

## E-Learning beyond COVID-19: Challenges and opportunities as perceived by 8th-grade science teachers

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### Abstract

The spread of E-learning accelerated exponentially during the COVID-19 pandemic. However, teaching science requires more attention than other subjects because it contains more practical activities and hands-on experiences. This study examines science teachers' perception of using E-learning platforms in teaching 8th-grade science during and after the COVID-19 pandemic. Twenty science teachers from 12 private schools participated in this study. The participants' perspectives were ascertained by a researcher-developed survey and a follow-up personal interview. To reinforce the data gathered from the survey, nine science teachers participated in an open-ended interview. The demographic variables used were gender, age, and years of experience. The results revealed that most teachers have positive perceptions towards E-learning. Furthermore, female teachers showed superiority over male teachers in embracing E-learning platforms. Moreover, younger teachers with fewer years of experience had more positive perceptions of using E-learning platforms than older teachers with more experience. However, most science teachers still do not consider E-learning a complete alternative to traditional classroom teaching. Based on the findings, this study proposes that schools increase their investment in and utilisation of E-learning platforms to enhance education and promote independent learning among students.

**Keywords**— E-learning, E-learning platforms, Science Education, Online Learning, Science Teachers.

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## **1. Introduction**

### **1.1 Conceptual framework**

In March 2020, the World Health Organization officially declared the outbreak of Coronavirus (COVID-19) a pandemic (World Health Organization, 2020). Soon after that, events accelerated rapidly, and countries worldwide started taking extreme measures to protect the lives of their citizens. Those measures were characterised by strict social distancing and included the shutdown of public places and facilities such as shopping malls, cinemas, theatres, airports, schools, and universities.

According to (Brueck, Lenhart, & Roskos, 2019), emergency events such as natural or artificial disasters bring unique organisational challenges. Educational institutions faced the challenge of sustaining education despite the public lockdown and quarantine. Therefore, online learning using E-learning platforms came to the forefront as a quick solution and a safer alternative to traditional education during such a crisis.

Over the years, technology integration in classrooms and schools has become increasingly common. E-learning platforms are characterised by the use of electronic systems in the service delivery of Information (Uygarer & Uzunboylu, 2017). In today's world, E-learning platforms signify comprehensive web-based educational systems that are gradually replacing the conventional means of education. Because it is interactive and uses multimedia technology, E-learning platforms have become integral to study habits and learning processes.

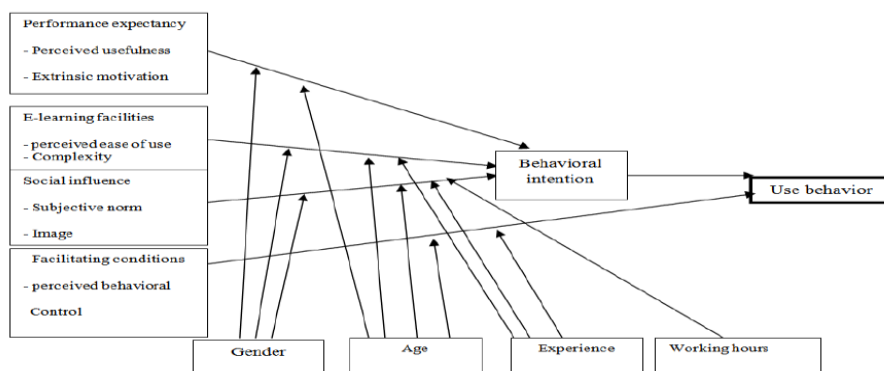
It will not be an exaggeration to say that E-learning platforms are revolutionising the classrooms, homework, teachers, and teaching methods. The teachers who once relied on blackboards and copies are now expected to be trained in technology and using E-learning platforms (Cheka, 2017). Therefore, measuring the change in attitudes and perceptions caused by E-learning platforms is pivotal in understanding and gauging the benefits of employing technology in the classrooms.

