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Teaching University Practical Courses Online during COVID-19 Crisis: A Challenge for E-Learning

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ABSTRACT

Just as the new Corona pandemic "Covid-19" has broken the barriers of time and space, the calls for distance learning - which accompanied the spread of the virus - came to break the barriers of space and time as well. The enforced quarantine made the absence of face-to-face classes an excuse to promote to different worlds through spacious internet networks. Universities have resorted to online applications that depend on designing lectures, setting assignments, homework, tests, and correcting them electronically, and communicating with students through a virtual environment and applications downloaded via PCs and smart phones. The paper investigates the difficulties of presenting practical classes in schools of science, and social sciences online. It explores the current situation and two questionnaires have been administered to collect the required data from teachers and students in science and applied sciences disciplinesin Istanbul Gelisim University and other Turkish private and state universities. The study shows that teachers (83.3%) and students (53.4%) believe that practical skills are affected by the lockdown due to the crisis. There is a little difference in the opinions of students and also of teachers of science and social science related to the size of the issue and how it can be solved. Teachers and students of science are more concerned about the impact of poor practical skills on their future career than social science students. Teachers (55.8%) and students (40.8%) prefer live teaching and recording of the practical courses more than other teaching modes.

Keywords: COVID-19, practical classes, science, social science, virtual lab

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INTRODUCTION

A. COVID-19

COVID-19 is an unknown pathogen that has become highly infectious to humans. Weiss was among the first to write about Coronavirus pathogenesis[1]. In December 2019, this coronavirus has mutated enough to start to cause serious human diseases. Its fast spread around the globe and its nature of high transmissivity has caused a fatal pandemic [2], (it was declared a pandemic by the World Health Organization on March 11, 2020)[3]. The effect of COVID-19 was medically severe. Its threat to public health is profound. The epidemic is escalating rapidly, and hasresulted in great terror the world over. COVID-19 is unique among human coronaviruses due to a combination of reasons: its high transmission and its high mortality risk. COVID-19 is now considered a major health threat to the global community. The global spread has been rapid, with more than 215 countries reporting cases. As of May 13, 2020, there were over 4,363,037confirmed cases and over 293,348deaths worldwide. Due to the spread of Covid-19, countries almost the world over resort to closing schools and universities nationwide.

Today there are a total of 7.5 million students studying at 207 Turkish universities. It should be mentioned here that Turkey is the second largest country in the European Higher Education Area (EHEA) after Russia [4]. Turkey has a previous experience in online education. In 2018, Turkish Higher Education Council (YÖK) launched an intensive program for students and academic staff to improve the digitalization of teaching at universities .Accordingly, YÖK established centres for distance education (UZEM) at 128 universities to support the transition process to online education [4]. Since the first day of the Corona announcement of a global pandemic, YÖK has dealt with the crisis with flexibility in compliance with the measures taken by the Ministry of Health and related institutions.

In the same connection, Turkey had to stop all schools and universities on March 16, 2020. The Council works to manage the crisis by taking quick and flexible decisions and reviewing the decisions taken earlier on a daily basis, in addition to following up the decisions of international universities.

As a response to the COVID-19 crisis, Turkey established a commission to follow the online education system. This commission is working under supervision ofYÖK. It includes a group of experts in technology and education. The mission of this commission is to put a road map for the current period and to provide academic staff with assistance and technical support in online education [4].

Concerning the applied and practical courses, The Council decided to postpone these courses to the most suitable time according to the universities vision with consideration to extend the academic calendar [5]. In fact, we are living in a period when distance education is at the forefront of effective ways to confront the spread of the virus and continue the educational process via the internet.

B. What is e-learning?

It can be defined as: an educational system to provide educational or training programs for students or trainees at any time and anywhere using interactive information and communication technology such as (the internet, TV channels, e-mail, computers, and teleconferencing, etc.) in a synchronous or asynchronous manner[6-9].E-learning can be considered a method of education that provides educational content and communicating skills and concepts to the learners via information and communication technology and its multiple media resources. The process is administered in a way that allows the student to interact actively with the content, the teacher and colleagues synchronously or asynchronously

in time, place and speed that suit the conditions of the learners and their abilities. Educators along with technical support staff [10]manage all educational and academic activities and requirements electronically through electronic platforms designated for that.

