

## E-LEARNING ADOPTION DURING COVID-19 CRISIS AND ITS EFFECT ON ACHIEVING STUDENTS' PERFORMANCE – EVIDENCE FROM BUSINESS COLLAGES – JORDANIAN UNIVERSITIES

Nazem M. Malkawi<sup>1</sup> , Mohammad Haider S. Mohailan<sup>2</sup> 

<sup>1</sup>Jadara University (Jordan)

<sup>2</sup>Institute of Public Administration (Saudi)

[n\\_malkawi@hotmail.com](mailto:n_malkawi@hotmail.com), [mohailanm@ipa.edu.sa](mailto:mohailanm@ipa.edu.sa)

Received March 2021

Accepted January 2022

### Abstract

This study aimed to know the effect of E-Learning with all its components on students' performance at Business Colleges-Jordanian Universities during at COVID-19 crisis. To achieve study goals, a questionnaire was distributed to the students at Jordanian Universities, (870) valid questionnaires were recovered. The study found that: The level of E-Learning and its components at Jordanian Universities were at middle rates, students' performance also comes at a moderate level. E-Learning and its components (Technological facilities readiness, Electronic applications readiness, Databases & E-resources readiness, People readiness, E-Learning management system readiness, Evaluation system readiness, teaching methods diversity, Educational curricula and electronic content readiness) have a significant effect on students' performance at Jordanian Universities at significance ( $\alpha \leq 0.05$ ). Whereas sub components of (E-Learning organizational environment readiness and legislations and regulations readiness) have no effect separately on students' performance. The study recommended Jordanian Universities to improve E-Learning in all its components in the Universities, reinforce using E-Learning in education, and exploit the benefits of E-Learning to improve students' performance because it is the main alternative to face emerging crises like Coronavirus.

**Keywords** – E-learning, students' performance, Information and communication technology, Coronavirus (COVID-19), Business colleges, Jordan universities.

### To cite this article:

Malkawi, N.M., & Mohailan, M.H.S. (2022). E-learning adoption during COVID-19 crisis and its effect on achieving students' performance – evidence from business collages – Jordanian Universities. *Journal of Technology and Science Education*, 12(2), 345-361. <https://doi.org/10.3926/jotse.1278>

## 1. Introduction

The world has experienced many financial and health crises in a century, from the Spanish flu in 1918-1920 to the global financial crisis and the great depression in 1929, Swine flu, Ebola... To the global financial crisis in 2008 (Alnajjar, Noor, Al-Ahmad & Issa, 2010), and this crisis (the emerging Coronavirus COVID-19). What distinguishes this crisis from others, it came in unprecedented circumstances of openness brought by the revolution of advanced information and communication technology and

associated smart systems. Such as artificial intelligence, block chain and other technologies, backed by huge capabilities of the Internet that facilitated openness and all aspects of life, which enabled the world to be a small village and abolished the concepts of time and space, not to mention many of the international legislations, conventions and unions that strengthened this. which, facilitated the spread of this crisis and its effect to every country, organization, family and individual in this connected world, and threatened the lives of individuals and many organizations in their existence if not within its deadly health effects, in its economic and social effects that are no less dangerous. So suddenly the countries of the world found themselves forced to close their borders (Mckinsey Global Institute, 2020), and it posed an unprecedented challenge that forced a sudden shift in how governments and business organizations around the world operate. The crisis has added new burdens to governments and leaders of governmental and private organizations, and increased coordination efforts between the public and private sectors. Not to mention the role of governments and business organizations in directing economic policies and managing high unemployment rates, and it is necessary to balance these competing priorities with accommodating orders to stay at home for the social distance of its workforce, and for educational institutions to continue in learning during this closing.

On the other hand, information and communication technologies and related applications have evolved in an unprecedented way, which facilitate the interactivity around the world (Guelfi, Pontes & Kofuji, 2012), and enabled work to be accomplished by different means and methods. Through which organizations, societies and individuals have achieved many advantages that have enabled them to overcome the concepts of time and space, reduced the cost of different businesses and improved their quality in various aspects of life (Economic, social, cultural and other) (Malkawi, 2017). These new technologies, such as cell phones, the Internet, and social networks, are affecting education in universities. It enabled better communication and implementation of the latest information systems, benefiting the learning and teaching process. These systems support individual learning, collaborative learning, learning content management, learning activity management, formal learning, informal learning and workplace learning (Urh, Vukovic & Jereb, 2015).

Also, the volume of data, information and knowledge accumulates in a way that no individual, organization or entity can control or comprehend it, and it is renewed and developed and accumulates at an accelerated pace, which imposed a major change in the methods of searching for and accessing information, also analyzing and drawing conclusions from it. The field of education and training received its share of these changes, and it became obligatory for educational institutions to change their view of the educational process as a whole, in line with these developments. As many universities and educational institutions moved in providing and practicing educational process from the direct physical presence to remote interaction with the various facilities and capabilities offered by the applications. The role of the teacher became a guide to search for information and not a carrier of it, as is the case for decades and centuries ago. Not only that, countries and governments have also used E learning in response to global crises and conditions in which individuals cannot attend physically and face-to-face to receive direct education. Either for security conditions or physical determinants and not less than social and health conditions as imposed by the Coronavirus which, affected all group activities in all various aspects of life, and disrupted study and attendance to schools and universities, and imposed transition to distance and E-learning. Like other organizations which applied E-services methods), this required intelligent decisions (Malkawi, 2018a) to replace traditional learning with distance and E-Learning as an indispensable option to overcome these conditions.

So this research comes to know the effect of E-Learning on the students' performance in Jordanian universities, as one of the most important institutions concerned with E-Learning, and many of them have a minimum of infrastructure and experience to deal with E-learning.

## **2. Study Importance**

The study importance stems from benefiting from the rapid developments in information and communication technology and their use, which affects all aspects of life: productivity, economic, social,

educational... In addition, Jordan, as one of the developing countries, started early in planning to introduce E learning in universities. However, despite the ambitious plans for that, its use is still limited, also despite its modest use in universities, its effect on the students' performance is not measured and studied well, and still in questions. Also, at a time when the use of E-Learning is no longer optional to use, global crises, especially the Coronavirus (Covid-19) crisis, which have halted most life activities, imposed educational institutions as well as other sectors suddenly to rely on E-Learning as a necessary choice in education. Jordan is one of countries, which adopt E-Learning approach to control the virus and protect society from the epidemic without sufficient readiness to adopt this approach, either at the school or university level. This may not achieve the desired benefits from the educational process as required. Therefore, this study came to know the level of E-Learning in Jordanian universities and its effect on students' performance during COVID-19 pandemic.

