A pre-assessment of the educational programs intended to be applied by Turkish universities in light of the continuing spread of COVID-19

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***Abstract:** Education is an ongoing process and an activity which we do not have the privilege of delaying or stopping. It has to go on despite any difficulty, obstacle or even crisis like COVID-19 that the whole world is experiencing at present. Hence, the study aims to evaluate the situation and assess the proposed scenarios for the next phase. Based on questionnaires targeting students and academicians at Turkish universities, and a previous study the authors published recently, the study discusses the present status, and explores the future proposed academic plans at Turkish universities. The results showed that both students (77.5%), and instructors (81.8%) fear the infection by COVID-19 which might affect their choice of the proposed educational program (72.2% and 86.6% respectively). The results also showed that students (52.4%) and instructors (62.5%) prefer to continue teaching social subjects using distance learning program while they prefer blended (36.4% and 56.3% respectively) slightly more than face to face for science subjects particularly the practical courses. The authors assume that the blended program is a way out where it offers a reasonable solution for university education especially at science departments.*

***Keywords:** COVID-19, Turkey, science, e-learning, blended.*

1. INTRODUCTION

1.1 COVID-19: An overview

Since the outbreak of Covid-19 in Wuhan, China in December 2019, the virus has spread rapidly, striking almost all countries of the world [1]. The total number of confirmed cases in the world until the date of preparing this study in September 2020 reached 31,132,906 case, and the number of deaths reached 962,008: a mortality rate of 3.01% compared to the number of cases worldwide [2]. The novel coronavirus (SARS-CoV-2), which causes COVID 19, belongs to a large family of viruses called the Corona family and is believed to have been transmitted to humans from the bat animal [3]. This virus targets the upper respiratory system in humans, and the symptoms range from mild to severe. The symptoms may include heat, coughing and loss of appetite, due to which the patient may enter intensive care and may lead to death [4, 5]. COVID-19 virus is characterized by its rapid spread so it was able in a short time to spread in most countries of the world, which caused a state of panic, as a result of which most countries of the world took strict measures including curfews, imposing sever restriction on international and domestic travel, strict control on trade and commerce, as well

as closing all educational institutions. Consequently, the economic situation deteriorated in most countries of the world and even the religious sites worldwide have closed their doors against worshippers and visitors [6]. Moreover, educational institutions around the world have resorted to applying the distance education system to reduce the negative impact on the educational process during the crisis.

Since the announcement of considering COVID-19 as a global pandemic, Turkish Higher Education Council (YÖK) has literally complied instantly and attentively with the measures taken by the Ministry of Health and related institutions. Implementing digital education at universities is not new and dates back to 2018 when YÖK started an intensive promising program for students and academic staff to internationalize and digitalize teaching at universities. Accordingly, YÖK founded centers for distance education (UZEM) at 128 universities to support the transition process to online education [7].

In the same vein, the Turkish authorities had to postpone the whole education process on March 16, 2020. YÖK has shown great responsibility in dealing with the crisis moment by moment taking into consideration the precautionary measures observed by international educational institutions worldwide. As a follow up to the COVID-19 crisis, Turkish authorities initiated a kind of commission whose sole interest is to follow up on the proceeding of online education programs. It is worthy to note here that the commission works under the direction of YÖK. It includes a good number of experts in both technology and education. The mission of this commission is to work as consultants and advisors on academic and technical issues related to online education and to provide expertise assistance all the time [7].

As a result of the strict measures taken by the countries of the world, including Turkey, to control the disease, the severity of the spread of this disease decreased, thus the number of infected people decreased, as well as the number of deaths, but in return, life almost stopped in these countries, which negatively affected the economy and all walks of life, including educational institutions. To reduce the negative effects on the economy, most countries gradually reduce the measures, but this led to the resurgence of the disease and the entry of the disease in the second wave. As a result, countries are trying to balance between reducing the health risks of their citizens while at the same time keeping the wheel of the economy rolling. Like other countries, Turkey has canceled the curfew and opened governmental and private institutions, factories and commercial bodies while adhering to safety measures, as well as opening airports while ensuring the safety of departures and arrivals. Despite these measures, the number of cases gradually increased with fear of the country entering the second peak of the first wave, as stated by the Turkish Minister of Health [8]. In order to control the disease and limit its spread, the concerned authorities regularly review and evaluate the health situation and the procedures followed. The Higher Education Council has decided eventually to give each university the freedom to make a decision to apply the appropriate educational program according to the health situation in the region in which the university is located. The university can implement the entire online education system or the full face-to-face or a blended programs in different proportions [9].

1.2 E-learning
E-learning is quite different from normal classroom routine and can take different types and shapes. In a nut shell, it is a form of virtual classes, educational seminars, video conferences, etc.
There are different types of e-learning such as distance, blended, mobile, synchronous and asynchronous learning. Distance education is one of the methods of learning in which the

available means of communication play a fundamental role in overcoming the problem of unavailability of direct face-to-face interaction between learner and teacher [10]. Blended learning is a model in which face-to-face direct classroom teaching techniques are combined with online e-learning [11]. Mobile learning is the use of mobile wireless devices such as smartphones and tablet computers, to ensure that learners have access to educational content anywhere, anytime. Synchronous (simultaneous) learning is a method of learning that brings teacher and learner together at the same time using educational tools, such as: virtual classrooms, the Blackboard collaboration system, and instant or text chat [12, 13]. Asynchronous learning tools, on the other hand comprises of educational forums, social networks, digital educational content, e-mail, blogs and special encyclopaedias. Distance education is an educational system that has recently gained popularity and attention on a large scale due to COVID-19 pandemics. With the development of technology in recent years, however, the term distance education or as it is known as virtual education has become in great use and demand, what is distance (remote) education?

