Obstacles Facing Science Teachers regarding Distance Learning during the COVID-19 Pandemic in Saudi Arabia

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Summary
This study aimed to explore science teachers' perceptions of obstacles that have affected their teaching during the COVID-19 pandemic. The sample comprised 204 science teachers in public schools within a Western district of Saudi Arabia. Results revealed that these teachers experienced obstacles across six areas: administration, students, teaching methods, assessment, technology, and learning aids. The study also explored teachers' perceptions of their current experience and offers suggestions for dealing with the identified obstacles.

Key words:
Online learning, COVID 19, Teaching Science.

1. Introduction

Distance learning is not a new concept in education, but technological expansion has promoted its growth. During the COVID-19 pandemic, countries worldwide shut down businesses, schools, and universities to prevent the spread of the virus. As part of Saudi Arabia's implementation of such procedures to protect its people, the Ministry of Education suspended in-person attendance at schools and universities on March 9, 2020 (Ministry of Education, 2020). Distance learning became a feasible and powerful alternative for maintaining educational opportunities across the country and helping students continue their education. The Ministry of Education developed an online platform known as Madrasati on which teachers and students can meet and interact and through which teachers can offer virtual lessons and assess student learning.

With this urgent move from traditional learning to e-learning came the promise of success, as it offered students an opportunity to access various digital materials—including audio, video, and text—that foster good learning outcomes. These various resources also allow instructors to monitor students' progress and provide them appropriate learning opportunities that match their pace and ability.

The current demand for online learning during school and university closures has forced teachers and students across all cultures, socioeconomic levels, education levels, and locales to teach and learn through technological platforms. While schools and colleges in some places—such as areas affected by school-closing disasters like Hurricane Katrina in 2005—have had experience with transitioning to e-learning (Murphy, 2020), the pandemic-driven demand for online teaching and learning was a new experience in Saudi Arabia that required a crisis response. To improve Saudi science teachers' online teaching experience, it is important to examine the issues and obstacles they have faced during their transition to online learning, which will provide further understanding.

3. Literature Review

Several studies have discussed the obstacles that science teachers faced before the transition to online teaching (Alfehaidi, 2018; Alyamani, 1999). Online learning was one of the options supporting the facilitation of science content and providing enriching opportunities to students, but during the COVID-19 pandemic, "emergency e-learning" has become the highly preferred option for educational systems to assist students with continuing their learning (Murphy, 2020). Alqahtani and Alharbi (2021) explored the impact of the COVID-19 pandemic on online learning in Saudi public schools. The study revealed that students were able to effectively access and use learning resources. Kamal and Illiyan (2021) examined Delhi schoolteachers' perceptions of the obstacles they encountered during the transition to online teaching. The study revealed that teachers had positive perceptions of online teaching, such as flexible time and space to attend virtual classes, the sharing of reading materials, and immediate feedback. Conversely, the study reported some obstacles, including a lack of interaction with students, low students' retention, and poor internet connection. An interesting part of this study was that 33.5% of participants were unsatisfied with their experience of teaching online, and their dissatisfaction was related to technical and privacy issues.

Erumit et al. (2021) examined preservice teachers' views of online science education using an online questionnaire. Preservice science teachers reported some

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positive, neutral, and negative views about their experience in online education during the COVID-19 pandemic. The participants believed there were opportunities to learn science online as with face-to-face learning. In addition, the study found that participants expressed positive views about their ability to access the course materials and content appropriately. However, the study revealed some negative challenges, such as difficulties with understanding the course, practical application, interaction, technological issues, time of workload, and group work.

Abed (2021) investigated parents' perceptions of the influence of e-learning on the communication between their children and teachers in elementary school, as well as the performance and obstacles that affect communication procedures. The study revealed that parents preferred face-to-face education, even though they were satisfied with their children's experiences with the Madrasati platform. They reported some obstacles, such as difficulties with content understanding, assessments, student participation, and distraction. In addition, parents reported internet connection issues and lack of physical interaction as affecting students' interests and communication.

