THE IMPACT OF E-LEARNING IMPLEMENTATION DURING COVID-19

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***ABSTRACT*:** *Universities and educational institutions were forced to close as a result of the COVID-19 pandemic, which had a significant impact on education. Saudi Arabia established itself as a pioneer during COVID-19 by instituting preliminary restrictions such as lockdowns and absolute bans. The Education Ministry made a concerted effort to deal with the repercussions of these developments as quickly as possible by implementing E-learning. the purpose of this research is to investigate the impact of E-learning on the learner's outcomes during COVID-19 by conducting an analysis of the responses obtained from computer science students. The present study used a survey method by the use self-administered online questionnaire using a five-point Likert scale. The participants of the present attempt were 102 Computer science students from a public university. The acquired data was examined, and the results were compared to those found in the literature. The primary factors that have been impacted by this shift are discussed. Findings indicated that E-learning impacted positively on the learning process whereas some constraints were also identified.*

Keywords: E-Learning; Online learning: Covid-19: Challenges

1. INTRODUCTION

It is impossible to overstate the magnitude of information technology's impact on various facets of our lives today, nor can it be denied that it is becoming increasingly popular and widely used in the educational sector [1]. This function in the educational sector has received even more significance in the context of the present Covid-19 pandemic, which has forced all academic institutions and universities to close, resulting in a slew of issues at all phases and educational levels, and primarily for learners [2]. Growing emerging technologies and learning resources, which are being used for both classroom instruction, and assessment have made significant strides forward, providing a workable solution for educators and providing policymakers with an attempt to enhance the use of digital technologies during isolation days in order to accomplish course requirements [3]. All of the major stakeholders, together with educational supervisors, instructors, learners, and others, are putting forth substantial effort to make the best use of the technology available to them in order to continue the learning system while also reducing the gap that exists that will inevitably arise as a result of the present situation [4-6].

There have been a number of studies [7, 8] conducted to determine the significance and effectiveness of e-learning adoption. It is being promoted as a teaching approach by a large number of universities throughout the world, and it is universally regarded as effective by students [9-11]. For its general acceptability, there are a variety of factors to consider; a few that are particularly relevant in the case of learners are its simplicity of use, adaptability, and complete control over the educational process. But even with its numerous benefits, there are a number of drawbacks to e-learning, such as the notion of social alienation, an absence of student engagement, and networking challenges, among other things [12].

Saudi Arabia, being the biggest consumer and market in the Middle East, has recently seen a significant increase in the number of students enrolled in higher education and distance learning programs. Higher education has seen significant expansion in the previous five years towards the implementation of E-learning. The shift to e-learning appears to be occurring quickly and with great force. E-learning is not in infancy[13-15]. A number of projects have been launched in the Kingdom of Saudi Arabia to bring E-learning to the country (KSA). The activities listed above include a training session and government initiatives on the subject, short-term and long coursework for concerned stakeholders, the formation of E-learning components in educational institutions and education providers, the foundation of the National Center for online learning, and the initiate of regional E-learning initiatives with the goal of achieving national certification in E-learning [16]. The following figure displays the E-learning impact in the gulf of KSA.

Figure 1. Impact of E-Learning in GCC Source: [17]

The world is currently experiencing the worst of all pandemics in history – the Covid-19. Things have been going awry, and it has been a difficult decision for the entire world to adhere to their regular schedules and habits. It is impressive to see how the Saudi Government has managed to keep its education programs running smoothly during such a difficult period. There were numerous initiatives implemented by the management and the education ministry to assure that students' normal educational activities are not impeded in the pursuit of their degrees.

2. LITERATURE REVIEW

While colleges and educational institutions all around the world were shut down during the COVID-19 outbreak, it revealed a quick shift away from face-to-face instruction and toward online instruction, which is available in two modes of interaction: asynchronous and synchronous [18]. Students' engagement and interactivity are enhanced by synchronous education, which increases the human connection between an instructor and a student. Synchronous teaching is focused on technology that does not require significant and real-time interaction among instructors and students, such as electronic

mail, video recording, discussion boards, and other similar tools. Asynchronous learning environments are provided by the majority of online education programs, which contain a flexible functional learning system [18].