1.3 Distance (Remote) education
The term direct e-learning means the techniques and styles of education based on the Internet to communicate and exchange lessons and research topics between the learner and the teacher. Moreover, the spread of the Internet provides an opportunity for interaction and adoption of direct e-learning in order to simulate the effectiveness of realistic teaching methods [14].
Distance education or virtual education is one of the approaches of contemporary education, which is used in Turkish universities, where lessons are provided directly, through computer technologies over the Internet in a completely virtual environment, and in a way that is completely independent of time and space, without requiring the student and the faculty member coming to the university, where the lessons are shown live via direct communication platforms, and students can watch them in video and audio at any time.
Virtual education boosts collaborative learning and group work, and achieves better communication among learners [15] and expands the concept of the teaching and learning process, beyond the boundaries of traditional classroom restrictions. Virtual education unleashes a rich multi-resource environment where distance learning technologies have a fundamental role that helps the role of both teacher and learner take more different shapes than face-to-face routines. Students can connect to the system anywhere there is an Internet connection and participate in the virtual classroom environment. In a typical virtual classroom environment, a teacher can explain lessons via video and audio, use whatever devices he opts for, and even share applications saved on their computers with students instantaneously.
This study aims to survey the opinions of teachers and students at Gelisim University in Istanbul - Turkey about the programs that were previously applied and the most appropriate program to be applied in the coming period in light of the disease entering the second wave, taking into account the pros and cons of each program.

2. METHODOLOGY
2.1. Study design
A descriptive survey was used in this study at Istanbul Gelisim University during the time between September 1 and September 20, 2020.

2.2. Setting and population
The present study is an assessment of the proposed alternative scenarios for university education during the academic year 2010/2021 in the time of Covid-19 crisis. The paper

evaluates the current challenges the various e-education programs pose 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 English questionnaires respectively by emails. For the sake of completion and facilitation, two questionnaires in Turkish language were distributed as well. That makes it four questionnaires altogether. Science schools include health sciences and engineering while the social sciences include school of applied sciences, translation, and gastronomy. For the sake of validity and reliability of Data, questionnaires have been administered anonymously. Total of 103 students and 43 teachers from Istanbul Gelisim University and other Turkish state and private universities have participated in the questionnaires.

2.3. Data analysis
SPSS Version 25 statistical software was used to analyze the collected data. The frequency, percentage and descriptive statistics were calculated to get inferences.

3. RESULTS AND DISCUSSION
During the preparation of this study, the Turkish Minister of Health announced that Turkey has experienced Coronavirus second wave: a fresh spike in COVID-19. Turkey is seeing a resurgence in COVID-19 cases after successfully slowing outbreaks early in the year. The country has taken some measures to control public transportation, weddings and other public gatherings [16]. The number of infected people increased from about 900 cases per day in July 2020 to more than 1600 cases during the preparation of this study (September 2020), and The COVID-19 daily death toll increased from 15 to 60 cases during the same period of time. The Council of Higher Education (YÖK) issued a statement in August 2020 that the council took a decision to grant universities the freedom to plan their academic term and implement the appropriate educational models according to the development of the spread of the virus and the number of cases in the region where the university is located [9].
Previous deliberation took place before the issuance of this statement, and several suggestions were made about the education models, including following the entire online education model or fully face-to-face or a mixture of these two models in different proportions (blended). The decision of the appropriate model depends on intensity of COVID-19 outbreaks. Turkish universities have transitioned to virtual instruction and administered their classes completely online in the spring semester of 2019-2020 as well as in the summer semester. Students were asked to follow their studies and meet their academic requirements remotely. It is worthy to note here that remote education has won the satisfaction of students and teachers according to our previously published study[18 ,17] .
In our previous research, we described the online education model applied in our university and in some Turkish universities, where teachers record lectures and upload them to the university website on the Internet, which gives students the opportunity to watch the recorded lectures at any time they choose with no restriction on the number of views. Some universities also teach online using local or international programs in order to involve students in the lectures using a pre-prepared schedule that organizes the times of these lectures, and after the end of the lecture, it is recorded and uploaded to the university website, and students can view it unlimited at their convenience. These universities have given teachers the freedom to choose the method of evaluation, provided that there is a midterm exam and a final exam. A question bank is prepared and uploaded to the used platform. The question bank includes a large number of questions and the student is examined in a certain number of them, provided that the questions are randomly selected for each student in order to reduce the possibility of cheating [17].

In this study, an assessment of COVID-19 situation in Turkey was conducted during the preparation of the study in order to come up with an educational model that preserves the safety of students and teachers in particular, their families and society in general, as well as achieving the goals required in the educational process.

This study was carried out at Istanbul Gelisim University at the end of the summer semester (2019-2020) on a group of teachers and students from several faculties of the university, including science and social colleges. Most of the participants in the study of teachers were male (75.0%), while the opposite was in the case of students, where most of the participants were females (72,0) as shown in Table 1. The participants' responses are shown in Tables 2 - 15.

