Digital Transformation of the Educational Process during the Covid-19 Pandemic

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Abstract: - E-learning has become an inevitable process for educational organizations as it helps an individual to get his or her education regardless of the place of learning, reducing the cost, time, and effort of the education process, especially in crises' occurrence. The theoretical approach was used in this study to collect the required data based on the literature review. The study clarified the significance of e-learning as a feature of the digital transformation process and an integrative, but not full alternative, for face-to-face learning in all the scientific disciplines in the universities, especially clinical disciplines. The study differentiated between e-learning and emergent-remote learning that occurred as an emergent response to the Covid-19 pandemic and confirmed that the pandemic-response migration cannot be equally assessed as much as online education in the ordinary situation. it was differentiated between methods of response to the emergent-remote learning during the Covid-19 pandemic. Also, the study demonstrated the challenges that have faced e-learning during the pandemic and the opportunities provided by the pandemic through e-learning. Finally, a set of suggested solutions was provided in the discussion section. For instance, It is suggested that schools fulfill their civic duty by teaming up with telecommunications firms to provide free or cheap internet access and downloads for students and teachers. Also, colleges and universities need to inspire their students to develop their digital skills so that they can remain competitive in the e-learning market.

Keywords: - Covid-19 pandemic, education, digital transformation, e-learning, emergent-remote learning, challenges, opportunities.

1 Introduction

Covid-19 (Coronavirus disease 2019) is currently a major public health emergency. It is described as a contagious disease caused by SARS-CoV-2, [1]. The disease is caused by a new strain of the coronavirus family. It is transmitted from one human to another by small nose or mouth liquid particles. The World Health Organization (WHO) described the disease as "2019-nCoV", where "n" refers to novel, "Co" to corona, and "V" to the virus. In December 2019, it was reported the first case of Covid-19 in Wuhan city in China. Then, the disease spread throughout the world threatening the health of millions of people. In March 2020, Covid-19 spread in most countries causing 693,220 confirmed cases and 33,390 deaths, and WHO declared Covid-19 as a global pandemic. In addition to the WHO health recommendation of social

distance as a protective means against the disease spread.

A pandemic in general is defined as "an outbreak of a disease that spreads over a wide geographical area and infects a high proportion of people". Globally, to curb the pandemic dissemination, most countries resorted to physical closure in all fields; business, education, sports, and services sectors. For the educational sector particularly, educational institutions have migrated their education to online platforms, [2], [3]. Online learning is the process of using technological devices and internet facilities to practice learning activities and thus achieve the education's objectives, [4], [5]. It includes two types, namely synchronous and asynchronous learning. Educational institutions are to have a comprehensive understanding of the limitations and benefits of each type, [6], [7]. This study provided a comprehensive awareness of the

methods used in the crisis-response migration in education, challenges, and opportunities related to the Covid-19 pandemic, differentiation between the emergent remote-learning and e-learning, and finally provided a set of suggestions that may help the online learning stakeholders, especially the educational institutions' management improve the emergent remote- learning.

2 Literature Review

Digital transformation has been accompanied by educational institutions and it is not novel for this sector, especially for universities, [8], [9], [10]. Undoubtedly, digital transformation has been an inevitable necessity for all educational institutions, and today is described as a topical issue that must be concerned by all stakeholders of education (i.e. faculty members, students, administrators, and university management), [11], [12]. Therefore, higher institutions have to be up to the task of having the potential capabilities to interact with the up-to-date digital transformation requirements to face threats as they appear and provide professional alternative solutions, [13]. It is suggested that sustainable management has to be capable of adjusting effectively to the new modifications reinforced by the novel technology, [14].

Digital transformation in higher education is described as the summation of all digital processes needed to perform a transformation process that assists the higher education institution in optimally applying digital technology, [15], [16]. Nevertheless, knowledge of information communication technology (ICT) is not enough for higher education institutions to get professional digital transformation, rather, other processes have to be taken into consideration, such as establishing effective strategy, building trust with the users, involving and promoting all stakeholders, having organizational and collaborative knowledge, etc., [17], [18].

