

## Face-to-Face, Online or Hybrid, Which Model is Preferred by University Students and Why?

Nükhet Hotar<sup>a</sup>, Mehmet Ali Özcan<sup>b</sup>, Bahar Baran<sup>c</sup>, Emre Karagöz<sup>d</sup>, Lütfiye Özge Güney<sup>e\*</sup>

<sup>a</sup>(ORCID ID: 0000-0002-2195-0852), Dokuz Eylül University, Turkey, [nukhethotar@deu.edu.tr](mailto:nukhethotar@deu.edu.tr)

<sup>b</sup>(ORCID ID: 0000-0001-7842-9702), Dokuz Eylül University, Turkey, [mehmet.ozcan@deu.edu.tr](mailto:mehmet.ozcan@deu.edu.tr)

<sup>c</sup>(ORCID ID: 0000-0002-9179-3469), Dokuz Eylül University, Turkey, [bahar.baran@deu.edu.tr](mailto:bahar.baran@deu.edu.tr)

<sup>d</sup>(ORCID ID: 0000-0002-4887-8168), Dokuz Eylül University, Turkey, [emre.karagoz@deu.edu.tr](mailto:emre.karagoz@deu.edu.tr)

<sup>e</sup>(ORCID ID: 0000-0003-1717-5379), Dokuz Eylül University, Turkey, [lozge.oral@deu.edu.tr](mailto:lozge.oral@deu.edu.tr)

\*Corresponding author

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### ABSTRACT

Teaching model preferences of university students and the factors explaining these preferences may give ideas to educators and decision-makers to design future innovative higher education systems. For this reason, this study aims to examine how some factors affect university students' teaching model preferences (face-to-face, online and hybrid) in detail. The factors of the study were gender, opinions about the complexity of the learning management system, sufficiency of digital materials, knowing how to solve problems during online learning, course participation preferences, online teaching methods preferences (synchronous, asynchronous or both), and finally community of inquiry elements (teaching, social and cognitive presence levels). 5504 university students participated in the study and the data were collected by an online questionnaire. Two-way contingency table analyses using Pearson  $\chi^2$  method and a multinomial logistic regression model (MLR) were applied to determine the factors affecting the teaching model preferences. The results revealed that 71.2% of students preferred to use online supported models (online and hybrid) while only 28.8% of them preferred a wholly face-to-face model. Interestingly, more than half of the females preferred face-to-face and hybrid, while more than half of the males preferred online education. The tendency to prefer online education was related to students' problem solving competencies in the online environment and the learning management system not being complicated for them. This study indicated the relationship of the teaching model preferences with the other factors and community of inquiry elements.



### INTRODUCTION

Online education needs in higher education have undergone a rapid transformation in the last two years. Online education has played a critical and essential role in the period of Covid-19 (the 2019-2020 spring term and the 2020-2021 fall and spring terms). After that, the post-pandemic period came out and blended/hyflex/hybrid learning methods were integrated to face to face education. The past studies investigated the dynamics of online education in small study groups, only while emergency distance education has given researchers opportunities to test and examine online education practices in larger study groups who experience online education. In this regard, this study was conducted with a large group of university students who experienced online education during the pandemic period, to analyze their online education model preferences (face-to-face, online hybrid) in higher education with a broader perspective. With this big data, it is expected to guide educators and decision-makers about the teaching models to be used in higher education.