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

	Teachers		Students	
	Science	**Social**	**Science**	**Social**
Male	28	20	17	28
Female	6	10	68	49
Total	34	30	85	77
	64		162	

4.1. Students

The study showed that the majority of student participants (77.5%) are still afraid of contracting the disease, although the state of fear has eased slightly from the onset of the disease, and the fear is still greater among females (84.6%) than males (60.0) The study shows the tendency of the majority of students to continue education online (63.8%) and the results vary between students of science colleges (59.4%) and social science colleges (68.2%). The reason students choose to continue with the online model may be due to two factors. The first is fear of infection, as mentioned previously, and the second is the success of online education from their point of view in the past period. Where (51.7%) students believe in the success of online education in general, which was previously applied, whether in the form of recorded lectures (74.2%) or direct lectures via the Internet, and their recording and uploading to the university website (78.9%), which was confirmed by our previous study [17]. When students were asked about their opinion about returning completely to face to face education or applying a blended model of both, students showed a tendency towards the application of blended model (62.8%) while (54.8%) of students supported returning to face-to-face model. It was clear from the results that students of science colleges prefer to return to face-to-face (61.4%) compared to students of social science colleges (51.0%). This can be related to students' fear of the effect of continuing the online model on their practical skills, which was confirmed by the results of the study, as a large percentage of them supported the negative impact of the crisis on their practical skills. When students were asked more precisely about which of the three options (fully online, fully face-to-face, blended) they choose for all subjects, the results showed the students' tendency towards online program (44.2%) followed by the blended system (37.7%). (36.4%) of students opted for the blended program when it comes to scientific subjects (36.4%) whereas (32.7%) preferred face to face models. While the opposite was in the case of social science subjects, where the majority of students supported the use of online program (52.5%) followed by blended program (32.7%). It was clear that students were hesitant between applying the blended program (40.1%) and face-to-face program (38.9) in the case of practical subjects, which reflects the keenness of students on gaining practical skills. It showed at the same time their concern about the

transmission of infection to them, and their concern for not transmitting the infection to their families, especially the elderly among them where the results showed (72.3%) of students fear to transmit the infection to their families if the system applied was face-to-face or blended.

We surveyed the students' views in the event that the university made a decision to apply the face-to-face education program or the blended program, which necessitates the student to attend the university. Attending university means mixing with colleagues and others within the university, using its facilities and transportation to move between home and the university. The results showed that (69.7%) of students admitted that the state of fear and anxiety will affect to some degree their attendance of lectures inside the university, where (55.3%) of students think that they will withdraw from the semester if this decision is implemented. Most of students (89.1%) believe that public transportation may be a cause of the spread of disease, and this can be considered one of the important reasons for choosing the type of education program to be applied. This appears in the students' approval (79.4%) for the university to arrange special buses to transport students from their homes to the university and vice versa, which limits mixing with others and the results show that female students are more supportive of the proposal (90.1%) and the reason is often due to the suffering of female students more than students on public transportation. The results also show the willingness of some students (41.1%) to bear the additional financial cost in the event that the university operates private transportation for them, and the presence of private transportation increased students' support for face-to-face education, which proves the students' concern for their safety in particular and the safety of their families in general.

The results show students' interest in the availability of safety measures within the facilities of the university in the event that either of face-to-face or blended program is applied. The results show students' support for the application of social distance inside classrooms (81.8%) as well as inside laboratories (81.2%). The application of social distance will encourage students to attend lectures, as (77.3%) agree with that. (57.8%) of the students showed their unwillingness to enter the classroom if the class is full, so as not to affect the procedures for applying social distancing. The students' concern for their personal safety and the safety of their families is also evidenced by their keenness to use personal sterilizers within the facilities of the university, as the study showed that (93.6%) carry personal sterilizer with them to use when necessary. This percentage increases among female students (96.2%) more than that of male students, due to female students' concern for personal safety more than male students. Students prefer to sterilize the classrooms after the end of the lecture and before the start of the next lecture, as (84.9%) of students supported that procedure, and some students (51.1%) showed their fear of sitting in the same place as other students before sterilizing the place, and once again, these results show that female students (68.3%) are more concerned with personal safety than male students.

The results also show the students' eagerness and willingness, especially students of science colleges, to conduct experiments inside the laboratory face-to-face or blended, as mentioned previously, but this study also shows students' keenness to take care of their personal safety during these experiments. The results show students' keenness to apply social distance inside the laboratory and their preference for sterilization between laboratory sessions, as was mentioned previously, but that is difficult due to the difficulty of applying social distance procedure inside laboratories, especially since some experiments require the participation of several students in one team. Usually the number of team members is from 2 to 4 students, but the results showed students' preference for conducting experiments in a team that does not exceed two (51.2%) while some of them (35.1%) support conducting experiments in a team of four students. Also, students (68.6%) support in the event that there is more than one laboratory in the semester that they should be scheduled on one school day, and the reason

may be the students' keenness on their personal safety as this limits mixing, whether inside or outside the university, and another factor may be involved, which is saving the cost of transportation.

Table 2. Students' responses on agree/disagree questions (n=162).