E-learning and information technology are not a goal or an end in themselves. Rather, they are a way to communicate knowledge and achieve the pre-set goals of education including making the learner ready to meet the requirements of working life in all its aspects, which have become dependent in one way or another on information technology and its rapidly changing nature. There is no doubt that there are justifications for this type of education that are difficult to limit in this paper, but it can be said that the most important advantages of e-learning are as follows. It increases the possibility of communication of students among themselves, and between students and the school. It expresses the different views of students thanks to online forums such as discussion boards and chat rooms. It promotes a sense of equality: since the communication tools give each student the opportunity to express his opinion at any time without embarrassment. It offers an easy access to the teacher in the fastest way, outside the official working hours. It maintains a flexible and adaptable method of teaching where students can receive the class materials in a way that suits the student, as e-learning allows the possibility of handling the resources in many different ways according to the preference of the student. The process contributes to taking into account the individual differences among students. It caters for the various teaching methods: E-learning allows the students to focus on important ideas while watching the lecture or lesson, each according to his own preferable way of learning. The curriculum is available all the time: that is, you learn wherever you are, whenever you want and make the most of time.

C. Disadvantages of e-learning

The paper has elaborated on the benefits of e-learning, however, it also has some shortcomings.

Several Studies investigated the shortcomings of e-learning[11-19]. For example, despite claims that e-learning can improve the quality of education, it is argued that making learning materials available online improves learning only for specific forms of collective assessment[16]. The paper investigates whether e-learning is just a supplementary device for traditional methods of learning and teaching. The most common criticism of e-learning is the complete absence of vital personal interactions, not only between students and instructors, but also among students themselves [20, 21].

E-learning as a means of education makes learners subject to meditation, educational distancing as well as lack of interactivities or personal ivolvement. We need a strong force of motivation, inspiration and time management skills in order to reduce these effects.With regard to clarifications, interpretations and exploration, the e-learning method may be less effective than traditional learning methods. No doubt face-to-face interaction is the best for both teachers and students.When it comes to improving the learner's communication skills, e-learning may have a negative impact. Although learners may have excellent academic knowledge, they may not possess the skills to provide their acquired knowledge to others.Since e-learning tests and assessments are currently administered online, it may be difficult, if not impossible, to control or regulate activities such as cheating.E-learning may also be subject to hacking, plagiarism, fraud, inappropriate selection skills and inappropriate use of copy and paste.E-learning may negatively affect socialization skills and limit the control of teachers on the educational process.Not all majors can use e-learning effectively in education. For example, scientific fields that require practical experience may be more difficult to study through e-learning. Researchers have argued that e-learning is more appropriate in social sciences and humanities more than fields such as medical science and engineering where there is a need to develop practical skills.

D. Teaching Practical Courses during COVID-19 Crisis

Practical courses have a significant importance in linking theory with practice and this linking consolidates students' academic and practical skills. Through practical and lab classes, students can get hands-on experience related to the field more than they did in the classroom. Indeed, practical courses can develop students' skills and affect their attitudes [22].

Teaching practical courses in many programs such as medical, engineering, health, languages, and gastronomy online without application or practical work created greater challenges for universities and institutions. Practical courses are essential for the students who are studying these majors for many reasons. Firstly; these courses contribute to building the knowledge of the students and their practices in the field study; secondly; the students can't graduate and join the labor market without getting the key skills for their future career; thirdly, most of these courses are prerequisite for other courses students need to register, so they are necessary for students' profiles. Also, teachers recognize the importance of practical courses in many programs [22, 23].

Due to widespread of COVID-19 pandemic, many universities all around the world decided to shift their educational programs to be online platforms for two reasons a) to ensure a continuous learning and teaching process b) to adapt to the global strategy to curb the spreading of coronavirus [24]. Indeed, theoretical courses are less overwhelmed [25],while, laboratory work and practical courses pose an evident obstacle to e-learning. The crisishas posed an urgent question; how the universities will overcome this critical situation and what are the efficient teaching strategies for practical courses during the COVID-19 crisis?

In fact, there is an obvious difference between the nature of theoretical and practical courses, so finding creative different approaches to ensure the quality of e-learning become necessary [23]. This transformation from face-to-face classes to home-settingscenariosduring lockdown and technological challenges could affect both the students and the academic staff negatively [26]. For example, many of the academic staff working in applied and practical colleges didn't experience online teaching before. Hence, this increased their worries and fears towards the new virtual environment and maintaining a reasonable degree of students'engagement [24]. In this context, Rose states that COVID-19 pandemic has deep impacts and may change the future of the applied sciences education[26]. Additionally, Rio et al, confirm that COVID-19 affects the learning and training environment for medical students because of applying social distancing[27]. It prevented all the forms of gathering in laboratory sessions and clinical teaching which always involves using real patients in various settings.

