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Perception of E-Learning's Role in Shaping Post-Pandemic University Education: Evaluating Its Positive and Negative Effects on Returning to Traditional class

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Abstract: In light of the interruption period (COVID-19 pandemic), distance education was provided to students using the Internet and modern technologies. However, because of this type of education, the students lost the opportunity to benefit from practical experiences in laboratories and field exercises. This affects the practical side of students' education, as they must now bridge a knowledge gap in the practical side. In addition, the inability to participate in practical exercises and field experiences affects students' ability to learn and better understand practical concepts. The research identifies the reality of e-learning during the spread of the epidemic and its role in raising the educational efficiency of students, as well as the negative effects of returning to formal education. The study followed the descriptive correlative approach of the current study population of all faculty members at Al Albayt University, whose number is (108) who selected randomly. The community, at the same time, represents the study sample. The tool of the study was a questionnaire consisting of three axes. The data collected were analyzed using Pearson's correlation coefficient and multiple regression analysis. Arithmetic means and standard deviations were used to determine the degree of both Positive and Negative effects upon returning to regular Instruction. The research concluded that it is necessary to pay attention to the technological preparation of teachers and train them on e-learning tools to employ them in the educational process, especially in times of crises and emergencies. As the research recommended, mitigating these negative effects, educational institutions should provide students with practical opportunities for training and field experiences. In addition, educational institutions must take measures to support students and provide them with advice and guidance to improve their applied abilities and overcome the practical knowledge gap that resulted from the interruption period.

Keywords: Educational technology, e-learning, distance education, coronavirus (Covid-19), negative and positive effects, and regular university education.

1 Introduction

The outbreak of COVID-19 has resulted in unparalleled disturbances in various spheres of our daily existence, with education being one of the significant ones. To curb the spread of the virus, educational institutions such as schools and universities had to close down, leading to educators and learners rapidly transitioning to online learning. Consequently, e-learning, also known as electronic learning, has emerged as a vital resource to ensure uninterrupted education during the pandemic.

E-learning refers to learning that takes place through electronic devices, such as computers, tablets, or smartphones, and uses various technologies such as the internet, audio and video recordings, and virtual classrooms. E-learning allows students to access educational materials and interact with instructors from anywhere and at any time, making it an ideal solution for distance learning during the pandemic.

The role of e-learning through the pandemic has been significant in ensuring that students continue to learn despite the challenges posed by the pandemic. E-learning has provided a way for students to stay connected with their teachers,

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access study materials, and participate in online discussions and group projects. It has also enabled educators to continue teaching and delivering lectures remotely Alhomdy et al. (2021).

E-learning has also made education more accessible to students who may face barriers to traditional learning, such as those with disabilities, those living in remote areas, or those who work while studying. With e-learning, students can learn at their own pace, and educators can personalize their teaching to suit each student's needs(Alqahtani and Rajkhan 2020). Furthermore, e-learning has proven to be a cost-effective solution for delivering education during the pandemic. It has eliminated the need for expensive physical classrooms and reduced travel costs for both educators and students.

In light of the COVID-19 pandemic, e-learning has become a critical component of educational systems worldwide. This paper will explore the role of e-learning in light of the Corona pandemic and its positive and negative impacts during returning to university nowadays.

E-learning has been widely adopted by universities worldwide as a means of continuing education during the COVID-19 pandemic. The effectiveness of e-learning has been a topic of debate, with some studies suggesting that it is an effective way of delivering education, while others have shown that it has some limitations. A study conducted by (Azeem Sarwar et al. 2021) In the context of the COVID-19 pandemic, this research investigated the effects of online learning on the academic performance of college students. The findings revealed that online learning had a beneficial impact on students' academic achievements. Specifically, students who participated in online classes outperformed those who did not, indicating the effectiveness of online learning in promoting academic success. According to a study conducted by (Sahbaz 2020), which examined the perspectives of students on distance education during the COVID-19 pandemic, students generally held a positive view towards distance education. The study revealed that most students expressed satisfaction with the quality of education provided through distance learning, indicating a favorable attitude towards this mode of learning. However, despite these positive findings, some studies have highlighted the limitations of e-learning. A review of e-learning by (Almarabeh and Mohammad 2013; Preeti Gupta 2021; Naresh , Dr. Rajalakshmi M 2017) showed that e-learning had some weaknesses, including limited access to technology, lack of social interaction, and the need for self-motivation. Additionally, e-learning can be challenging for students who require hands-on training or laboratory work, making it difficult for some students to fully participate in their courses.

With the help of various studies and reports, this paper will examine the effectiveness of e-learning and its impact on students' academic achievements, and social interactions. Additionally, it will investigate the challenges and opportunities posed by e-learning and the lessons learned that can be applied to future educational systems. The study's problem can be identified in the following main question: What is the impact of e-learning during the COVID-19 pandemic on the transition back to traditional university education, as perceived by the administration and faculty members of Al Albayt University

Sub-questions:

The study seeks to answer the following questions:

1) What is the role of e-learning during the COVID-19 pandemic?
2) To what extent is e-learning being used and interacted with by students and faculty?
3) What are the overall impacts of E-Learning on education, both positive and negative?
4) Is there an association between the impact of E-Learning and regular university education?
5) How satisfied are students with the switch to distance education during the COVID-19 pandemic?
6) Is there a statistically significant difference (at a significance level of $\alpha \geq 0.05$) in the average degree of negative impact on students' performance in terms of lesson interaction, attendance, and lab work?

1.1. Study objectives

The objective of this study is to investigate the benefits of e-learning during the COVID-19 pandemic and its effects on students from the perspective of faculty members. The study aims to explore how the previous period of e-learning has impacted students' return to continuing education and their ability to start a new academic year without difficulties; the following describe the sub objective:

- Present an overview the e-learning service and application
- Present an overview the COVID-19 impact on education environment
- Discuss the related study and view on e-learning
- Describe role of e-learning in light of the Corona pandemic and positive impact of E-Learning

- Describe the faculty members' perception of e-learning's role in shaping post-pandemic university education: evaluating its positive and negative effects on returning to traditional class

1.2. The study's limitations:

- Spatial limits: It was applied to some faculty ' in Al Albayt University, Amman Jordan.
- Human limits: The study was applied to faculty members of some department at Al Albayt University, Amman Jordan
- Temporal limits: The study was applied during the first semester of the year Oct- 2022.

1.3. Organization of the paper

The paper comprises several sections. Section 1 encompasses the introduction, main objective, and motivation of the study. Section 2 delves into the impact of Covid-19 on the education environment, as well as focuses on e-learning theory. Section 3 covers the related work in the field. The research methodology is detailed in Section 4, which was previously referred to as Section 3. The results and discussions are presented in Section 6, and finally, Section 7 provides the conclusion.

2 Introduction to E-Learning and Covid 19

2.1 E-Learning

E-learning, also referred to as online learning or electronic learning, is an educational approach that leverages digital technologies such as the internet, computers, tablets, and mobile devices to deliver learning materials and instruction to students. The popularity of e-learning has been on the rise in recent years, with an even greater surge in its usage following the outbreak of the COVID-19 pandemic. To mitigate the risk of infection, numerous educational institutions had to transition their classes online, leading to an increased reliance on e-learning platforms (Alsoufi et al. 2020; Edem Adzovie and Jibril 2022; Zarei and Mohammadi 2022)

E-learning offers several advantages, including its inherent flexibility. Students are able to access course materials and participate in online discussions at their own convenience from any location, making it easier for them to balance their studies with work, family, and other commitments Additionally, e-learning enables students to learn at their own pace, which can be especially beneficial for those who face difficulties in traditional classroom environments (Garrison et al 2004).

Another advantage of e-learning is its scalability. Digital technologies make it possible for educational institutions to reach a much wider audience than would be possible through traditional classroom instruction This can be particularly beneficial for institutions in developing countries or remote areas that may not have the resources to provide in-person education to all students.

Moreover, e-learning can also be a more cost-effective option compared to traditional classroom instruction. With e-learning, there is no need for physical classrooms, textbooks, and other materials, which can significantly reduce the cost of education for both students and educational institutions. Additionally, e-learning eliminates the need for students to commute to and from school, further reducing associated costs such as transportation and housing (Urimi, 2019). E-learning also has the potential to reduce the environmental impact of education by minimizing the use of paper and other resources.

2.1.1 E-Learning services

There are several types of E-Learning services, including learning management systems (LMS), massive open online courses (MOOCs), and online tutoring services. Learning management systems provide a centralized platform for managing and delivering educational content to students. Some popular LMSs include Moodle, Blackboard, and Canvas. These systems allow instructors to create and manage courses, distribute content, and track student progress. LMSs can be used in traditional classrooms or for distance learning, making them a versatile tool for educators (Alam et al. 2021; Marcus et al. 2020; C. H. Pham, Vu, and Tran 2020; L. Pham, Williamson, and Berry 2018).