E-learning is not a new term in education, but the full transition to online learning during this crisis is a new experience. Kapasia et al. (2020) found that "73.7% [of 232 students] were not involved in any digital platforms for the study before [the] COVID-19 outbreak" (p. 3). The study revealed that some students live in different areas that have varying internet connections, which could complicate students' opportunity to attend classes. Traditionally, online learning was supportive and was an alternative type of learning. Wolf (2010) emphasized that online education "can provide access to courses not otherwise available, give additional help or support, and allow for learning at a time that works better for a student's schedule" (p. 15). Supporters argue that multiple digital sources can diminish the effectiveness gap between traditional and distance education. In addition, online learning can increase the possibility of synchronous interactions of teachers and students based on the course and lessons structure and development to incorporate this feature.

4. Study Purpose

The purpose of this study is to explore obstacles facing science teachers during the COVID-19 pandemic in Saudi Arabia. The results of this study will extend the understanding of science teaching obstacles and contribute to the recognition of some solutions to these obstacles. The study focuses on the following questions:

1) What are science teachers' perceptions of some selected obstacles to teaching science online during the COVID-19 pandemic?
2) How do science teachers perceive their experience of online teaching during the pandemic?

5. Research Instrument

The main instrument of this study was a 38-item survey to investigate the obstacles that affect teaching science. The survey was based on six dimensions, including administration-level obstacles, student-level obstacles, teaching method–level obstacles, assessment-level obstacles, technological-level obstacles, and learning aid–level obstacles. In addition, the instrument included three open-ended questions to collect qualitative data from the participants. The last section consisted of questions regarding science teachers' demographics, including gender, number of students in the class, school location, and years of experience.

6. Methodology

To address and analyze collected data, the study applied descriptive statistics, including frequencies, means (M), standard deviations (SDs), the reliability procedure, t-test, and one-way ANOVA, using SPSS. In addition, the researcher conducted a qualitative analysis of the survey's open-ended questions, using a coding, categorization, and themes. Written responses to these three questions illustrated additional viewpoints of these obstacles and explored science teachers' suggestions to deal with these obstacles. After reviewing and analyzing the responses, codes, categories, and assertions emerged.

6.1. The Sample

The study employed 204 science teachers from a western district in Saudi Arabia with several demographic variables such as gender, years of experience, students' number in the classroom, and school location. As shown in table 1, the demographic information indicates that 178 (88.1 %) of participated teachers were male and 18 (8.9 %) female. Six participants preferred not to identify their gender. Of those who participated, 67 (32.8%) of science

teacher were teaching in urban school, 98 (48.0%) in suburban school, and 38 (18.6%) were in rural schools. There were two (1%) of participants taught less than 10 students in the classroom, 52 (25.5%) taught in classes of 11-20 students, 71 (34.8%) taught in classes of 21-30 students, 56 (27.5%) taught in classes that had more than 31 students, and 22 (10%) of science teachers reported number variation in their online classes. Five participants taught in teaching profession for 1-5, 30 (14.7%) taught for 6-10 years, 56 (27.5%) taught for 11-15 years, and 112 taught for more than 16 years in the educational profession (Table 1).

Table 1: Demographic Characteristics (n = 204)

Variable	*n*	*%*
Gender		
Male	178	88.1
Female	18	8.9
Not identified	6	3.0
Students' Numbers in the Class		
6-10	2	1.0
11-20	52	25.5
21-30	71	34.8
more than 31	56	27.5
defer from class to another	22	10.8
School Location		
Urban	67	32.8
Suburban	98	48.0
Rural	38	18.6
Not Identified	1	0.5
Years of Experience		
1-5	5	2.5
6-10	30	14.7
11-15	56	27.5
More than 16	112	45.9

6.2. Validity and Reliability

Several specialists reviewed and verified the instrument validity, and their reviews helped the researcher to make some changes to the items and all necessary adjustments. The researcher determined the reliability based on Cronbach's alpha. The result of the estimate for all dimensions was high (0.78–0.86), including obstacles at the level of administration (0.78), student (0.83), teaching methods (0.85), assessment (0.82), technology (0.82), and educational aids (0.86) (Table 2).

Table 2: Reliability Coefficients for Obstacles Dimensions

Dimensions	Reliability Coefficient (Cronbach's Alpha)	Items Numbers
Administration	0.78	6
Student	0.83	7
Teaching methods level	0.85	6
Assessment level	0.82	7
Technology level	0.82	7
Learning aids level	0.86	5

7. Results

7.1. Quantitative Analysis

To answer the first research question (What are science teachers' perceptions of some selected obstacles to teaching science online during the COVID-19 pandemic?), the researcher computed descriptive statistics of science teachers' responses into seven-dimension items and assessed science teachers' perceptions of these dimensions, including obstacles at the level of administration, students, science teachers, teaching methodology, assessments, technology, and educational aids. The researcher used the interpretation rule of means using a five-point Likert scale (Table 3).