The E-learning situation is different in the Middle East, where many underdeveloped countries in the region, like Egypt, have limited access to formal learning management systems (LMS), which are used for remote development and educational communication [19]. Many organizations were compelled to explore alternatives in free communication tools, such as Zoom, Microsoft Teams, and Google Classroom, or in social media platforms, such as WhatsApp, Facebook, and YouTube, in order to remain competitive. An investigation was decided to carry out a study in order to find out how much students and instructors depend on informal platforms and social media to keep academic interaction going in developing nations [19]. To gain responses from faculty members and students from nine educational institutions, the researchers used surveys and in-depth interviews to gather information. The findings revealed that the right use of these channels might create a new generation of social e-learning and that social networks can be implemented effectively to produce a pleasant learning process for those who participate in them. During the COVID-19 pandemic, additional research was carried out in Jordan to assess the use of distant e-learning amongst medical students learners [20]. According to the findings of the study, there are potential obstacles and constraints in medical education when delivering educational material and clinical practice via sequential online streaming sessions backed by innovative communication technologies. It was revealed through the qualitative research that cutting-edge technologies and social networking sites portray novel teaching method methods and may prove to be the most effective solution for preserving the learning system in exceptional and crisis situations like the COVID-19 pandemic. Nevertheless, portraying instructional materials to classes utilizing instantaneous streaming video techniques may prove to be the most challenging task for learners as nearly 69 percent of the students in the investigation asserted that it was the most difficult challenge for them considering the quality and coverage of the online platform [20].

In order to maintain the continuity of the educational process in Saudi Arabia, the Ministry of Education devised a stopgap policy to regulate and aid online learning for all educational institutions. Similarly, the Ministry of Education extensively monitored the learning system in public education, using virtual learning portals to support online education and richer digital materials, including (Vschool.sa), and that is the official online schooling network in KSA [21]. Furthermore, many of the lectures for most of the learners' levels being made accessible intermittently on the Ain channel, which was televised on Arabsat and YouTube [21]. Universities and colleges and universities, on the other hand, have indeed been granted greater autonomy in terms of managing instructional activities. However, the Ministry of Education (MOE) devised many measures and procedures to protect students' education, future opportunities, and accumulated grade [22, 23]. Presently, most academic institutions make use of e-learning platforms powered by Blackboard, which is one of the most widely utilized systems in the world. Through the use of dependable communication tools, this method of education made the learning experience more adaptable. University administrators were prepared to achieve various communication barriers between teachers and students as a result of this, and they were able to connect all partners with one another [24, 25].

Khalil, Mansour [18], performed a quantitative investigation the impact of online learning. The findings showed that medical students had a significant level of understanding and endorsement of the procedure. Participants unanimously indicate that online classes save time and that their overall

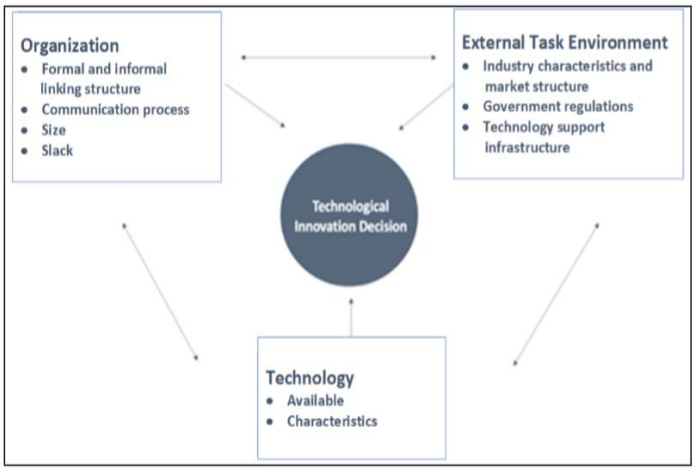

Figure 2: TOE framework. Source: [29]

performance had improved as a result of the added information they had for their classes. The students did, however, report certain difficulties, particularly procedural difficulties, material comprehension difficulties, technological and attitudinal difficulties all through the online classes and assessments, among other things. The students who took part in the study stressed the importance of systematic and periodic monitoring of the fundamentals of the online education paradigm as well as intended learning in order to determine its success.

Rajab, Gazal [26], examined the impact of eradicating the COVID-19 epidemic on the College of Medicine's transition from traditional to online education (COM). The questionnaire was forwarded to selected students and professors, and it was discovered that 41% of participants had little or no knowledge of online learning (and some students had no experience of online learning). As a result, the study's findings were related to several relevant tools and educational processes, included communication, student assessment, internet use, timekeeping, online user experience, and technophobia. Furthermore, online learning has a mostly positive effect at the College of Medicine, Al Faisal University, where respondents' confidence in the efficacy of online education grew on the onset of the Covid-19 break. Likewise, Abdulrahim and Mabrouk [27], conducted a survey to two subgroups of respondents: faculty and learners across many Saudi universities. The questionnaire was created to test the hypothesis and to

evaluate the effectiveness of 4th industrial revolution technologies (4IR), particularly the rise of virtual learning conversion, in mitigating the effects of COVID-19 on tertiary education at Saudi Educational institutions.