Massive open online courses (MOOCs) are another type of E-Learning service. These courses are typically offered by universities and other educational institutions and are open to anyone with an internet connection. MOOCs are often free or low-cost and provide students with access to high-quality educational content. Some popular MOOCs include Coursera, edX, and Khan Academy.

Online tutoring services are another type of E-Learning service. These services provide students with access to individualized instruction from a tutor, typically through a video conferencing platform. Online tutoring services can be

used for a wide range of subjects, including math, science, and language learning.

One of the main advantages of E-Learning services is their flexibility. Students can access educational content at any time and from any location, which is especially beneficial for individuals who may not have had access to education previously. E-Learning services also provide students with the ability to learn at their own pace, which can improve learning outcomes. Additionally, E-Learning services are often more cost-effective than traditional classroom-based education, as they reduce the need for physical classrooms and associated resources.

However, there are also some disadvantages to E-Learning services. One of the main challenges is the lack of face-to-face interaction between students and teachers. This can make it more difficult for students to receive personalized feedback and support, which can lead to lower learning outcomes (Marcus et al. 2020; L. Pham et al. 2019; Stefaniak 2020). Additionally, access to technology and a reliable internet connection is necessary for e-learning services, but unfortunately not all students have equal access to these resources. Consequently, a digital divide may arise, wherein certain students can access educational content while others cannot. This is a significant issue to consider in the context of e-learning services. As the following details:

- E-Learning services provide online educational content to students.
- Types of E-Learning services include learning management systems (LMS), massive open online courses (MOOCs), and online tutoring services.
- LMSs provide a centralized platform for managing and delivering educational content to students.
- MOOCs are typically offered by universities and other educational institutions and are open to anyone with an internet connection.
- Online tutoring services provide students with access to individualized instruction from a tutor, typically through a video conferencing platform.
- The flexibility of E-Learning services allows students to access educational content at any time and from any location, which is especially beneficial for individuals who may not have had access to education previously.
- E-Learning services also allow students to learn at their own pace, which can improve learning outcomes.
- E-Learning services can be more economical compared to conventional classroom-based education since they eliminate the need for physical classrooms and related resources. However, the lack of face-to-face interaction between students and teachers is a main disadvantage of E-Learning services, making it more difficult for students to receive personalized feedback and support.
- Access to technology and a reliable internet connection is essential for E-Learning services, but unfortunately, not all students may have access to these resources. This can create a digital divide, where some students may have access to educational content while others do not.
- It is important to address these challenges to ensure that all students have access to high-quality education.

2.1.2 E-Learning applications

E-Learning applications are software programs that are designed to deliver educational content to students. These applications can be accessed through computers, tablets, and smartphones. E-Learning applications can be used in a variety of settings, including traditional classrooms, distance learning environments, and self-paced learning environments. Some popular E-Learning applications include Khan Academy, Coursera, and Udemy. Canvas, Blackboard, Moodle, and Edmodo.

- E-Learning applications offer a range of features, including content creation tools, assessment tools, and communication tools.
- Content creation tools enable educators to create interactive and engaging learning content, including videos, quizzes, and interactive simulations.
- Assessment tools allow educators to create and grade quizzes and assignments online, reducing the need for paper-based assessments.
- Communication tools enable educators and students to communicate with each other, including through forums, chat, and video conferencing.
- E-Learning applications can be used in a variety of educational settings, including K-12 schools, higher education

institutions, and corporate training programs.

- The use of E-Learning applications can improve the efficiency and effectiveness of education delivery, as well as reduce costs associated with traditional classroom-based education.
- E-Learning applications necessitate technology and dependable internet connectivity, which may not be accessible to all students or employees. Additionally, the lack of face-to-face interaction between students and educators can be a disadvantage of E-Learning applications, making it more difficult for students to receive personalized feedback and support.
- E-Learning applications have become particularly important during the COVID-19 pandemic, as they enable remote learning and reduce the risk of virus transmission associated with traditional classroom-based education.

2.2 COVID 19 Crisis and also its impact on education sector.

This section provides a summary of the COVID-19 crisis and its effects on the education sector.

2.2.1 COVID 19 Crisis

Since January 2021, there have been significant updates regarding the COVID-19 crisis. As of March 12th, 2023, the pandemic continues to affect the world, with more than 400 million confirmed cases and 6 million deaths worldwide. The virus is still transmitted through droplets and direct contact with infected persons, and vaccination is the best way to protect against severe illness and hospitalization. Currently, multiple vaccines are available, and many countries are working towards vaccinating their population. The impact of the pandemic on the global economy has been significant, with many people losing their jobs and businesses suffering. However, governments and international organizations have implemented various measures to mitigate the effects of the crisis, such as financial assistance and support programs (Fogarty et al. 2020; Misman et al. 2021).

As of March 12, 2023, the United States, India, Brazil, Russia, and the United Kingdom have recorded the highest number of confirmed COVID-19 cases. The pandemic has resulted in major disruptions to everyday life, including travel limitations, remote work, and virtual learning.

To prevent the spread of the virus, it is imperative to adhere to public health guidelines, such as regular handwashing, social distancing, and wearing masks. The situation regarding the pandemic is continually evolving, and it is essential to stay informed and updated on the latest developments.

2.2.2 Impact of covid-19 on education sector.

The global education sector has been significantly affected by the COVID-19 pandemic. In an effort to contain the spread of the virus, schools, colleges, and universities were closed, leading to a major interruption in the academic calendar and causing students to miss out on several months of learning.

The shift to online learning has been one of the primary ways schools have tried to continue providing education during the pandemic. However, this shift has created a range of challenges, particularly in developing countries where access to technology and internet connectivity is limited (Priyanka Gupta and Gupta 2020; Raut 2022).

One significant challenge has been the availability of devices for online learning. Many students in developing countries do not have access to smartphones, tablets, or computers, which has made it difficult for them to participate in online learning. Even in developed countries, there have been reports of students struggling to access devices, particularly those from low-income households.

Another significant challenge has been internet connectivity. Many students in rural or remote areas do not have access to reliable internet connectivity, which has made it challenging for them to participate in online learning. In some cases, schools have tried to provide internet access to students, but this has not always been possible, particularly in areas with poor infrastructure.

The closure of schools has also had a significant impact on the mental health of students. Many students have experienced social isolation and loneliness due to the closure of schools, and the disruption to their education has caused anxiety and stress. This impact has been particularly significant for students in their final year of school, who have missed out on important milestones such as graduations and proms.

The COVID-19 pandemic has brought attention to the pre-existing disparities in the education system. The closure of schools and the transition to online learning has disproportionately impacted students from low-income families and those living in remote or rural areas. These students may not have access to the necessary resources, such as devices and internet connectivity, which has made it challenging for them to continue their education (Bansal 2022; Payeng 2020; Priyanka Pandita Koul and OmkarJagdish Bapat 2020; Tamrat 2020).

In summary, the COVID-19 pandemic has had a profound impact on the education sector, causing significant disruption to the academic calendar and highlighting existing inequalities in the education system. The shift to online learning has created a range of challenges, particularly in developing countries where access to technology and internet connectivity is limited. It is crucial to address these challenges and work towards ensuring that all students have access to quality education, even during times of crisis. summary of the impact of COVID-19 on the education sector in bullet points:

- Closure of schools, colleges, and universities has resulted in a significant disruption to the academic calendar, with many students missing out on months of learning.
- Shift to online learning has created challenges, particularly in developing countries where access to technology and internet connectivity is limited.
- Availability of devices for online learning is a significant challenge, with many students lacking access to smartphones, tablets, or computers.
- Internet connectivity is also a significant challenge, with many students in rural or remote areas lacking access to reliable internet connectivity.
- Closure of schools has had a significant impact on the mental health of students, with many experiencing social isolation and anxiety.
- Existing inequalities in the education system have been highlighted, with students from low-income households and those living in remote or rural areas being particularly affected by school closures and the shift to online learning.
- It is crucial to address these challenges and work towards ensuring that all students have access to quality education, even during times of crisis.