This is an invaluable part of learning the art of medicine, as it enables students to apply learning to the real world, and also to learn from patients, which is often the most meaningful form of learning.

In this regard,Rose mentioned that some faculties such as faculty of medicine in a few cases have been succeeded to transform the pre-training course into online system[26]. This includes small virtual groups and online clinical skills settings. Also, he added that in some other cases they decided to postpone these practical courses.

It's very important to mention that the optimal learning situation is the interaction between the students and teachers in the practical work. Within this learning environment, teachers depend mainly on role modeling that enhances the professional identity of students [28].

As a result of the increasing infection rates, some faculties especially the faculty of medicine started preventing students from going to practice their training in the hospitals. Accordingly, in the mid of March 2020, Association of American Medical Colleges recommended that medical students should stop their clinical rotations [26].

On the other hand, China has exceptional experience in online education. The universities decided to open 401 practical courses based on virtual simulation through 22 platforms [25]. There still remains one urgent question how the student will gain practical experiences in this critical time? The solutions have been developing but may resort to moving many practical sessions online, creating virtual cases, engaging the students with telemedicine environments. Indeed, the e-learning approach can play a significant role to address this challenge [23]. However, the online simulation can enhance the theoretical concepts, but it will not provide the students with the real experiences [23, 26]. However, very soon it's expected that the technology of artificial intelligence and 5G will accelerate communication and enhance the teaching methods for different disciplines [25].

E. E-learning as a challenge for Gastronomy education

Gastronomy education depends mainly on training and application [29]. It has been mentioned that gastronomy and culinary education is based mostly on the American and French approaches which apply the principles of learning by doing and experiential learning [30-32]. In this perspective, Sarıoğlan highlights that gastronomy training is a significant aspect for undergraduate and postgraduate students[29]. It needs real practices in the kitchen laboratories under the supervision of chiefs and academic staff. Furthermore, Temizkan et al, confirm that the quality of gastronomy education relies on the training of students in the field and their ability to develop their skills on a personal level[31]. In this sense, the internship is considered as an essential part of hospitality and gastronomy programs particularly before student's graduation [33]. In line with this Koemphasizes the importance of professional skills in gastronomy to improve the quality of education and to help students in their career development [34].

The gastronomy students face severe impacts as a result of the COVID-19 pandemic. The practical courses in many universities have been stopped. Also, they missed the training opportunities, practices and internships in hotels and restaurants which were locked down completely. This means that COVID-19 becomes a pivotal obstacle to implementing successful internships programs. In fact, in this critical time, gastronomy education is expected to witness many changes according to the new restrictions imposed by COVID -19 pandemic. So, the courses and training techniques should be developed to align with the new needs and requirements [31, 35]. According to YÖK, 184 Turkish universities teach gastronomy education [36]. Turkey has 35 programs focusing on food offered by four many institutions: faculty of tourism, faculty of applied science, faculty of fine arts, and vocational colleges. These programs include culinary arts, gastronomy, and food &beverage management.

This study aims to explore the current situation of practical courses at science and applied sciences schools; it tends to describe how COVID-19 crisis may impact the teaching of practical courses, training and internship programs. Also, the purpose of this paper is to explore the potential implications of COVID 19 and possible alternatives for practical and lab work.How will thehigher education institutions provide practical and lab work – as a major and essential component - for medical, health sciences, engineering, gastronomy, and translation and interpretation students in the time of COVID-19 crisis?.

METHODOLOGY

A. Study design

This study was conducted during May 1, 2020 and May 27, 2020 using a descriptive survey.

B. Setting and population

The present study investigates the scenarios for alternative university practical classes in the time of Covid-19 crisis. The paper evaluates the current challenges the practical work poses on universities. The researchers adopted descriptive research design and used convenient sampling technique for data collection by introducing online survey with google form. Students and teachers from Istanbul Gelisim University, schools of science and social science have received two questionnaires respectively by emails. Science schools include health sciences and engineering while the social sciences include school of applied sciences, translation, and gastronomy. For the sake of confidentiality and reliability of data, questionnaires have been organized without names. Total of 103 students and 43 teachers from Istanbul Gelisim University and other Turkish state and private universities have taken part in the survey.

C. Data analysis

Collected data were analyzed by using SPSS Version 25. Frequency analysis, percentage analysis and descriptive statistics were used to get inferences.