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Q1	Science	5 (5.90)	2 (2.40)	27 (31.8)	26 (30.6)	25 (29.4)
	Social	7 (9.10)	0 (0.00)	7 (9.10)	35 (45.5)	28 (36.4)
Q2	Science	11 (12.9)	20 (23.5)	16 (18.8)	24 (28.2)	14 (16.5)
	Social	4 (13.3)	2 (6.70)	2 (6.70)	8 (26.7)	14 (46.7)
Q3	Science	18 (21.2)	23 (27.1)	7 (8.20)	17 (20.5)	20 (23.5)
	Social	16 (20.8)	9 (11.7)	7 (9.10)	17 (22.1)	28 (36.4)
Q4	Science	17 (20.0)	17 (20.0)	17 (20.0)	15 (17.6)	19 (22.4)
	Social	36 (46.8)	8 (10.4)	7 (9.10)	13 (16.9)	13 (16.9)
Q5	Science	16 (18.8)	4 (4.70)	10 (11.8)	35 (41.2)	20 (23.5)
	Social	28 (36.4)	7 (9.10)	7 (9.10)	21 (27.3)	14 (18.2)
Q6	Science	7 (8.20)	20 (23.5)	14 (16.5)	28 (32.9)	16 (18.8)
	Social	7 (9.10)	7 (9.10)	0 (0.00)	35 (45.5)	28 (36.4)
Q7	Science	7 (8.20)	20 (23.5)	13 (15.3)	29 (34.1)	16 (18.8)
	Social	7 (9.10)	6 (7.80)	1 (1.30)	35 (45.5)	28 (36.4)
Q8	Science	5 (5.90)	27 (31.8)	10 (11.8)	21 (24.7)	22 (25.9)
	Social	7 (9.10)	14 (18.2)	7 (9.10)	21 (27.3)	28 (36.4)
Q9	Science	15 (17.6)	20 (23.5)	26 (30.6)	15 (17.6)	9 (10.6)
	Social	7 (9.10)	35 (45.5)	14 (18.2)	14 (18.2)	7 (9.10)
Q10	Science	2 (2.40)	6 (7.10)	11 (12.9)	21 (24.7)	45 (52.9)
	Social	0 (0.00)	0 (0.00)	0 (0.00)	21 (27.3)	56 (72.7)
Q11	Science	1 (1.20)	3 (3.50)	3 (3.50)	24 (28.2)	54 (63.5)
	Social	21 (27.3)	7 (9.10)	0 (0.00)	14 (18.2)	35 (45.5)
Q12	Science	33 (38.8)	23 (27.1)	5 (5.90)	12 (14.1)	12 (14.1)
	Social	56 (72.7)	7 (9.10)	0 (0.00)	7 (9.10)	7 (9.10)

Q13	**Science**	12 (14.1)	8 (9.40)	12 (14.1)	15 (17.6)	38 (44.7)
	Social	21 (27.3)	7 (9.10)	14 (18.2)	21 (27.3)	14 (18.2)
Q14	**Science**	3 (3.50)	2 (2.40)	6 (7.10)	24 (28.2)	50 (58.8)
	Social	14 (18.2)	0 (0.00)	14 (18.2)	7 (9.10)	42 (54.5)
Q15	**Science**	9 (10.6)	11 (12.9)	11 (12.9)	19 (22.4)	35 (41.2)
	Social	28 (36.4)	0 (0.00)	0 (0.00)	28 (36.4)	21 (27.3)
Q16	**Science**	33 (38.8)	23 (27.1)	16 (18.8)	11 (12.9)	2 (2.40)
	Social	35 (45.5)	21 (27.3)	7 (9.10)	7 (9.10)	7 (9.10)
Q17	**Science**	23 (27.1)	14 (16.5)	23 (27.1)	15 (17.6)	10 (11.8)
	Social	28 (36.4)	14 (18.2)	28 (36.4)	7 (9.10)	0 (0.00)
Q18	**Science**	0 (0.00)	3 (3.50)	0 (0.00)	15 (17.6)	67 (78.8)
	Social	0 (0.00)	0 (0.00)	0 (0.00)	28 (36.4)	49 (63.6)
Q19	**Science**	13 (15.3)	0 (0.00)	2 (2.40)	19 (22.4)	54 (63.5)
	Social	7 (9.10)	0 (0.00)	7 (9.10)	35 (45.5)	28 (36.4)
Q20	**Science**	3 (3.50)	3 (3.50)	7 (8.20)	16 (18.8.)	56 (65.9)
	Social	7 (9.10)	0 (0.00)	14 (18.2)	14 (18.2)	42 (54.5)
Q21	**Science**	2 (2.40)	1 (1.20)	5 (5.90)	27 (31.8)	50 (58.8)
	Social	7 (9.10)	0 (0.00)	7 (9.10)	14 (18.2)	49 (63.6)
Q22	**Science**	17 (20.0)	11 (12.9)	8 (9.40)	27 (31.8)	22 (25.9)
	Social	7 (9.10)	0 (0.00)	28 (36.4)	28 (36.4)	14 (18.2)

Table 3. Students' responses on good/bad questions (n=162).

		Very Bad	**Bad**	**Neutral**	**Good**	**Very Good**
Q23	**Science**	3 (3.50)	19 (22.4)	18 (21.2)	14 (16.5)	31 (36.5)
	Social	0 (0.00)	7 (9.10)	21 (27.3)	28 (36.4)	21 (27.3)
Q24	**Science**	4 (4.70)	12 (14.1)	25 (29.4)	15 (17.6)	29 (34.1)
	Social	0 (0.00)	7 (9.10)	7 (9.10)	21 (27.3)	42 (54.5)
Q25	**Science**	28 (32.9)	20 (23.5)	13 (15.3)	12 (14.1)	12 (14.1)

	Social	7 (9.10)	35 (45.5)	14 (18.2)	21 (27.3)	0 (0.00)

Table 4. Students' responses on preferred program question (n=162).

		Completely Online		Blended		Completely Face to Face
Q26	Science	35 (41.2)		35 (41.2)		15 (17.6)
	Social	37 (48.1)		26 (33.8)		14 (18.2)
Q27	Science	22 (25.9)		38 (44.7)		25 (29.4)
	Social	28 (36.4)		21 (27.3)		28 (36.4)
Q28	Science	47 (55.3)		27 (31.8)		11 (12.9)
	Social	38 (49.4)		26 (33.8)		13 (16.9)
Q29	Science	16 (18.8)		34 (40.0)		35 (41.2)
	Social	18 (23.4)		31 (40.3)		28 (36.4)
Q30	Science	53 (62.4)		24 (28.2)		8 (9.40)
	Social	56 (72.7)		21 (27.3)		0 (0.00)

Table 5. Students' responses on always/never question (n=162).

		Never	Rarely	Sometimes	Usually	Always
Q31	Science	0 (0.00)	9 (10.6)	28 (32.9)	17 (20.0)	31 (36.5)
	Social	7 (9.10)	14 (18.2)	0 (0.00)	21 (27.3)	35 (45.5)

Table 6. Students' responses on academic year question (n=162).