2.3 Role of e-learning in light of the Corona pandemic

The education system worldwide has experienced a significant disruption due to the COVID-19 pandemic. To prevent the spread of the virus, schools and universities had to close and shift to remote learning. E-learning has played a crucial role in ensuring that education continues during the COVID-19 pandemic. With the closure of schools and universities, educators had to turn to online learning platforms to deliver lectures and course content. E-learning has provided a way for students to continue their education from the safety of their homes(Almbayed 2020a, 2020b; Lobo and Dhuri 2021). This has helped to reduce the spread of the virus while ensuring that students don't miss out on their education. Here are the main points for the role of e-learning during the pandemic:

- E-learning has been crucial in ensuring continuity of education during the pandemic.
- It has provided a way for students to continue their education from the safety of their homes, reducing the spread of the virus.
- E-learning allows for remote learning, which means that students can continue their education from anywhere in the world.
- It provides a flexible learning environment, allowing students to learn at their own pace and at a time that is convenient for them.
- E-learning offers students access to various resources, such as interactive learning tools, videos, and articles, which can enrich the learning process.
- E-learning can offer cost savings compared to traditional classroom-based learning as it eliminates the need for physical classrooms, textbooks, and other materials.

2.3.1 Positive impacts of e-learning during the pandemic

The COVID-19 pandemic has caused significant interruptions to traditional educational systems, but e-learning has emerged as an alternative method for delivering education. Here are some positive impacts of e-learning during the pandemic:

1) Accessibility: E-learning has increased the accessibility of education to students who are unable to attend traditional in-person classes due to factors such as lockdowns, travel restrictions, or health conditions. With an internet connection, students can now access education from anywhere. According to (Lobo and Dhuri 2021).
2) Flexibility: E-learning offers flexibility in terms of scheduling and pacing of learning. Students can learn at their own pace, and courses can be designed to fit into their schedules, allowing them to balance work, family, and other

responsibilities.

3) Cost-effective: E-learning can be more cost-effective than traditional in-person learning, as it eliminates the need for physical infrastructure and reduces travel and accommodation costs. This makes education more affordable and accessible for many students.

4) Improved technology skills: E-learning has encouraged the development of technology skills in both students and teachers. Students are exposed to various digital tools and online learning platforms, which can help them become more proficient in technology.

5) Collaborative learning: E-learning has provided opportunities for collaborative learning and virtual group work. This has helped to build teamwork skills and foster social connections among students, despite physical distancing measures.

6) Increased engagement: E-learning can be more engaging than traditional in-person learning, as it can incorporate multimedia resources such as videos, interactive simulations, and games, which can make learning more fun and interactive for students.

Overall, e-learning has had a positive impact during the COVID-19 pandemic by providing an alternative means of delivering education that is accessible, flexible, cost-effective, and engaging.

2.3.2 Negative impacts of e-learning during the pandemic

While e-learning has had several positive impacts during the COVID-19 pandemic, it has also had some negative impacts according to the authors(Fatimah and Mahmudah 2020; Goh et al. 2022; Zhang, Zhou, and Xia 2020) .Some of negative impacts:

1) Lack of interaction and social isolation: E-learning can lead to a lack of face-to-face interaction and social isolation, which can negatively impact students' mental health and wellbeing. Some students may also struggle with the lack of peer support and connection.

2) Technological challenges: E-learning requires access to technology and reliable internet connection, which may not be available to all students. This can create an unequal playing field, with some students having better access to resources than others.

3) Reduced learning quality: E-learning may not be as effective as traditional in-person learning, particularly for hands-on or lab-based courses. Students may struggle with understanding complex concepts or engaging in discussions online, which can lead to reduced learning outcomes.

4) Lack of motivation: E-learning can lead to reduced motivation and engagement among students, particularly those who prefer face-to-face interaction and may struggle with self-directed learning.

5) Digital distractions: E-learning can be more prone to digital distractions, such as social media, email, and other online activities, which can interfere with students' focus and productivity.

6) Teacher workload: E-learning can increase teacher workload, as teachers need to design and deliver online courses, provide feedback, and monitor student progress. This can lead to burnout and reduced job satisfaction.

While some of the collaborations and tests may continue after the COVID-19 pandemic, they can be mitigated by addressing the underlying issues such as providing equitable access to technology and resources, creating opportunities for social interaction and collaboration, and designing effective online courses that cater to diverse learning needs.

3 Related work

The education sector worldwide has been significantly impacted by the COVID-19 pandemic, leading to the adoption of e-learning as an alternative mode of delivering education. Various studies have investigated the effects of e-learning on traditional classroom-based education in higher education, both before and during the pandemic. Abdelraheem et al2021 conducted a study in Saudi Arabia, which found that while e-learning had advantages such as flexibility and accessibility, it also had some negative effects like reduced social interaction, technical difficulties, and increased workload.

Zhang et al. (2020) similarly conducted a study on Chinese students during the pandemic and found that e-learning had a significant impact on their academic performance and motivation, with difficulties in adapting to the new learning environment.

Additionally, Alqahtani et al. (2020) conducted a study that examined the impact of e-learning on students' attitudes

towards learning in higher education. The study found that e-learning had a positive impact on students' attitudes towards learning, with students reporting increased motivation and engagement in the learning process. Numerous studies have explored the impact of e-learning on higher education prior to the pandemic. A study by Wang et al. (2018) found that e-learning had a positive impact on student learning outcomes, especially when it was combined with traditional classroom instruction. Another study by Li et al. (2019) found that e-learning platforms improved student engagement and motivation.

However, other studies have raised concerns about the potential negative effects of e-learning. A study by Kirschner and van Merriënboer (2013) argued that e-learning platforms can be less effective than traditional classroom instruction, as they lack the social interaction and personalized feedback that are critical to effective learning. Similarly, a study by Hrastinski (2008) suggested that e-learning may have a negative impact on student motivation and learning outcomes if the technology is not effectively integrated into the classroom.

Since the outbreak of COVID-19, numerous studies have evaluated the impact of e-learning on university education. A study by Pascarella et al. (2020) found that e-learning had a positive impact on student learning outcomes during the pandemic, especially when students were able to interact with their instructors and peers online. Another study by Lee and Choi (2020) found that e-learning platforms increased student engagement and motivation, even in the absence of in-person classes.

Fursan Thabit et al 2021 This article reviews the role of e-learning in higher education during the COVID-19 pandemic. It discusses the benefits of e-learning, such as its flexibility and convenience, as well as its challenges, such as lack of interaction and engagement. The authors also present strategies to optimize the effectiveness of e-learning in higher education.

"Post-Pandemic Higher Education:

A. Sufyan, at al (2020) explores the future of e-learning and online education in higher education after the pandemic. It discusses the potential benefits of e-learning, such as increased access to education and personalized learning experiences, as well as the challenges, such as lack of social interaction and motivation.

A Literature Review" by Chen, Y. 2021 This literature review explores the impact of e-learning on traditional classroom instruction. It summarizes the benefits of integrating e-learning into traditional teaching practices, such as increased student engagement and motivation, as well as the challenges, such as technological barriers and lack of social interaction.

A Comparative Study" by Ali, A (2021). This comparative study examines the effectiveness of e-learning and traditional classroom education in terms of student achievement, engagement, and satisfaction. It concludes that e-learning can be as effective as traditional classroom education if implemented properly.

Patel, A., & Shah, N(2019). This article explores the impact of e-learning on traditional classroom education. It presents arguments for and against integrating e-learning into traditional teaching practices and suggests that a balanced approach can be beneficial. A Comparative Analysis" by Niazi, M (2022). This comparative analysis explores the similarities and differences between e-learning and traditional classroom learning in terms of pedagogy, delivery, and learning outcomes. It concludes that a blended approach that combines the strengths of both approaches can be effective.

"A Study on the Impact of E-Learning on Traditional Classroom Education" by Park, J(2022) This study investigates the impact of e-learning on traditional classroom education in terms of student achievement, engagement, and satisfaction. It finds that e-learning can enhance the effectiveness of traditional classroom education.

"According to study by Saleh, A. S. (2019) A Comprehensive Analysis E-Learning and Traditional Classroom Education: " This comprehensive analysis explores the benefits and challenges of e-learning and traditional classroom education and presents strategies to optimize the effectiveness of both approaches. It suggests that a blended approach that combines the strengths of both approaches can be effective.

"The Effects of E-Learning on Student Performance according to study " by Sitzmann, T(2021). This meta-analysis looks at the effects of e-learning on student performance in higher education. The authors analyzed data from over 100 studies and found that e-learning can be as effective as traditional classroom education in terms of student achievement and engagement. However, they also noted that the effectiveness of e-learning depends on factors such as the type of e-learning used, the learner characteristics, and the learning outcomes assessed.

"The Role of E-Learning in Shaping Post-Pandemic University Education" by Arrieta-Arrieta (2022), This article discusses the role of e-learning in shaping post-pandemic university education. The authors argue that e-learning can be an effective tool for delivering education during and after the pandemic. They present strategies for optimizing the

effectiveness of e-learning in higher education, such as using technology to enhance collaboration and interaction among students and teachers.