It is agreed that digital education has brought about revolutionary modifications in the field of the higher education process, as it moved the face-to-face education that is concerned with place-centered teaching and achieved in domestic universities, to online programs to provide learning efficiently; anytime, and anywhere. In this manner, online courses loaded are synchronically available to all students in all their different places, [19], [20]. Additionally,

digital transformation enables students to attend the class course asynchronously; a student can attend the lecture given to his/her colleagues after a limited time, [15]. Therefore, e-learning is described as cost-effective learning. It can be imagined how much e-learning minimized costs for educational institutions, [20], [21]. For instance, a course given by an online program can sometimes be attended by hundreds or even thousands of students in the case of a training program, which cannot be anyway given to students in a face-to-face situation. Thus, a university adopting e-learning may reduce the costs of students' classes' requirements, costs of new instructors in case of course load, costs of communications, etc.

Although digital transformation was adopted in higher education, its use was limited to some educational situations. However, the Covid-19 pandemic has developed and expanded digital transformation so that novelties that would need many years to be presented because of highly complicated and bifurcated managerial regulations just took some weeks because of the nationally and internationally continuous, stressful, and collaborative scientific efforts that were exerted as an urgent response to the crisis, [22], [23]. Particularly, in Jordan, for instance, there were highly collaborative and unremitting efforts during the beginning of the pandemic between the ministry of digital communication, the Arab weather organization, and other private programming companies to design and develop educational stations for the schools' students.

E-learning is the educational usage of technological tools and the internet to realize educational objectives, [24], [25].

Adedoyin and Soykan, [15], mentioned that technological innovations and internet accessibility have motivated e-learning since the beginning of the millennium. Thus, Boricha and Gohil, [26], concluded that digitalization in higher education cannot be referred to as e-learning as e-learning is one feature of the digital transformation in higher education. However, some scholars have argued that e-learning is still controversial as it cannot be considered a substitute for face-to-face education, as it lacks face-to-face interaction and communication among the students in the class as well as among the students and their instructors. Additionally, some scholars went beyond that when they described e-learning emerging from the crises such as the Covid-19 pandemic with emergent-remote education which lacks the quality of

education compared to direct interaction in the students' class, [27].

3 Methods of Response to the Emergent-Remote Learning

E-learning is not a novel phenomenon, rather it has been adopted in some universities since 1980, and expanded later in the 1990s and 2000s, [16]. For its several merits, it has been viewed by educational organizations as an effective alternative to face-to-face education, [28], [29]. Nevertheless, e-learning cannot be recognized as an educational model that can guarantee the quality and steadiness of instructional activities, [30].

Since the WHO, [1], had claimed that Covid-19 is a pandemic, as it is a very infectious disease that spreads rapidly near distant people, and thus distance people communication is recommended, schools and other educational institutions have been closed to curb the disease transmission. Accordingly, to maintain the educational process continuity, the traditional education method was hindered and replaced, for its necessity, with the e-learning educational method.

Due to the pandemic's hard circumstances, schools switched their traditional instructional activities to remote learning, [10]. With this rapid and compulsory educational migration approach, remote learning faced several challenges, [16]. One of the major issues was the obligatory modifications in the attitudes of the learners, instructors, and administrators about their satisfaction with e-learning effectiveness, [30]. However, some schools and universities that adopted e-learning before the pandemic emergence as a part of their educational process have not faced such major issues as much as those that resorted to e-learning as an urgent response to the pandemic, [31].

After the global physical closure of educational institutions, universities are to adopt e-learning as a necessary alternative solution to keep the continuity of the educational process, [5]. According to Rusly et al., [32], two methods of the crisis-response migration of e-learning have been used by universities, which are external-assisted migration and external–integrated migration.

In the first method "external-assisted migration" the universities used the web.2 platforms (e.g. Moodle's, Microsoft 360) designed by an external organization, [32]. In this case, the universities transformed all e-learning-related data (i.e. data of instructors, learners, courses, etc. into the application. On the other hand, in the external–integrated migration, the university integrated web.2 platforms (e.g. Google Classroom, Big Blue Button) with its e-learning platform, [33], [34]. However, for both methods, the instructional delivery for both methods is the same, such as assignments submission, video conferences, forums discussions, etc.

