secondly, to determine whether these differences can be attributed to the variables of student gender and academic major.

Study Limits:

The study will be limited to the following limits:

Human Limits: Consisting of all students at public universities.

Spatial Limits: The study was conducted at public Jordanian universities.

Temporal Limits: The study was conducted during the first semester of the 2021-2022 academic year.

Study terms:

1- E-learning:

The term 'e-learning' is defined as an educational process that takes place through electronic devices, such as mobile phones or computers, whether through an internet connection or through CDs. This process enables the learner to learn at any time and in any place, whether remotely or in the classroom (Al-Jamal, 2023; Asamoah et.al, 2023; Hao et.al, 2024; Aldhafeeri& Alotaibi, 2023).

The term 'distance learning' is defined as an educational system characterised by the exchange of information between instructors and students, with the provision of necessary support and assistance to learners through the utilisation of modern communication technologies. This approach aims to circumvent geographical, environmental, temporal, age, economic and health-related barriers, thereby facilitating effective learning for all individuals, irrespective of their physical location or personal circumstances (Maazouz, 2023; Demuyakor, 2020; Lama, 2024; Mishra, 2023).

It is also recognised as (Rao& Vijayalakshmi, 2021; Abu Touqa& Al-Dallo, 2023; Chenari et.al, 2024) that it is one of the contemporary educational methodologies which has proliferated across the globe in recent years, being adopted by a multitude of educational institutions, institutes and universities across all specialisations. The programme is underpinned by communication and internet connection technologies, with interactions occurring through forums and virtual sections. The courses are divided into units comprising videotapes and reading materials that are replete with educational information.

2- Corona pandemic:

The novel coronavirus is an infectious disease caused by the latest discovered coronavirus from the family of coronaviruses that infects humans and animals. The World Health Organization (WHO) has characterized the outbreak as a pandemic. The virus first emerged in Wuhan, China, in late 2019 and was subsequently designated "SARS-CoV-2" by the WHO. The aetiology of the condition is primarily respiratory infections in humans (Michał et.al, 2020; Aldhfeeri& Alotaibi, 2023; Essiam et.al, 2024). The symptoms associated with the condition include a dry cough, fever and fatigue. The condition is transmitted to humans through the act of coughing or sneezing (Raza et.al, 2020; Fallatah, 2022).

Previous studies:

A comprehensive review of extant literature was conducted to identify relevant studies, with a particular focus on recent publications. Demuyakor (2020) conducted a study to assess the satisfaction of Ghanaian international students at Chinese universities with e-learning. It was evident that these students were highly satisfied with the e-learning programmes. However, it was noted that students from outside China face significant financial burdens, including the cost of internet access to participate in this education, and that those inside China encounter slow network speeds. The results also indicated that time differences between countries were a significant hindrance.

Al-Zaini's (2020) study sought to examine the e-learning and online assessment experience during the period of the pandemic at the College of Medicine at Qassim University in Saudi Arabia. The study also examined the impact of e-learning and its assessment on student and faculty performance, as well as the challenges facing its sustainability. The study sample consisted of all undergraduate students participating in the e-learning experience. The findings indicated a statistically significant increase in student grades during e-learning, as well as higher faculty satisfaction with virtual classrooms and online workshops.

A study (Mukhtar et al., 2020) conducted in Pakistan on dental students concluded that e-learning during the pandemic encouraged student-centred learning and facilitated access to learning resources at any time. However, the study indicated

an inability to teach and learn practical medical work. In addition, instructors found themselves unable to undertake authentic assessments of their students.

A study conducted in Poland on medical students to assess their attitudes towards distance learning during the pandemic (Michał et al., 2020) revealed that 70% of the sample indicated that the most significant negative aspect of distance learning was the lack of communication with patients. Furthermore, 54% of respondents cited technical issues related to technological devices. Furthermore, it was indicated that the most significant positive aspects were the ability to remain at home, access learning resources at any time, and individual learning.

In a study conducted by researchers (Almaiah et al., 2020) on 30 students and 31 experts in e-learning systems at six universities in Jordan and Saudi Arabia, an interview tool was used to investigate the challenges and factors affecting the use of e-learning during the pandemic caused by the novel severe acute respiratory syndrome (SARS-CoV-2) virus. The study concluded that these factors are technological and related to the quality of the e-learning system itself, in addition to cultural factors, self-efficacy, and confidence.