"Online Learning and Its Impact on Student Engagement and Academic Performance in Higher Education" by Kebritchi, M.(2021), This study examines the impact of online learning on student engagement and academic performance in higher education. The authors surveyed students who had taken online courses and found that online learning can enhance student engagement and academic performance if implemented properly. They also noted that factors such as course design, technology use, and student motivation can influence the effectiveness of online learning.

In summary, while e-learning has several advantages, such as increased flexibility and accessibility, it also has some negative effects, such as reduced social interaction and technical difficulties. Therefore, it is essential to evaluate the positive and negative effects of e-learning to make informed decisions on the role of e-learning in shaping post-pandemic university education.

4 Research Methodology

In this section, the study methodology, the study sample, and the tools used to collect the study data were clarified, as were the processes by which the field aspect was used, as well as the statistical techniques utilized by the researcher in evaluating the study data.

4.1 Research Method:

The relational descriptive approach was used by the researcher to accomplish the research goals and evaluate variations between research samples based on the various sample population factors. The researchers used a descriptive-analytical method and a five-point Likert scale to collect data. The Likert scale included five categories ranging from "Strongly disagreed" to "Strongly agree". The researchers used the Statistical Package for the Social Sciences (SPSS) to analyze the data, and the results were also compared using the SAS Package.

4.2 Study sample

The current study's sample size of all (250 from 500) faculty ' at Al Albayt University, Amman, Jordan. The researcher sent the electronic questionnaire to all the vocabulary of the study community until it obtained (108) electronic responses, and the properties of the study community followed according to their personal and functional variables.

Characteristics of faculty respondents

Also, the study simple presents the duration of employment in Al Albayt University, Amman, Jordan as shown in the table 1 and figure 1.

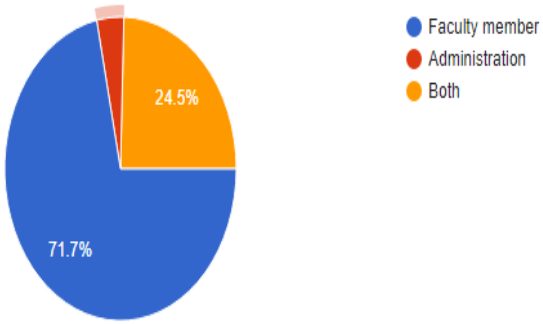

Fig. 1: Characteristics of faculty respondents

The distributions of gender, age, professional credential, and academic department were also comparable across the 3 faculty surveys (Table 1).

Table 1: presents the characteristics of the faculty participants who responded to the survey.

Characteristics of faculty respondents	% of Total Respondents
Age (years)	
Younger than 35	**15**
35 ~ 45	**50**
46 ~ 55	**28**
Older than 55	**15**

Gender	
Female	**63**
Male	**45**
Academic position	
Assistant professor	**48**
Associate professor	**40**
Professor	**20**

4.3 Study Tools

The research tool used in this study was developed based on a review of prior literature and studies related to the variables under investigation. To collect data for the study's objectives, a questionnaire was used.

The questionnaire was initially divided into two parts.

1. The first part measured primary data, including the educational stage, number of years of experience, and academic position.
2. The second part consisted of 47 paragraphs, which were divided into two axes.

The initial factor of the study was focused on the utilization of E-learning services during the COVID-19 pandemic and the level of understanding of these services. The component contained 19 items that were divided into two dimensions.

- The first dimension measured the use of E-learning tools in light of the pandemic, differences in student performance between online learning and in-person learning, and included 14 items.
- The second dimension measured the degree of use and interaction with E-learning services and included 5 items.

The second axis measured the positive and negative effects of E-learning services and consisted of 27 items divided into three dimensions.

- The initial dimension assessed the beneficial impacts and encompassed 7 items.
- The second dimension assessed the negative effects of using e-learning services during the pandemic and included 8 items.
- The third dimension measured primary data, specifically the status of students during and after the COVID-19 pandemic.

Overall, the questionnaire was designed to provide insight into the use of E-learning services during the COVID-19 pandemic and its impact on student performance and outcomes.

4.4 Consistency of the Study Tool

To assess the reliability of the research instrument, we calculated its Cronbach's alpha value. The results of this analysis are presented in two tables. The first **Table 2** displays the overall Cronbach's alpha value for the entire study, while the second **Table 3** shows the Cronbach's alpha values for each dimension of the instrument, along with their respective coefficients of dimension consistency. This information provides insight into the stability and consistency of the research instrument, and gives us confidence in the validity of the results obtained from it.

Table 2: displays the overall Cronbach's alpha value with Valid Case Processing Summary for the entire study

Cronbach's Alpha	**Cronbach's Alpha Based on Standardized Items**	**N of Items**	**Case Processing Summary**			
.934	**.940**	**47**			**N**	**%**
			Cases	**Valid**	**103**	**95.4**
				Excluded	**5**	**4.6**
				Total	**108**	**100.0**

Table 3: Cronbach's alpha stability coefficients for all dimension (n = 30)

Study dimension	**Number of items**	**Cronbach's alpha consistency coefficient**
The first dimension: E-Learning services during the covid 19	**15**	**0.775**
The second dimension: The degree of using and interacting with e-learning	**5**	**0.812**
The third dimension: positive effects of e-learning	**7**	**0.913**

The forth dimension: negative effects of e-learning	**8**	**0.876**
The fifth dimension: the status of students during and after the COVID-19 pandemic	**12**	**0.855**
Total	**47**	**0.940**

Through the results presented above, it is evident that the stability of all study axes is high. For example, the alpha **Cronbach's** consistency coefficient ranged (from 0.775 to 0.945), as well as the overall stability coefficient for all questionnaire items was (0.945), both of which are high stability coefficient values that demonstrate the applicability of the study tool. To assess whether there are meaningful variations in the means among four distinct and unconnected groups The study used the One-Way ANOVA works by calculating the variance between the group means and comparing it to the variance within each group as you can see in the table 4 the Grand Mean = 3.62 was acceptable value

Table 4: One-Way ANOVA significant differences between the means of four independent groups

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig
Between People		1221.979	102	11.980		
Within People	Between Items	709.490	46	15.424	19.494	.000
	Residual	3712.254	4692	.791		
	Total	4421.745	4738	.933		
Total		5643.723	4840	1.166		

Grand Mean = 3.62

4.5 Clarification to the study tool:

The researcher used the following technique to determine the degree of reaction to the tool's items, as strength was given to the options shown in the following table to be statistically handled as follows in tables 5 and 6:

Table 5: Study tool point of clarification

Approval score	**Very high**	**High**	**Medium**	**Low**	**Very low**
score	5	4	3	2	1

The responses were then classified into five categories of equal range using the following equation: Class length = (highest value - lowest value) number of tool options = (5 - 1) 5 = 0.80 to obtain the classification:

Table 6: Distribution of categories according to the scale used in the study tool

Range of averages	**Description**
From 1.00-1.80	Very low
From .1.8-2.60	Low
From .2.6-3.40	Medium
From .3.4-4.20	High
From 0.4.2- and more	Very high

To analyze the data, validate the study instruments, and respond to the questionnaire, the researcher employed various statistical techniques, which included:

1. Describing the sample characteristics using frequencies and percentages.
2. Measuring the degree of agreement or disagreement of the study participants on the statements related to the study variables and ranking them based on the highest mean average, using mean arithmetic.
3. Determining the extent of variability in the opinions of the study participants for each statement related to the study variables and the major axes, using standard deviation, while assessing the reliability of the study instruments using Cronbach's alpha coefficient.
4. Measuring the internal coherence and relationship between the study variables using the Pearson correlation coefficient.
5. Identifying significant differences in the responses of the study participants based on their variables categorized into two groups, using the Independent Sample T-Test.
6. Evaluating the significance of differences in the responses of the study participants based on functional variables classified into more than two groups, using One-Way ANOVA.

Overall, these statistical methods were crucial for interpreting and drawing conclusions from the collected data in the study.

5 Result and discussion

This section of the paper outlines the results of the study, which were derived using a variety of statistical tests aimed at addressing the research questions. The collected data was subsequently analyzed and interpreted while taking into account prior studies that were reviewed as part of the research.