### **1.2 Literature Review**

According to the study by (Grammenos, Savidis, Georgalis, Bourdenas, & Stephanidis, 2007), more than 50% of the organisational investment has been made in developing Information and communications technology (ICT). This radical step has called for a change of attitudes and perceptions of the teachers. The measure of the change in perception of the teaching community and their reception towards technological change is considered a fascinating area of study for the researchers' (Qu & Lu, 2016) (Venkatesh, Thong, & Xin, 2012).

However, can some theoretical models explain how secondary school teachers view E-learning platforms? (Afzal, Safdar, & Ambreen, 2015) Proposed a unified model essential to understanding the teachers' perception. Similarly, (Joo, Park, & Lim, 2018) discussed user acceptance of the information technology model or UAT. According to such a model, users' comfort level depends on several factors (see exhibit below).

Teachers' perceptions of E-learning platforms also depend on performance expectancy, social influence, and facilitating conditions (Gordillo, Barra, Aguirre, & Quemada, 2014). The model is further employed by the researchers (Sánchez-Prieto, Olmos-Migueláñez, & García-Peñalvo, 2018), who explain that the perception of teachers varies from age to age. Young science teachers will likely welcome the use of E-learning platforms in their secondary schools. At the same time, due to the lack of usage of internet technology by the older generation, there looms a feeling of fear and anxiety when employing integrated learning management systems. Contrastingly, according to the research of (Davis, 1993), the factor of gender in determining the perception of teachers in welcoming the use of e-learning did not show a significant difference implying that the perception does not vary with gender.



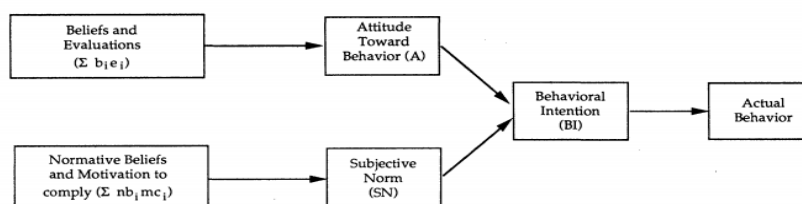
**Figure 1.** User Acceptance Technological Model (Fishbein & Ajzen, 1980).

Another conceptual framework laid down to understand the mechanism of teachers' perception in adopting the use of E-learning platforms is given by (Hankonen et al., 2018), who puts forth a Theory of Reasoned Action or TRA model that explains how the mechanism of perception development for early adopters of E-learning platforms. The model (as shown in Figure 2) considers that the intention of performing a task mainly drives behaviour. This intention is a function of the attitude towards the behaviour (Uribe-Tirado, & Castano, 2016). The model is instrumental in determining that the unmotivated learner will fall behind the motivated learner in using the E-learning platforms, affecting the teacher's perception (Ivanović et al., 2013).

According to the research of (Zhai, Gu, Liu, Liang, & Tsai, 2017), the findings concord with the statement that E-learning platforms are beneficial for students and warmly received by the teaching community. Moreover, science teachers also feel that technology is familiar and accessible for the students as the system is easily comprehensible by the students (Mewburn, Thomson, & Lupton, 2017). Teachers have also supported the technology as, according to the research of (Botes & Zeeman, 2019) (Yusuf & Widyaningsih, 2020), E-learning platforms offer particular benefits in place of the high cost.

These benefits include a lack of paperwork, the record of students' track and progress, and providing additional sources. According to (Yusuf & Widyaningsih, 2020) and (Odabasi, Uzunboylu, Popova, Kosarenko, & Ishmuradova, 2019), E-learning is thought to have a positive effect on learning and was found to be effective in enhancing learning quality and developing students' metacognitive skills in the physics experiment courses. Furthermore, the study of (Caliskan, Guney, Sakhieva, Vasbieva, & Zaitseva, 2019) found that with the advancement of mobile technologies, it has become now easier than ever to demonstrate and explain examples that were in the past impossible to display to students in the classroom.

Concerning job security, teachers have shown a mixed response. The research of (Ohanu & Chukwuone, 2018) shows that teachers find E-learning platforms as simply a tool to increase the productivity of the students and aid the learning process; hence, the job market for teachers will largely remain unchanged. However, Field (Loro et al., 2016) has concluded that the role of teachers will become redundant and irrelevant shortly based on the direction of the development. Regarding the application in real life of knowledge learned through electronic channels, teachers did not show any authoritative confidence in the system (Loro et al., 2016).