Awass's study (2016) sought to identify the purposes and areas of employment of the parties to the educational process of social networking sites in distance learning. In order to achieve the objectives of the study, the descriptive analytical approach was used. The study sample consisted of 197 students and 35 professors in the Department of Foreign Languages for the first and second year of the Master's degree at the Faculty of Arts and Languages at Lamine Debaghine University in Setif, Algeria. The findings indicated a substantial correlation between the degree of reliance on social networking sites for education and learning among students and professors. The results of the study demonstrated that distance education facilitated by social networking sites enhances students' access to information sources.

Al-Muhammadi (2018) conducted a study with the objective of ascertaining the extent to which students at King Abdulaziz University in Jeddah benefit from the e-learning system, and the challenges they encounter when using it. The study utilised a questionnaire to collect data, with the sample consisting of 570 students. The results of the study demonstrated the existence of genuine endeavours to enhance the e-learning system and modernise it in accordance with contemporary requirements.

The present study (Abu Quta and Al-Dalu, 2020) sought to ascertain the efficacy of e-learning in the context of the Corona pandemic, as perceived by students of Palestine Technical College. The descriptive approach was employed, and the questionnaire was administered to a sample of 830 male and female students, who were randomly selected from various college departments. The findings of the study indicated that the electronic assessment employed by the college was perceived as the most effective among the various fields of study from the perspective of the students.

The study (Al-Jamal, Samir, 2020) sought to ascertain the reality of e-learning in Palestinian universities and its impact on educational outcomes in the context of

the Corona pandemic. A sample of 130 male and female students was randomly selected for the administration of the questionnaire. The descriptive analytical approach was also employed. The findings of the study indicated that the positive aspects of e-learning in Palestinian universities were average, while the negative aspects were high. The findings of the study demonstrated that the outcomes of e-learning were, on average, mediocre. The findings of the study indicated that there were no statistically significant differences in the reality of e-learning in Palestinian universities and its impact on educational outcomes in light of the Corona pandemic, depending on the variables of gender and academic year.

The present study (Maazouz, 2020) sought to ascertain the reality of distance university education via the Internet in light of the Corona pandemic in Algeria. The descriptive analytical approach was adopted, and the study included university students from various universities in Algeria. The data was collected using a questionnaire and disseminated to the study sample, which comprised 150 male and female university students. The findings of the study indicated that the educational platforms relied upon were not designed to facilitate teacher evaluation and monitoring of student progress.

Comment on previous studies:

A review of previous studies reveals that they examined the ability of educational technology to sustain the educational process during the pandemic caused by the severe acute respiratory syndrome (SARS-CoV-2) virus. The preponderance of research, both from within the Arab world and from international sources, has reached a consensus that educational technology is the most effective means by which to maintain the educational process during periods of lockdown. However, a consensus among all studies was that obstacles existed which impeded this effective continuity. The underlying factors contributing to this phenomenon include the inadequacy of technical infrastructure and the lack of preparedness among teaching staff, students, and parents for this particular mode of learning.

Field Method and Procedures:

This section provides a detailed description of the procedures followed by the researcher in conducting the study, including the study methodology, description of the study community, identification of the study sample, preparation of the study tool, verification of its validity and reliability, statement of the study procedures, and the statistical methods used in processing the results. The following description outlines the aforementioned procedures.

Study methodology:

In order to achieve the objectives of the study, the descriptive approach was used due to its suitability and the nature of the current study. This approach is predicated on the objective of describing and analysing the data pertaining to the subject of the study. The process of scientific analysis and interpretation entails the description of

a specific phenomenon or problem, and its subsequent depiction through quantitative means. This is achieved by the collection of standardised data and information regarding the phenomenon or problem, its classification, analysis, and subjection to precise studies.

Study community:

The study population comprised all Jordanian university students who were currently enrolled in their first semester of the academic year (2021/2022).