### **3. Problem Statement**

The number of students has increased dramatically over the past decades, because of the worldwide population growth in general and Jordan in particular (Banihani, Al-Ahmad & Alnajjar, 2009). Responding to this growth, the number of Jordanian public and private universities has also increased. In addition, the living conditions changed that have imposed individuals to develop their knowledge and skills at the same time as they practice their business. Information and communication technology also accelerating evolved, and it is necessary to take advantage of this technology in the educational process in order to save time, effort and money, besides to the circumstances that sometimes affect students' attendance like wars and diseases, COVID-19 the best evidence for that. Where in the aftermath of the World Health Organization's designation of the coronavirus as a pandemic on March 11 ([www.who.com](http://www.who.com)), in March 16 universities across Jordan are shutting down in an attempt to slow its spread and shift to virtual classrooms. A quick switch to platforms like Zoom disrupts the curriculum, especially for less-equipped professors to navigate the Internet and the privacy of classroom management with a screen and microphone, professors had canceling some classes because they faced technical difficulties, or a problem with networks, or they simply panicked over the prospect of teaching the class entirely on the new platform. And with the university's IT services focused on providing teachers with webinars on how to use online platforms, individual student needs for these services have been suspended.

However, the effect of E-Learning on students' performance compared to direct education is still a question. So this study comes to know the effect of E-Learning on students' performance at Jordanian universities by answering the question: What is the effect of E-Learning on students' performance in Jordanian universities during COVID-19 crisis? Which has not yet been studied within the limits of the researchers' knowledge.

## **4. Literature Review**

### **4.1. E-Learning**

The term E-Learning has become popular during the past two decades, which is a new method of distance learning as a result of the great development in information and communication technology, and the increase in spread and dependence globally on the Internet (Alhabeeb & Rowley, 2017). Where a set of E-Learning methods globally has been employed in the field of education to support traditional education (Sangrà, Vlachopoulos & Cabrera, 2012). Alternatively, because of the increased need for distance education due to the inability of educational institutions, especially in higher education to absorb the growing need for education on the one hand, and the lack of the ability of a segment of students to benefit from traditional education due to work conditions, location or costs on the other hand. So over the past few decades, online learning in higher education has been widely used, online programs are increasing, and perhaps not surprising, in an environment that often require virtual conferences and remote collaboration. E-Learning is an approach for learning and teaching that represents the applied educational model, using multimedia, and technical mobile devices to improve access to communication, interaction, and education (Sangrà et al., 2012).

The speed and magnitude of the educational disorder because of the spread of the Coronavirus – which now affects hundreds of millions of students worldwide – has no similarity in history. Therefore, the closure of schools and universities for days, weeks and sometimes even months may have untold consequences for students. For universities, the integration of technology in the education system with quantity and quality is a prerequisite for keeping pace with accelerated technical progress through electronic portals, self-service windows, direct lectures registration and some form of training and interactive teaching. This does not compensate for attending lectures, direct interaction with teachers, the presence of the library, laboratories, and testing laboratory and other events (Alroai, 2020). Therefore, as the Coronavirus spreads and its impacts on public health increases, the importance of relying on technology and mobile learning platforms has increased. Therefore, to adapt with this, universities have developed their digital tools and platforms to ensure the continuity of providing education to their students under quarantine conditions. (QS, 2020). Moreover, although most students stay at home, universities and colleges have to make many decisions to deal with this. An integrated nerve center can help in this (Illanes, Law, Mendy, Sanghvi & Sarakatsannis, 2020).

Education is defined as an organized process that aims to acquire the educated person the general bases of knowledge. This is done in an organized and intended manner and with specific and known goals (<https://www.nawa3em.com/%D8%AA%D9%83%D9%86%D9%88%D9%84%D9%88%D8%AC%D9%8A%D8%A7/158970/%D8%A8%D8%AD%D8%AB-%D8%B9%D9%86>), and it can be said that education is a coordinated transmission of information to the students, or it is an information, knowledge, experiences, and skills acquired by the recipients in certain ways (Al-Sultani, 2011; Attia 2013). So education is a formal system of a long learning path aims to change the behavior of the individual permanently through the transfer of information and knowledge (Nedha, 2011) through an audited and governed systems.

E-Learning defined as an educational system based on the use of electronic resources in teaching. Teaching may be inside or outside the classroom, but the use of computers and the Internet is the main component that distinguishes E-Learning from traditional education (<https://economictimes.indiatimes.com/definition/e-learning>). So E-Learning is a learning system that provides educational programs at any time and place by using advanced telecommunication and technologies like artificial intelligence and cloud computing to provide an interactive learning environment to achieve learning goals (Moreno & Mayer 1999; Mayer & Mayer, 2005).

While some believe that the unplanned transition to E-Learning and without adequate training, leads to a bad experience in E-Learning use, and does not lead to sustainable growth in E-learning, others believe that the new integrated education brings significant benefits. Where, the integration of information and communication technology in education will be greatly accelerated, and E-Learning will become an essential component of education. However, there are challenges that must be overcome. Where some students lack experience for reliable access to the Internet and/or technology to participate in E-Learning (Ellis, Ginns & Piggott, 2009), this gap varies from country to country and between different income brackets within each country. So in order to achieve greater benefit from E-learning, efforts must be combined to provide this structure and go beyond the repetition of the classroom/physical lectures through video capabilities, to a set of required collaboration tools and methods of participation to promote “inclusion and discussions” (World Economic Forum, 2016).