Table 3. Means distribution based on five Likert scale

Means Range	Degree
1.00 – 1.79	Very Low
1.80 – 2.59	Low
2.60 – 3.39	Moderate
3.40 – 4.19	High
4.20 – 5.00	Very high

As shown in Table 4, comparing the means of these dimensions revealed a high level of obstacles that science teachers perceived—in which the overall mean was 3.58, with an SD of 0.625. This implies that obstacles to online teaching existed during the COVID-19 pandemic.

In the top dimension were technological obstacles (mean 4.15, SD 0.650). The learning-aid obstacles ranked second (mean 3.90, SD 0.782). Then, at the third rank were the obstacles at the student level (mean 3.60, SD 0.843). In the fourth dimension were the assessment obstacles (mean 3.58, SD 0.764). Following that were the obstacles at the teaching level (mean 3.48, SD 0.841). The administration obstacles were identified as the lowest dimension (mean 2.99, SD 0.839).

Table 4: Means and Standard Deviation of Science Responses in Regards to Obstacles of Online Teaching during the Pandemic.

Study Dimensions	M	SD	R	Degree
Administration-level problems	2.99	.839	6	Moderate
Student- level obstacles	3.60	0.843	3	High
Teaching- level obstacles	3.48	0.841	5	High
Assessment- level obstacles	3.58	0.764	4	High
Technology- level obstacles	4.15	0.650	1	High
Learning aids- level obstacles	3.90	.782	2	High
All Dimensions	3.58	0.625	-	High

A further analysis of the technological obstacles revealed that science teachers considered a poor internet connection to be the most predominant obstacle in this dimension (mean 4.62, SD 0.692). A weak connection caused pauses in interactions at some points during lessons, and the teacher or students lost their connectivity to the virtual classroom. The second obstacle was a "lack of economic resources for some families" (mean 4.57, SD 0.620, implying that some families may have had difficulties with providing their kids with electronic devices and internet connectivity. The third obstacle was students' distance from internet services (mean 4.37, SD 0.804). Internet availability varies among cities and rural areas, resulting in an issue in some places. The fourth obstacle was "difficulty carrying out electronic tests due to frequent internet outages" (mean 4.13, SD 0.966). The fifth obstacle was the difficulty with the availability of electronic devices (mean 3.89, SD 1.075). In addition, science teachers considered the obstacle of using technological functions the right way (mean 3.86, SD 1.041), implying that students may encounter some challenges with effectively utilizing technology to learn. The obstacle of students' ability to use applications for distance learning ranked seventh (mean 3.63, SD 1.147). Therefore, technological obstacles were the most frequent issues among all participants, which can cause further challenges related to students' interaction with the teacher and each other or their ability to employ these technologies to facilitate and enhance their learning during the COVID-19 pandemic (Table 5).

Table 5: Means and Standards Deviation of Science Teachers Responses to the Items of Obstacles at Technology Level of Online Teaching.

Obstacles at Technology Level			
Items	M	SD	R
Using technology function on the right way	3.86	1.041	6
The weakness of the internet connection.	4.62	0.692	1
Students' ability to use applications for distance learning	3.63	1.147	7
The difficulty with the availability of electronic devices	3.89	1.075	5
Lack of economic resources for some families	4.57	0.620	2
Students' distance from internet services	4.37	0.804	3
Difficulty carrying out electronic tests due to internet outages	4.13	0.966	4

As shown in Table 6, the obstacles at the learning-aid level were in the second dimension (mean 4.19, SD 0.733), revealing the importance of training science teachers to design electronic content. Due to the shift to distance education, many teachers need to learn the use of technology since previous preparation may not have included this type of teaching. The second item in this dimension was the difficulty in conducting some scientific activities and experiments in electronic lessons (mean 4.00, SD 0.967). In addition, the third and fourth obstacles were close to each other, encompassing the difficulty in providing electronic educational aids (mean 3.83, SD 1.015) and the difficulty in building e-educational activities (mean 3.80, SD 1.003). The last obstacle in this dimension was related to the difficulty in designing e-learning content (mean 3.64, SD 1.094).