RESULTS AND DISCUSSION

Practical lessons and lab work have gained great importance because they link theory and practice[22], which offers a greater experience for students to digest the theoretical part. Students also acquire practical skills that qualify them for better jobs when they start delving into the labor market after graduation from university. The more students participate in practical work, the more they become more confident in themselves. The risk resulting from less practical experience will be minimal as a result. These lessons also qualify the student to participate in the research field, whether during his university studies or at the graduate level. As stated earlier the study investigates the impact of lockdown in the time of COVID-19 on their practical and technical skills in light of students no longer attending universities and consequently not joining their practical work in labs. The two questionnaires directed to students and teachers aim to survey their opinions for the sake of addressing the effects of the crisis and eliciting better practices for future similar situations. The study was conducted on a group of students of Gelisim University and some Turkish universities distributed as follows (50.5%) represents science disciplines such as School of Health Sciences, Engineering, and (49.5%) represents social science students. In this study, the opinions of teachers were also surveyed as such (41.9%) from science schools and (58.1%) from social science schools, as shown in Table 1.The participants' responses are shown in Tables 2 -5.

A. Students

The study shows that a large percentage of students (54.4%) believe that the crisis negatively affected their practical skills, as a larger percentage of students (62.1%) believe that the impact of the crisis on practical lessons is greater than on theoretical lessons. Both science and social students have a similar opinion regarding the negative impact of the crisis on practical courses where the percentage of science students(55.8%) whereas the social science is (52.9%). The students' position on the impact of the crisis on their practical abilities was reflected in their desire to withdraw from the practical courses and postpone them to latter after the crisis is over. It has been observed that (44.7%) of the students expressed their desire to withdraw from these courses, and this percentage increases among students of science (50.0%) and it is (39.2%) for students of social sciences. This can show the fear and anxiety of science students, especially medical, engineering and even translation and interpretation majors, that the impact of the crisis on their skills would be grave. The main concern for students is the possible impact of poor practical practices on their future career opportunities. This interpretation is supported by the fact that 44.2% of students of science support the postponement of practical courses until after the crisis, while 39.2% of social science students support the same view. In a previous study that we conducted on the same sample of students, these students showed great support for both the method of recording lectures of theoretical subjects and uploading them to the university's website besides the way of conducting live online lectures via the internet, saving and uploading them to the university's website for students to view them at their convenience with no restriction on the number of viewing[37].

To address the effects of the crisis, Gelisim University and Turkish universities have chosento upload lectures of theoretical courses to the university's website and the student can view these lectures whenever he

wants with no restriction on the number of views. At a later stage, online lectures were also offered for students to increase their participation during the lectures and to provide a means for direct communication with the course teacher. As a preliminary measure until the universities instruct otherwise, teachers have been allowed to administer the practical lessons in the same way and upload them to the university's website for students to view in the same manner explained earlier.

The results of the study showed that a small percentage of students (26.2%) believe that the method of recording practical lessons will give the same outputs students used to get when conducting practical lessons themselves inside the university in the same way before the crisis. The responses of students of science (25.0%) and students of social science (27.5%) are almost the same. The percentage increases slightly (38.8%) for the method of recording practical lessons, provided that the experiment is conducted live online via the internet and that students are allowed to communicate directly with the lecturer. The results show a higher percentage of supporters of this method among students of science (42.3%) compared to students of social science (35.3%). Students believe in the importance of the presence and supervision of the lecturer during practical lessons, as 59.2% of the students agreed with this opinion. The percentage of approval in science colleges (63.5%) was greater than among students of social science (54.9%) and the reason may be due to the nature of practical lab work in science colleges that requires accuracy and high skill because they relate to humans as in medical sciences or machines as in engineering disciplines compared to practical lessons in social science that require skills as well, but to a lesser extent than science.

To lower the effects of the crisis on the student's practical skills, China has implemented a virtual simulation method to teach practical lessons, a known method that enables students to conduct experiments using simulation programs [25]. The study showed that 36.9% of students support using the simulation method to conduct practical lessons, and the percentage of supporters among students of science (34.6%) is less than students of social science (39.2%). Through the results, it can be observed that the percentage of supporters for the method of recording practical lessons is almost the same as the percentage of supporters for conducting practical lessons through simulation, taking into consideration that Gelisim University did not apply this method during the crisis, and the percentage of students' support for it may be due to their lack of knowledge of this method.