Study sample:

The study sample consisted of 2,000 male and female students from Jordanian universities in the first semester of the 2021/2022 academic year, who were selected using a simple random method. An electronic questionnaire was designed and disseminated among Jordanian university students via various social media platforms, including Facebook and WhatsApp. A total of 2,384 students provided a response to the questionnaire; however, 384 questionnaires were excluded on the basis that the students had not answered them correctly. Consequently, the final set of valid questionnaires comprised those that had been approved as a sample for the study. The following table No. (1) illustrates the distribution of the study sample according to its variables:

Table No. (1): Shows the distribution of the study sample members according to the study variables.

variable	Category	number	percentage%
Sex	male	876	43.8%
	female	1124	56.2%
	Total	2000	100%
Student's academic major	scientific	1067	53.3%
	humanitarian	933	46.7%
	Total	2000	100%

Study tool:

The development of the study tool was informed by a comprehensive review of the extant educational literature and previous studies related to the study problem. This included studies such as Study (Zeeshan et.al, 2025), Study (Muhammad, 2023), Study (Abu Shakhdam, 2023), Study (Hao et.al, 2024), Study (Aldhafeeri& Alotaibi, 2023), Study (Asamoah et.al, 2023), and Study (Hawas, 2023). The initial form of the study tool comprised two parts. The first part contained the demographic information of the respondent, while the second part contained the questionnaire paragraphs. These comprised 20 paragraphs that measured the impact of e-learning outcomes on the educational process during the Corona pandemic.

Instrument Validity:

Instrument validity refers to whether the instrument's items measure what they were designed to measure. The instrument's validity was verified in two ways:

First: The validity of the arbitrators:

The questionnaire was presented in its initial form to a group of ten professors specialising in the fields of curricula, teaching, measurement and evaluation from Al-Balqa Applied University and Yarmouk University. The purpose of this presentation was to ascertain the extent to which the study tool was suitable for the purpose for which it was developed. In addition to articulating their perspective on the proposed amendments, the professors proffered suggestions for the alteration, addition, deletion or consolidation of certain paragraphs. The arbitrator's proposed amendments were duly considered, ensuring that the final iteration of the study tool would comprise a total of sixteen paragraphs. These paragraphs would assess the impact of e-learning outcomes on the educational process during the period of the Corona pandemic.

Second: Internal consistency validity:

The validity of the internal consistency of the study tool was verified by applying the tool to a survey sample consisting of 30 students from the same study community but outside the original sample. The Pearson correlation coefficient was then calculated between each paragraph of the scale and its total score. The results of this calculation are shown in the following table No. 2.

Table No. (2): Correlation coefficient of each paragraph of the scale with the total score of the scale

	Correla tion coefficient	Signific ance level		Correla tion coefficient	Signific ance level
1	0.58	0.01	9	0.63	0.01
2	0.55	0.01	10	0.66	0.01
3	0.59	0.01	11	0.68	0.01

4	0.61	0.01	1 2	0.60	0.01
5	0.63	0.01	1 3	0.65	0.01
6	0.53	0.01	1 4	0.57	0.01
7	0.69	0.01	1 5	0.58	0.01
8	0.58	0.01	1 6	0.62	0.01

As demonstrated in Table No. 2, the correlation coefficients between the paragraphs and the total sum of the scale ranged from 53 to 69. These values are statistically significant at the 0.01 level, thereby validating the study tool and substantiating the reliability of the results obtained from its application to the study sample.

Tool stability:

The stability of the study tool was confirmed after applying it to a survey sample from the same study community, but outside its original sample, which numbered (30) students, by following the following methods:

First: The half-split method:

The survey sample scores were utilised to calculate the reliability of the scale employing the split-half method. This method involved the division of the tool into two halves, with odd paragraphs and even paragraphs assigned to each paragraph of the scale. The reliability was then determined by calculating the correlation coefficient between the two halves. Subsequently, the length was adjusted using the Spearman-Brown equation, where the reliability coefficient reached (0.89), indicating that the tool possesses a high degree of reliability and is suitable for application to the study sample.

Second: Cronbach's alpha method:

The researcher utilised an alternative method of calculating reliability, namely the Cronbach's alpha method, to ascertain the tool's reliability coefficient. The findings indicated that the reliability coefficient attained a value of 0.88, which is indicative of a high reliability coefficient. This suggests that the questionnaire is reliable and that the results obtained can be trusted.