Another study was undertaken by Almaghaslah and Alsayari [21] to ascertain academic staff experience with the transition to online learning and the impact of the suspension on academic output. According to an online questionnaire answered by the entire university faculty of pharmacy, KKU's teaching environment was already equipped for the essential digital transition. Additionally, the personnel at the Pharmacy College saw that online instruction is more customizable than the traditional model. Furthermore, a gradual change to an educational setting necessitated some online instructor training offered by the E-Learning Deanship, which also supplied online courses, recorded lectures, and facilitated online debate. Moreover, the results indicated that the transition to e-learning experienced difficulties due to the absence of face-to-face social interaction.

The majority of teachers have encountered difficulties in student engagement directly and in evaluating and assessing participation with authenticity. In conjunction with the prior constraints, this investigation showed a lack of participation at practice rounds and a lack of coverage of all syllabus topics. Additionally, [28] conducted a study that emphasized the administration of the procedure used by health science colleges at (KSAU-HS) to respond to changes in the COVID-19 situation by providing online education. The target groups were formed to establish incident response programs based on the SWOT analysis (strengths, weaknesses, opportunities, and threats); a model approach that emphasized four primary areas: I faculty ability advancement, (ii) curriculum planning, (iii) evaluation reforms, and (iv) technology support infrastructure. The researchers suggested using a framework presented by KSAU-HS as a foundation for implementing online education in health science colleges.

The study uses the TOE framework to examine the primary elements affecting the efficiency of the educational process on computer students in Saudi Arabian universities during the COVID-19 epidemic. Tornatzky and Fleischer pioneered the TOE theoretical framework [29]. The TOE paradigm has been largely integrated into research on technology acceptance. The theory is primarily predicated on three contexts: the environmental factors, the organizational factors, and the technology context, as depicted in Figure 2 and described briefly in earlier studies [29, 30]. As a result, three dimensions of the TOE are developed to indicate influential aspects that may enhance the ability of universities and higher educational institutions to integrate technology.

The review of the research shows that literature lacks the studies that investigated the impact of E-learning on computer students' perception on learning outcomes during the pandemic situation. As a result, the primary research question for this study is: "Does E-learning have an effective impact on the learning process of computer students during the COVID-19 pandemic?"

3. METHODOLOGY

The purpose of this study was to determine the computer science learners' perceptions of the impact of E-Learning. The research used a survey to ascertain learners' perceptions of E-learning. The population of the present attempt is the Common First-Year Students (CFY) of the Computer science major of Majmaah University. The study's participants were computer science students enrolled in the CFY section; CFY is a requirement for getting admission majors at all Saudi Arabian universities. Surveys are a frequently used approach in research projects [31, 32]. A questionnaire was distributed to this researcher in order to accomplish the purpose of the current investigation. The questionnaire assisted the researcher in eliciting information about the learners' perceptions on the aspect of E-learning. The current study sampled 102 learners from the CFY's computer science majors. The table below summarizes the demographics of the investigation.

Table 1: Demographic Illustration of the study

Serial No	Gender	Frequency	Percentage	Major
1	Male	54	53%	Computer Science
2	Female	48	47%	Computer Science
3	Total	102	100	

All universities have implemented remote instruction in response to the spread of COVID-19. Additionally, students in the CFY year were taught online through the use of two software programs recommended by the education ministry and the IT Deanship. As a result, it was critical to assess learners' preferences for e-learning tool utilization. SPSS 22 was utilized to conduct the analysis for this study.

A questionnaire was utilized to collect data for the survey approach. Van Khuc, Pham [33], argues that using a questionnaire is advantageous for conducting research because it allows for the construction of answer patterns that are appropriate for the research and adaptable for statistical measurement purposes. The questionnaire was adapted from prior studies [24, 34] and tailored to the E-Learning learn's setting. Following the questionnaire's design, it was forwarded to professionals for validation of the questionnaire's construct. The questionnaire contained 17 items, 11 of which addressed learners' impressions of E-Learning implementation, 6 of which addressed identified issues, and one of which addressed learners' preference for the program utilized for learning purposes, namely Webex, GoogleZoom and M-LMS. Learners were asked to write their reactions using a Likert scale ranging from strongly agree (5) to strongly disagree (1). All participants received the questionnaire electronically through WhatsApp and Blackboard announcements. Prior to doing the data analysis, the participants' replies were coded and reliability analysis was conducted. The following table summarizes the questionnaire's reliability analysis.