Students were asked about their preference among the three previous methods that they decide on to conduct practical lessons: the results showed students' tendency to record lectures by simulation is against expectation (18.5%). The percentage of students who favor the method of recording lectures and uploading them on the university's website (40.8%) is so close to those who favor live online lectures (40.8%), but science students' support for live lectures (44.2%) is greater than recorded ones (40.4%) and is also greater than the social science students' support (37.3%) for live online. Even social science students (41.2) support recorded lectures more for the reasons previously mentioned. The results also show a noticeable decrease in students' support for the simulation method (18.5%) as shown in Figure 1. The reason, as mentioned earlier, may be that students do not know this method or not familiar with because it was not applied during the crisis.

Table 1. The number of participants from science and social schools.

	Teachers		**Students**	
	Science	**Social**	**Science**	**Social**
Male	14	14	13	21
Female	4	11	39	30
Total	18	25	52	51
	43		103	

Table 2. Mean and standard deviation of students' responses on the Questionnaire (n=103).

	Questions		**Mean**	**SD**
Q1	Do you agree that the crisis has affected the practical work more than the theoretical part?	Science	3.67	1.03
		Social	3.88	1.04
Q2	Do you agree that recording the lab experiment and uploading it as a demo video meets the goal of the practical training?	Science	2.85	1.13
		Social	2.92	1.04
Q3	Do you agree that the instructor should make the experiment at lab and students watch it live online?	Science	3.08	1.22
		Social	3.02	1.20
Q4	Do you agree to use simulation software that enable the student to make the experiment via specialized program as a temporary solution during the crisis?	Science	3.25	0.90
		Social	3.29	0.87
Q5	Do you prefer to drop the practical work during the crisis?	Science	3.38	1.04
		Social	3.22	0.98
Q6	Do you agree that the crisis will negatively affect your practical skills?	Science	3.56	1.12
		Social	3.55	1.14
Q7	Do you prefer to take the practical work after the crisis as a compensation for not taking it earlier?	Science	3.35	0.98
		Social	3.33	1.00

Q8	Do you agree that teacher's supervision and guidance during practical work cannot be compensated?	Science	3.77	1.07
		Social	3.61	1.05

Response scale: 1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree and 5 = Strongly Agree.

Table 3. Students' responses on the Questionnaire (n=103).

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Q1	**Science**	3 (5.80)	1 (1.90)	18 (34.6)	18 (34.6)	12 (23.1)
	Social	2 (3.90)	2 (3.90)	13 (25.5)	17 (33.3)	17 (33.3)
Q2	**Science**	9 (17.3)	7 (13.5)	23 (44.2)	9 (17.3)	4 (7.70)
	Social	8 (15.7)	4 (7.80)	25 (49.0)	12 (23.5)	2 (3.90)
Q3	**Science**	7 (13.5)	10 (19.2)	13 (25.0)	16 (30.8)	6 (11.5)
	Social	7 (13.7)	9 (17.6)	17 (33.3)	12 (23.5)	6 (11.8)
Q4	**Science**	3 (5.80)	3 (5.80)	28 (53.8)	14 (26.9)	4 (7.70)
	Social	3 (5.90)	2 (3.90)	26 (51.0)	17 (33.3)	3 (5.90)
Q5	**Science**	2 (3.80)	9 (17.3)	15 (28.8)	19 (36.5)	7 (13.5)
	Social	3 (5.90)	7 (13.7)	21 (41.2)	16 (31.4)	4 (7.80)
Q6	**Science**	2 (3.80)	8 (15.4)	13 (25.0)	17 (32.7)	12 (23.1)
	Social	4 (7.80)	3 (5.90)	17 (33.3)	15 (29.4)	12 (23.5)
Q7	**Science**	2 (3.80)	7 (13.5)	20 (38.5)	17 (32.7)	6 (11.5)
	Social	3 (5.90)	4 (7.80)	24 (47.1)	13 (25.5)	7 (13.7)
Q8	**Science**	2 (3.80)	4 (7.70)	13 (25.0)	18 (34.6)	15 (28.8)
	Social	1 (2.00)	7 (13.7)	15 (29.4)	16 (31.4)	12 (23.5)