The theoretical classification of teaching models in this study is based on Coldeway's views on educational practices. Coldeway identifies educational practices in four ways which are the combination of the concepts of time and space (Gulbahar, 2012). These are the same time-same place, same time-different place, different time-same place, and different time-different place. Face-to-face, online, and hybrid categories are used in this study based on Coldeway's framework. Traditional face-to-face teaching refers to the same time-same place teaching. It usually takes place in the classroom environment and is teacher-centered. On the other hand, the same time-different place and different time-different place refer to synchronous and asynchronous online learning, respectively. Recent educational requirements led to new teaching developments in online teaching environments and this brought a few opportunities to be able to compare online education with face-to-face education. Therefore, higher education institutions had a chance to evaluate not only a single method, but also the different combinations of the methods. This was also a great opportunity to reason the affecting factors through educational requirements. For example, there are hybrid and blended solutions where face-to-face and online learning environments are used together. Hybrid learning is a learning environment in which courses are conducted face-to-face and online at the same time (O'Byrne & Pytash, 2015; Abi Raad & Odhabi, 2021). Similarly, blended learning is also a course learning method in which some of the activities within a course are conducted face-to-face and some part of it is conducted online (Graham, 2006; Müller & Wulf, 2022). During the pandemic in recent years, courses are conducted face-to-face on some days of the week and online on some days (UNESCO, 2020). In this study, hybrid learning is discussed as a learning

environment that combines the advantages of face-to-face and online learning and also includes asynchronous and synchronous learning opportunities. Hybrid learning is relatively a new term and has emerged as a popular method of presenting information in the information age (Rahman et al., 2015). The last element of the teaching model of this study is online learning which contains the implementation of fully online activities including synchronous and asynchronous learning.

The past studies also investigated university students' instructional model preferences. A study found that 65% of 6504 university students were willing to enroll in an online undergraduate/graduate-level program (Baran et al., 2010). While only 12% of the students stated that they would like to participate in a completely online course, 56% of them stated that they would prefer to enroll in a hybrid course. At end of the 2020-2021 fall term, the Council of Higher Education (CoHE) in Turkey investigated the teaching model preferences of university students and academic staff because of the Covid-19 Pandemic. 1.255.022 students from 207 universities from all regions of the country voluntarily participated in the study. During the pandemic, 46% of participants preferred completely face-to-face teaching, 29% fully online teaching, and 25% preferred a blended model consisting of both online and face-to-face teaching. After the pandemic, 27% of the students wanted the education process in the spring term to be "face to face", 47% preferred it to be "online" and 26% preferred it to be done in blended learning (CoHE, 2021). According to the Turkish Higher Education Quality Council (THEQC) report, only 3.85% of all Turkish universities partially provided face-to-face teaching during the pandemic period, while 96.15% carried out all education services over the Internet during this period (THEQC, 2020). These three studies indicated that willingness to participate in an online/hybrid/blended course rate accelerated in years and especially in pandemic term while demand for face-to-face education decreased. The studies also examined the teaching model preferences of students descriptively and provided valuable information to the literature. Moreover, as stated before, it is also important to investigate the factors that affect the teaching model preferences of university students to shape further educational practices.

Recent studies about online learning environments focused on the following factors; demographics, individual characteristics, self-regulated learning strategies, motivation, and interaction (Baturay and Yukselturk, 2015). In addition, research studies during the pandemic examined the effect of gender, the usability of the platform, participation, accessibility of course tools, interaction, and support to teaching model preferences (Basuony et al., 2020; Al-Azzam et al., 2020; Chen et al., 2020). Chen et al. (2020) examined seven major online education platforms and identified an index to describe them before and after the pandemic. The results indicated that the index included the timeliness, access speed, and reliability of videos on the online learning platform before the pandemic, while users mainly focused on communication, course management, interaction, and support services of the platform after the pandemic. The common feature of these studies was to examine a small number of students in a certain academic field. Therefore, this study has studied with a larger student group from more diverse academic degrees and so investigated more independent factors in one study. Unlike general and descriptive studies, this study aims to investigate the reasons that affect teaching model preferences.

A theoretical framework should be followed for an in-depth analysis of online learning. According to this purpose, the learning community approach, which is widely used in higher education, (Garrison & Arbaugh, 2007) has been considered as one of the factors affecting the teaching model preferences of students in this study. Community of Inquiry (CoI)'s has three elements: social, teaching, and cognitive presence. While social presence is defined as the ability of participants in the community of inquiry to show their characteristics to the community and present themselves as "real people", cognitive presence reflects learners' critical thinking skills and learning output levels in online environments (Garrison et al., 2000). Teaching presence is defined as "designing, simplifying and directing cognitive and social processes to achieve valuable learning outcomes" (Shea et al., 2003). It begins before the course and continues during the course (Anderson et al., 2001).