Table 2: Reliability Analysis

Reliability Measures			
	No of Items	Cronbach's AlPha	Remarks
First Part	11	.861	Good Reliability
Second Part	6	.831	Good Reliability
Third Part	1	.892	Good Reliability

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Table. 3: Impact of online Learning Perceptions

SN	Items	SA	A	N	D	SD	M	SD
1.	E-Learning helps to learn greatly	33%	27%	10%	12%	8%	3.3	1.8
2.	E-Learning offers several advantages during online learning	28%	30%	12%	20%	10%	3.1	1.7
3.	E-Learning helps in developing material during online learning	34%	26%	15%	10%	15%	2.4	1.3
4.	E-Learning will become a part of learning in future	14%	32%	14%	21%	19%	3.1	1.4
5.	I enjoy completing my homework and quizzes in an E-Learning setting	39%	21%	10%	10%	20%	3.8	1.7
6.	E-Learning has the potential to replace face-to-face learning	33%	27%	12%	18%	10%	2.7	1.8
7.	E-learning is a good source of information delivery of the course contents	8%	15%	10%	20%	47%	2.8	1.2
8.	E-Learning developed my self-learning	24%	30%	12%	14%	20%	3.7	1.7
9.	E-Learning is a ubiquitous learning	32%	29%	7%	17%	15%	3.3	1.8
10.	E-Learning increased my interaction with other students and teachers	18%	11%	12%	30%	29%	2.9 2.8	1.4
11.	E-Learning facilitates rapid delivery of material to students	30%	22%	12%	20%	16 %	2.9	1.4

4. DATA ANALYSIS

Table 3 shows the impact of E-Learning perceptions of the computer science students. Participants had to mark from strongly agree to strongly disagree

The perspectives of the learners were calculated using SPSS. The use of the Blackboard application, as shown in Table 3, was deemed to be productive. In addition, a significant number (n=33 percent) strongly agreed that E-Learning platforms enhance learning, and a substantial percentage (n=27percent) agreed with this assertion. E-Learning was perceived as ineffectual by a small fraction of learners (n=8 percent strongly disagreed), among male and female learners. The mean (M = 3.3) and standard deviation (1.8) suggested that learners' perceptions were close to an agreement. On the theme of self-learning, it was determined that (n=25 percent) strongly agreed, a relatively smaller proportion (n=30 percent) agreed with this feature, and a relatively large proportion (n=20 percent) disagreed with this element, indicating a significant difference in opinion. The mean (M=2.8) and standard deviation (SD=1.8) were both low, as well. In a similar vein, the student's satisfaction with the timely delivery of information looked to be on par with the average value of the statistics. According to the responses of the learners, (n=61 percent) accepted the notion of E-Learning this thought as strongly agreed, which was followed by (n=29 percent) who agreed. However, the majority of learners (n=29 percent) strongly disagreed with this notion, and the remaining (30 percent) agreed with it just in part.

Table 4. Technical Aspects of E-Learning

SN	Items	SA	A	N	D	SD	M	SD
1.	I am happy with the use of E-Learning tools like BB; Zoom etc	36%	33%	12%	8%	11%	4.1	2.6
2.	In E-learning, instant feedback and chat developed the interaction in various aspects	59%	27%	11%	18%	8%	3.9	2.4
3.	E-Learning toll-like BB covers all my required elements of the online learning process	49%	26%	12%	7%	6%	3.4	2.4
4.	Other E-Learning tools were also integrated for online learning	35%	25%	13%	14%	13%	4.1	2.4
5.	I have E-Learning tools that I need for the virtual learning process including; computers, laptops, or printers	51%	20%	14%	10%	5%	4.1	2.6
6.	I have reliable internet connectivity for online classes	36%	34%	16%	9%	5%	3.7	2.6

Nearly two-thirds of the students (69 percent) agreed or strongly agreed that technical tools such as the BB LMS system met all of their learning needs while participating in E-Learning and 86 percent agreed or strongly agreed on E-learning, instant feedback, and chat developed the interaction in various aspects. Furthermore, more than 60 percent of respondents claimed that they utilized other applications and platforms during online learning in including WhatsApp, Webex, and google meet in the course of material delivery and for other information. Additional technologies were cited by learners for conversation and classroom demonstrations, with approximately 48 percent claiming to have used Zoom, 29 percent claiming to have used Google Meet, and 24 percent claiming to have used Microsoft Teams and Skype. The accessibility of learning instrumentation was not a concern for the majority of students, with approximately 71 percent claiming to have all of the necessary E-Learning resources, such as a personal computer, printing facility, and laptops for the online course during E-learning. It's a similar issue when it comes to internet access; almost 70 percent of the respondents reported that they had a reliable internet connection, which allowed them to participate in the E-learning, submit their assignments and projects, and appear in the tests. Figure 3 displays the tools used during E-Learning.