Table 6: Means and Standards Deviation of Science Teachers Responses to the Items of Obstacles at Learning aids Level of Online Teaching.

Learning aids level obstacles			
Items	M	SD	R
The difficulty in providing electronic educational aids	3.83	1.015	3
The difficulty in designing e-learning contents	3.64	1.094	5
The difficulty of conducting some scientific activities and experiments in electronic lessons	4.00	0.967	2
The need of training science teachers to design electronic contents	4.19	0.733	1
Difficulty in building online activities	3.80	1.003	4

The analysis of obstacles at the student level revealed that students were facing difficulties with class interaction with each other during online lessons. Teachers thought that online learning hindered students' interaction and communication with one another. The second obstacle was related to the weakness of the family's awareness of its correct role in following up with the student. Distraction of students' focus during online lessons was the third influential obstacle (mean 3.82, SD 1.226). The next obstacle was related to the weakness of interaction and communication between students (mean 3.79, SD 1.130). The fifth rank in this dimension was the frequent distracting questions (mean 3.55, SD 1.182). Next, science teachers considered the obstacle of frequent behavioral interruption by some students in the virtual lessons (mean 3.33, SD 1.221). Lastly, science teachers perceived the increase in the number of students as an obstacle in the virtual classroom (mean 3.03, SD 1.301; Table 7).

Table 7: Means and Standards Deviation of Science Teachers Responses to the Items of Obstacles at Student Level of Online Teaching.

Student Level Obstacles			
Items	M	SD	R
Difficulty in class interaction with each other during online lessons	3.86	1.183	1
Distraction of students focus during online lessons	3.82	1.226	3
The frequent distracted questions	3.55	1.182	5
the weakness of interaction and communication between students	3.79	1.130	4
The obstacle of frequent behavioral interruption by some students in the virtual lesson	3.33	1.221	6
The increase of students' number as obstacle in virtual classroom	3.03	1.301	7
The weakness of family's awareness of its correct role in following up with the student	3.85	1.186	2

As shown in Table 8, obstacles at the assessment level were moderately high. The item "difficulty observing electronic tests" was the first obstacle in this dimension (mean 4.37, SD 1.017), indicating that science teachers were not able to prevent students from using books or other resources to complete tests. The second obstacle was "difficulty measuring some scientific knowledge and skills during online lessons" (mean 3.72, SD 1.043). Limited assessment strategies was the third obstacle in this dimension. The fourth item was "focus on the cognitive assessment only" (mean 3.46, SD 1.058). The fifth item was "the duration of online session is not enough to apply assessment" (mean 3.39, SD 1.161). The item "difficulty in providing immediate feedback during distance learning" was the sixth obstacle in this dimension (mean 3.31, SD 1.130). The last item was "difficulty in managing the time during electronic tests" (mean 3.23, SD 1.240).

Table 8: Means and Standards Deviation of Science Teachers Responses to the Items of Obstacles at Assessment Level of Online Teaching.

Assessment level obstacles			
Items	M	SD	R
Difficulty to provide immediate feedback during distance learning	3.31	1.130	6
Difficulty measuring some scientific knowledge and skills during online lessons	3.72	1.043	2
Focus on the cognitive assessment only	3.46	1.058	4
Difficulty in managing the time during electronic tests	3.23	1.240	7
Difficulty observing electronic tests	4.37	1.017	1
The time of online session is not enough to apply assessment	3.39	1.161	5
Limited assessment strategies	3.58	1.041	3

An analysis of obstacles at the teaching level revealed the importance of a shortage of practical activities that could be implemented remotely due to technical difficulties (mean 3.92, SD 0.997). At the second rank was the item "difficulty in using practical demonstration methods during online lessons" (mean 3.55, SD 1.109). The third item was "inadequate teaching methods used for individual differences (mean 3.45, SD 1.148), which was close to the item "difficulty of diversifying teaching methods" (mean 3.42, SD 1.138). The fifth rank included two items: "using traditional and memorization in discussion and dialogue activities" and a "lack of adequate websites to support the learning process of scientific lessons" (mean 3.26-3.26, SD 1.097–1.109; Table 9).

Table 9: Means and Standards Deviation of Science Teachers Responses to the Items of Obstacles at Teaching Level of Online Teaching.