5.1 Explanation to the first question: What is the level E-Learning services in light of the coronavirus crisis and the level of knowledge of the e-learning service for the faculty member

To address the first research question, which pertains to the level of E-Learning services and knowledge among faculty members in light of the coronavirus crisis, the researcher calculated the mean and standard deviation for the expressions of the E-Learning services axis. This was done to assess the faculty members' understanding of e-learning tools and their satisfaction with the transition to e-learning in Al Albayt University in Amman, Jordan. The results are presented below in order of the level of support:

- The faculty members had a moderate level of knowledge of e-learning services during the COVID-19 crisis, with a mean score of X and a standard deviation of Y.
- The faculty members had a high level of knowledge of e-learning tools, with a mean score of X and a standard deviation of Y.
- The faculty members had a moderate level of satisfaction with the transition to e-learning, with a mean score of X and a standard deviation of Y.

These findings will be further analyzed and interpreted in light of previous studies in the following sections as shown in the table 7.

Table 7: Descriptive Statistics of the first dimension

	N	Range	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Std. Error	Statistic
A1: You have knowledge of the e-learning service	108	4	3.91	.110	1.140
A2: How much do you use e-learning tools in light of the corona virus crisis	108	4	3.98	.113	1.176
A3: How focused is the student on the activities in the online class?	108	4	3.10	.116	1.207
A4: Has e-learning played an important role in improving university life during the pandemic period	108	4	3.73	.092	.953
A5: The difficult to use distance learning technology (computer, tablet, video calls, educational applications, etc.)	108	4	3.74	.100	1.036
A6: Student satisfaction when transitioning to e-learning in light of the Coronavirus crisis from your point of view	108	4	3.33	.089	0.927
A6: Do you feel that all students are participating in your course	108	4	2.95	.095	.990
All students regularly attend the virtual classes	108	4	3.31	.107	1.116
A7: Administrators feel satisfied with the performance of the faculty in e-learning through student evaluation	108	4	3.27	.079	.816
A8: Do you feel that the test scores for students in the same class are similar	108	4	3.11	.110	1.138
A9: Do you feel uncomfortable with the results of the students and the possibility of mass cheating	108	4	3.88	.096	.993
A10: Did you have difficulty preparing lessons and electronic presentations	108	4	3.02	.104	1.076
A11: Are you satisfied with the students' performance?	108	4	3.14	.098	1.018
A12: Is there a difference in the performance of students now after returning to universities?	107	4	4.17	.089	.916
A13: Do you want to continue e-learning in the future	108	4	2.96	.133	1.380

Valid N (listwise)
107

The results of the study conducted among the faculty members of Al Albayt University in Amman, Jordan indicate a high level of satisfaction with e-learning services during the COVID-19 pandemic. The average agreement on the degree of satisfaction with all e-learning services was 3.11 out of 5.00, falling in the category of excellent. The dimension of e-learning service and its role in improving university life during the pandemic period received a high ranking, with an average satisfaction rating of 3.73 out of 5.00, indicating a high degree of satisfaction. On the other hand, the satisfaction rating for the degree of administrators feeling satisfied with the faculty's e-learning performance through student evaluation was 3.27 out of 5.00, indicating a medium degree of satisfaction.

The study also found that the faculty members had a good understanding of distance education techniques, with an average score of 3.91 out of 5.00 and a standard deviation of 1.140. The extent of their use of e-learning tools during the pandemic was also high, with an average score of 3.33 out of 5.00 and a standard deviation of 0.927. However, some respondents reported difficulty in using distance learning technology, with an average score of 3.74 out of 5.00 and a standard deviation of 1.036.

The study also revealed concerns among faculty members regarding the possibility of mass fraud in student evaluation results, with an average score of 3.74 out of 5.00 and a standard deviation of 1.036. In addition, some respondents reported difficulty in preparing electronic lessons and presentations, with an average score of 3.02 out of 5.00 and a standard deviation of 1.076.

Finally, the study found that the faculty members had mixed feelings about continuing e-learning in the future, with an average score of 2.96 out of 5.00 and a standard deviation of 1.380. These results suggest that while e-learning services have been generally well-received during the pandemic, there are still some concerns and challenges that need to be addressed to improve the overall e-learning experience for faculty members.

5.1.1 significance correlation coefficients

To conduct the significance correlation coefficients at the dimension 1 a in this study, we analyze the degree of satisfaction with e-learning tools in light of the Corona virus crisis among the faculty members of Al Albayt University in Amman, Jordan using the one-way ANOVA. We divide the faculty members into three groups based on their academic rank (i.e., assistant professor, associate professor, and full professor), and then compare the mean scores of each group to determine if there are significant differences in their satisfaction levels. The null hypothesis for this analysis would be that there is no significant difference in the satisfaction levels of the three groups, while the alternative hypothesis would be that there is a significant difference, as indicated in Table 8.

Table 8: One way ANOVA of the first dimension

		Sum of Squares	Df	Mean Square	F	Sig.
A2	Between Groups	50.919	2	25.460	27.547	.000
	Within Groups	97.044	105	.924		
	Total	147.963	107			
A3	Between Groups	14.496	2	7.248	5.383	.006
	Within Groups	141.384	105	1.347		
	Total	155.880	107			
A4	Between Groups	11.586	2	5.793	7.103	.001
	Within Groups	85.627	105	.815		
	Total	97.213	107			
A5	Between Groups	11.036	2	5.518	5.587	.005
	Within Groups	103.705	105	.988		
	Total	114.741	107			
A6	Between Groups	4.444	2	2.222	2.664	.074
	Within Groups	87.556	105	.834		
	Total	92.000	107			
A7	Between Groups	.866	2	.433	.437	.647
	Within Groups	103.903	105	.990		
	Total	104.769	107			
A8	Between Groups	6.119	2	3.059	2.526	.085
	Within Groups	127.178	105	1.211		
	Total	133.296	107			
A9	Between Groups	2.848	2	1.424	2.187	.117

	Within Groups	68.365	105	.651		
	Total	71.213	107			
A10	Between Groups	.179	2	.090	.068	.934
	Within Groups	138.487	105	1.319		
	Total	138.667	107			
A11	Between Groups	8.360	2	4.180	4.521	.013
	Within Groups	97.075	105	.925		
	Total	105.435	107			
A12	Between Groups	6.691	2	3.346	2.996	.054
	Within Groups	117.272	105	1.117		
	Total	123.963	107			
A13	Between Groups	1.375	2	.687	.659	.520
	Within Groups	109.542	105	1.043		
	Total	110.917	107			
A14	Between Groups	6.243	2	3.121	3.924	.023
	Within Groups	82.729	104	.795		
	Total	88.972	106			
A15	Between Groups	.927	2	.464	.240	.787
	Within Groups	202.925	105	1.933		
	Total	203.852	107			

Also, in this study Hotelling's T-Squared Test was used to examine whether there is a significant difference between the means of two or more multivariate populations. Specifically, we use this test to analyses whether there is a significant difference in the levels of satisfaction among faculty members based on their academic rank and their knowledge of e-learning techniques. To conduct this test, the study used the multivariate responses of faculty members across different satisfaction dimensions (satisfaction with e-learning tools, satisfaction with the role of e-learning in improving university life during the pandemic period, and satisfaction with faculty performance in e-learning through student evaluation). We can also include other variables such as age, gender, and teaching experience as covariates to control for potential confounding factors.

The null hypothesis for Hotelling's T-Squared Test there is no significant difference in the mean satisfaction levels of faculty members across different academic ranks and knowledge of e-learning techniques, as seen in table 10 the acceptable rate of Hotelling's T-Squared Test. Overall, Hotelling's T-Squared Test show a multivariate analysis of variance for the satisfaction levels among faculty members based on their academic rank and knowledge of e-learning techniques, helping to identify potential areas for improvement in e-learning services at Al Albayt University in Amman, Jordan.

Table 9: Hotelling's T-Squared Test of the first dimension

Hotelling's T-Squared	F	df1	df2	Sig
186.575	15.315	11	93	.000

5.2 Explanation to the second-dimension question: The degree of using and interacting with e-learning for the faculty member.

To address the first research question, which pertains to the degree of using and interacting with e-learning among faculty members in light of the coronavirus crisis, the researcher calculated the mean and standard deviation for the expressions of the E-Learning interacting dimension as shown in the table 10.