4 Challenges of the Emergent-Remote Learning

Several educational challenges have been associated with the digital transformation of instructional delivery. The major challenges the education system has faced during the covid-19 pandemic include the following:

4.1 Acquisition of Internet Connections and Smart Technology

E-learning is entirely dependent on the internet and several subsequent technological devices. Therefore, students and instructors who do not have internet connections are liable to be denied e-learning application access, [35]. However, internet connections and technological equipment availability are considered a challenge for institutions, [36].

Kapasia et al. [22], stated that students with outdated technological devices cannot match up with e-learning technical requirements. For instance, the students who try to take their e-quiz using an old mobile phone, cannot get internet accessibility. Also, some students may have accessibility problems therefore they may not have the ability to follow instructions added by their instructor on the announcement page related to a particular course.

4.2 Socio-Economic Situation

Because of the inequality in the socio-economic status of some students, they attempt to rely on their schools' computers and the internet, [37]. This education-related migration has infrequently occurred during the Covid-19 pandemic, as the transfer was mostly limited because of the pandemic-related lockdown. This challenge encountered the students with low socioeconomic status during the pandemic and limited their academic abilities in e-learning compared to other students with medium or high-level socioeconomic status. In the study conducted by Fishbane & Tomer, [38], it was confirmed through the

study findings that the rate of increase in community poverty leads to a decline in internet accessibility. This inevitable result has led students of low socioeconomic status to fall behind or be unable to meet up with their colleagues in the e-learning process.

4.3 Human-Related Interruption

It is the unexpected interruption that may be caused by family members or friends during the e-learning process. Such interruptions may create a diversion or disruption to the participants' attention during online learning or teaching, [39]. Manfuso, [31], mentioned that human-related interruptions usually occur in online video conferences during the learning progress. Also, a sound launched during an e-learning lecture by a pet animal or even outside vehicles led by humans may cause entropy and distorts the learners' and instructors' interaction.

5 Opportunities

E-learning is characterized by several merits, such as interactivity, flexibility, availability, responsiveness, etc., [40], [41]. In general, universities have stressfully used e-learning during the Covid-19 pandemic to get aligned with other organizations worldwide in minimizing, at least, the spread of the Covid-19 pandemic, in addition to the desire to keep the academic calendar. Educational institutions, especially universities, have responded to the pandemic through the rapid digital transformation of their educational processes, [42]. By responding to the pandemic, universities have attempted to achieve educational, economic, and social objectives. The chief information officer (CIO) of Baldwin Wallace University, Greg Flank, asserted that when he was told about the quick digital transformation for educational activities, he informed his team to do best in investing opportunities offered by the crisis, as the use of e-learning tools is highly essential for everybody in the university, [16]. Greg Flank added that e-learning introduced a roadmap by which the educators, as well as the stakeholders, can be engaged in creating a novel market, and the longer the crisis goes on, the more likely the e-learning becomes an acceptable mode of learning and education.

5.1 Research-Related Innovations

Since the world health organization (WHO) has declared that the Corona disease caused by the Covid-19 virus is a pandemic, researchers have sprung frequent attempts to find short-term and long-term alternative solutions to overcome the pandemic and restrict the virus's spread throughout the world, [1]. However, the increasing number of e-learning participants entailed the existence of professional researchers and technologists who can exploit this opportunity and provide innovations to overwhelm the online learning challenges, [41], [43], [44]. Such innovative activities included providing new models that accommodated the contemporary alterations in e-learning, reviewing the process of digital transformation in e-learning activities, improving and developing new designs of personalized e-learning models, developing new e-learning models that could reduce the workload of instructors, etc., [45].

This indicates that there has been a great alteration of the academics' attention to Covid-19 searching for alternative solutions to overcome the pandemic effects and thus curb its negative impact on education.

5.2 Technological Innovations

Educational institutions and universities have a great responsibility for providing innovations that can assist in preventing and protecting humanity against the pandemic, [46]. Universities, in particular, have a scientific responsibility by opening new gates for researchers to collaborate their scientific research in such a way that can prevent or control the disease's spread, [33]. For instance, some universities in North Cyprus have introduced some innovations for the frontline health workers that assisted in eradicating the pandemic and for the general public in minimizing protection against the disease spread, [15].