#### **4.2. Components and Advantages of E-Learning**

The E-Learning system consists of several components. The most important of which are: learners, educational policies and standards, technological infrastructure which includes (electronic networks, computers for scientists, servers, programs, educational goals and objectives), individuals (professors, programmers, coordinators, support teams, etc.). Electronic content (electronic programs and courses), electronic sources and media, educational processes, strategies and methods, virtual learning environments, electronic learning resource centers, electronic libraries, communication and interaction system, content management system, learning management system including (registration and

management system Student Affairs, Personnel Management System, Learning Management Environments). Assessment and Evaluation System, Services and Facilities, Maintenance and Technical Support System (<http://www.elearning-arab-academy.com/elearning-principles/66-2010-12-02-16-55-56.htm>). Moreover, when talking about the importance of E-Learning (Malhas & Musa, 2008) mentioned the importance and advantages of E-Learning in the following:

1. E-Learning helps to provide educational opportunities for different groups of society, women, workers and employees without regard to gender and color, and it is also possible for some groups that could not continue their education for social, political or economic reasons to join it.
2. It provides education at any time and place.
3. E-Learning contributes in developing thinking, enriching the learning process, providing information, presenting topics and updating them.
4. Increases the ability to communicate and exchange opinions, experiences and perspectives between students and their teachers, between students together, and in large numbers through advanced tools such as e-mail, interactive videos, and discussion rooms.
5. The student is given the freedom to express himself in comparison to the traditional education, so that the student can ask at any time without his fear, embarrassment, or shame.
6. E-Learning overcomes the problem of the increasing number of students with limited halls and limited capabilities.
7. The student gets continuous learning during the learning process, and provides the student with the process of structural and final evaluation.

#### 4.3. Performance

The developed world seeks to achieve leadership and progress through human development (Malkawi, 2016), and considered it a basis for developing the capabilities and creativity of individuals and increasing their productivity, to form a social fabric whose members form an integrated system of various capacities and skills that governments and civil societies alike need. For this, countries concentrate on performance and performance management, which is known as an approach to manage and develop people in a way that improves individual, team, and organizational performance, it is also a process for establishing a shared understanding of what needs to be achieved and how to achieve it (Armstrong, 2009). The education sector is one of the most important keys for development that governments and societies are working to reform, by setting up projects to develop it and improve its outcomes. In the developed world, education reform projects are not only a governmental responsibility, but also a national responsibility and a community partnership presented and shared by various civil society institutions, as they achieve fundamental values for both parties. So achieving the desired individuals, learning outcomes makes them able in business and developing these institutions. The success of educational reform projects and the achievement of their goals persuade governments to pursue work on these projects. On the other hand, the participation of governmental and civil institutions in reform projects in education directly, contribute to their understanding and coexistence with the reality of the education sector, which makes them more efficient and practical when proposing solutions to the problems facing it. Several global initiatives have emerged to define the learning outcomes that should be provided for future skills, the result of which was the emergence of the term skills of the twenty-first century which reflected by students' performance acquired through education (Voogt, Fisser, Pareja-Roblin, Tondeur & van Braak, 2013; Kameis, 2018). All of this can motivate these parties to support E-Learning through COVID-19 and after. Jordan universities like these universities are affected by COVID-19 and entering this new educational territory. Therefore (Heitz, Laboissiere, Sanghvi & Sarakatsannisare, 2020) identified practical ways and specific actions that universities could take to help students' performance while learning remotely:

1. Focus on accessibility and equity. Which requires addressing with logistical challenges to ensure that students have access to the basic technology needed to learn. This is done by coordinating

the sharing of available free options, and by working with government and local service providers. E learning in this pandemic also requires dealing with emotional, social, and human needs along with technical issues to enable students to learn.

2. College support. Some ways that Colleges can help:
  - Provide more teaching support.
  - Use social media and online discussions to share best practices by faculty members.
  - Investing in capabilities during the summer.
3. Activate stakeholders.
4. Investing in cybersecurity to ensure continuity of E-learning.

## 5. Previous Studies

Malkawi and Halasa's (2016) study which aimed to know the role electronic social networks in educational process at north Jordan universities. The study found that students use electronic social networks for educational purposes in varying degrees, and recommended the university leaders and professors to merge electronic social networks in learning process (in lectures, exams, etc.), and aware students about the importance of depending on social networks as one of tools of education.

Theoretical study by Stanciu, Mihai and Aleca (2012). The study aimed to investigate the effect of social networks on learning process at higher education in Romania. The study suggested a model for applying Facebook use in higher education processes. The study found that social media has become a student interest in the educational process and have a value in education process.

Wang, Chen and Liang's (2011) study which aimed to know the effects of social media on Students. It found that 45% of the sample spent 6-8 hours a day examining social media, more than 8 hours 23%, 2-4 hours 20%, and less than two hours only 12%. In addition, the results indicated that there is a downside to college students' use of social media.

Al-Dalae (2018) The study aimed to identify the obstacles that faculty members face in using E-Learning at Najran University by using the quantitative descriptive approach through the questionnaire tool. The study revealed a set of difficulties in applying E-Learning such as the type of subject. Some scientific and applied courses need realistic viewing, lack of experience, lack of incentives, students' lack of response, and technical problems related to security and communication.

Ahmed's (2014) study. The study aimed to find out the availability of E-Learning skills for faculty members in colleges of education in Sudanese universities in the state of Khartoum for the academic year (2013/2014). The study concluded that the computer and internet competencies are available in a medium degree, and the planning and evaluation skills are available in high level.

Wang, Shannon and Ross (2013) study, which aimed to know the correlation between the nature of students, self-organized learning, self-technological competence and the educational outcomes in the light of E-learning. The study showed that students with experience in using the E-Learning system had highly effective learning strategies when learning with an E-Learning system, and therefore they had a high psychological motivation towards E-Learning and a high degree of technological self-efficacy in addition to high educational efficiency.

Njenga and Fourie's (2010) study (The myths about e-learning in higher education). This study focuses on the use of E-Learning and the innovations associated with it. It indicates that many researchers are marketing E-Learning by focusing on its adoption as the right thing to do while ignoring the concerns of potential users, and the negative effects on them. It shows also that most technological positivists in the context of higher education are driven by a personal agenda, with the goal of spreading the ideology of

technological positivism among stakeholders. By frequently disseminating and directing E-Learning by them without giving teachers the time and opportunity to explore the risks and rewards of E-Learning in teaching and learning.

## 6. Methodology

### 6.1. Study Objectives

The main objective of the study is to know the effect of E-Learning with all its components on students' performance with all components at Jordanian Universities during COVID-19 through the following minor objectives:

1. Find out the level of E-Learning readiness at Jordanian Universities during COVID-19.
2. Find out the level of students' performance at Jordanian Universities gained from E-Learning during COVID-19.
3. Find out the effect of E-Learning on students' performance at Jordanian Universities.
4. Give recommendations in this regard.