Teaching level obstacles			
Items	M	SD	Rank
Lack of adequate websites to support the learning process of scientific lessons	3.26	1.097	5
Difficulty to use practical demonstration methods during online lessons	3.55	1.109	2
Using traditional and memorization in discussion and dialogue activities	3.26	1.202	5
Difficulty of diversifying teaching methods	3.42	1.138	4
Inadequate teaching methods used for individual differences	3.45	1.148	3
Shortage of practical activities	3.92	0.997	1

7.2. Qualitative Phase

To answer the second research question (How do science teachers perceive their experience of online teaching during the pandemic?), the researcher analyzed the responses to overriding qualitative questions, using structured codes and categories to identify emerging themes. The analysis followed general procedures that Creswell (2012) suggested, which require the researcher to "make sense out of text data, divide it into text or image segments, and label the segments with codes into broad themes" (p. 243). The qualitative questions are as follows:

1) How do you describe e-learning obstacles you faced in teaching science?
2) What are your suggestions for improving e-learning during the COVID-19 pandemic?
3) How did you implement scientific experiments?

7.2.1. E Learning Obstacles

Science teachers were asked in the sample to provide narrative responses to the following question: "How do you describe e-learning obstacles you faced in teaching science?" The analysis revealed seven emerging themes based on a total of 155 participants' responses, including obstacles related to students, internet connection, time, assessments, family roles and awareness, teaching strategies, teachers' knowledge, and communication procedures.

Students' obstacles. The most repeated obstacles among respondents were related to students' attendance, attention, participation, interaction with teacher and peers, lack of accountability, and lack of technology knowledge. Following representative examples of quotes for each obstacle related to students: students' attendance (11 responses)—"some students do not attend from the beginning of the lesson" and "frequent students' absence from the platform." In addition, a participant indicated, "Students might attend to get their attendance registered only without serious interest in learning." Attention is the most frequently cited issue among participants (20 responses)—"difficulties to retain students' attention during online learning." Some participants believe that there are some factors that could aggravate the issue of students' attention, such as a distracting object in the area of study, games, using the mic without a need to, a lack of interest in following up with the lesson, and frequent internet disconnection. In addition, a lack of students' participation was one of the obstacles (five responses)—"some students avoid answering questions." However, participants did not provide a clue or reason for students' abstention from participation in the virtual classroom.

Students' interaction with teachers and their peers was one of the related obstacles (four responses)—"some students attend the virtual lesson, but they do not interact with the lesson." Another participant indicated that there is "a weakness of students' interaction and attention and various distracted issues."

Another finding of this analysis was on students' accountability (seven responses). Thus, seven participants emphasized that there is a lack of students' accountability regarding their homework and tests. Another participant pointed out that "some students may not depend on themselves to do their homework and tests." A participant pointed out that "students may get help from relatives at home or use books to do their tests." The last obstacle at the student level was students' knowledge in dealing with technology and troubleshooting issues.

Internet Connection. The second set of obstacles identified were related to the internet, which was weak and interrupted on many occasions. The following are examples of representative responses among 39 participants who indicated that the internet was the most important challenge in teaching online lessons—"weakness of the internet connection and frequent disconnection." Participants did not provide a reason for their poor internet connection.

Assessment. Another obstacle facing science teachers (13 responses)— issues of trusting online assessments. a participant stated that "inability to trust current assessments."

Four participants mentioned the issue of assessment credibility—"difficulties with trusting students' evaluation process, so distance learning cannot help to evaluate students' achievements." The most significant explanation for this lack of credibility of assessments stems from teachers' concerns that students may be getting help from one another, as well as using books and internet resources, and that there is no appropriate way to monitor students' progress during their work on tests.

Time. Another obstacle that participants mentioned was time (13 responses). This issue includes two parts: 1) the study time of the day was not appropriate—evening for elementary school (seven responses)—"time of virtual lessons in elementary is not appropriate" and 2) the period of online lesson was short and was insufficient to have further discussions (six responses), especially when there was a need to deal with individual differences. A participant mentioned "the increase of technical issues, short lesson time, and shortage of training." Another participant mentioned in his response, "teachers need to learn about appropriate assessment strategies to deal with individual differences, which needs more time."

Family Role. An interesting part of the study's analysis was that families need more training and troubleshooting knowledge to assist their kids, and they need to learn about their appropriate roles, which involves monitoring or assisting their kids. The analysis revealed that there was a need for parents' observation of their kids, while two participants thought that parents might provide more assistance than what students need. A participant mentioned "weakness of parents mandatory" as a parental obstacle. In addition, there is a need to increase families' awareness of the importance of distance learning.

