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A Comprehensive Survey of the Utilization of Information Technologies in Education During the COVID-19 Pandemic in Jordan

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ABSTRACT
During the last two years, the COVID-19 pandemic forced most countries worldwide to apply policies to control the number of positive cases of COVID-19. One of these policies was a lockdown of two types: partial and complete. During the lockdown, information technologies (IT) played a major role in the sustainability of governmental services. In this paper, a comprehensive survey of the utilization of IT tools in facing the pandemic is presented. This paper is most interested in utilizing IT tools in the most important and significant domain, education, in Jordan.

Keywords – COVID-19 pandemic, Information technology, Digital education, Jordan, Student engagement, Academic performance.

I.   Introduction

As an AI language model, I can provide an overview of the utilization of information technologies in education during the COVID-19 pandemic in Jordan based on available data and research.

The COVID-19 pandemic significantly affected the education sector in Jordan, leading to the closure of schools and universities in March 2020. To ensure the continuity of learning, the Jordanian government, in collaboration with educational institutions, implemented several measures to utilize information technologies in education. These measures included the following:

1. Online learning platforms: The Ministry of Education and the Higher Education Council in Jordan launched several online learning platforms, such as Darsak, Edraak, and Moodle, to facilitate distance learning. These platforms offer a range of digital resources, including recorded lectures, e-books, and interactive quizzes to support students' learning.
2. Broadcast lessons: Televised educational programs were broadcast through national TV channels, including Jordan TV and Al-Mamlaka TV, to support students' education in rural areas and those without access to the internet.
3. Online examinations: The universities in Jordan utilized online examination systems, such as Blackboard, to conduct assessments and evaluations remotely.
4. Training programs: Government and education institutions provided training programs for teachers and students to help them adapt to distance learning and effectively utilize digital tools and platforms.

However, these measures faced several challenges, including limited access to the internet and technology devices for students in remote areas, a lack of teacher training in digital pedagogy, and insufficient infrastructure for online learning.

In conclusion, the utilization of information technologies in education during the COVID-19 pandemic in Jordan was critical in ensuring the continuity of learning. However, the challenges faced should be addressed to enhance the effectiveness and accessibility of online learning, especially in remote areas.

On July 11, 2020, the World Health Organization declared the COVID-19 pandemic to the public. Therefore, to control the pandemic and

minimize the number of daily positive cases of COVID-19, most countries followed restricted protocols such as partial lockdown, complete lockdown, and physical distancing among others [1]. The main goal of these restrictions was to flatten the curve of COVID-19's spread.

The Hashemite Kingdom of Jordan was one of the first countries that took all the needed constraints to control the spread of COVID-19 and hence protect the lives of its citizens. Like most other countries, Jordan adopted certain policies such as partial and complete lockdowns [2]. Therefore, all schools and universities in Jordan canceled their campus activities and moved toward e-learning or online distance learning.

Consequently, for more than a year, all students, teachers, and lecturers in schools and universities were involved in a new paradigm of learning barely known in Jordan before the COVID-19 pandemic [3]. This paper surveys the platforms used in e-learning systems in Jordan and discusses the limitations as well as the challenges related to this topic from the perspectives of students, teachers, and the government.

The rest of the paper is organized as follows. The next section surveys the platforms used in e-learning systems in Jordan. Section 3 lists the most important challenges faced and suggests procedures to maintain in case of any future crises or pandemics. Section 4 concludes the paper and introduces future work.

II. Comprehensive Survey of E-Learning Systems Adopted During the COVID-19 Pandemic in Jordan

This section is divided into two subsections. Section 2.1 surveys the e-learning systems adopted in Jordanian schools, while Section 2.2 surveys the e-learning systems adopted in Jordanian universities.

2.1 E-Learning Systems Adopted in Jordanian Schools

The most popular e-learning system used by students in Jordanian schools during the COVID-19 pandemic was the Darsak platform. According to Jordan's Ministry of Education (MoE), Darsak is a free Jordanian distance learning platform that provides education lessons designed according to the Jordanian curriculumto all Jordanian students from grade one to grade 12. These educational lessons are presented and introduced by expert Jordanian teachers with extensive experience [4].