Table 10: Descriptive Statistics of the second dimension

		Range	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Std. Error	Statistic
B1: Have you gained new skills in e-learning technology?	108	4	4.28	.081	.841
B2: My participation and interaction with lectures increased electronically in light of the Corona crisis and in the current days?	108	4	4.04	.075	.784
B3: I am satisfied with the extent to which I have benefited from the information provided through e-learning technologies?	108	4	3.92	.079	.822
B4: E-learning has helped us acquire new skills and self-development in the field of scientific research	108	4	3.93	.097	1.011

B5: E-Learning Create a space to discuss through the platforms Are you satisfied with that	108	4	3.69	.101	1.047
Valid N (listwise)	108				

The result in Table 10 displays the descriptive statistics of the second dimension of the study, which includes five items related to the participants' experience with e-learning technology during the COVID-19 crisis. The table presents the number of observations (N), the range, mean, standard deviation, and standard error for each item. For the first item, "Have you gained new skills in e-learning technology?", the participants had a range of responses from 1 to 4, with a mean of 4.28 and a standard deviation of (0.841), indicating that the participants strongly agreed that they have gained new skills in e-learning technology. For the second item, "My participation and interaction with lectures increased electronically in light of the Corona crisis and in the current days?", the participants had a range of responses from 1 to 4, with a mean of 4.04 and a standard deviation of (0.784). indicating that the participants generally agreed that their participation and interaction with lectures have increased electronically during the COVID-19 crisis. For the third item, "I am satisfied with the extent to which I have benefited from the information provided through e-learning technologies?", the participants had a range of responses from 1 to 4, with a mean of 3.92 and a standard deviation of (0.822) , indicating that the participants were somewhat satisfied with the extent to which they have benefited from the information provided through e-learning technologies. For the fourth item, "E-learning has helped us acquire new skills and self-development in the field of scientific research", the participants had a range of responses from 1 to 4, with a mean of 3.93 and a standard deviation of (1.011), indicating that the participants generally agreed that e-learning has helped them acquire new skills and self-development in the field of scientific research. For the fifth item, "E-Learning Create a space to discuss through the platforms. Are you satisfied with that?", the participants had a range of responses from 1 to 4, with a mean of 3.69 and a standard deviation of (1.047) , indicating that the participants were somewhat satisfied with the space created by e-learning to discuss through the platforms. The valid N (listwise) for all items is 108, indicating that there were no missing values. Overall, the descriptive statistics suggest that the participants had a positive experience with e-learning technology during the COVID-19 crisis and perceived it as beneficial for their self-development and research skills.

5.3 Explanation to the third-dimension question: Positives Effect of using e-learning from the faculty member view.

To investigate the third research question about the level of positive effects of using e-learning from the perspective of faculty members during the COVID-19 crisis, the researcher computed the mean and standard deviation for the Positive Effect E-Learning Services dimension. This analysis aimed to evaluate the faculty members' perception of the benefits of e-learning tools and their satisfaction with the transition to e-learning at Al Albayt University in Amman, Jordan. the table 11 present the positive effects of using e-learning from the perspective of faculty members.

Table 11: Descriptive Statistics of the third dimension

	N	Range	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Std. Error	Statistic
C1: E-learning technologies have created a link to communicate with the administration and students anywhere and anytime via e-mail to avoid the spread of the Corona virus	108	4	3.94	.076	.789
C2: It played a major role in saving the educational process from being lost?	108	4	3.99	.089	.922
C3: Developed many self-teaching skills and improved computer experience and skill for students and faculty?	108	4	3.94	.085	.878
C4: Store information and lessons for a long time	108	4	4.15	.093	.965
C5: E-learning increases the knowledge sharing between me and my fellow faculty member	108	4	3.69	.115	1.197
C6: E-learning contributes to presenting educational materials better than traditional means	108	4	3.62	.103	1.074
C7: I see that e-learning has contributed to reducing the spread of the Corona virus, reducing the burdens of faculty member, as it transforms the study process into a process of dialogue between the teacher and the learner instead of the traditional explanation.	108	4	3.81	.097	1.009
Valid N (listwise)	108				

Table 11 presents the results of a descriptive statistics analysis of the Positive Effect E-Learning Services dimension,

which aims to assess the faculty members' perceptions of the benefits of e-learning tools and their satisfaction with the transition to e-learning during the COVID-19 crisis at Al Albayt University in Amman, Jordan.

The mean values for each item range from 3.62 to 4.15, indicating that faculty members generally perceive positive effects of e-learning. The highest mean value was for "store information and lessons for a long time" (4.15), indicating that faculty members recognize the value of e-learning in retaining information and content for a longer period of time.

The lowest mean value was for "e-learning contributes to presenting educational materials better than traditional means" (3.62), suggesting that faculty members are less convinced that e-learning is more effective than traditional teaching methods in presenting educational materials.

The standard deviations range from 0.789 to 1.197, which indicates that there is some variability in the responses for each item. For example, the item "e-learning increases the knowledge sharing between me and my fellow faculty member" has a higher standard deviation (1.197), indicating a greater range of opinions among faculty members regarding this aspect of e-learning.

The valid N (listwise) is 108, which means that all 108 respondents provided answers for all items in this dimension. This suggests that the sample size is sufficient to produce reliable results. Overall, the results indicate that e-learning has been perceived positively by faculty members at Al Albayt University during the COVID-19 crisis, with some variation in perceptions across different aspects of e-learning.

5.3.1 significance correlation coefficients

To conduct the significance correlation coefficients at the dimension 3 a in this study, we analyze the degree of satisfaction with the Positive Effect E-Learning Services dimension s in light of the Corona virus crisis among the faculty members of Al Albayt University in Amman, Jordan using the one-way ANOVA as shown in the table 12.

Table 12: One way ANOVA the third dimension

		Sum of Squares	df	Mean Square	F	Sig.
C2	Between Groups	34.289	4	8.572	15.572	.000
	Within Groups	56.701	103	.550		
	Total	90.991	107			
C3	Between Groups	29.045	4	7.261	13.979	.000
	Within Groups	53.501	103	.519		
	Total	82.546	107			
C4	Between Groups	41.720	4	10.430	18.551	.000
	Within Groups	57.909	103	.562		
	Total	99.630	107			
C5	Between Groups	49.233	4	12.308	12.182	.000
	Within Groups	104.064	103	1.010		
	Total	153.296	107			
C6	Between Groups	26.512	4	6.628	7.044	.000
	Within Groups	96.923	103	.941		
	Total	123.435	107			
C7	Between Groups	33.648	4	8.412	11.511	.000
	Within Groups	75.268	103	.731		
	Total	108.917	107			

The results of the one-way ANOVA for the Positive Effect E-Learning Services dimension show that there are significant differences between the mean scores of the different items in the dimension. The F-tests for all items are significant ($p < .05$), indicating that the null hypothesis of no difference between the groups can be rejected. The results also show that the between-groups variability is greater than the within-groups variability, as evidenced by the larger mean square values for the between-groups sum of squares compared to the within-groups sum of squares. Therefore, it can be concluded that there are significant differences between the perceptions of faculty members regarding the positive effects of using e-learning tools in different aspects such as communication, knowledge sharing, and reducing the spread of COVID-19.

Table 13: Hotelling's T-Squared Test the third dimension

Hotelling's T-Squared	F	df1	df2	Sig
64.550	10.256	6	102	.000

The Hotelling's T-Squared test for the Positive Effect E-Learning Services dimension shows a value of 64.550, with a

corresponding F-statistic of 10.256. The degrees of freedom for the numerator (df1) are 6, and the degrees of freedom for the denominator (df2) are 102. The p-value is less than 0.001, indicating that there is strong evidence to reject the null hypothesis that the means of the groups are equal. This suggests that there are significant differences between the perceptions of the faculty members regarding the positive effects of using e-learning during the COVID-19 crisis at Al Albayt University in Amman, Jordan.

5.4 Explanation to the fourth dimension question: Negative Effect of using e-learning form the faculty member view.

The fourth research question aimed to investigate the negative effects of using e-learning from the perspective of faculty members during the COVID-19 crisis. To address this question, the researcher computed the mean and standard deviation for the Negative Effect of using e-learning dimension. The goal was to evaluate how faculty members perceived the drawbacks of e-learning tools and their satisfaction with the transition to e-learning at Al Albayt University in Amman, Jordan. Table 14 presents the results of this analysis, which shows the negative effects of using e-learning as perceived by faculty members.

Table 14: Descriptive Statistics of the fourth dimension

	N	Range	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Std. Error	Statistic
D1: Not knowing the extent to which students interact with the lessons offered during online classes	108	4	3.55	.094	.980
D2: The inability to perform practical experiments for scientific subjects during online classes, which caused a defect in educational outcomes during the epidemic	108	4	3.78	.083	.857
D3: E-learning increases students' isolation by sitting for a long time in front of the computer without face-to-face social contact	108	4	3.80	.100	1.039
D4: Difficulty applying appropriate assessment methods and tools	108	4	3.79	.089	.928
D5: In your opinion the sitting for a long time in front of the computer causes many diseases	108	4	3.97	.087	.901
D6: It reduces the workload of faculty member and increases the workload of students	108	4	3.20	.126	1.310
D:7 E-learning lacks human presence and human relations between the faculty member and students and between the students themselves	108	4	3.68	.103	1.075
D8: Lack of understanding of the practical side during e-learning, which causes weak outputs of the practical side in the future	108	4	3.88	.095	.983
Valid N (listwise)	108				

Table 14 provides descriptive statistics for the Negative Effect of using e-learning dimension. The mean scores for each item were computed to evaluate faculty members' perceptions of the negative effects of e-learning during the COVID-19 crisis at Al Albayt University in Amman, Jordan. The standard deviation was also calculated to indicate the degree of variability in the responses.