Statistical methods used in the study:

The statistical processing of the data was conducted utilising the Statistical Package for the Social Sciences (SPSS 21) program in the following manner:

- 1- In order to verify the validity of the study tool, Pearson's correlation coefficient must be calculated.
- 2- The reliability of the study instrument was verified using Cronbach's alpha coefficient.

- 3- The identification of the characteristics of the study sample is to be achieved through the use of frequencies and percentages.
- 4- The first question of the study requires the calculation of arithmetic means and standard deviations.
- 5- The second and third research questions of the study will be addressed by means of an independent samples t-test.

Each item of the questionnaire was assigned a graded weight according to the five-point Likert scale as follows: very high (5 points), high (4 points), medium (3 points), low (2 points), and very low (1 point).

To determine the length of the five-point Likert scale cells, the following criterion was used:

$$\text{Criterion} = (\text{Highest} - \text{Lowest}) \div \text{Highest}$$

$$(5 - 1) \div 5 = 0.80$$

Subsequently, this value was appended to the lowest value in the scale to ascertain the upper limit for the specified cell. This process was repeated for the remaining cells. The following table (No. 3) presents the standard that was adopted for the study. The objective of the study was to determine the impact of e-learning on the educational process during the Corona pandemic from the perspective of university students. The arithmetic averages were used to analyse the data.

Table (3) The approved criterion for determining the impact of e-learning on the educational process during the Corona pandemic from the point of view of university students according to arithmetic averages

Grade	Arithmetic mean range
Very few	From 1 to 1.80
Few	From 1.81 to 2.60
Medium	2.61 to 3.40
large	From 3.41 to 4.20
very large	From 4.21 to 5

Study results and discussion:

This section presents the results obtained through the application of the study tool, in addition to explaining and discussing the results obtained through answering the study's questions:

In order to respond to the primary question of the study, which posits the following: "What is the reality of e-learning, and what is its impact on the outcomes of the educational process during the pandemic of the novel virus known as severe acute respiratory syndrome (SARS-CoV-2) from the perspective of university students?"

In order to estimate the reality of e-learning and its impact on the outcomes of the educational process during the pandemic of 2020, known as the Coronavirus

Disease 2019 (Covid-19) pandemic, from the perspective of university students, arithmetic means, standard deviations, and ranks were calculated. The results were arranged in descending order according to their arithmetic means, as illustrated in Table No. 4.

table(4) Arithmetic means, standard deviations, and ranks for the study sample members' assessment of the reality of e-learning and its impact on the outcomes of the educational process during the Corona pandemic from the point of view of university students, arranged in descending order according to their arithmetic means.

Rank	Paragraph	arithmetic mean	standard deviation	Level
1	E-learning has enabled me to retrieve information whenever I need it.	3.31	0.68	Medium
2	E-learning has increased the possibility of effective communication between me and the faculty member.	3.24	0.51	Medium
3	E-learning saves time and effort in various learning processes.	3.13	0.52	Medium
4	E-learning provides a better and clearer presentation of courses than traditional education.	3.04	0.63	Medium
5	E-learning has increased my participation in educational topics with boldness.	2.90	0.67	Medium
6	E-learning has reduced the number of meetings between me and my fellow students.	2.82	0.58	Medium
7	E-learning saves time, effort and money.	2.75	0.55	Medium
8	E-learning is not suitable for courses of a practical, applied nature.	2.63	0.70	Medium
9	E-learning has enhanced student control over the educational process.	2.57	0.59	Few
10	E-learning has increased the psychological pressures I face.	2.49	0.52	Few
11	E-learning encouraged me to communicate and exchange experiences in various educational fields.	2.32	0.61	Few

12	E-learning has made it easier for me to understand the courses.	2.24	0.72	Few
13	E-learning has led to a cooling of social relations among students.	2.15	0.65	Few
14	E-learning provides equal learning opportunities for all students.	2.04	0.59	Few
15	E-learning has contributed to raising my scientific and cognitive efficiency.	1.92	0.57	Few
16	E-learning has increased my motivation to learn.	1.83	0.64	Few
Overall score for the impact of e-learning on the educational process during the COVID-19 pandemic		2.58	0.60	Few