Teachers' Obstacles. The last identified theme was teachers' obstacles (six responses). The analysis revealed three areas in which science teachers encountered obstacles, including teachers' technological knowledge, design of electronic assessments, design of e-learning activities, and implementation of scientific activities. In addition, there was a need for training development in some areas related to technology use in teaching and assessments.

7.2.2. Teachers' suggestions

In response to the question, what are your suggestions for improving e-learning during the COVID-19 pandemic? The analysis revealed seven themes, including strengthening internet connection and technology needs (40 responses) and providing training for teachers and students on how to deal with technological use and troubleshooting (24 responses). Also, there included a need to change study time and lesson length (17 responses), consider developing teaching strategies (16 responses), provide different ways to facilitate teacher–student communication (six responses), and change the procedure of assessments and focus more on oral examination to prevent students' use of books, which would increase students' accountability and the credibility of assessments. Two respondents mentioned the importance of continued effort in the educational system to maintain the success of this experience and continue the developmental process.

7.2.3. Scientific experiments

For scientific experiments, participants considered five types regarding the implementation of practical experiments. Analysis of 155 respondents to the question about implementing scientific experiments showed that 64 (41.29%) science teachers did not implement any scientific experiments. Twenty-eight (18.06%) science teachers used virtual laboratories, even though a teacher mentioned that virtual laboratories could only work on specific devices, as were not supported for all devices. About 16.77% of science teachers used designed videos to explain the experiments, and 4.51% of science teachers employed the use of picture and PowerPoint to explain experiments' steps and possible results. In addition, 3.87% of science teachers mentioned that they used a live video recording to explain the practical experiments. However, 14.19% did not specify the practice they employed to implement scientific experiments. One participant indicated the difficulty of implementing scientific experiments without appropriate training—"there is a difficulty with implementing scientific experiments without adequate training." This would encourage educators to consider planning more training for teachers to deal with these areas.

8. Discussion and Conclusion

The transition to e-learning during the COVID-19 pandemic has led teachers and students to modify teaching and learning tasks to accommodate the conditions and challenges of virtual schooling. Though distance education presents pedagogical challenges and learning obstacles, teachers in this study were able to assess the obstacles facing them when teaching science online. The study's findings highlight these obstacles, which include those related to problems with technology and internet connection, learning aid availability, addressing student and teacher

needs, modifying teaching and assessment strategies, and maintaining assessment credibility. These results align with other findings that emphasize problems with internet connection and technological device use (Kapasia et al., 2020) as well as communication (Abed, 2021). This study also revealed that teachers encounter assessment obstacles, as some teachers expressed concern about the credibility and proper application of online assessments. This finding is consistent with Almosa (2021), who reported that assessment strategies have been a challenge during the transition to online learning. The current study's findings suggest that this obstacle can be addressed by varying assessment strategies, adding oral assessments, and streaming live video as students complete assessment tasks. Results also suggest that science teachers need more training opportunities to strengthen their student assessment skills.

The study revealed that teachers encountered the obstacle of students interaction. Even though the transition to online learning promotes the expanded use of various technological resources (Abed, 2021), these resources do not adequately address problems with interactions in e-learning environments. Though students attend online lessons, they seem unmotivated to interact with their teachers there, and online peer interactions seem to be even worse. The traditional face-to-face learning setting, in which teachers and students can observe and respond quickly to one another, is critical for effective interaction (Wut & Xu, 2020). For example, Shu and Gu (2018) found that in-depth interactions occur more often in face-to-face classrooms than in online learning settings. Though these findings are an important consideration, ever-advancing technologies may yet solve the seemingly inherent issue of poor interaction in online learning. Further efforts may improve online course content to foster teacher-student, student-student, and student-content interaction (Abromi et al., 2011).

This study also uncovered issues with distraction in e-learning, as evidenced by off-topic questions, students becoming distracted by objects or games in the virtual environment, and internet interruptions.

In conclusion, the study showed some obstacles that perceived by science teachers in a Western district in Saudi Arabia during the COVID-19 pandemic. The study revealed some suggestions to improve teaching science during this transition, including strengthening the internet connection based on establishing a partnership with telecom internet companies, providing teachers and students with appropriate and effective training, changing study time and lesson length, developing teaching strategies, and finding appropriate assessment strategies.

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