**Figure 2.** Theory of Reasoned Action (Hankonen et al., 2018)

## **1.2. Research problem**

Since E-learning platforms offer a diverse learning material source and use animated and simulated exercises, their use in science courses has shown some real potential. However, it is observed that the perception of science teachers regarding the use of E-learning platforms depends on a multitude of factors. These factors include the teachers' characteristics such as age, gender and education, or the organisational factor and support to encourage the installation of such platforms (West & Clarke, 1999).

Consequently, this study aims at addressing the following questions:

1. How do science teachers perceive the use of E-learning platforms in teaching 8<sup>th</sup>-grade science during and after the COVID-19 pandemic?
2. Do demographic variables of gender, age, and the number of years of experience affect science teachers' perceptions of E-learning platforms in science education?
3. What challenges and opportunities do science teachers perceive concerning the use of E-learning platforms in teaching 8<sup>th</sup>-grade science during and after the COVID-19 pandemic?

## **2. Method and Materials**

### **2.1 Research approach and participants**

The research aims to investigate the perception of science teachers from the 8<sup>th</sup> grade on the usefulness of E-learning platforms in science education. The study has employed a diverse set of research techniques. To begin with, a total sample size of 20 teachers (25 years and above) who were presently teaching science courses to 8<sup>th</sup>-grade students in private schools in Jordan was chosen. The numbers of private schools that were part of the study were 12. The selection was based on the convenience sampling method. The sampling method was determined based on the feasibility of the researcher.

### **2.2. Data collection tool and analysis**

This study followed the descriptive design, combining quantitative and qualitative research methods. Twenty science teachers from 12 private schools participated in this study. The participants' perspectives were ascertained by a researcher-developed survey and a follow-up personal interview.

The rationale behind choosing this methodology was to give a numerical measurement and analysis of the feelings and perceptions of the teachers. The quantitative method transforms feelings and emotions and ascribes a number to each factor (Thornhill, Saunders, & Lewis, 2009). This was done because descriptive methods best explain the prevailing phenomenon or situation among a particular sample size. It uses different research tools to describe the behaviour of the problem under investigation.

A 5-point Likert scale-based questionnaire was designed to capture teachers' perceptions regarding using E-learning platforms in teaching practices. All necessary precautions were exercised to ensure that the questionnaire was understandable by the selected sample and that it was able to capture the feelings and perceptions of the respondents. The researcher confirmed the instrument's internal consistency, reliability, and face validity. The Cronbach alpha value equals 0.82, which tests the reliability. At the same time, face validity is tested via a review of the instrument by experts (5 university professors).

For data analysis, the frequency analysis technique was employed. Frequency Analysis is particularly effective, in this case, in gauging the frequency of feelings and perceptions among the teachers.

To reinforce the data gathered from the survey, nine science teachers participated in an open-ended interview. A qualitative research method was chosen because it allows us to understand better

the many digital platforms used to deliver classes to students during the lockdown. Finally, the research was conducted, keeping in mind the ethical considerations mandatory for academic research. These ethical considerations included the participants' consent and confidentiality, the researcher's objectivity, the right to withdraw from the study, and reporting of the findings without bias.