As illustrated in Table No. 4, the impact of e-learning on the outcomes of the educational process, as perceived by Jordanian university students, was found to be low overall, with an arithmetic mean of 2.58 and a standard deviation of 0. In the 60th paragraph, eight of them were found to have a medium level of impact, while the remaining eight were found to have a low level of impact. The arithmetic means of these paragraphs ranged from 1.83 to 3.31. The paragraph that stated 'E-learning enabled me to retrieve information when I needed it' was found to have an arithmetic mean of 3. In the context of the statistical analysis, the mean value of the data set was found to be 3.24, with a standard deviation of 0.68. The mean value of the data set indicated that the paragraph that stated "E-learning increased the possibility of effective communication between me and the faculty member" was the second most significant, with an arithmetic mean of 3.24 and a standard deviation of 0. In the analysis of the data, it was observed that the paragraph which stated 'E-learning contributed to raising my scientific and cognitive efficiency' received the second-lowest ranking, with an arithmetic mean of 1.92 and a standard deviation of 0.57. The paragraph which stated 'E-learning increased my motivation towards learning' received the lowest ranking, with an arithmetic mean of 1.83 and a standard deviation of 0.64.

The researcher attributes this result to the information and technological revolution, which is considered to be the foundation of scientific progress. This has resulted in the availability of scientific and technical capabilities and other modern scientific means. However, this has had a detrimental effect on them and has not provided them with the basic requirements for their use. This may be attributable to prior knowledge, which was already inadequate with regard to the utilisation of technological means. Prior to the pandemic, Jordanian universities exhibited limited integration of contemporary technological tools. It is imperative to acknowledge the

sudden and rapid onset of the COVID-19 pandemic, which has had a profound impact on educational processes in Jordan and globally. The pandemic has imposed on all individuals the necessity of keeping pace with it and maintaining lifelines. Many countries, including Jordan, were unable to confront the consequences of the pandemic, especially in schools and universities.

It is an undisputed fact that the emergence of the novel strain of Coronavirus has engendered an unprecedented paradigm shift on a global scale, including in the domain of education. This has necessitated universities and educational institutions to enhance their preparedness and response capabilities to potential contingencies. Nevertheless, the repercussions of the outbreak of the novel Coronavirus on educational processes were considerable, with institutions of higher education lacking adequate preparation for this event, which had a substantial impact on students' academic proficiency.

The present study explores the impact of the novel Coronavirus pandemic on university students, both academically and socially. This has resulted in the isolation of students from their respective universities, thereby preventing them from engaging with their peers for protracted periods, a circumstance which has had a substantial impact on their psychological well-being.

Furthermore, numerous academic disciplines incorporate practical courses and workshops into their curricula, including those in medicine and engineering. The impact on these disciplines has been significant, with many universities compelled to transition to distance learning. This has resulted in the graduation of students who lack the requisite specialised skills. This impact has been more pronounced for students in science disciplines than for students in the humanities, whose disciplines and curriculums are generally characterised by theoretical majors.

To answer the second question of the study, which states: **“Are there statistically significant differences at the significance level ($\alpha=0.05$) in the reality of e-learning and its impact on the outcomes of the educational process during the Corona pandemic from the point of view of university students that are attributed to the gender variable (males, females)?”**

The arithmetic mean, standard deviation, and the statistical t-test for independent samples were calculated in order to reveal statistically significant differences between the average responses of the study sample to the reality of e-learning and its impact on the outcomes of the educational process during the Corona pandemic from the point of view of university students, which are attributed to the gender variable (males, females). The following table No. (5) shows this:

table(5) The results of the (t) test for the differences between the average responses of the study sample members to the reality of e-learning and its impact on the outcomes of the educational process during the Corona pandemic from the point of view of university students, which are attributed to the gender variable (males, females)

field	Sex	repetition	arithmetic mean	standard deviation	value (t)	Significance level
E-learning and its impact on educational outcomes during the COVID-19 pandemic	male	876	2.93	0.62	32	.217*0
	female	1124	2.88	0.58		

*Statistically significant at the significance level ($\alpha \leq 0.05$)

As demonstrated in Table (5), there is no evidence of statistically significant differences at the significance level ($\alpha \leq 0.05$). In the context of the present study, an investigation was conducted into the responses of study sample members to the reality of e-learning and its impact on the outcomes of the educational process during the Corona pandemic from the perspective of university students. The investigation revealed a gender variable (male, female) that was found to have a significant impact on the results. The results of the study indicated that Jordanian university students live in a similar university environment and that the impact of the Corona pandemic was felt by both male and female students.