		1	2	3	4
Q32	Science	8 (9.40)	34 (40.0)	7 (8.20)	36 (42.4)
	Social	0 (0.00)	49 (63.6)	7 (9.10)	21 (27.3)
Q32: Which academic year?					

Table 7. Students' responses on yes/no questions (n=162).

		Yes				No
Q33	Science	51 (60.0)				34 (40.0)

	Social	42 (54.5)				35 (45.5)
Q34	**Science**	80 (94.1)				5 (5.90)
	Social	77 (100.0)				0 (0.00)
Q33: Do you have classes that need labs next semester?						
Q34: Did you study last semester through distance learning?						

Table 8. Mean and standard deviation of Students' responses on the Questionnaire (n=162).

	Question		**Mean**	**SD**
Q1	Are you still afraid of getting the Coronavirus?	Science	3.75	1.08
		Social	4.00	1.12
Q2	Do you feel less anxious now compared to the previous period (spring semester last year)?	Science	3.11	1.29
		Social	2.82	1.27
Q3	Do you agree to continue with distance learning completely?	Science	2.97	1.50
		Social	3.41	1.56
Q4	Do you agree to return to study face-to-face completely?	Science	3.02	1.43
		Social	2.46	1.59
Q5	Do you agree with the use of a blended program (distance and face-to-face learning)?	Science	3.46	1.39
		Social	2.82	1.58
Q6	Do you agree that your fear of infection will affect your choice of the appropriate education program for the next stage?	Science	3.31	1.24
		Social	3.91	1.23
Q7	Do you agree that your fear of transmitting the infection to your family will affect your choice of the appropriate education program for the next stage?	Science	3.31	1.24
		Social	3.92	1.22
Q8	Do you agree that your fear of infection will affect your attendance of lectures at the university?	Science	3.33	1.31
		Social	3.64	1.36
Q9	Do you agree to withdraw from the semester due to fear of infection?	Science	2.80	1.22
		Social	2.73	1.13
Q10	Do you agree that public transportation may be a cause of transmission of Covid-19 infection?	Science	4.19	1.05
		Social	4.72	0.44

Q11	Do you agree that the university should arrange private buses to transport students to and from the university?	Science	4.49	0.82
		Social	3.45	1.72
Q12	Do you agree that students should bear the financial costs of using private buses?	Science	2.38	1.46
		Social	1.73	1.35
Q13	If the university allocates special buses for students, will this encourage you to attend face to face lectures?	Science	3.69	1.46
		Social	3.00	1.47
Q14	Do you agree to observe social distancing in the classroom?	Science	4.36	0.96
		Social	3.82	1.52
Q15	If social distancing is applied in the classroom, will this encourage you to attend face to face lectures?	Science	4.55	1.84
		Social	3.18	1.69
Q16	If you arrived and found the class is complete, taking into account the social distance, will you enter the hall and violate the social distance?	Science	2.13	1.13
		Social	2.09	1.31
Q17	Would you agree to sit in the same place of students who had a lecture in the same hall?	Science	2.71	1.34
		Social	2.18	1.02
Q18	Do you agree to carry a personal sterilizer with you when you go to university?	Science	4.72	0.64
		Social	4.64	0.48
Q19	Do you agree with observing social distancing inside laboratories?	Science	4.12	1.40
		Social	4.00	1.12
Q20	Do you agree to sterilize the place where you will be sitting in the hall or laboratory?	Science	4.40	1.01
		Social	4.09	1.23
Q21	Do you agree to reduce the number of students inside the laboratory to meet safety requirements?	Science	4.44	0.84
		Social	4.27	1.21
Q22	If face-to-face has been applied in laboratories only, do you agree to have all practical classes on one day?	Science	3.31	1.47
		Social	3.55	1.07
Q23	How do you evaluate recording lectures, uploading them to the university website, and viewing them at a time that suits you?	Science	3.60	1.27
		Social	3.82	0.93
Q24	How do you evaluate the online live lectures,	Science	3.62	1.21

	recording and uploading them to the university website?	Social	4.27	0.96
Q25	How do you rate distance education in general compared to face-to-face education?	Science	2.53	1.42
		Social	2.64	0.97
Q26	Which of these programs do you choose to teach all subjects?	Science	1.76	0.72
		Social	1.70	0.75
Q27	Which of these programs do you choose to teach scientific subjects?	Science	2.03	0.74
		Social	2.00	0.85
Q28	Which of these programs do you choose to teach social subjects?	Science	1.57	0.70
		Social	1.67	0.74
Q29	Which of these programs do you choose to teach practical subjects (which require laboratories)?	Science	2.22	0.74
		Social	2.12	0.76
Q30	Which of these programs do you choose if you suffer from chronic diseases?	Science	2.34	0.88
		Social	2.45	0.89
Q31	Have you ever felt afraid of getting the Coronavirus?	Science	3.82	1.04
		Social	3.82	1.40

Response scale: 1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree and 5 = Strongly Agree.
Response scale: 1 = Very Bad; 2 = Bad; 3 = Neutral; 4 = Good and 5 = Very Good.
Response scale: 1 = Never; 2 = Rarely; 3 = Sometimes; 4 = Usually and 5 = Always.
Response scale: 1 = Online; 2 = Blended; 3 = Face to face.