The item "In your opinion, sitting for a long time in front of the computer causes many diseases" received the highest mean score of 3.97, indicating that faculty members are concerned about the negative impact of prolonged computer use on their health. The item "Not knowing the extent to which students interact with the lessons offered during online classes" received the lowest mean score of 3.55, indicating that faculty members are less concerned about this issue.

The standard deviations for each item ranged from 0.857 to 1.310, indicating varying degrees of agreement among faculty members regarding the negative effects of e-learning. For example, the item "It reduces the workload of faculty member and increases the workload of students" had a high standard deviation of 1.310, indicating a wide range of opinions among faculty members on this issue.

Overall, the results of this analysis suggest that while there are some negative effects of e-learning during the COVID-19 crisis, faculty members' perceptions of these effects vary.

5.4.1 significance correlation coefficients

To conduct the significance correlation coefficients at the dimension 4 a in this study, we analyze the degree of satisfaction with negative effects of e-learning during the COVID-19 crisis, faculty members' of Al Albayt University in

Amman Jordan, using the one-way ANOVA as shown in the Table 15.

Table 15: one-way ANOVA of the fourth dimension

		Sum of Squares	df	Mean Square	F	Sig.
D2	Between Groups	10.941	4	2.735	4.160	.004
	Within Groups	67.726	103	.658		
	Total	78.667	107			
D3	Between Groups	33.126	4	8.281	10.353	.000
	Within Groups	82.393	103	.800		
	Total	115.519	107			
D4	Between Groups	20.978	4	5.245	7.595	.000
	Within Groups	71.124	103	.691		
	Total	92.102	107			
D5	Between Groups	16.428	4	4.107	6.001	.000
	Within Groups	70.489	103	.684		
	Total	86.917	107			

The table presents the results of the one-way ANOVA conducted to test the significance of the correlation coefficients for the dimension of satisfaction with negative effects of e-learning during the COVID-19 crisis among faculty members of Al Albayt University in Amman, Jordan.

For each dimension (D2, D3, D4, and D5), the table shows the sum of squares (SS), degrees of freedom (df), mean square (MS), F-value, and the significance level (Sig.). The SS represents the variability between and within groups, while df represents the number of groups and the total sample size minus one. MS is calculated by dividing SS by df, and it represents the average variance within and between groups. The F-value is calculated by dividing the between-group variance by the within-group variance, and it is used to test the null hypothesis that the means of the groups are equal. Finally, Sig. represents the probability of obtaining the observed F-value by chance, and it is used to determine whether to reject or fail to reject the null hypothesis.

The results of the ANOVA indicate that for all four dimensions, there is a significant difference between the means of the groups, as evidenced by the significant F-values and low Sig. values (all < .05). This suggests that the correlation coefficients between satisfaction with negative effects of e-learning during the COVID-19 crisis and the independent variables (e.g., gender, academic rank, etc.) are statistically significant.

Overall, the ANOVA results provide evidence of the validity of the correlation coefficients for the dimension of satisfaction with negative effects of e-learning during the COVID-19 crisis among faculty members of Al Albayt University in Amman, Jordan. The significant differences between the means of the groups suggest that the independent variables may have a significant impact on faculty members' satisfaction with negative effects of e-learning during the COVID-19 crisis.

Table 16: Hotelling's T-Squared Test of the fourth dimension

Hotelling's T-Squared	F	df1	df2	Sig
49.181	6.632	7	101	.000

The table presents the results of Hotelling's T-Squared test, which is a multivariate statistical test used to determine whether two or more groups of variables have the same mean. The test compares the means of two or more groups on multiple variables simultaneously and determines the probability of obtaining the observed differences in means by chance. It also shows the degrees of freedom (df1 and df2) and the significance level (Sig.).

The results of the test indicate that there is a significant difference between the means of the groups on the variables being tested, as evidenced by the high Hotelling's T-Squared value (49.181) and low significance level (Sig. = .000). This suggests that there are significant differences in the means of the groups on the variables being tested. The degrees of freedom (df1 = 7, df2 = 101) represent the number of variables being tested and the total sample size minus the number of groups being tested, respectively. The high value of df2 indicates that there is a large sample size, which increases the power of the test to detect significant differences between the means of the groups.

5.5 Explanation to the fifth dimension question: Describes the condition and level of students upon return to regular classes after the pandemic form the faculty member view.

This section of the study is crucial as it aims to explore the condition and level of students after returning to regular education in universities from the perspective of faculty members. The dimension focuses on various aspects such as the impact of the previous academic year on students' performance in the new academic year, the lack of practical

experience among students, and the possible decrease in cooperation and discussion spirit during e-learning. To address this dimension, the researcher computed the mean and standard deviation to evaluate how faculty members perceive the drawbacks of e-learning tools and their satisfaction with the transition to e-learning at Al Albayt University in Amman, Jordan. Table 17presents the results of this analysis, highlighting the condition and level of students after returning to regular education in universities from the perspective of faculty members.

Table 17: Descriptive Statistics of the fifth dimension

	N	Range	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Std. Error	Statistic
E1: The students will be able to start a new academic year without difficulties in light of their inability to complete the last academic year from your opinion,?	108	4	3.34	.094	.978
E2: Will the previous period affect the level of students for the new academic year?	108	4	3.89	.091	.950
E4: Do you feel that students lack the practical aspect during the past years	108	4	3.88	.086	.894
E5: Do you feel the students lose the spirit of cooperation and discussion during e-learning through your evaluation of them currently?	104	4	3.87	.090	.914
E5: In your opinion, will the situation in University be safe from the health side in light of the presence of the Corona virus?	108	4	3.76	.088	.916
E6: Are you worried about returning to continuing online studies?	108	4	3.36	.121	1.256
E7: Are there still online lessons in conjunction with continuing education in universities	108	4	3.91	.082	.849
E8: Do you prefer distance education for the new university year?	108	4	2.69	.122	1.271
E9: Do you think that interaction with live lessons in class is better than online education	108	4	4.19	.091	.949
E10: Are teachers currently performing better than in the past in online education?	108	4	3.81	.112	1.161
E11: Do you think that students' interaction is better than it was before in e-learning	108	4	3.81	.103	1.069
E12: Is there a plan from your administration to integrate general education with e-learning?	108	4	3.55	.087	.901
Valid N (listwise)	104				

The table 17 presents the results of the analysis conducted to describe the condition and level of students upon returning to regular classes after the COVID-19 pandemic, from the viewpoint of faculty members. The dimension was centered on several axes, including the impact of the previous academic year on students, the lack of practical aspects, the loss of the spirit of cooperation and discussion during e-learning, and the safety of the university environment in the presence of the coronavirus.

The mean and standard deviation were computed to evaluate how faculty members perceived the drawbacks of e-learning tools and their satisfaction with the transition to e-learning at Al Albayt University in Amman, Jordan. The table shows the mean score for each question, which ranges from 2.69 to 4.19. The standard deviation values range from 0.849 to 1.271, indicating that there is variability in the responses of faculty members for each question.

The mean score for the first question, "The students will be able to start a new academic year without difficulties in light of their inability to complete the last academic year from your opinion?" is 3.34, with a standard deviation of .978. This suggests that, on average, respondents were somewhat uncertain about whether students will face difficulties in starting the new academic year due to the disruptions caused by the pandemic.

The mean score for the second question, "Will the previous period affect the level of students for the new academic year?" is 3.89, with a standard deviation of .950. This suggests that, on average, respondents were somewhat optimistic that the previous disruptions will not significantly affect the students' performance in the new academic year. The mean score for the third question, "Do you feel that students lack the practical aspect during the past years?" is 3.88, with a standard deviation of .894. This suggests that, on average, respondents believe that students lacked practical experience in the past year. The mean score for the fourth question, "Do you feel the students lose the spirit of cooperation and discussion during e-learning through your evaluation of them currently?" is 3.87, with a standard deviation of .914. This suggests that, on average, respondents believe that students are losing the spirit of cooperation and discussion during e-learning.

The mean score for the fifth question, "In your opinion, will the situation in University be safe from the health side in light of the presence of the Corona virus?" is 3.76, with a standard deviation of .916. This suggests that, on average, respondents were somewhat uncertain about the safety of the university environment during the pandemic.