Distance education researchers are more interested in social presence because of the lack of communication in educational technologies (Poquet et al., 2018). Law et al. (2019) examined that student enrollment has a positive effect on cognitive and social presence, and relatively has an effect on student learning outputs. Teaching presence plays a crucial role to simplify student cognitive skills and social interactions among peers. Instructors' social presence can be established using text or asynchronous video communication (Collins et al., 2019). Online students' high social presence and high interaction with low course structure increase the students' satisfaction with online learning platforms (Horzum, 2015). Molinillo et al (2018) stated the effect of teacher-student interaction, student-student interaction, and social presence on active learning and emotional engagement in blended learning courses. The study indicated that social presence and teacher-student interaction have positive effects both directly and indirectly through emotional engagement in active learning. Ozonur et al. (2018) tackled the effects of the learning environment on students' social presence and motivation. Students were more satisfied when their social presences were high in online learning (Horzum, 2015).

Many studies analyzed the readiness level of students for online and hybrid learning according to the CoI (Law et al., 2019; Ozonur et al., 2018; Poquet et al., 2018). These studies examine students' readiness levels in online learning according to the learning environment and their demographics such as gender, faculties, or region of residence. It has been revealed that the self-efficacy aspect of online communication, which is considered one of the aspects of online readiness, differs depending on the gender and major of the students. But geographical regions did not indicate any difference in readiness for online classes (Sakal, 2017). However, different results can be obtained in a study examining the effects of the existing Internet infrastructure. In studies examining the factors affecting student preferences in online learning environments, gender, age, course-based success grades, and general grade points were taken into account as variables (Beyth-Marom et al., 2003).

Students' teaching model preferences may be different in the distance learning process in the term, which is sometimes accomplished unprepared and unplanned. This study examines how these learning conditions affect students' teaching model preferences owing to teaching, social and cognitive presence just after they experienced distance education rapidly. This study investigates the effect of the CoI elements (social presence, cognitive presence, and teaching presence) on teaching model preferences. In addition, gender, quantity/quality of content, and students' digital problem-solving skills have been investigated in the study.

## Research Questions

This study has two main research questions and the following sub-questions as stated below.

RQ1: How did students' teaching model preferences (face-to-face, online, hybrid) after experiencing emergency distance learning?

1. What were students' teaching model preferences? (Q1)
2. How frequently students' teaching model preferences changed according to ...
  - students' gender? (Q2)
  - students' evaluation of the complexity of the learning management system was changing from strongly disagree to strongly agree? (Q3)
  - students' beliefs on the sufficiency of digital materials were changing from strongly disagree to strongly agree? (Q4)
  - students' knowing how to solve problems was changing from strongly disagree to strongly agree? (Q5)
  - online education method (synchronous, asynchronous, or both)? (Q6)
  - students' preferences about mandatory participation in the course? (Q7)

RQ2: How did the CoI framework elements (teaching presence, cognitive presence, social presence) predict students' teaching model preferences?

## METHOD

### Research Design and Sample

The survey method was used to evaluate students' preferences for face-to-face, online and hybrid models. 5504 university students taking mainly synchronous courses from different faculties of Dokuz Eylul University (a Turkish public university) participated in the survey at the end of the 2020-2021 fall term. 49% percent of the participants were female, while 51% were male. Mean age was 21.65 (SD = 3.64, Mod = 21, Median = 21). The youngest and oldest participants were 17 and 58 years old, respectively. The frequencies of age range were,  $\leq 21$  (n=3748; 68.1%), 22-26 (n=1468; 26.7%), and  $27 \geq$  (n= 288; 5.2%). The research ethics approval was taken on November 19, 2020.