4.2. Academic staff (Teachers)

In this study also, teachers' opinions were surveyed about the appropriate program for the academic year 2020/21 in light of the outbreak of a second wave of coronavirus after easing the previous measures that were applied at the beginning of the discovery of COVID-19 in Turkey. The results show a good level of satisfaction in general by teachers (72.2%) with the online education system that was applied in the university in the last semester, and a good percentage of teachers (67.6%) showed satisfaction with online education versus face-to-face education. These results show a greater level of satisfaction among teachers of social science colleges (70.6%) compared to science colleges (64.6%). The reason is mostly due to the association of science colleges with some practical skills that are difficult to acquire without practical performance and direct supervision from the lecturer. A large proportion of teachers (76.3%) supported the negative reflection of the crisis on the student's practical skills, as supported by some published studies [19, 20]. The results show teachers' fear of infection as a result of the persistence of the virus and its entry into a second wave, as a large percentage of teachers believe that applying a face-to-face program will pose a risk to the health of the

teachers themselves (81.8%) and the health of students (82.9%). Teachers believe that public transportation may be a major factor in transmitting the virus, as most of them (91.2%) agreed that transportation constitutes danger to their health, especially since the majority of them (86.3%) use transportation to move between their residences and the university. The results also show that the state of anxiety experienced by teachers about their health and the health of their families, as well as the health of students, may be due to the unsatisfactory precautionary measures that have been taken to limit the spread of the disease. Some teachers (35.2%) believe that the university procedures may be insufficient to prevent the spread of the disease. The study shows teachers' keenness on the necessity of applying preventive measures in classrooms and laboratories where the majority of them (85.2%) support the application of social distancing in classrooms and laboratories. Most of them also support (92.6%) reducing the number of students in classrooms and laboratories, in order to reduce direct contact among students. There is a difficulty of applying social distance in most practical lessons, because many practical experiments are conducted in groups and not individually, so the majority of teachers support reducing the number of team members to reduce students intermingling with each other and (56.3%) of teachers believe that it is better that each team consists of only two students.

The results show that the state of anxiety currently experienced by teachers and the lack of clarity of vision of the course the virus will take in future has affected the choice of most of these teachers (86.6%) and their preference for certain educational programs. As the results generally show that some teachers (53.8%) support returning to face-to-face system completely, while more teachers (67.3%) support the application of the blended system and a larger percentage of them (74.0%) support the application of online system. The results show that both the teachers of science and social science subjects agree with this opinion. When teachers are asked about which of the systems (face-to-face, blended, online) they believed to be the most suitable for teaching all subjects, the results show (50.0%) of the teachers choose the blended system followed by the online system (31.3%) and while (18.8%) among them choose face-to-face system. When asked which of these three systems is more suitable for science subjects, the results show a noticeable increase in the number of supporters for the use of the blended system (56.3%) over the online system (25.0%), while the percentage of supporters of face-to-face system remained unchanged. It should be noted here that the results were reversed when teachers were asked about the most appropriate system for social science subjects. Two-thirds of the teachers (62.5%) preferred the online program and the percentage of supporters of the blended system decreased to (25.0%) and the percentage of supporters of face-to-face system decreased to (12.5%). The results are reversed once again when teachers are asked about the most appropriate system for teaching practical subjects. About two-thirds (62.5%) chose the blended program, and about a quarter (25.0%) chose face-to-face, and few (12.5%) chose online program. Taking the results into consideration, it is possible to notice the teachers' tendency towards applying online program in the case of social science subjects while they tend to apply the blended program in the case of science subjects. The number of supporters for applying blended program increases in the case of laboratories. The point is the students need to acquire practical skills that are difficult to acquire through the use of Internet only [19]. Due to the nature of social sciences and the importance of maintaining the safety of students and teachers themselves, teachers have chosen the online system because it satisfactorily achieves the educational goals without exposing students and teachers to danger.

Despite the apparent satisfaction by teachers and students with online program in general, teachers believe that this system lacks some capabilities compared to face-to-face system. Therefore, these teachers believe that blended program may be a better option than online program because it combines the characteristics of the two. The results show that (51.4%) of

teachers believe that online is less efficient when it comes to measuring students' performance compared to face-to-face, and this percentage decreases if we replace online with blended (34.9%). A considerable percentage of teachers (52.8%) also believe that online program does not motivate students' participation compared to face-to-face program, and this percentage decreases with the blended (37.2%).The teacher plays a pivotal role in raising students' motivation to participate effectively through the use of various techniques that may be difficult to provide in online program [10, 21]. (48.8%) of teachers also believe that the online program does not offer enough incentives for students to attend lectures compared to face-to-face program but this percentage decreases in the blended (35.4%) and the reason may be that the lectures in the online program are registered and uploaded to the university website and the student can view them at any time he pleases, and that often discourages some students to attend these lectures.

In general, the study shows that a blended system can be the best solution (especially in the case of practical lessons) in light of the continuing crisis with the virus entering its second wave. The reason for choosing this system is due to the fact the world has gained experience in dealing with the virus and the availability of many studies that helped in understanding the nature of the disease as well as the accessibility of assistive drugs to overcome the symptoms of the disease and preventing patients from reaching the critical stage. Reassuring both teachers and students through the use of strict preventive measures within the facilities of the university and not neglecting their application and spreading awareness of the nature of the disease and how to prevent it. In the blended program, students are divided into groups following the rotation system: one group attends the lecture face to face, and another follows the lecture online, and then vice versa. In all cases, the lecture is recorded and uploaded to the university website to be watched at students' convenience. However, face-to-face lectures should be maintained at a low rate compared to online, and then it can be increased with time, so that safety measures are ensured and the virus is monitored and more controlled. The same previous system and the same procedures can be applied in practical classes. It is preferable for the student to conduct the practical lesson alone, and if this lesson requires group work, it is better for the team to consist of only two students, and in special cases not exceeding three students, taking into account safety procedures. It is also possible to reduce the student's reluctance to attend the lectures face to face by setting a study schedule in which the student's lectures are arranged on few days per week and it is preferable to schedule all the lectures on one day, thus reducing students intermingling with each other in classes and others in public transportation. Since the number of students who attend the university in the blended program is small, the university can arrange private buses for students who wish to use shuttles from home to the university and vice versa, especially in light of the availability of many private buses because most schools use online system.