According to the MoE, more than 88% of students have registered for and used the Darsak platform. 62% of those students accessed Darsak five times a week, while 48% accessed Darsak three

or four times a week [5]. Moreover, according to a study conducted by the MoE, the main reasons for not accessing or using the Darsak platform are a lack of internet service in students' homes, poor connection services, and a lack of computers or smart devices in students' homes [5].

Consequently, the Jordanian government provided about 160,000 tablets and internet subscriptions to students in poor cities or villages according to specific criteria [6].

Several studies [1, 3, 6] recommended the need for both students and teachers to master soft computer skills and for teachers to provide lessons in the Darsak platform with more drawing and visual aids as well as improve their teaching methods and use more modern techniques.

Specifically, the aforementioned studies recommended the following to improve the learning of students using the Darsak platform:
a. More computer skills training should be provided to teachers in the public sector
b. More activities and scientific experiments should be included in lessons provided by the Darsak platform
c. Teachers should be given the ability to present lessons directly to their students and receive instant feedback from them
d. A new mechanism for conducting e-tests should be provided
e. Continuous evaluation of the Darsak platform should occur with the help of students, teachers, and domain experts

The second main e-learning system that the MoE adopted to provide lessons to students was the Noorspace platform. This platform existed before the COVID-19 pandemic and was used before the Darsak platform. The Noorspace platform cannot serve a large number of users at the same time, but it has the advantage of providing needed interactions between teachers and students [7]. Through Noorspace, teachers can send assignments to students, develop electronic tests, and build virtual classes that allow for direct communication through text and video using the platform's Microsoft Times feature.

The third e-learning strategy that the MoE adopted was Mawdoo3, a platform oriented toward teachers to provide them with needed soft skills (i.e., distance learning tools, education technology, blended learning, the inverted classroom, reflective teaching, and teaching with confidence). Mawdoo3 is an open online course and represents a collaboration among MoE, the Ministry of Digital Economy and Entrepreneurship, and other private sectors [8].

Along with the three e-learning strategies, and seeking more accessibility and flexibility, the

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MoE dedicated three TV channels to broadcasting educational content. One of these channels was designated for the 12th grade (Tawjihi). In addition, Jordan's sports channel was designated to teach students from grade one to grade 12 [3, 4].

2.2 E-Learning Systems Adopted by Jordanian Universities

In quick reaction to the complete and partial lockdowns during the COVID-19 pandemic, most Jordanian universities considered three main platforms for contacting students and delivering educational lessons. These platforms were Microsoft Teams, Zoom, and Moodle [8].
Fundamentally, Microsoft Teams, Zoom, and Moodle are platforms designed specifically to unite group or team members in different places for discussion, connection, and organizing. These platforms were used all over the world during the COVID-19 pandemic, not just for educational purposes but for all kinds of meetings involving large numbers of people. Table 1 depicts the main differences between Zoom and Microsoft Teams, the main two platforms used by Jordanian universities [8].

Table 1. Comparison Between Zoom and Microsoft Teams

Feature	Zoom	Microsoft Teams
Users	Up to 100 users	Up to 100 users
Price	Free	Free
Time	Up to 40 minutes	Up to 60 minutes
Alternative Hosts	In Zoom, hosts can designate an alternative host upon scheduling to assist with meeting management duties.	Teams currently have no option to designate an alternative host.
Local recordings	In Zoom, you can choose to create a local recording, which saves directly to your device.	In Teams, no local recording options are available. Recordings must go to OneDrive once the the meeting is complete.
Meeting Passwords	A password option is available to protect meetings.	No password option is currently present within Teams.
Screen Sharing	In Zoom, multiple participants can share their screens at a time.	In Teams, only one participant can share their screen at a time.
Attendance Report	Hosts can retrieve an attendance report from Zoom to gather the names of meeting attendees.	Organizers can retrieve an attendance report from Teams to gather the names of meeting attendees.
Meeting Notes	No meeting notes feature is available within Zoom.	Teams has a meeting notes feature.