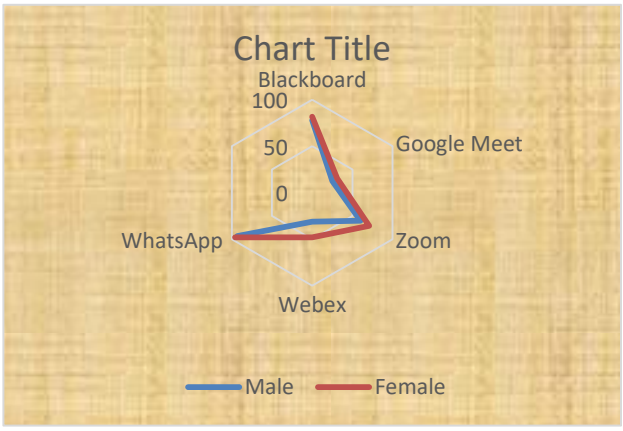

Figure 3. The use of E-learning tools.

5. CONCLUSION

There were no problems with the unexpected move to E-learning, and the present classroom resources were adequate for the quick shift to online education, according to the findings of this research. Communication with peers and instructors was effortless for the respondents, and they reported that they had no trouble coping communication with other students. This has been made possible by the availability and diversity of social networking programs, which allowed learners to reduce the challenges they may have had, particularly during this time period. Between then and now, students' capacity to concentrate and understand was lower than it would be in a typical face-to-face setting, which is most likely influenced by their setting, social standing, and family situations.

E-learning, on the other hand, offers students with a better opportunity to utilize the time between classes to accomplish the tasks that are assigned to them. While presentations proceeded even in distance learning, they did not have a detrimental effect on the presenter's or deliverer's skills; however, the physical location had an impact on the performance and interaction between participants of learning groups. A number of hurdles were encountered during the instructional design application process in topics where practical hours were required, and the advantages of technical experience were not realized. E-learning saves time that would otherwise be spent traveling between home and college or university. It allows the learner additional time to examine topics and concentrate on the assignments and projects that are required, which aids in the improvement of the students' academic achievement; similar findings were discovered in the research conducted by [20]. According to another study, online learning has the benefit of saving time in a variety of ways, which may then be used for a variety of other aspects of learning, such as additional reading and examination preparation [22]. In this study, the majority of respondents shared their prior experience using internet tools prior to the outbreak of the pandemic virus. They actually had an edge over other students because of their previous experience while using an online program in classes. A previous study conducted at a university discovered that students and faculty members required some time to learn the online tools [2], which was later confirmed by the researchers. Since students can attend a lecture more than once, the approach of recording lectures aids in gaining a better understanding and comprehension of scientific information among students. Note-taking and repeating a previous lesson in the instance of a complicated matter or a difficult lecture is thus a straightforward process. Due to this characteristic, online learning is both more effective and versatile than formal classes [27]. The online assessment also focuses on analyzing the awareness and appreciation of the learner by providing conceptual and conversational questions rather than evaluating memory and presentation of the content. The structure of these generally asked to establish the material in the student's mind while requiring the least amount of effort from the student to remember the information, which is rapidly lost by the time the exam is through.

CONCLUSION

The purpose of this study was to assess the efficiency of E-Learning during the COVID-19 epidemic in KSA's higher education institutions. Aside from that, research revealed the most significant problems and difficulties that students faced as a result of the pandemic situation. The author conducted an online survey in order to gather student opinions. The survey's results suggest that the transition to E-learning was a pleasant experience, although there was a learning process to contemplate for future improvements to the entire E-learning experience. Nonetheless, the university's lockdown has had a significant impact on group activities, student achievement, newcomers' orientation, and practical teaching, among many

other things. Additionally, according to the findings of the study, institutions must build a unified structure for the examination procedure, which should include restrictions for accessible topics, examination time, and testing methodologies. This study addressed the main components and their influence on the learning process in intended to facilitate decision-makers at universities in resolving the limits that have been encountered and implementing new approaches in order to enhance the learning environment. The causes and obstacles that have been identified and addressed in this investigation can be helpful for the academic system in Saudi Arabia in order to resolve the problem which has been identified in this study. The findings of this study may also be valuable in improving other processes, like how to organize online teaching materials, a list of preferred online tests, and, most importantly, the development of standard criteria for examinations. The primary research limitation in this study included time constraints, which resulted in just a small number of participants being contacted for participation. Future studies might examine how satisfied faculty members are with E-learning and teaching technologies, as well as how well students perform academically in a remote learning context.

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