### 3. Results / Findings

#### 3.1 The questionnaire

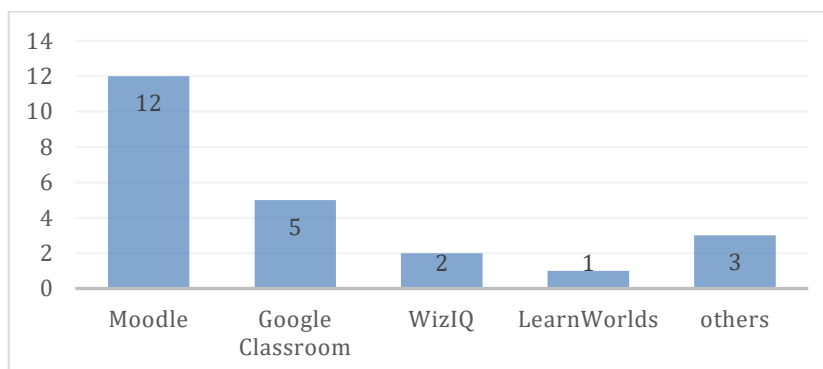
The study's main objective is to find the perspective of science teachers regarding the usage of E-learning platforms in science education. A five-point Likert scale was used in which the responses consisted of strongly disagree, disagree, neutral, agree, and strongly agree. The demographic variables used in the study were gender, age, and the number of years of experience in teaching. Frequency tables and histograms are used to analyse the data collected from the 20 respondents.

**Table 1.** Demographics

	Frequency	Percentage
<b>Gender</b>		
Male	7	35
Female	13	65
Total	20	100
<b>Age</b>		
25 to 39 years	12	60
Over 39 years	8	40
<b>Experience</b>		
Between 1 and 7 years	12	60
Over 7 years	8	40
<b>Total</b>	<b>20</b>	<b>100</b>

The total number of respondents in the study was (20) teachers, which consisted of (7) male teachers and (13) female teachers. All of them were 8<sup>th</sup>-grade science teachers. The data was collected from (12) private schools situated in Jordan.

Concerning the age of the science teachers who participated in the study, most of the teachers fall under the age groups of (25-39) years and over (39) years. The third demographic included is the experience of the teachers. Around (60%) of the teachers were relatively new in the field and had experience between (1 to 7) years. At the same time, (40%) of the teachers had work experience of Over (7) years. The figure below assesses teachers' prior knowledge regarding electronic education mediums, i.e., the E-learning platforms. Most respondents were well aware of the significant education platforms used in this field, such as Moodle and Google Classroom. The participants' responses to the Likert-scale-based questions were recorded and are further discussed below.



**Figure 3.** Prior knowledge of teachers regarding the E-learning platforms

The first question was regarding the accessibility of E-learning platforms. 65% of the teachers felt that E-learning platforms are easily accessible to students. While 30% strongly agreed with the given statement. Only 5% of respondents had a neutral stance.

**Table 2.** Frequency analysis

N	Items	SD	D	N	A	SA	Total
1	The E-learning platform is easily accessible for studying science.	0	0	1	13	6	20
2	The E-learning platform is comprehensible to students.	0	1	6	12	1	20
3	Students face technical difficulties while using the E-learning platform.	2	13	4	1	0	20
4	The E-learning platform can offer a suitable and sufficient alternative to traditional in-class teaching.	1	3	6	4	4	20
5	The E-learning platform promotes independent learning among science students	0	0	4	11	5	20
6	The unmotivated learner may fall behind while using educational E-learning platforms.	0	7	10	3	0	20
7	E-learning builds self-confidence among students.	1	3	13	3	0	20
8	Science students can apply the Information gained from E-learning platforms in the real world.	0	0	1	9	10	20
9	In the future, there will be fewer jobs available for science teachers.	1	8	6	4	1	20

The teachers' response regarding comprehensibility towards educational platforms was also measured. 65% of the teachers agreed with the given statement that the students easily understand E-learning platforms. While 30 % had a neutral stance, and only 5% of respondents disagreed with the given statement. According to (Mewburn, Thomson, & Lupton, 2017), science teachers feel that using technology is familiar and accessible for the students as the system is easily comprehensible.

The following response was related to the technical difficulty faced by the students while using E-learning platforms. 65% of the teachers disagreed that students face problems using the E-learning platform. Two respondents strongly disagree with the statement. At the same time, only four respondents had a neutral stance towards the report. However, previous research has suggested that this understanding depends on multiple factors, such as performance expectancy and facilitating conditions (Gordillo, Barra, Aguirre, & Quemada, 2014), (Fishbein & Ajzen, 1980).

The following response dealt with the capability of E-learning platforms to replace traditional in-class teaching from the teachers' perspective. 20% disagreed, and 40% agreed with the given statement. At the same time, 30% of the teachers still needed to decide whether E-learning platforms provide a suitable and sufficient alternative to traditional teaching. This suggests that although most science teachers believe in the usefulness of E-learning platforms, they still need to consider them an adequate replacement for the classroom.