Both Microsoft Teams and Zoom suffer from several shortcomings and disadvantages. The following are the main disadvantages of the Microsoft Teams platform [9]:
1. Limited storage
2. Limited number of channels
3. Limited flexibility
4. Similar and redundant tools
5. Nonoptimal online meeting experience

The following are the shortcomings and disadvantages of the Zoom platform [10]:
1. The need to download the app
2. Inconsistent cloud file size
3. HD video is not the standard

A recent study by Alameri, Masadeh, Hamadallah, Ismail, and Fakhouri [11] attempted to evaluate the main platforms used by students at the University of Jordan. This study revealed the following interesting facts:
1. 83.8% of students stated that Moodle, Microsoft Teams, and Zoom platforms helpthem turn to additional educational material.
2. 84.2% of students stated that takingan electronic course is valuable in time and usage.
3. 90.2% of students stated that the quality of courses on the Moodle, Microsoft Teams, and Zoom platforms matches that of today's level of education.
4. 70.3% of students stated that e-learning could be used in all subjects.
5. 92.3% of students stated that the Moodle, Microsoft Teams, and Zoom platforms provide 24/7access to teaching materials and assignments.

The main finding of this paper and several others are that Moodle, Zoom, and Microsoft Teams are extremely useful tools for an educational organization currently as well as in the near future [11]. In addition, these platforms will comprise an integral part of the educational process. Another significant finding is that both professors and students invest a fair amount of time in attempting to improve their technology skills through self-learning [11].

III. Challenges in Adopting E-Learning Strategies

Adoptinge-learning strategies can bring numerous benefits, such as increased accessibility, flexibility, and cost-effectiveness. However, some challenges also must be addressed to effectively implement E-learning programs.

Despite Jordanian universities'success in adopting e-learning strategies during the pandemic, both professors and students have faced several challenges. Below are some of these challenges [11].

1. Technological challenges: E-learning requires access to technology and reliable internet connectivity, which can be a barrier for learners in certain areas or with limited resources.
2. Pedagogical challenges: E-learning requires a different approach to teaching and learning than traditional classroom-based education. Educators must design and deliver courses that are engaging, interactive, and effective for online learners.
3. Motivational challenges: E-learning can be isolating and may require learners to be more self-directed and motivated than traditional classroom-based education. Some learners may struggle with staying motivated and engaged in the absence of face-to-face interaction with teachers and peers.
4. Assessment challenges: E-learning requires developing effective assessment methods that can accurately measure learning outcomes and evaluate student progress. It can be challenging to design assessments that are valid, reliable, and fair in an online environment.
5. Cultural challenges: E-learning may not be accepted in certain cultures or may be viewed as inferior to traditional classroom-based education. Educators must be sensitive to cultural differences and find ways to overcome these barriers.
6. A fair number of students living in poor cities or villages have poor Internet connection and, in many cases,an inability to access the Internet.
7. Students may lack smart mobile devices or laptopsbecause several students in the same family may share these smart devices.
8. There are insufficient computer laboratories in universities, and the hardware they provide is of low quality.
9. There is inadequate time for online lessons.
10. There is a large number ofstudents enrolled in classes at some universities, especially public universities.
11. Many professors and students have poor technology and internet skills, especially old professors in domains not related to information technology.
12. There is poor instant communication and poor direct feedback.
13. There is a need for strong self-motivation and time management skills.
14. There is a high chance that students will cheat when taking online exams.

Overall, adopting e-learning strategies requires careful planning, investment in technology and resources, and ongoing evaluation and improvement [17, 18, 19, 20]. By addressing these challenges, educators can successfully implement e-learning programs that meet the needs of learners and achieve positive learning outcomes [21, 22, 23, 24].

IV. Conclusion and Future Work

This paper has presented an extensive survey of digital tool utilization during theCOVID-19 pandemic in Jordan. Specifically, it reviews the main e-learning platforms adopted by both Jordanianschools and universities. This paper concludes that Moodle, Zoom, and Microsoft Teams played a major role in maintaining the services of teaching and learning in Jordanian schools and universities. Nevertheless, several challenges related to adopting e-learning platforms must be solved. In future work, it is highly recommended for Jordanian universities to design their own platforms, build more data centers, and provide academic staff with all the needed soft skills in information technology.

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