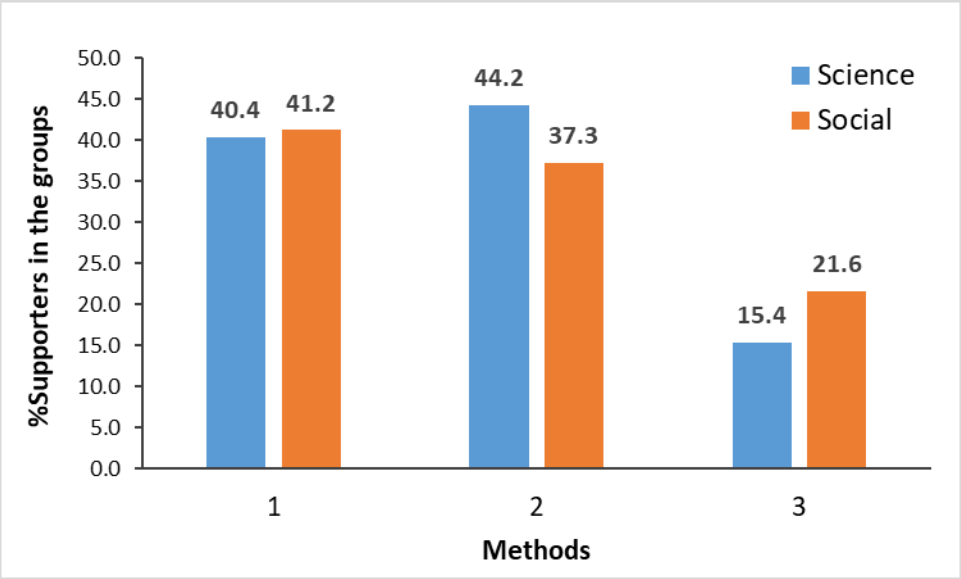

Figure 1. Preferred modes of teaching practical courses by the students. 1 = recorded lectures, 2 = live lectures and 3 = simulation mode.

B. Teachers

The study shows that the majority of teachers (83.7%) believe that the crisis has negatively affected the science courses more than social courses, and this percentage is almost the same among teachers of science schools (83.4%) and social schools (84.0%). This is due to the teachers' fear of the impact of the crisis on the skills required to be acquired during practical lab work, as 81.4% of teachers believe that the crisis will negatively affect students' practical skills, especially since these skills are necessary to

prepare the student for future courses in which the student will gain new skills that depend on Skills that he would have gained from previous courses. The crisis poses a great burden for the lecturers if the students are not well qualified during the crisis because a student will not be equipped with sufficient skills for practical lessons after the crisis has ended, which requires from the lecturer a great effort to solve this problem. Also, the student's practical skills constitute an important part of the university's reputation from which the student graduates, especially in the job market and in research areas where practical skills are considered a criterion for evaluating the university's competence. The study showed that teachers of science are more concerned about the loss of practical skills among students because of the crisis than teachers of social science, where the percentage in science reached 94.5%, while this percentage was 72.0% in social science, which is similar to the opinion of science students about the reasons that were mentioned previously. Nevertheless, in a previous study that we conducted to survey the opinions of the same teachers on the impact of the crisis on theoretical courses, a large percentage of them showed satisfaction with the procedures followed which included recording lectures and uploading them on the university's website as well as conducting live online lectures via the internet as mentioned previously[37].

In this study, teachers' opinions were surveyed about the method used in the university, which is to record lectures and upload them on the university website, where a small percentage of teachers (18.4%) considered that this method can lead to students acquiring the required practical skills similar to conducting practical lessons at the university and there is a convergence in this percentage between teachers of science colleges (16.7%) and social (20.0%). A much larger percentage than the previous percentage of teachers who support conducting practical work live online, and just below the percentage of teachers in science schools (61.1%) compared to their counterparts in social science (66.0%). The increase in teachers' support for this method can be understood due to the possibility of having direct communication with students, which may reduce the impact of the crisis on students' acquisition of the required skills. The role of the lecturer in supervision of students during practical work is a pivotal and important role in terms of guiding students to the optimal application of skill and assessing student performance and guiding them towards maintaining their personal safety, the safety of the place, the safety of equipment and tools. A large percentage of teachers (66.1%) support this view, and it is difficult to replace the role of the supervisor for the reasons mentioned. The support of teachers of science for the important role of the supervisor is 72.2%, while in social science is 60.0%. This can be explained by the nature of practical work in science that relate, for example, to the human body, as in the medical school, and by the use of sophisticated machines and devices, as in engineering departments, and the use of chemicals as in the school of science.