### 6.2. Questions of the Study

1. What is the level of E-Learning readiness at Jordanian Universities during COVID-19?
2. What is the level of students' performance at Jordanian Universities gained from E-Learning during COVID-19?
3. What is the effect of E-Learning on students' performance at Jordanian Universities?

### 6.3. Study Hypothesis

#### *Main hypothesis:*

There is significant positive effect at ( $\alpha \leq 0.05$ ) of E-Learning with all its components on students' performance with all of its components at Jordanian Universities.

#### *Minor hypothesis:*

**P1:** There is significant effect at ( $\alpha \leq 0.05$ ) of technological facilities readiness on students' performance at Jordanian Universities.

**P2:** There is significant effect at ( $\alpha \leq 0.05$ ) of Electronic applications readiness on students' performance at Jordanian Universities.

**P3:** There is significant effect at ( $\alpha \leq 0.05$ ) of databases & E-resources readiness on students' performance at Jordanian Universities.

**P4:** There is significant effect at ( $\alpha \leq 0.05$ ) of People readiness on students' performance at Jordanian Universities.

**P5:** There is significant effect at ( $\alpha \leq 0.05$ ) of Organizational environment readiness on students' performance at Jordanian Universities.

**P6:** There is significant effect at ( $\alpha \leq 0.05$ ) of Legislations and regulations readiness on students' performance at Jordanian Universities.

**P7:** There is significant effect at ( $\alpha \leq 0.05$ ) of E-Learning management system readiness on students' performance at Jordanian Universities.

**P8:** There is significant effect at ( $\alpha \leq 0.05$ ) of Evaluation system readiness on students' performance at Jordanian Universities.

**P9:** There is significant effect at ( $\alpha \leq 0.05$ ) of teaching methods diversifying on students’ performance at Jordanian Universities.

**P10:** There is significant effect at ( $\alpha \leq 0.05$ ) of Educational curricula and Electronic content readiness on students’ performance at Jordanian Universities.

#### 6.4. Study Model

Figure 1 shows the study model (dependent and independent variables).

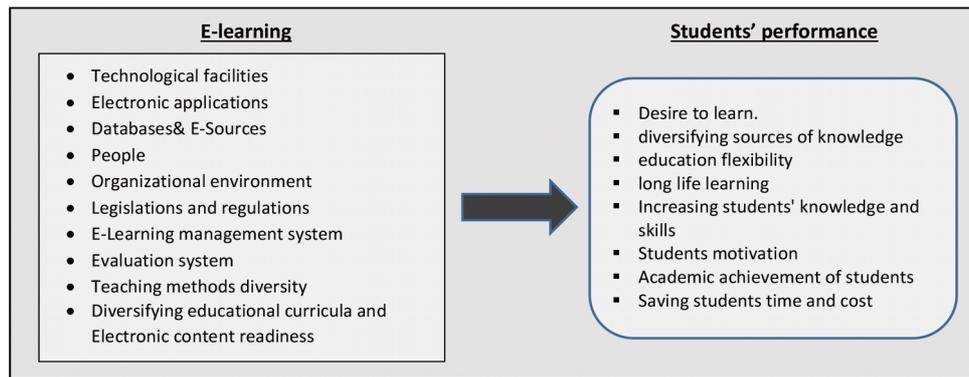


Figure 1. Study model

#### 6.5. Data Collection

Depending on Malkawi, Obeidat and Halasa (2017), Scott (2020), Guelfi et al. (2012), Malkawi and Al-Omari (2020), Unis (n.d.), Malkawi (2018b), Alraja and Malkawi (2015), Al-Gharaibeh and Malkawi (2013), Malkawi, Mohailan, Malkawi and Malkawi (2021) and others; researchers defined variables and developed questionnaire for the study. The questionnaire examined for face and content validity by faculty members from Jordanian universities whose major computer science, education, and involved in E-Learning process. The Likert scale (1-5) used for measuring sample responses.

#### 6.6. Data Analysis

This study aimed to examine the effect of E-Learning on students’ performance. This study predicts that E-Learning variables have effect on students’ performance. For this several analyses achieved, these analyses explained in the next sections below.

##### 6.6.1. Descriptive Statistics

Table 1 below shows demographic variables for the study sample.

Variables	Frequency	Percent
Gender		
Male	455	52.30%
Female	415	47.70%
Total	870	100%
Education level		
Under graduate studies	780	89.65%
Postgraduate studies	90	10.35%
Total	870	100%

Table 1. Demographic variables n (870)

Mean and standard deviation values for the study variables E-Learning and students' performance and all their components appear in Table 2. Where the mean is considered as low if it is  $<2.34$ , moderate if  $\geq 2.34$  and  $\leq 3.67$ , and high if  $>3.67$ . Having this in mind, the E-Learning as a whole is assessed in a moderate level with arithmetic mean (3.10) and in term of all its components. In addition, students' performance as a whole is assessed in a moderate level also with arithmetic mean (2.87) and in term of all its components. Table 2 shows this in detail.

Main variable	Sub variables	Mean	Standard deviation
E-learning	Technological facilities readiness	3.24	0.78
	Electronic applications readiness	3.16	0.69
	Databases& E-resources readiness	3.21	0.73
	People readiness	2.71	0.73
	Organizational environment readiness	3.15	0.56
	Legislations and regulations readiness	2.72	0.58
	E-Learning management system readiness	2.92	0.81
	Evaluation system readiness	3.08	0.78
	Teaching methods diversity	2.83	0.83
	Educational curricula and Electronic content readiness	3.10	0.61
Average		<b>3.10</b>	<b>0.68</b>
Students' performance	Desire to learn.	2.98	0.67
	Diversifying sources of knowledge	2.63	0.46
	Education flexibility	3.12	0.58
	Long life learning	3.24	0.73
	Increasing students' knowledge and skills	2.51	0.81
	Students motivation	2.74	0.86
	Academic achievement of students	2.61	0.74
	Saving students time and cost	3.12	0.86
Average		<b>2.87</b>	<b>0.54</b>

Table 1. Mean and standard deviation of the variables

Before regression analysis, researchers examined the internal consistency of the variables by estimating the Cronbach's Alpha to confirm the data quality. The values appear in Table 3 are (0.78) for E-Learning, (0.810) for students' performance, and (0.84) for the total instrument, which are above the value (0.70). These figures confirm that our data can be used safely in regression analyses and testing hypotheses.