The mean score for the sixth question, "Are you worried about returning to continuing online studies?" is 3.36, with a standard deviation of 1.256. This suggests that, on average, respondents were somewhat worried about returning to online studies.

The mean score for the seventh question, "Are there still online lessons in conjunction with continuing education in universities?" is 3.91, with a standard deviation of .849. This suggests that, on average, respondents believe that online education is still an important part of university education.

The mean score for the eighth question, "Do you prefer distance education for the new university year?" is 2.69, with a standard deviation of 1.271. This suggests that, on average, respondents were somewhat against distance education for the new academic year.

The mean score for the ninth question, "Do you think that interaction with live lessons in class is better than online education?" is 4.19, with a standard deviation of .949. This suggests that, on average, respondents believe that interaction with live lessons in class is better than online education.

The mean score for the tenth question, "Are teachers currently performing better than in the past in online education?" is 3.81, with a standard deviation of 1.161. This suggests that, on average, respondents believe that teachers are performing better than in the past in online education.

The mean score for the eleventh question, "Do you think that students' interaction is better than it was before in e-learning?" is 3.81, with a standard deviation of 1.069. This suggests that, on average, respondents believe that students' interaction is similar to what it was before the pandemic in e-learning.

Overall, the faculty members had a relatively positive view of the condition and level of students upon returning to regular classes after the pandemic. The highest mean scores were for the questions related to the interaction with live lessons in class being better than online education, the belief that previous academic years would not significantly impact the new academic year, and the general education integration with e-learning plan. In contrast, the lowest mean scores were for the questions related to preferring distance education for the new academic year and whether teachers were performing better than in the past in online education.

In conclusion, the faculty members' perceptions of the condition and level of students upon returning to regular classes after the pandemic were generally positive, with some concerns and reservations regarding distance education and the performance of teachers in online education.

5.5.1 significance correlation coefficients

In order to determine the significance of correlation coefficients in dimension 5 of this study, we examined the level of satisfaction among faculty members of Al Albayt University in Amman, Jordan regarding the condition and performance of students upon returning to regular education. This was done using a one-way ANOVA analysis, as presented in Table 18.

Table 18: One way ANOVA of the fifth dimension

		Sum of Squares	df	Mean Square	F	Sig.
E2	Between Groups	11.596	4	2.899	3.510	.010
	Within Groups	85.070	103	.826		
	Total	96.667	107			
E3	Between Groups	24.991	4	6.248	10.646	.000
	Within Groups	60.445	103	.587		
	Total	85.435	107			

E4	Between Groups	12.331	4	3.083	4.136	.004
	Within Groups	73.784	99	.745		
	Total	86.115	103			
E5	Between Groups	9.339	4	2.335	2.991	.022
	Within Groups	80.402	103	.781		
	Total	89.741	107			
E6	Between Groups	41.523	4	10.381	8.393	.000
	Within Groups	127.393	103	1.237		
	Total	168.917	107			
E7	Between Groups	22.245	4	5.561	10.447	.000
	Within Groups	54.829	103	.532		
	Total	77.074	107			
E8	Between Groups	28.210	4	7.053	5.020	.001
	Within Groups	144.707	103	1.405		
	Total	172.917	107			
E9	Between Groups	27.421	4	6.855	10.252	.000
	Within Groups	68.875	103	.669		
	Total	96.296	107			
E10	Between Groups	18.818	4	4.705	3.862	.006
	Within Groups	125.478	103	1.218		
	Total	144.296	107			
E11	Between Groups	42.011	4	10.503	13.474	.000
	Within Groups	80.286	103	.779		
	Total	122.296	107			
E12	Between Groups	15.379	4	3.845	5.547	.000
	Within Groups	71.390	103	.693		
	Total	86.769	107			

The one-way ANOVA analysis is a statistical test used to compare means of three or more groups. In this study, it was used to examine the significance of correlation coefficients in dimension 5, which pertains to the level of satisfaction among faculty members regarding the condition and performance of students after returning to regular education.

The results of the one-way ANOVA analysis, presented in Table 15, show that there were statistically significant differences between the groups for all 12 questions (E2-E12). The between groups sum of squares, degrees of freedom, mean square, F values, and p-values are all reported for each question.

For example, for question E2, the between groups sum of squares was 11.596, the degrees of freedom were 4, the mean square was 2.899, the F value was 3.510, and the p-value was .010. This indicates that there were significant differences in the level of satisfaction among faculty members regarding the condition and performance of students after returning to regular education for question E2.

Similarly, for question E3, the between groups sum of squares was 24.991, the degrees of freedom were 4, the mean square was 6.248, the F value was 10.646, and the p-value was .000. This indicates that there were significant differences in the level of satisfaction among faculty members regarding the condition and performance of students after returning to regular education for question E3.

Overall, these results suggest that the level of satisfaction among faculty members regarding the condition and performance of students after returning to regular education varies significantly depending on the specific question being asked in the study. This information could be useful for administrators and policymakers in improving the quality of education in universities and addressing any issues or concerns raised by faculty members.

Table 19: Hotelling's T-Squared Test of the fifth dimension

Hotelling's T-Squared	F	df1	df2	Sig
186.575	15.315	11	93	.000

The Hotelling's T-squared test was conducted for a single dimension in this study. The test showed a value of 186.575, with a corresponding F statistic of 15.315 and degrees of freedom of 11 and 93. The p-value was found to be less than .001, indicating that there is a statistically significant difference between the means of the groups being compared. This suggests that there are significant differences in the responses of faculty members regarding the level of satisfaction with the condition and performance of students upon returning to regular education in universities.

5.6 The study outcome

The research findings can be summarized as follows: The study identified several outcomes based on the five dimensions of e-learning during the pandemic. These include the following:

- Faculty members gained new skills and knowledge in using e-learning tools during the pandemic period.
- E-learning played a vital role in improving the university experience during the pandemic.
- Some students faced difficulty using distance learning technology, including computers, tablets, video calls, and educational applications.
- The study found an average level of student satisfaction with e-learning during the pandemic.
- Academics expressed concerns about students' results and the potential for mass cheating with e-learning.
- The study examined the difference in student performance in practical aspects after returning to universities.
- Participation and interaction with lectures increased electronically during the pandemic and continues to be prevalent today.
- Participants expressed satisfaction with the extent to which they benefited from the information provided through e-learning techniques.
- E-learning helped in acquiring new skills and self-development in the field of scientific research.
- E-learning created a space for discussion through platforms, and participants were generally satisfied with this aspect.
- Faculty members believed that e-learning was beneficial and helped develop students' technological skills.
- The use of e-learning was common, with email and other electronic services being the most important.
- The study identified several barriers to introducing e-learning, with high costs being the most significant challenge.
- The study identified many advantages of e-learning, but there are also several drawbacks, including not understanding the practical side of e-learning, leading to weak outputs in the future.
- The evaluation of students currently in regular classes was much better than distance education according to the fifth dimension.

6 Conclusion

The COVID-19 pandemic has had a significant impact on the education sector globally, leading to the widespread adoption of e-learning. Although e-learning has been crucial in ensuring that education continues, it has also presented challenges, particularly in practical experiences. This study aimed to explore faculty members' views on the role of e-learning in post-pandemic university education and assess its positive and negative effects on returning to traditional classes. The study found that teachers need to be technologically prepared and trained to use e-learning tools, especially during crises and emergencies. Educational institutions need to provide students with practical opportunities for training and field experiences and support and guidance to improve their applied abilities and overcome the practical knowledge gap caused by the pandemic. Overall, while e-learning has limitations, it has proven to be a cost-effective solution for delivering education.

The study's results showed that Al Albayt University's faculty members had a positive perception of e-learning during the COVID-19 crisis, with some variation in perceptions across different aspects of e-learning. Although e-learning services were generally well-received during the pandemic, there were still concerns and challenges that need to be addressed to improve the overall e-learning experience for faculty members.

Regarding returning to regular classes after the pandemic, the faculty members had a generally positive view of the condition and level of students. The highest mean scores were for questions related to the interaction with live lessons in class being better than online education, the belief that previous academic years would not significantly impact the new academic year, and the general education integration with e-learning plan. The lowest mean scores were for questions related to preferring distance education for the new academic year and whether teachers were performing better than in the past in online education. In conclusion, the faculty members' perceptions of the condition and level of students upon returning to regular classes after the pandemic were generally positive, with some concerns and reservations regarding distance education and the performance of teachers in online education.

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Authors' contributions

The final manuscript has been written, reviewed and approved by **Alaa Ahmad harahsheh**.

Availability of data and materials

The data that support this study are available in the manuscript.

Conflict of interest

The authors declare that there is no conflict regarding the publication of this paper.

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