The results also show an increase in the percentage of teachers (65.0%) who support conducting practical lessons through simulation programs over the previous methods. This increase appears more among the teachers of social science (80.0%) while it is (50.0%) in science for the reasons that have been mentioned previously. However, when teachers were asked which method they prefer to conduct practical work with: the largest percentage supported the second method (55.8%), followed by the third method (30.2%), then the first method (14.0%). The science teachers' support for the second method (38.9%) which is equal to the third (38.9%), while the social science teachers' support for the second method (68.0%) which is much greater than the third (24.0%) as shown in Figure 2. The reason may be that the practical lessons in social science do not need simulation programs in the same way science disciplines do, that is why the teachers of these schools tend to support more the use of the second method during the crisis.

A large percentage of teachers (66.9%) believe that postponing practical lessons until the end of the crisis may be the best solution.This percentage increases as expected among teachers of science (77.7%) than social science (56.0%) and it seems that this is the most acceptable solution currently, especially in the event of a rapid finding of a treatment or vaccine for the coronavirus. The duration of the negative impact of the crisis will be only for one regular semester and the effect may continue for the summer semester.

Table 4. Mean and standard deviation of teachers' responses on the Questionnaire (n=103).

	Question		Mean	SD
Q1	Do you agree that the crisis has affected the practical work more than the theoretical part?	Science	4.44	0.90
		Social	4.28	0.72
Q2	Do you agree that recording the lab experiment and uploading it as a video demo meets the goal of the practical training?	Science	2.28	1.19
		Social	2.80	0.94
Q3	Do you agree that the instructor should make the experiment at lab and students watch it live online?	Science	3.22	1.36
		Social	3.52	0.90
Q4	Do you agree to use simulation software that enable the student to make the experiment via specialized program as a temporary solution during the crisis?	Science	3.50	0.83
		Social	3.80	0.75
Q5	Do you agree that the crisis will negatively affect the student's practical skills?	Science	4.50	0.60
		Social	3.84	0.83
Q6	Do you prefer to give the practical work after the crisis as a compensation?	Science	4.11	0.74
		Social	3.68	0.68
Q7	Do you agree that teacher's supervision and guidance during practical work cannot be compensated?	Science	3.94	0.70
		Social	3.48	0.85

Response scale: 1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree and 5 = Strongly Agree.

Table 5. Teachers' responses on the Questionnaire (n=43).

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Q1	**Science**	0 (0.00)	1 (5.60)	2 (11.1)	3 (16.7)	12 (66.7)
	Social	0 (0.00)	0 (0.00)	4 (16.0)	10 (40.0)	11 (44.0)
Q2	**Science**	6 (33.3)	5 (27.8)	4 (22.2)	2 (11.1)	1 (5.60)
	Social	0 (0.00)	12 (48.0)	8 (32.0)	3 (12.0)	2 (8.00)
Q3	**Science**	4 (22.2)	1 (5.60)	2 (11.1)	9 (50.0)	2 (11.1)
	Social	0 (0.00)	4 (16.0)	7 (28.0)	11 (44.0)	3 (12.0)
Q4	**Science**	0 (0.00)	2 (11.1)	7 (38.9)	7 (38.9)	2 (11.1)
	Social	1 (4.00)	0 (0.00)	4 (16.0)	18 (72.0)	2 (8.00)
Q5	**Science**	0 (0.00)	0 (0.00)	1 (5.60)	7 (38.9)	10 (55.6)
	Social	0 (0.00)	2 (8.00)	5 (20.0)	13 (52.0)	5 (20.0)
Q6	**Science**	0 (0.00)	0 (0.00)	4 (22.2)	8 (44.4)	6 (33.3)
	Social	0 (0.00)	0 (0.00)	11 (44.0)	11 (44.0)	3 (12.0)
Q7	**Science**	0 (0.00)	0 (0.00)	5 (27.8)	9 (50.0)	4 (22.2)
	Social	1 (4.00)	2 (8.00)	7 (28.0)	14 (56.0)	1 (4.0)