### Data Collection Tool

The data collection process took two months from January to February 2021. The questionnaire was designed as a web-based survey and shared with the students via the online system. The first part of the questionnaire included the dependent variable "teaching model preferences (face-to-face, online and hybrid models)". This study assumed that our sample heard and knows these terms owing to social media and their own experiences in the pandemic term conditions. The results of a research study support our assumptions that 131,760 tweets in 2020 were about "distance learning" and focused on "e-learning" and "online learning" as the year progressed. Also, they indicated the relationship learning with distance, online, hybrid terms in a diagram (Kimmons, Rosenberg and Allman, 2021). Independent variables were also asked in the first part of the questionnaire. These variables were gender, location of attending online education, teaching model preference, by which method online education can be more effective (synchronous, asynchronous, and both together), etc. The second part consisted of questions about the evaluation of the online education system. Finally, the third part contained 34 items derived from the CoI. The CoI survey which was developed by Arbaugh et al. (2008), has been adapted into the Turkish language by Olpak and Çakmak (2018). According to their study, Cronbach's  $\alpha$  internal consistency coefficients calculated to evaluate the reliability of the scale was 0.96 for teaching presence, 0.95 for social presence, and 0.97 for cognitive presence. Cronbach  $\alpha$  value was calculated as 0.98 for all items.

### Data Analysis

Four different two-way contingency table analyses using crosstabs (Green and Salkind, 2014) were conducted to evaluate the relationship between "teaching model preference" and other factors (gender, students' view about the complexity of the learning management system, sufficiency of the digital educational materials provided by the faculty member and knowing how to solve problems faced in the learning management system). Before starting the analysis, researchers examined the data. Surveys were applied to volunteer students.

Statistical methods specific to categorical data analysis have gained great prevalence, especially in biomedical and social sciences (El-Habil, 2012). If there are more than two categories in the response variable, it is appropriate to use Multinomial Logistic Regression (MLR) (Long, 1997). In this study, MLR was used to determine the factors which affect the teaching model preference having three categories. While conducting MLR analysis, the factor categories were re-coded into three levels instead of five Likert types. Strongly disagree and disagree were re-coded as "Disagree" while agree and strongly agree were re-coded as "Agree". Moderate remained unchanged. The description of variables used in the Chi-Square and MLR are given in Table 1.

**Table 1.** Description of Variables Used in Chi-Square Analysis and Multinomial Logistic Regression (MLR)

Method(s)	Variable Name	Description of Categories	Data Type
Chi-Square, MLR	Teaching Model Preference (Independent variable)	1. Online Education 2. Face to Face Education 3. Hybrid Education	Categorical
Chi-Square	Gender	1. Female 2. Male	Categorical
Chi-Square, MLR	Learning Management System Used Seems Complicated to Me	1. Strongly Disagree 2. Disagree 3. Moderate 4. Agree 5. Strongly Agree	Categorical
Chi-Square, MLR	Sufficiency of the Digital Educational Materials Provided by the Faculty Member	1. Strongly Disagree 2. Disagree 3. Moderate 4. Agree 5. Strongly Agree	Categorical
Chi-Square, MLR	Knowing How to Solve Problems Faced in the Learning Management System Used	1. Strongly Disagree 2. Disagree 3. Moderate 4. Agree 5. Strongly Agree	Categorical
MLR	By which method online education can be more effective	1. Synchronous, 2. Asynchronous 3. Both	Categorical
MLR	Course participation preference for the course to be effective in online education	1. Student attendance must be required and graded 2. No attendance requirement, but attendance must be graded 3. Student attendance must not be required and graded	Categorical
MLR	Teaching Presence Score (dependent variable)	Score between 1 – 5	Continuous Variable
MLR	Social Presence Score (dependent variable)	Score between 1 – 5	Continuous Variable
MLR	Cognitive Presence Score (dependent variable)	Score between 1 – 5	Continuous Variable

**FINDINGS**

**RQ1. Factor’s effects on the teaching model preferences**

The findings of the questionnaire on the students’ teaching model preferences (face-to-face, online, hybrid) after experiencing emergency distance learning are presented below.