The study further discusses the perception of science teachers towards the practice of independent learning. The majority of the teachers agreed with the fact that educational platforms encourage independent learning among science students. At the same time, only 20% had a neutral perspective towards the statement. There was no clear conclusion regarding the teachers' attitude towards the performance of unmotivated learners. 50% of the responses had a neutral stance towards the statement. Whereas 15% agreed with the Information and 35% disagreed.

Regarding teachers' perspective towards self-confidence among science students, 65% of the responses favour E-learning which builds self-confidence among students. While the remaining 20% disagreed or had a neutral stance. Another response that was used to assess the perspective of science teachers was the application of knowledge gained from the E-learning platforms. About 95% of the teachers agreed or strongly agreed with the statement. At the same time, only one respondent had a neutral perspective towards the application. However, contrastingly, (Thornhill, Saunders, & Lewis, 2009) did not observe any authoritative confidence in teachers in the system.

The last response was regarding the future job security of science teachers. Quite a large amount of variation was observed in the data set, which concentrated more towards disagree and neutral

responses, while 20% of the responses agreed with the proposed statement. In this regard, (Loro et al., 2016) revealed that teachers' roles would be redundant shortly due to the application of E-learning platforms.

To explain the results, the researcher adopted the following scale for the teachers' responses percentages, shown in Table (3).

**Table 3.** Scale the percentages of teachers' responses to the questionnaire

Percentage	Response degree
Less than 50%	Very low
50% - 59%	Low
60% - 69%	Moderate
70% - 79%	High
80% and above	Very high

The percentages and arithmetic averages of the questionnaire items were extracted as in Table (4).

**Table (4):** Arithmetic averages, percentages, and degree of response for each paragraph of the questionnaire

N	Items	Number of responses	Response average	Percentage	Degree of response
8	Science students can apply the Information gained from E-learning platforms in the real world.	20	4.45	%89	Very high
1	The E-learning platform is easily accessible for studying science.	20	4.25	%85	Very high
5	The E-learning platform promotes independent learning among science students	20	4.05	%81	Very high
3	Students face technical difficulties while using the E-learning platform.	20	3.80	%76	High
2	The E-learning platform is comprehensible to students.	20	3.65	%73	High
6	The unmotivated learner may fall behind while using educational E-learning platforms.	20	3.20	%64	Moderate
9	In the future, there will be fewer jobs available for science teachers.	20	3.20	%64	Moderate
4	The E-learning platform can offer a good and sufficient alternative to traditional in-class teaching.	20	3.10	%62	Moderate
7	E-Learning builds self-confidence among students.	20	2.90	%58	Low
<b>Total</b>			<b>3.6</b>	<b>72%</b>	<b>High</b>

It is evident from the previous Table (4) that teachers support the use of educational platforms to a high degree, as the total arithmetic average of the questionnaire was (3.60) and a percentage amounted to (72%). The response of teachers to paragraphs (8, 1, 5) was very high, with averages of (4.45, 4.25, 4.05), and percentages of (89%, 85%, and 81%) respectively. At the same time, teachers' response to the third and second paragraphs was at a high degree, with arithmetic averages of (3.80, 3.65), and percentages of (76% and 73%) respectively. The teachers responded to the items (6, 9, 4) to a medium degree and with arithmetic averages (3.20, 3.20, 3.10, respectively). Paragraph (7) was ranked last, with a low score, with an arithmetic average of (2.90) and a percentage of (58).

To reveal the effect of gender, experience, and age on teachers' use of educational platforms, the arithmetic averages and standard deviations of the study variables were extracted from the questionnaire items, shown in Table (5).