Variable name	Cronbach's alpha
E-learning	0.78
Students' performance	0.81
Total	0.84

Table 3. Cronbach's alpha

### 6.6.2. Hypotheses Testing

To test the study hypotheses, the researchers tested the normal distribution for the data, results of analysis of the Kolmogorov-Smirnov test showed that all study data are subject to the normal distribution where the significance values for all variables were more than 5% and Table 4 shows that.

Variable	Kolmogorov-Smirnov value	Degrees of freedom	Sig.
E-learning	0.083	970	0.120
Students' performance	0.086	970	0.160

Table 4. Test the value of Kolmogorov-Smirnov for distribute data

To test study hypotheses, we run models below. Firstly, researchers test the main hypothesis; it appears that there is a significant relationship and effect between E-Learning as a whole and students' performance. At the second model, researchers investigate the effect of each E-Learning component on students' performance.

Table 5, indicates that E-Learning as a whole explains about 0.53 ( $R^2=0.53$ ) of the variance in the students' performance, (F) sign at ( $p<0.00$ ). This indicates that E-Learning have a significant effect on students' performance. Moreover, indicates that the there is a positive relationship between E-Learning and students' performance at  $P<0.01$ . Therefore the main hypothesis in our study is accepted. It suggests that when E-Learning increases, students' performance increase.

Model	F-test	r	R <sup>2</sup>	(Beta)	t	Sig.
1(constant)					6.197	0.000
Overall E-Learning	11.37**	0.73	0.53	0.537	4.514	0.001

\*\* signifies significant at 0.01

Dependent variable: Students' performance

Table 5. Simple regression results between E-Learning as a whole and Students' performance

The results of the second model, examined the effect of each component of E-Learning on Students' performance, as it is shown in Table 6. F-test significant at ( $p < 0.01$ ), which indicates that E-Learning components **jointly** are significant. Moreover, the study model explained (0.53) of students' performance as shown by  $R^2$  value. For E-Learning components **individually**, by taking the absolute value of ( $\beta$ ) and looking at the rest of the values, the results of Table 6 show:

1. There is a significant effect at ( $\alpha\leq 0.01$ ) of the Technological facilities readiness in Jordanian universities on students' performance, where the value of ( $\beta$ , T) (0.237, 0.154) respectively, and statistically significant at Significance level (0.01), which means acceptance of the first sub-hypothesis.
2. There is a significant effect at ( $\alpha\leq 0.01$ ) of the Electronic applications readiness in Jordanian universities on students' performance, where the value of ( $\beta$ , T) (0.804, 1.681) respectively, and statistically significant at Significance level (0.01), which means acceptance of the second sub-hypothesis.
3. There is a significant effect at ( $\alpha\leq 0.01$ ) of the Databases& E-resources readiness in Jordanian universities on students' performance, where the value of ( $\beta$ , T) (0.337, 0.950) respectively, and statistically significant at Significance level (0.01), which means acceptance of the third sub-hypothesis.
4. There is a significant effect at ( $\alpha\leq 0.01$ ) of the People readiness in Jordanian universities on students' performance, where the value of ( $\beta$ , T) (0.618, 0.167) respectively, and statistically significant at Significance level (0.01), which means acceptance of the 4<sup>th</sup> sub-hypothesis.
5. There is no significant effect at ( $\alpha\leq 0.05$ ) of the organizational environment readiness in Jordanian universities on students' performance, where the value of ( $\beta$ , T) (0.426, 2.614) respectively, and are not significant at ( $\alpha\leq 0.05$ ), this suggests that any increases in organizational environment readiness has no corresponding increases in students' performance. Accordingly, we reject the 5<sup>th</sup> sub-hypothesis.
6. There is no significant effect at ( $\alpha\leq 0.05$ ) of the Legislations and regulations readiness in Jordanian universities on students' performance, where the value of ( $\beta$ , T) (-0.437, 4.189) respectively, and are not significant at ( $\alpha\leq 0.05$ ), this suggests that any increases in Legislations and

regulations readiness has no corresponding increases in students' performance. Accordingly, we reject the 6<sup>th</sup> sub-hypothesis.

7. There is a significant effect at ( $\alpha \leq 0.01$ ) of the E-Learning management system readiness in Jordanian universities on students' performance, where the value of ( $\beta$ , T) (0.572, 1.492) respectively, and statistically significant at Significance level (0.01), which means acceptance of the 7<sup>th</sup> sub-hypothesis.
8. There is a significant effect at ( $\alpha \leq 0.01$ ) of the Evaluation system readiness in Jordanian universities on students' performance, where the value of ( $\beta$ , T) (0.138, 1.149) respectively, and statistically significant at Significance level (0.01), which means acceptance of the 8<sup>th</sup> sub-hypothesis.
9. There is a significant effect at ( $\alpha \leq 0.01$ ) of the Teaching methods diversity readiness in Jordanian universities on students' performance, where the value of ( $\beta$ , T) (0.818, 0.876) respectively, and statistically significant at Significance level (0.01), which means acceptance of the 9<sup>th</sup> sub-hypothesis.
10. There is a significant effect at ( $\alpha \leq 0.01$ ) of the Educational curricula and Electronic content readiness in Jordanian universities on students' performance, where the value of ( $\beta$ , T) (0.327, 0.634) respectively, and statistically significant at Significance level (0.01), which means acceptance of the 10<sup>th</sup> sub-hypothesis.

Variables (Independent)	$\beta$	T	T Sig.	R	R Square	F	F Sig.
(Regression constant)	0.296	1.665	0.000	0.73	0.532	34.61	0.001
Technological facilities readiness	-0.237	0.554	0.001				
Electronic applications readiness	0.804	1.681	0.000				
Databases& E-resources readiness	0.337	0.950	0.001				
People readiness	0.618	0.167	0.000				
Organizational environment readiness	0.426	2.614	0.110				
Legislations and regulations readiness	-0.437	4.189	0.141				
E-Learning management system readiness	0.572	1.492	0.000				
Evaluation system readiness	0.138	1.149	0.001				
Teaching methods diversity	0.818	0.876	0.000				
Educational curricula and Electronic content readiness	0.327	0.634	0.001				

\*\* signifies significant at 0.01

Dependent Variable: Students' performance

Table 6. Multiple regression between each dimension of E-Learning and the Students' performance as a whole.