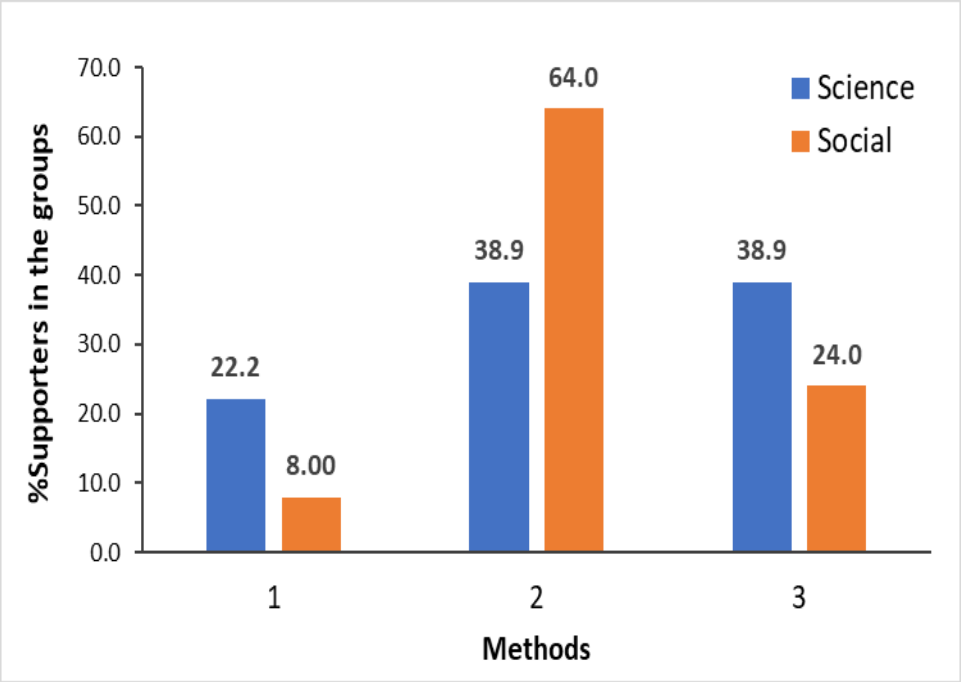

Figure 2. Preferred modes of teaching practical courses by the teachers. 1 = recorded lectures, 2 = live lectures and 3 = simulation mode.

According to some published studies and our previous study, e-learning was widely accepted by students and teachers in teaching theoretical subjects, but the situation is completely different in the case of practical courses because it requires the student to gain certain skills that vary according to different majors and courses[37]. We see that the degree of the impact of the crisis on the student's skills differ according to the student's academic year at the university. As the reflection of the crisis on first and second year students is greater than that of students in subsequent years because in the first years the student is somehow behind in terms of skill, while students of subsequent years can overcome this crisis through the experiences that they already acquired in the years preceding the crisis. Therefore, watching practical lessons online is more useful for senior students more than first-year students. For example, this can be observed in the direct broadcast of some surgeries by specialized surgeons and the presence of many other surgeons of this process via the

internet, which qualify these surgeons to gain the skill of performing the operation via online presentation.

In the field of training and business, where many training courses are held online and have achieved great success. Consequently, the second method can be applied for students of the senior years, which is to conduct practical lessons live online via the internet because of their experience and skills gained from previous years.Besides, recording these lectures and uploading them on the university website can have a great impact on helping the student to overcome the state of anxiety and fear because of the crisis through the possibility of watching the video many times at their convenience. It is also possible to use the simulation method in some practical lessons that participate with the recording method of lectures in compensating for the lack of practical skills during the crisis. Training courses should be held for students and teachers on these programs to get the most benefit out of them.

The process of remote teaching in emergency situations is a temporary shift to transfer teaching from the traditional system to e-education through technology, and once crisis is over, the teaching will return to what it used to be before the emergency situations. Online teaching in emergency situations is created to provide education and communicate with students in a prompt and reliable manner during crisis. In other words, investing technology in communicating with students and using technology to provide services is not evidence of distance learning. The primary element in distance learning is the student, but in the current situation the teacher or lecturer is the only source of information, with no or little role for the student.There may currently be support for faculty members to use technology to deliver their lectures, and provide opportunities for professional development, but there are more important matters, which are content development process, assessment tools, and teaching strategies that have a very important role in increasing student motivation to learn online, and continue to follow those lectures. Lectures of distance teaching in the event of an emergency do not meet the minimum quality, they are based on improvisation without meeting the needs of students, especially as they came in response to the call of the emergency, and are often prepared in advance for face-to-face teaching. The scenarios discussed in this paper can take online practical work to another level if the concerned parties take into account the pedagogical foundations in design, evaluation and presentation.

CONCLUSION

Due to the spread of Covid-19, countries almost the world over resort to closing schools and universities nationwide. In this study, the impact of Covid-19 on the practical skills of the students of science and social science schools in Turkish universities was studied. The results showed that the majority of the teachers and students were afraid of missing the practical skills during the crisis becausethese skills could not be compensated by e-learning techniques.However, they preferred live teaching and recording of the practical courses. The solutions have been developing but may resort to moving many practical sessions online, creating virtual cases, engaging the students with telemedicine environments and simulation modes.

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