**Table (5):** Arithmetic averages and standard deviations of teachers' responses to the questionnaire items according to study variables (gender and experience

Study variables	Gender	Average	Standard deviation	Number of participants	Degree of response
Gender	Male	3.15	1.26	7	Moderate
	Female	4.05	0.54	13	Very high
	Total	3.60	1.94	20	High
Experience	1 – 7 years	4.20	1.30	12	Very high
	More than 7 years	3.00	0.90	8	Moderate
	Total	3.60	1.05	20	High
Age	25 – 39 years	4.30	1.20	12	Very high
	More than 39 years	2.90	1.10	8	Low
	<b>Total</b>	<b>3.60</b>	<b>0.90</b>	<b>20</b>	<b>High</b>

It is evident from the previous Table that the female teachers outperform the male teachers, where the arithmetic mean of females was (4.05) and with a standard deviation of (0.54) and a very high degree, compared with the average of males, which amounted to (3.15) and with a standard deviation of (1.26) with a medium degree. Also, as shown in the previous Table, teachers with few years of experience outperformed those with high years of experience. At the same time, those with young ages exceeded those with older generations.

### 3.2 The personal interviews

To reinforce the Information gathered from the online survey, nine (9) science teachers participated in an open-ended interview. The alphabet A–I was used to identify the teachers. Zoom and Skype, video conferencing apps, were used to record the interviews. Each teacher's interview lasted about 15 minutes. The responses were noted and summarised in the discussion area for analysis.

During the personal interview, the science teacher who participated in this study was asked the following questions:

1. What is the E-learning platform that you use to teach science?
2. Do you think that you are able to teach science through the said platform effectively?
3. In your opinion, which E-learning platform do you think is the best one for teaching science subjects?
4. How did the E-learning platform help in enhancing your own science teaching method/style?
5. Did you face any difficulties in using it? If yes, what were they?

Most science teachers (male and female) in this study have used E-learning platforms. According to their statements, the following are the major critical points regarding those platforms:

#### 3.2.1 Most commonly used online educational platforms:

Through the interviews, science teachers were asked about the most used virtual platforms in their schools, and the most used and most accessible to use platform for teaching science was Moodle; Because it provides all the easy and simple tools to display the content of science books and activities, so that students can interact with them easily. The popularity of this platform had already been established amongst the private schools in Amman, Jordan. Teachers B, D and E pointed out that their schools had incorporated this platform into their teaching even before the pandemic. Therefore, they



and their students were reasonably familiar with it, which eased the transition phase to complete online education.

The platform that came in second place was Google Classroom. According to the science teachers interviewed, these two platforms were the most prevalent among private schools in the Amman governorate.

“After all, everyone knows Google and most people have Gmail accounts. This is why Google Classroom seemed like a no-brainer to move to it at the time. Unfortunately, the transition was not as smooth as we had expected, and many students and parents struggled with it at the beginning,” – Teacher A said.

Teachers A and H noted interestingly that their schools did not incorporate any online platform before the pandemic. However, the most accessible platform seemed to be Google Classroom when the pandemic hit, and the lockdown occurred.

### **3.2.2 Most common challenges attributed to using online educational platforms as perceived by science teachers:**

Throughout the interviews, we found a recurring theme amongst teachers, regardless of the platform they used. Those who were familiar with a specific platform before the pandemic, and used it in their teaching, found it more accessible and smoother to transition to full online teaching mode. They also thought their students could accept the change and interact more with the activities. On the other hand, the teachers who found themselves in a new situation where they needed to adopt a brand new and unfamiliar platform faced a more challenging time during the transition period.

“It was tough for us to move to full online education. Our school was planning on purchasing a license for a new platform in early 2019, but it did not follow through with that plan. When covid-19 came, we were not ready for online education yet. At the time, students were confused, parents were demanding, and teachers were overwhelmed!” – teacher F said.

Most science teachers have expressed their aspiration for a single, robust platform that fully supports the Arabic language and solves all the problems of teaching science and other subjects; Because the available platforms support the Arabic language to varying degrees, but not 100%.

“Had there been a fully functional online platform supporting the Arabic language, things would have been much easier and more efficient for us. I remember that at the beginning, most of my time was wasted on non-science-education-related tasks, such as fixing the font and re-editing sentences and paragraphs that were altered inside the online platform due to language problems. Not to mention that we needed more time to get used to the interface in English only!” – Teacher C said.