Table 9. Teachers' responses on agree/disagree questions (n=64).

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Q1	**Science**	0 (0.00)	6 (17.6)	12 (35.3)	14 (41.2)	2 (5.90)
	Social	0 (0.00)	0 (0.00)	6 (20.0)	22 (73.3)	2 (6.70)
Q2	**Science**	4 (11.8)	2 (5.90)	6 (17.6)	8 (23.5)	14 (41.2)
	Social	4 (13.3)	2 (6.70)	2 (6.70)	8 (26.7)	14 (46.7)

Q3	**Science**	4 (11.8)	0 (0.00)	6 (17.6)	14 (41.2)	10 (29.4)
	Social	0 (0.00)	0 (0.00)	2 (6.70)	10 (33.3)	18 (60.0)
Q4	**Science**	4 (11.8)	0 (0.00)	6 (17.6)	16 (47.1)	8 (23.5)
	Social	0 (0.00)	0 (0.00)	2 (6.70)	12 (40.0)	16 (53.3)
Q5	**Science**	0 (0.00)	8 (23.5)	12 (35.3)	6 (17.6)	8 (23.5)
	Social	0 (0.00)	12 (40.0)	8 (26.7)	6 (20.0)	4 (13.3)
Q6	**Science**	0 (0.00)	0 (0.00)	2 (5.90)	8 (23.5)	24 (70.6)
	Social	0 (0.00)	0 (0.00)	2 (6.70)	12 (40.0)	16 (53.3)
Q7	**Science**	0 (0.00)	2 (5.90)	4 (11.8)	16 (47.1)	12 (35.3)
	Social	0 (0.00)	2 (6.70)	4 (13.3)	4 (13.3)	20 (66.7)
Q8	**Science**	0 (0.00)	0 (0.00)	2 (5.90)	10 (29.4)	22 (64.7)
	Social	0 (0.00)	0 (0.00)	2 (6.70)	6 (20.0)	22 (73.3)
Q9	**Science**	0 (0.00)	6 (17.6)	0 (0.00)	10 (29.4)	18 (52.9)
	Social	0 (0.00)	2 (6.70)	0 (0.00)	6 (20.0)	22 (73.3)
Q10	**Science**	0 (0.00)	8 (23.5)	10 (29.4)	6 (17.6)	10 (29.4)
	Social	0 (0.00)	4 (13.3)	6 (20.0)	10 (33.3)	10 (33.3)
Q11	**Science**	4 (11.8)	8 (23.5)	8 (23.5)	8 (23.5)	6 (17.6)
	Social	10 (33.3)	10 (33.3)	6 (20.0)	0 (0.00)	4 (13.3)
Q12	**Science**	2 (5.90)	6 (17.6)	4 (11.8)	16 (47.1)	6 (17.6)
	Social	2 (6.70)	10 (33.3)	4 (13.3)	8 (26.7)	6 (20.0)
Q13	**Science**	0 (0.00)	0 (0.00)	8 (23.5)	16 (47.1)	10 (29.4)
	Social	0 (0.00)	0 (0.00)	0 (0.00)	12 (40.0)	18 (60.0)
Q14	**Science**	0 (0.00)	0 (0.00)	4 (11.8)	16 (47.1)	14 (41.2)
	Social	0 (0.00)	0 (0.00)	0 (0.00)	12 (40.0)	18 (60.0)

Table 10. Teachers' responses on good/bad questions (n=64).

		Very Bad	Bad	Normal	Good	Very Good
Q15	Science	2 (5.90)	6 (17.6)	12 (35.3)	10 (29.4)	4 (11.8)
	Social	3 (10.0)	2 (6.70)	6 (20.0)	14 (46.7)	5 (16.7)
Q16	Science	6 (17.6)	12 (35.3)	8 (23.5)	6 (17.6)	2 (5.90)
	Social	6 (20.0)	16 (53.3)	4 (13.3)	2 (6.70)	2 (6.70)
Q17	Science	6 (17.6)	4 (11.8)	6 (17.6)	16 (47.1)	2 (5.90)
	Social	2 (6.70)	4 (13.3)	6 (20.0)	16 (53.3)	2 (6.7)
Q18	Science	10 (29.4)	8 (23.5)	4 (11.8)	10 (29.4)	2 (5.90)
	Social	14 (46.7)	8 (26.7)	0 (0.00)	6 (20.0)	2 (6.70)
Q19	Science	2 (5.90)	6 (17.6)	6 (17.6)	18 (52.9)	2 (5.90)
	Social	4 (13.3)	6 (20.0)	10 (33.3)	8 (26.7)	2 (6.70)
Q20	Science	8 (23.5)	8 (23.5)	8 (23.5)	8 (23.5)	2 (5.90)
	Social	8 (26.7)	8 (26.7)	8 (26.7)	4 (13.3)	2 (6.70)
Q21	Science	4 (11.8)	8 (23.5)	6 (17.6)	14 (41.2)	2 (2.90)
	Social	0 (0.00)	6 (20.0)	8 (26.7)	14 (46.7)	2 (6.70)

Table 11. Teachers' responses on preferred program question (n=64).

		Completely Online		Blended		Completely Face to Face
Q22	Science	6 (17.6)		20 (58.8)		8 (23.5)
	Social	14 (46.7)		12 (40.0)		4 (13.3)
Q23	Science	4 (11.8)		22 (64.7)		8 (23.3)
	Social	12 (40.0)		14 (46.7)		4 (13.3)
Q24	Science	20 (58.8)		10 (29.4)		4 (11.8)
	Social	20 (66.7)		6 (20.0)		4 (13.3)
Q25	Science	4 (11.8)		20 (58.8)		10 (29.4)
	Social	4 (13.3)		20 (66.7)		6 (20.0)

Table 12. Teachers' responses on always/never question (n=64).