Some of these innovations include the "3-dimensional Multiplexer Ventilator" which was provided by Near East University and Medical Shields" which was provided by Eastern Mediterranean University, [16]. Other innovative technologies supplied by the Covid-19 crisis include hands-free door openers, Wrist-Mounted Disinfectant Sprays, and basic ventilators. Some of the urgent technological innovations brought about by the Covid-19 era include 3D Printed Hands-Free Door Openers, Basic Ventilators, Spiderman Wrist-Mounted Disinfectant Sprays, and Wristband that rings whenever someone wants to touch his/her face, [15].

5.3 Social Responsibility

During the Corona pandemic peak, most countries have been adopting policies of mitigation for reducing the effects resulting from lockdowns. All organizations, either public or private, have activated social responsibilities toward their communities, [47]. For the higher education sector, in particular, in North Cyprus, universities called public, private, and alumni provide social-economic supportive interventions to the students, [15]. Some of the socio-economic interventions, for example, included food items, reduction of increments of tuition debts, and medical and psychological help to students, [48]. Some internet service providers in the USA have supplied university students with free internet bundles, [38].

6 Discussion

It is clear that educational technology, represented in e-learning as one of the digital transformations, has played a significant role in alleviating the effect of the Covid-19 pandemic by providing platforms for educational design, delivery, and assessment. Many researchers have been striving their efforts in inventing new mechanisms for control and protection against the Covid-19 pandemic. Adedoyin & Soyka, [15], confirmed that there should be sharing of the contemporary research findings relating to the Covid-19 pandemic. Online learning is not new in the education process, rather it is deeply rooted in educational institutions in terms of online education's planning and design supported by many theories and models. However, in the migration process during the Corona pandemic, as an urgent global health situation, universities witnessed a lack of effective planning, design, and development of online educational programs, [46], [48]. Methods used in the crisis-response migration by the universities were limited to the delivery media without taking into consideration the educational theories and models required for effective online learning. Therefore, the crisis-response migration cannot be equally assessed as online education in an ordinary situation, but it should be viewed from the perspective of remote teaching platforms.

Digital competence is recognized as a problem in emergent remote education. Some scholars, [49], [50], [51] suggested that there is no need for a university to design a separate platform for learning digital skills, but they can be embedded in all subjects of the education process. Others, [52], [53], [54], see that students in universities have to be motivated to attain digital competency as they need to be relevant to what is up-to-date in e-learning.

As an electronic system, the assessment of students' learning activities and their exams loaded on online learning applications is vulnerable to bias, hacking, and plagiarism. Therefore, there is a necessary need for a more immune-effective native assessment of the scientific work on online education systems, [55].

Technological devices and internet facilities are the main components of e-learning. However, because some students and instructors may not have enough financial capabilities to get e-learning components, it is recommended that educational institutions provide their social responsibility by collaborating with telecommunications companies so that the students and instructors can get low-cost or free browsing and download their educational activities, [52]. For the instructors, there is still a persistent need for developing a uniform platform of online learning that can fit all research disciplines to overcome the compatibility problem.

Emergent- remote learning still needs more improvement and development to be aligned with e-learning. Nevertheless, the Corona pandemic has manifested that e-learning is inevitable even after the pandemic eradication, [16], [34]. This indicates the importance of professional usage of e-learning tools and techniques. Instructors, as well as students, are to be accustomed to using e-learning tools as they are required to deal with this technology not only during the education process but also beyond university graduation in the workplace, [31], [30].

To be more effective in its outcomes and values, e-learning must be supported by the faculty members. In this context, they should activate e-learning activities similar to face-to-face education. For instance, they can motivate the students to electronically practice brainstorming, critical thinking, team discussions, problem-solving, etc., [56], [57]. Such activities practiced online arouse the attention of the students and motivate them to participate in their ideas and suggestions enthusiastically as similar as they are in the traditional classroom.

Intrusions by humans or pets that may occur during e-learning activities can be minimized or eradicated by setting up a separate online learning library/studio.

Despite the emergent migration of educational delivery and content on online platforms by higher education institutions, the challenges that the instructors and learners faced have been transformed into opportunities affirming that e-learning will sustain and that hybrid education will be dominant.

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