## 7. Results

The main results of the study are:

1. There is moderate level of E-Learning in Business Colleges-Jordanian universities; all E-Learning components also came in a moderate level.
2. The level of students' performance in Business Colleges-Jordanian universities also moderate.
3. E-Learning as a whole has a positive significant effect at ( $\alpha \leq 0.05$ ) on students' performance at Jordanian universities.
4. There is a significant effect at ( $\alpha \leq 0.05$ ) of E-Learning components (Technological facilities readiness, Electronic applications readiness, Databases& E-resources readiness, People readiness, E-Learning management system readiness, Evaluation system readiness, Teaching methods diversity, Educational curricula and Electronic content readiness) separately on students'

performance at Jordanian universities, whereas organizational environment readiness, legislations and regulations readiness have no effect.

## 8. Discussion and Recommendations

We believe that Jordanian universities now a days realize the necessity and role of E-Learning specially during COVID-19 crises where educational institutions closed to keep social distance to avoid spread of the virus. So Jordanian universities going to remote learning without preplanning, this research studied the level and reality of E-Learning in these universities and its effect in students' performance from students' point view at these universities. Therefore, good alignment and clear understanding of E-Learning for students' performance is necessary to overcome the deficiencies and exploit the potential benefits for Jordanian universities especially during crisis like COVID-19 crises.

Researchers examined in this paper the effect of E-Learning with its components on students' performance in Jordanian universities. We presented that an initial implementation of E-Learning in these universities and other educational institutions is seen as an important step to support students' performance during online learning during this crisis. The study results indicate that E-Learning used with moderate level at Jordanian universities, students' performance also moderate. There is a positive relationship and effect of E-Learning on students' performance. In addition, E-Learning dimensions (Technological facilities readiness, Electronic applications readiness, Databases& E-resources readiness, People readiness E-Learning management system readiness, evaluation system readiness, teaching methods diversity, Educational curricula and Electronic content readiness) have a significant positive effect on students' performance. These results indicate that Jordanian universities still do not have enough aware of the benefits of E-Learning and students' performance which can be obtained once they concerning E-learning.

Therefore, the first implication of the study is that E-Learning is the main method to achieve students' performance in all its components during crises, especially the COVID-19 crisis. This facilitates the adoption of E-Learning in education during and after the crisis. Second, due to the benefits expected from E-Learning and its positive effect, it makes adopting E-Learning as a necessary option, and Jordanian universities must transform these opportunities into reality and maximize the use of available E-Learning tools and enhance their role in achieving students' performance. Third, due to the survival, health conditions, and requirements for social distance during this pandemic, Jordanian universities must realize that adopting E-Learning for achieving students' performance will help them in dealing with this crisis and others.

From all of the above, researchers say that; originality of the study stems from studying important problem specially during COVID-19, which is whether good dealing with E-Learning adoption can affect students' performance. Therefore, it is unique in its correlation and analysis of E-Learning and students' performance in an important educational sector in Jordan, which is Jordanian universities.

In light of the above researchers recommended Jordanian universities management to concentrate on developing E-Learning because still it needs more attention as indicated in the moderate level (3.10). Also, give more attention to students' performance, which needs reinforcement because it is the main output of the educational process and comes in a moderate level in this study with mean (2.87).

## 9. Future Research Directions

Following our study, future research can be conducted in Jordan universities to measure their progress in E-learning, and for other educational institutions such as schools. To determine the level of E-Learning adoption they have, with the same variables or others, and their effects.

## 10. Limitations of the Study

1. Difficulty of reaching students during Quarantine.
2. Difficulty of reaching academic leaders and doctors during Quarantine.

3. Cost of the research because it is self-financed.
4. Lack of studies on the effects of E-Learning during the Corona pandemic.

### Authors Contribution

Nazem Malkawi was the main leader of the study, who organized the study and distributed roles and tasks, he is also formulated the study methodology (importance, objectives, questions... of the study). Mohailan gathered literature review, previous studies about E-Learning and students' performance. All the authors gathered primary information from business colleges' students at Jordanian universities, also contribute in building the study tool and analysing data content, and then come up with implications and recommendations.

### Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### Funding

There is no funding for this paper. It is self-funding by authors. Therefore, there is no financial, professional, and personal interest arisen from applications of our research.

### References

- Ahmed, O. (2014). *The availability of E-Learning competencies for faculty members in colleges of education in Sudanese universities*. Doctoral Theses. Alzaiem Alazhari University. Sudan.
- Alnajjar, F., Noor, M., Al-Ahmad, N., & Issa, S. (2010). The global financial crisis and its impact on the financial sector in Jordan: applied study on financial companies listed in Amman stock exchange. *Journal of International Finance and Economics*, 10(1), 87-99.
- Al-Dalae, Z.A.A.S. (2018). Impediments to the Use of E-Learning from the Point of View of Faculty Members at Najran University. *The Arab Journal of Quality Assurance in Higher Education*, 11(36), 153-173. <https://doi.org/10.20428/AJQAHE.11.36.7>
- Al-Gharaibeh, S.M., & Malkawi, N.M. (2013). The impact of management information systems on the performance of governmental organizations-Study at Jordanian ministry of planning. *International Journal of Business and Social Science*, 4(17), 101-109. Available at: [https://ijbssnet.com/journals/Vol\\_4\\_No\\_17\\_Special\\_Issue\\_December\\_2013/13.pdf](https://ijbssnet.com/journals/Vol_4_No_17_Special_Issue_December_2013/13.pdf)
- Alhabeeb, A., & Rowley, J. (2017). Critical success factors for eLearning in Saudi Arabian universities. *International Journal of Educational Management*, 31(2), 131-147. <https://doi.org/10.1108/IJEM-01-2016-0006>
- Alraja, M.N., & Malkawi, N.M. (2015). E-business adoption in banking sector: Empirical study. *Indian Journal of Science and Technology*, 8(27), 1-5. <https://doi.org/10.17485/ijst/2015/v8i27/70739>
- Al-Sultani, H.H. (2011). The Concept of Teaching. Available at: <https://www.uobabylon.edu.iq> (Accessed: September 2020).
- Armstrong, M. (2009). *Armstrong's handbook of performance management: An evidence-based guide to delivering high performance*. Kogan Page Publishers. Available at: <https://www.koganpage.com/product/armstrong-s-handbook-of-performance-management-9780749481209>
- Attia, M.A. (2013). Modern Curricula and Teaching Methods (first ed.) (260-261). Amman-Jordan: Dar Al-Amanaheg for Publishing and Distribution. <https://produccioncientificaluz.org/index.php/opcion/article/view/31034>