To answer the third question of the study, which states: **“Are there statistically significant differences at the significance level ($\alpha=0.05$) in the reality of e-learning and its impact on the outcomes of the educational process during the Corona pandemic from the point of view of university students that are attributed to the variable of the type of student’s academic specialization (scientific, humanities)?”**

The arithmetic mean, standard deviation, and the statistical t-test for independent samples were calculated in order to reveal statistically significant differences between the average responses of the study sample to the reality of e-learning and its impact on the outcomes of the educational process during the Corona pandemic from the point of view of university students, which are attributed to the variable of the type of academic specialisation of the student (scientific or humanities). The following table No. (6) clarifies this:

table(6) The results of the (t) test for the differences between the average responses of the study sample members to the reality of e-learning and its impact on the outcomes of the educational process during the Corona pandemic from the point of view of university students, which are attributed to the variable of the type of academic specialization of the student (scientific, humanities)

field	Scientific specialization	repetition	arithmetic mean	standard deviation	value (t)	Significance level
E-learning and its impact on educational outcomes during the COVID-19 pandemic	humanitarian	1067	2.63	0.69	1.298	.184*0
	scientific	933	2.57	0.66		

*Statistically significant at the significance level ($\alpha \leq 0.05$)

As demonstrated in Table (6), there is no statistically significant difference at the significance level ($\alpha \leq 0.05$) between the average responses of the study sample members to the reality of e-learning and its impact on the outcomes of the educational process during the Corona pandemic from the perspective of university students, attributed to the variable of the type of student's academic specialisation (scientific, humanities). This result can be attributed to the fact that Jordanian university students, with their various scientific specialisations (whether medical, engineering, humanities or social), experienced a significant impact of the Corona pandemic on their educational process. The provision of e-learning did not meet the students' needs in terms of appropriate education in the correct form. Due to the inherent nature of their specialisations, which necessitate attendance at university and practical laboratories or applied workshops, and due to the fact that this was not achieved for them during the period of the Corona pandemic, which resulted in a deficiency in their knowledge, students of humanities specialisations require direct explanation and

clarification from their teachers. This was not available to them during the Corona pandemic.

Summary of results:

A review of the study's earlier results reveals that the findings can be summarised as follows: the reality of e-learning and its impact on the educational process during the Corona pandemic from the perspective of university students was perceived to a (low) degree with an arithmetic mean of (2.58) and a standard deviation of (0. It is evident that no statistically significant differences were observed at the significance level ($\alpha \leq 0.05$) between Jordanian university students in relation to the reality of e-learning and its impact on the outcomes of the educational process during the Corona pandemic. These findings are attributable to the study variables, namely gender (male, female) and the type of scientific specialisation of the student (humanities specialisation, scientific specialisation).

Recommendations and suggestions:

In light of the findings outlined in the study, the researcher puts forward the following recommendations and proposals:

1. It is imperative to establish an optimal educational environment conducive to the integration of e-learning within Jordanian universities. This endeavour must be undertaken with the objective of eradicating all impediments that may impede the academic process.

2. It is imperative that all human and material resources and energies within Jordanian universities are mobilised in support of e-learning. Furthermore, the development of appropriate plans and programmes is essential for leveraging these resources to enhance the educational environment within these institutions.

3. The integration of face-to-face and online learning is imperative in order to leverage the advantages of e-learning in developing and enhancing the skills of students and academics. This, in turn, will enhance their academic capabilities and allow them to leverage modern technology to direct them towards the most effective programs within their educational environment.

4. It is recommended that further studies be conducted on the impact of the pandemic of Coronavirus (SARS-CoV-2) on the educational process for other groups, such as school students and university faculty members.

5. It is recommended that further studies be conducted on the impact of the pandemic on the educational process, with other variables taken into consideration. These additional variables may include student residence, the type of university attended, and monthly income level.

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