### **3.2.3 Benefits of using online educational platforms:**

Despite the challenges and hardships that came with the transition to complete online education during the covid-19 pandemic, some teachers still thought of it as a “blessing in disguise”! One of the main benefits science teachers saw was that it “forced” the schools and the educational system to move to online education.

“Adopting an online educational platform in parallel with classroom instruction has always been on our school’s agenda, but there have always been some excuses to postpone this step. When covid-19 hit, there was no choice but to move forward with this. Had it not been for the pandemic, I think we would have needed a few more years to reach where we are now. In retrospect, I think this was a true blessing in disguise!” – Teacher H said.

Science teachers still think face-to-face classroom instruction is indispensable, especially for science subjects and activities. However, they are now more open to new technologies and incorporating online education into their teaching styles. With all that has happened over the past couple of years, they realised it was an empowering extension to the regular teaching – not as an enemy or a threat.

#### 4. Discussion

According to the interview and open-ended questionnaire results, the research findings in answer to the first research question revealed that most teachers have positive perceptions towards E-learning. They believe in the ease of accessibility and comprehensibility of E-learning platforms. It is observed that such platforms promote independent learning among science students and help apply Information gained in the real world.

Virtual platforms have spread considerably and effectively during the Corona pandemic by creating integrated e-learning educational systems for all educational topics because they facilitate learning through an e-learning management system (LMS). However, teaching science requires more attention than other subjects because it contains more practical activities and hands-on experiences. Due to the lack of face-to-face education during the pandemic, virtual laboratories and platforms that provide simulations of reality and experiences were used, as science needs students' interaction in activities.

In regards to the second research question, the findings revealed that the demographic variables of gender, age, and years of experience do, in fact, affect science teachers' perceptions and utilisation of E-learning platforms in science education. For example, female teachers showed more superiority over male teachers in embracing E-learning platforms. Moreover, younger teachers with fewer years of experience had more positive perceptions of using E-learning platforms than older teachers with more experience.

These results may be attributed to several factors, most notably that teachers with long years of experience primarily adhere to traditional methods. This may be due to the need for more practice for teachers with long years of experience using modern technology. From this emerges the resistance of older teachers with more years of experience to change and develop outside the comfort zone they are accustomed to.

The superiority of females over males in the use of E-learning platforms can also be attributed to the fact that females found a way through which they could reconcile their work in a school with their family and home obligations, as they were able to harness technology through the use of educational platforms to provide more time to take care of their family and home affairs.

As for the third research question, it was found that despite all the opportunities, most science teachers still do not consider E-learning as a complete alternative to traditional classroom teaching. Which opens the doors to a room for improvement.

When asked about the most used virtual platforms in their schools, science teachers said that the most used and most accessible to use platform for teaching science was Moodle; Because it provides all the easy and simple tools to display the content of science books and activities so that students can interact with them easily. Google Classroom came in second place, followed by all the other platforms. Interestingly, most science teachers expressed their aspiration for a single, mature, and robust platform that fully supports the Arabic language and solves all the problems of teaching science and other subjects.

#### 5. Conclusion

This research aimed to investigate the perceptions of 8th-grade science teachers regarding the use of E-learning platforms in science education. It contributes to the already existing body of research by shedding more light on the challenges and opportunities of E-learning in science education during and after the coronavirus pandemic. As well as the future of E-learning beyond the COVID-19 era.

Despite relying on different virtual platforms in private schools in the capital city of Amman, the results of this study cannot be automatically generalised to the rest of the schools in the same country

or even to other countries; Because of various factors such as the available infrastructure and the difference in the financial capabilities available in each school from the other and those in public schools. Future research can also focus on post-crisis assessment and investigate teachers' perceptions regarding the effectiveness of using E-learning platforms during challenging times.

## 6. Recommendations

Based on the findings, it is recommended that schools invest more in both the E-learning platforms and their teachers' training and capacity building to use and utilise those platforms fully. Such an investment in E-learning platforms will reap benefits for both teachers and students. Future research on the subject needs to gain more insights, and it should ideally work with a bigger sample size to better understand the perspective of the science teachers.

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