**Q1.** The participants were asked which method between online, face-to-face, and hybrid education they preferred with the question “*What is your teaching model preference?*”. 45.4% of students responded as “online education”, 28.8% “face to face” and 25.8% “hybrid” (Table 2). These results indicated that most of the students preferred online education.

**Table 2.** Frequency Distribution of Teaching Model Preference

Model Preference	f	%
Online Education	2497	45.4
Face to Face Education	1587	28.8
Hybrid Education	1420	25.8
Total	5504	100

**Q2.** The relationship between “*Teaching model preference*” and *gender* has been investigated. The results indicated that teaching model preference and gender were found to be statistically related (Pearson  $\chi^2(2, 5504) = 27.85, p < 0.01$ ). 54.6% of the students who prefer online education are male, while 45.4% are female students. 51.5% of students who choose face-to-face education are female, and 48.5% are male students. When the students who prefer hybrid education are examined, it is seen that 53.4% of them are female students and 46.6% are male students (Table 3). The percentage of females who prefer face-to-face (51.5%) and hybrid

(53.4%) teaching models was higher than males. The percentage of males who prefer online education (54.6%) is higher than females.

**Table 3.** Contingency Table Showing the Relationship Between Teaching Model Preference and Gender

Teaching model Preference		Gender		Total
		Female	Male	
Online Education	n	1133	1364	2497
	%	45.4	54.6	100
Face to Face Education	n	817	770	1587
	%	51.5	48.5	100
Hybrid Education	n	758	662	1420
	%	53.4	46.6	100
Total	n	2708	2796	5504
	%	49.2	50.8	100

**Q3.** The relationship between "Teaching model preference" and "students' view of the learning management system used" has been investigated. The results indicated a statistically significant difference (Pearson  $\chi^2$  (8, 5419) = 690.307,  $p < 0.01$ ). The majority of students (76%) who preferred online education as a method, answered "strongly disagree" and "disagree" with the statement "the learning management system seems complicated to me" (Table 4).

**Table 4.** Contingency Table Showing the Relationship between Teaching Model Preference and Students' View of the Learning Management System Used as Complex

Teaching Model Preference		Strongly Disagree	Disagree	Moderate	Agree	Strongly Agree	Total
Online Education	n	884	988	311	177	105	2465
	%	35.9	40.1	12.6	7.2	4.3	100
Face to Face Education	n	157	544	319	298	241	1559
	%	10.1	34.9	20.5	19.1	15.5	100
Hybrid Education	n	172	592	287	226	118	1395
	%	12.3	42.4	20.6	16.2	8.5	100
Total	n	1213	2124	917	701	464	5419
	%	22.4	39.2	16.9	12.9	8.6	100

**Q4.** The relationship between *teaching model preference* and *the sufficiency of the digital materials provided by the faculty member* was examined. The results indicated that there is a statistically significant correlation between these (Pearson  $\chi^2$  (8, 5353) = 1029.907,  $p < 0.01$ ). The majority of students (77.5%) who preferred face-to-face education responded as "strongly disagree", "disagree" and "moderate" to the statement "digital educational materials provided by the faculty member meets my needs" (Table 5).

**Table 5.** Contingency Table Showing the Relationship Between Teaching Model Preference and Sufficiency of the Digital Educational Materials Provided by the Faculty Member

Teaching Model Preference		Strongly Disagree	Disagree	Moderate	Agree	Strongly Agree	Total
Online Education	n	132	209	533	963	601	2438
	%	5.4	8.6	21.9	39.5	24.7	100
Face to Face Education	n	379	367	443	284	60	1533
	%	24.7	23.9	28.9	18.5	3.9	100
Hybrid Education	n	215	301	454	343	69	1382
	%	15.6	21.8	32.9	24.8	5.0	100
Total	n	726	877	1430	1590	730	5353
	%	13.6	16.4	26.7	29.7	13.6	100