- Banihani, J., Al-Ahmad, N.M., & Alnajjar, F.J. (2009). *The impact of management information systems on organizations performance: Field study at Jordanian universities*. Available at: <https://www.academia.edu/37807145/>
- Ellis, R.A., Ginns, P., & Piggott, L. (2009). E-learning in higher education: some key aspects and their relationship to approaches to study. *Higher Education Research & Development*, 28(3), 303-318. Available at: <https://www.tandfonline.com/doi/full/10.1080/07294360902839909>  
<https://doi.org/10.1080/07294360902839909>
- Guelfi, A., Pontes, E., & Kofuji, S. (Eds.) (2012). *E-Learning: Organizational Infrastructure and Tools for Specific Areas*. BoD-Books on Demand. <https://doi.org/10.5772/2466>
- Heitz, C., Laboissiere, M., Sanghvi, S., & Sarakatsannis, J. (2020). *Getting the next phase of remote learning right in higher education*. Washington, DC: McKinsey & Company. Available at: <https://economictimes.indiatimes.com/definition/e-learning>. Accessed 30-9-2020  
<https://www.nawa3em.com/%D8%AA%D9%83%D9%86%D9%88%D9%84%D9%88%D8%AC%D9%8A%D8%A7/158970/%D8%A8%D8%AD%D8%AB-%D8%B9%D9%86>
- Illanes, P., Law, J., Mendy, A., Sanghvi, S., & Sarakatsannis, J. (2020). *Coronavirus and the campus: How can US higher education organize to respond*. McKinsey Insights. <https://www.mckinsey.com/industries/public-sector/our-insights/coronavirus-and-the-campus-how-can-us-higher-education-organize-to-respond>
- Khamis, S. (2018). Skills of the 21st Century: A Framework for the Future. *Journal of Childhood and Development*, 8(31),149-163.
- Khdour, T., & Salem, S. (2014). The effect of integrated knowledge management with E-learning systems. *Conference of the American Society for Engineering Education*. <https://doi.org/10.13140/2.1.4885.6321>
- Malhas, D.E., & Moussa, O.S. (2008). *Educational innovations*. Dar Wael for Publishing. Amman, Jordan.
- Malkawi, N. (2016). Executing Knowledge Management 2.0 (KM 2.0) through Web 2.0-Applied Study at Jordanian Insurance Companies. *International Journal of Business and Social Science*, 7(10), [https://www.ijbssnet.com/journals/Vol\\_7\\_No\\_10\\_October\\_2016/16.pdf](https://www.ijbssnet.com/journals/Vol_7_No_10_October_2016/16.pdf)
- Malkawi, N. (2017). Enhancing Entrepreneurship through E-Commerce Adoption-Applied Study at Small Companies, Irbid, Jordan. *International Journal of Research in Management, Economics and Commerce*, 7(1). Available at: [http://www.indusedu.org/pdfs/IJRMEC/IJRMEC\\_1049\\_69037.pdf](http://www.indusedu.org/pdfs/IJRMEC/IJRMEC_1049_69037.pdf)
- Malkawi, N. (2018a). Using electronic human resource management for organizational excellence-case study at social security corporation-Jordan. *International Journal of Engineering Technologies and Management Research*, 5(5), 146-166, <https://doi.org/10.29121/ijetmr.v5.i5.2018.237>
- Malkawi, N. (2018b). How to Improve Decision Making Process through Decision Support Systems & Business Intelligence: Evidence from Jordan University Hospital. *Journal of Economic & Management Perspectives*, 12(2), 255-265. Available at: <https://www.researchgate.net/profile/Nazem-Malkawi/publication/336578822>
- Malkawi, N., Mohailan, M., Malkawi, A.N., & Malkawi, R.N. (2021). Leadership and decision making in cases of uncertainty and risks-the coronavirus (covid-19) crisis. *International Journal of Engineering Technologies and Management Research*, 8(8), 52-74. <https://doi.org/10.29121/ijetmr.v8.i8.2021.966>
- Malkawi, N., Obeidat, A.M., & Halasa, A. (2017). Achieving Performance Excellence through Cloud Computing Atmosphere-Applied Study at Zain Telecommunications Company-Jordan. *International Review of Management and Business Research*, 6(1), 229 Available at: <https://www.irmbrjournal.com/papers/1487595353.pdf>