		Never	Rarely	Sometimes	Usually	Always
Q26	**Science**	6 (17.6)	0 (0.00)	0 (0.00)	4 (11.8)	24 (70.6)
	Social	2 (6.70)	0 (0.00)	0 (0.00)	8 (26.7)	20 (66.7)

Table 13. Teachers' responses on yes/no question (n=64).

		Yes				No
Q27	**Science**	12 (35.3)				22 (64.7)
	Social	4 (13.3)				26 (86.7)
Q27: Do you have lab?						

Table 14. Teachers' responses on preferred team members question (n=64).

		1	2	3	4
Q28	**Science**	2 (5.90)	20 (58.8)	8 (23.5)	4 (11.8)
	Social	2 (6.70)	16 (53.3)	12 (40.0)	0 (0.00)
Q28: Which team number do you think is more appropriate?					

Table 15. Mean and standard deviation of teachers' responses on the Questionnaire (n=64).

	Question		Mean	SD
Q1	Do you agree that last semester was a success despite the crisis?	Science	3.35	0.84
		Social	3.87	0.50
Q2	Do you agree that the crisis has negatively affected the practical skills of students?	Science	3.76	1.35
		Social	3.87	1.41
Q3	Do you agree that returning to face to face education poses a risk to students' health?	Science	3.76	1.21
		Social	4.53	0.62
Q4	Do you agree that returning to the education system face to face poses a danger to the health of the teacher?	Science	3.71	1.18
		Social	4.47	0.62
Q5	Do you agree that the precautionary measures taken within the university are sufficient to prevent transmission of infection?	Science	3.41	1.06
		Social	3.07	1.50
Q6	Do you think that public transportation helps	Science	4.65	0.59

	spread infection?	Social	4.47	0.62
Q7	In the event that face-to-face learning is implemented, do you agree with the application of social distance in the classroom?	Science	4.12	0.83
		Social	4.40	0.95
Q8	Do you agree to reduce the number of students in the hall and the laboratory?	Science	4.59	0.60
		Social	4.67	0.60
Q9	Do you agree to minimize the team number in the lab?	Science	4.18	1.10
		Social	4.60	0.80
Q10	Do you agree to continue with distance learning completely next semester?	Science	3.52	1.14
		Social	3.87	1.02
Q11	Would you agree to return to fully face-to-face next semester?	Science	3.11	1.28
		Social	2.27	1.3
Q12	Do you agree with applying a blended program combining distance and face-to-face learning?	Science	3.53	1.14
		Social	3.20	1.28
Q13	Do you agree that the teacher's fear of infection may affect his/her choice of the type of education planned for the next stage?	Science	4.06	0.73
		Social	4.60	0.49
Q14	Do you agree that the student's fear of infection may encourage him not to attend face to face lectures?	Science	4.29	0.67
		Social	4.60	0.49
Q15	How do you rate distance education in general compared to face-to-face education?	Science	3.23	1.05
		Social	3.53	1.14
Q16	How do you evaluate online education compared to face-to-face education in terms of measuring students' performance and academic growth?	Science	2.59	1.14
		Social	2.27	1.23
Q17	How do you rate online education compared to blended education in terms of measuring students' performance and academic growth?	Science	3.11	1.23
		Social	3.40	1.02
Q18	How do you rate online education compared to face-to-face in terms of students' participation during the class?	Science	2.59	1.33
		Social	2.13	1.35
Q19	How do you rate online education compared to blended education in terms of student participation during the lesson?	Science	3.35	1.02
		Social	2.93	1.12

Q20	How do you rate online education compared to face-to-face in terms of controlling student attendance?	Science	2.65	1.23
		Social	2.47	1.20
Q21	How do you rate online education compared to blended education in terms of controlling student attendance?	Science	3.06	1.16
		Social	3.40	0.87
Q22	Which of these plans do you prefer to teach all classes?	Science	1.58	0.77
		Social	2.06	0.92
Q23	Which of these plans do you prefer to teach scientific classes?	Science	1.47	0.69
		Social	1.93	0.92
Q24	Which of these plans do you prefer to teach social classes?	Science	2.29	0.89
		Social	2.46	0.80
Q25	Which of these plans do you prefer to teach practical classes? (Which needs labs)?	Science	1.52	0.69
		Social	1.46	0.71
Q26	Do you use public transportation to come to the university?	Science	4.17	1.50
		Social	4.46	1.02

Response scale: 1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree and 5 = Strongly Agree.
Response scale: 1 = Very Bad; 2 = Bad; 3 = Neutral; 4 = Good and 5 = Very Good.
Response scale: 1 = Never; 2 = Rarely; 3 = Sometimes; 4 = Usually and 5 = Always.
Response scale: 1 = Online; 2 = Blended; 3 = Face to face.

4. CONCLUSION

As many countries in the world have entered the second wave of Covid-19, and Turkey has also entered the second peak of the first wave, so it is necessary to agree on an educational program that takes into account the educational outcomes and at the same time the safety of students and staff in the educational institutions. In this study, students and teachers' opinions were surveyed in order to develop a perception of the appropriate educational program for the future time period. The results showed the tendency of both students (36.4%) and instructors (56.3%) to use the blended program in teaching scientific subjects and to continue with the online program in social subjects (52.4% and 62.5% respectively). We believe that the blended program can be used in the next academic year in general, provided that the preventive measures are strictly observed.

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