**Q5.** The relationship between *teaching model preference* and *knowing how to solve problems faced in the learning management system used* was examined. The results indicated a statistical significance relationship (Pearson  $\chi^2$  (8, 5426) = 699.091,  $p < 0.01$ ). The majority of students (76.8%) who preferred face-to-face education as a method, responded as "strongly disagree", "disagree" and "moderate" to the statement "I know how to deal with the problems at the learning management system" (Table 6). 29.6% of the students did not know how to solve the problems they encountered while using the LMS, 31.5% knew it at a moderate level, and only 38.8% knew it.

**Table 6.** Contingency Table Showing the Relationship between Teaching Model Preference and Knowing How to Solve Problems Faced in the Learning Management System Used

Teaching Model Preference		Strongly Disagree	Disagree	Moderate	Agree	Strongly Agree	Total
Online Education	n	168	240	683	925	448	2464
Online Education	%	6.8	9.7	27.7	37.5	18.2	100
Face to Face Education	n	330	337	532	298	65	1562
Face to Face Education	%	21.1	21.6	34.1	19.1	4.2	100
Hybrid Education	n	207	324	495	320	54	1400
Hybrid Education	%	14.8	23.1	35.4	22.9	3.9	100
Total	n	705	901	1710	1543	567	5426
Total	%	13.0	16.6	31.5	28.4	10.4	100

**RQ2. Examination of Teaching Model Preference by the Multinomial Logistic Regression**

The frequencies of the variables for MLR and the results of the MLR in which the whole factors affecting teaching model preferences were investigated in Table 7 and Table 8, respectively.

**Table 7.** Frequencies of Required Variables for MLR

Independent Variables		f	%
Learning management system used seems complicated to me	1. Disagree	2261	61.9
	2. Moderate	613	16.8
	3. Agree	778	21.3
Digital educational materials provided by the faculty member is sufficient	1. Disagree	1091	29.9
	2. Moderate	953	26.1
	3. Agree	1608	44.0
Knowing how to solve problems faced in the learning management system (LMS) used	1. Disagree	1104	30.2
	2. Moderate	1104	30.2
	3. Agree	1444	39.5
Which method of online education can be more effective	1. Synchronous	1071	29.3
	2. Asynchronous	527	14.4
	3. Both	2054	56.2
Course participation preference for the course to be effective in online education	1. Student attendance must be required and graded	311	8.5
	2. No attendance requirement, but attendance must be graded	1130	30.9
	3. Student attendance must not be required and graded	2211	60.5
	Valid	3652	100.0
	Missing	1852	
	Total	5504	
	Subpopulation	3416	<sup>a</sup>

a. The dependent variable has only one value observed in 3383 (99.0%) subpopulations.

Considering the factors affecting teaching model preferences as independent variables, those who prefer face-to-face education and those who prefer online or hybrid education are compared with MLR (Table 8). Face-to-face education is a reference category. Base categories of independent categorical variables are knowing how to solve problems faced in the LMS (agree), the digital educational materials provided by the faculty member being sufficient (agree), the learning management system used is complex (agree), by which method online education can be more effective (synchronous + asynchronous), course participation preference (student attendance must not be required and graded).

**Table 8.** The results of Multinomial Logistic Regression

Education Preference	Independent Variables	$\beta$	S.E.	Wald	df	p	Exp( $\beta$ )
Online Education	Intercept	-	.343	43.191	1	.000	-
	Teaching Presence	2.257					
	Teaching Presence	-.687	.099	48.502	1	.000	.503