- Malkawi, N., & Al-Omari, K. (2020). The Role of Organizational Justice in Managing Organizational Conflict - Case Study at Jordanian Marseilles company for Real Estate Investments/Irbid City Center-Irbid-Jordan. *International Journal of Research in Engineering, IT and Social Sciences*, 10(7), 43-56. Available at: <https://www.academia.edu/43678899/>
- Malkawi, N., & Halasa, A. (2016). Exploiting electronic social networks in educational process: Study at Universities in Irbid State-Jordan. *Journal of Education & Social Policy*, 3(5), 96-105. Available at: [https://www.jespnet.com/journals/Vol\\_3\\_No\\_5\\_November\\_2016/10.pdf](https://www.jespnet.com/journals/Vol_3_No_5_November_2016/10.pdf)
- Mayer, R., & Mayer, R.E. (Eds.) (2005). *The Cambridge handbook of multimedia learning*. Cambridge university press. <https://doi.org/10.1017/CBO9780511816819>
- Mckinsey Global Institute, (2020). [https://www.mckinsey.com/~media/mckinsey/about%20us/covid%20response%20center/overview/covid-19%20education%20response%20toolkit/202010\\_unesco-mckinsey%20response%20toolkit\\_remote%20learning%20strategy\\_vf.pdf](https://www.mckinsey.com/~media/mckinsey/about%20us/covid%20response%20center/overview/covid-19%20education%20response%20toolkit/202010_unesco-mckinsey%20response%20toolkit_remote%20learning%20strategy_vf.pdf)
- Moreno, R., & Mayer, R.E. (1999). Cognitive principles of multimedia learning: The role of modality and contiguity. *Journal of Educational Psychology*, 91(2), 358. <https://doi.org/10.1037/0022-0663.91.2.358>
- Nedha (2011). *Difference between Education and Training*. Available at: <https://www.differencebetween.com> (Accessed: December 2019).
- Njenga, J.K., & Fourie, L.C.H. (2010). The myths about e-learning in higher education. *British Journal of Educational Technology*, 41(2), 199-212. Available at: <https://bera-journals.onlinelibrary.wiley.com/doi/abs/10.1111/j.1467-8535.2008.00910.x> <https://doi.org/10.1111/j.1467-8535.2008.00910.x>
- QS (2020). What Opportunities and Challenges Does Online Learning Present to the Admissions Office During COVID-19 and Beyond? Available at: <https://www.qs.com/how-universities-are-embracing-online-learning-during-the-coronavirus-outbreak/> (Accessed: May 2020).
- Sangrà, A., Vlachopoulos, D., & Cabrera, N. (2012). Building an inclusive definition of e-learning: An approach to the conceptual framework. *International Review of Research in Open and Distributed Learning*, 13(2), 145-159. <https://doi.org/10.19173/irrodl.v13i2.1161>
- Scott, G. (2020). *Change matters: Making a difference in education and training*. Routledge. <https://doi.org/10.4324/9781003115137>
- Stanciu, A., Mihai, F., & Aleca, O. (2012). Social networking as an alternative environment for education. *Accounting & Management Information Systems/Contabilitate si Informatica de Gestiune*, 11(1). Available at: <https://ideas.repec.org/a/ami/journal/v11y2012i1p56-75.html>
- Voogt, J., Fisser, P., Pareja-Roblin, N., Tondeur, J., & van Braak, J. (2013). Technological pedagogical content knowledge—a review of the literature. *Journal of Computer Assisted Learning*, 29(2), 109-121. <https://doi.org/10.1111/j.1365-2729.2012.00487.x>
- Unis (n.d.). Available at: <https://www.unesco.com> (Accessed: May 2020).
- Urh, M., Vukovic, G., & Jereb, E. (2015). The model for introduction of gamification into E-Learning in higher education. *Procedia-Social and Behavioral Sciences*, 197, 388-397. Available at: <https://www.sciencedirect.com/science/article/pii/S1877042815041555> <https://doi.org/10.1016/j.sbspro.2015.07.154>
- Wang, C.H., Shannon, D.M., & Ross, M.E. (2013). Students' characteristics, self-regulated learning, technology self-efficacy, and course outcomes in online learning. *Distance Education*, 34(3), 302-323, <https://doi.org/10.1080/01587919.2013.835779>

Wang, Q., Chen, W., & Liang, Y. (2011). The effects of social media on college students. *MBA Student Scholarship*, 5, 1-12. Available at: [http://scholarsarchive.jwu.edu/mba\\_student/5](http://scholarsarchive.jwu.edu/mba_student/5)

World Economic Forum (2016). Reports. Available at: <https://www.weforum.org/reports/>

## Appendix 1

Survey Taken by Students

#	Variable	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	The university has advanced digital infrastructure for e-learning					
2	The university has advanced communication network for e-learning					
3	The university is constantly updating E-Learning technologies and networks					
<b>Technologies facilities</b>						
4	The university has advanced applications for e-learning					
5	Applications are available to everyone concerned with e-learning					
6	Electronic applications are easy to use					
7	Electronic applications are confidential and secure					
<b>Electronic applications</b>						
8	The university has a variety of databases and electronic resources that serve e-learning					
9	The available electronic content meets requirements of E-Learning					
10	The electronic content is constantly updated					
11	The electronic content is easily accessed					
<b>Databases and E-sources</b>						
12	Faculty members have sufficient experience to deal with e-learning					
13	Students have sufficient capabilities to deal with e-learning					
14	The university trains faculty members and students to deal with e-learning					
<b>People</b>						
15	The university's organizational environment facilitates the E-Learning					
16	The university's senior management supports E-Learning					
17	The prevailing organizational culture at the university encourages e-learning					
<b>Organizational environment</b>						
18	Laws and legislations support e-learning					
19	The university sets policies and procedures that facilitate e-learning					
20	E-Learning policies and procedures are constantly updated					
<b>Legislations and regulations</b>						
21	The university has a comprehensive E-Learning management system (registration, accounting, ...)					
22	All components of the E-Learning management system are integrated with each other					
23	The E-Learning management system is easy to use					

<b>E-Learning management system</b>						
24	The university has a system to evaluate students electronically					
25	Evaluation system used provides a variety of methods to evaluate students					
26	The evaluation system used allows students to be evaluated fairly					
<b>Evaluation system</b>						
27	E-Learning enables diversification of teaching methods					
28	The teaching methods used suit students' orientations					
29	The teaching methods used encourage students to e-learning					
30	E-Learning facilitates moving between one teaching method and another					
<b>Teaching methods diversity</b>						
31	The university has sufficient curricula and content for e-learning					
32	Curricula and available electronic content are varied					
33	Easily access to the curriculum and electronic content					
34	The university is constantly updating curricula and electronic content					
<b>Diversifying educational curricula and Electronic content readiness</b>						
35	Desire to learn.					
36	Diversifying sources of knowledge					
37	Education flexibility					
38	Long life learning					
39	Increasing students' knowledge and skills					
40	Students motivation					
41	Academic achievement of students					
42	Saving students time and cost					
<b>Students' Performance</b>						

Published by OmniaScience ([www.omniascience.com](http://www.omniascience.com))Journal of Technology and Science Education, 2022 ([www.jotse.org](http://www.jotse.org))

Article's contents are provided on an Attribution-Non Commercial 4.0 Creative commons International License.

Readers are allowed to copy, distribute and communicate article's contents, provided the author's and JOTSE journal's names are included. It must not be used for commercial purposes. To see the complete licence contents, please visit <https://creativecommons.org/licenses/by-nc/4.0/>.