	Social Presence	1.305	.088	220.62	1	.000	3.686
	Cognitive Presence	.497	.106	21.904	1	.000	1.643
	Knowing how to solve problems faced in the LMS (disagree)	-.286	.141	4.094	1	.043	.752
	Knowing how to solve problems faced in the LMS (moderate)	-.296	.122	5.838	1	.016	.744
	The digital educational materials provided by the faculty member is sufficient (disagree)	-	.149	72.789	1	.000	.279
	The digital educational materials provided by the faculty member is sufficient (moderate)	1.275	.127	35.972	1	.000	.466
	Learning management system used seems complicated to me (disagree)	-.763	.138	12.223	1	.000	1.622
	Learning management system used seems complicated to me (moderate)	.484	.161	.763	1	.382	1.151
	By which method online education can be more effective (synchronous)	-.300	.111	7.232	1	.007	.741
	By which method online education can be more effective (asynchronous)	.398	.149	7.141	1	.008	1.489
	Course participation preference (student attendance must be required and graded)	-.479	.178	7.279	1	.007	.619
	Course participation preference (no attendance requirement, but attendance must be graded.)	-.158	.112	1.979	1	.159	.854
	Intercept	-.416	.303	1.881	1	.170	-
	Teaching Presence	-.252	.085	8.901	1	.003	.777
	Social Presence	.169	.079	4.569	1	.033	1.184
	Cognitive Presence	.245	.091	7.264	1	.007	1.278
	Knowing how to solve problems faced in the LMS (disagree)	.323	.135	5.703	1	.017	1.381
	Knowing how to solve problems faced in the LMS (moderate)	.151	.126	1.443	1	.230	1.163
	The digital educational materials provided by the faculty member is sufficient (disagree)	-.517	.140	13.551	1	.000	.596
	The digital educational materials provided by the faculty member is sufficient (moderate)	-.130	.128	1.019	1	.313	.878
Hybrid Education	Learning management system used seems complicated to me (disagree)	.307	.121	6.486	1	.011	1.359
	Learning management system used seems complicated to me (moderate)	.089	.136	.430	1	.512	1.093
	By which method online education can be more effective (synchronous)	-.295	.106	7.801	1	.005	.744
	By which method online education can be more effective (asynchronous)	-.301	.146	4.247	1	.039	.740
	Course participation preference (student attendance must be required and graded)	-.293	.167	3.081	1	.079	.746
	Course participation preference (no attendance requirement, but attendance must be graded.)	.175	.106	2.741	1	.098	1.192
	Pseudo R-Square						
	Cox and Snell	.366					
	Nagelkerke	.416					
	McFadden	.214					
	Model Fitting Information						
	Likelihood ratio tests, Chi-square = 1665.120, df = 24, Sig = 0.0001 < 0.05						

Reference category: face-to-face education,

Base categories of independent categorical variables: knowing how to solve problems faced in the LMS (agree), the digital educational materials provided by the faculty member is sufficient (agree), learning management system used is complex (agree), by which method online education can be more effective (synchronous + asynchronous), course participation preference (student attendance must not be required and graded).

The students who disagreed with the “learning management system (LMS) used seems complicated to me” were more likely to prefer online education or hybrid education instead of face-to-face education. The students who stated “LMS used is not complex” preferred online education to face-to-face education 1.622 times more than students who found LMS used complex. Similarly,

students who stated “LMS used is not complex” preferred hybrid education to face-to-face education 1.359 times more than students who found LMS used complex. The sufficiency of digital training materials provided by instructors is an important determinant of teaching model preference. Students who find the digital education materials provided by the instructor insufficient or moderately sufficient are 0.279 and 0.466 times less likely to prefer online education to face-to-face education than students who find the educational materials sufficient. In addition, the fact that the learners do not find the digital training materials provided by the instructor sufficient reduces the possibility of choosing hybrid training to face-to-face training by 0.596 times.

Students who choose “disagree” or “moderate” to the statement “I know how to solve the problems that I faced in the LMS used”, are less likely to prefer online education instead of face-to-face education in terms of education preference than students who answer agree. Students who state they do not know how to solve the problems they face at LMS prefer online education to face-to-face education 0.752 times less than students who state they know. In addition, students who are moderate about solving the problems they face at LMS prefer online education to face-to-face education 0.744 times less than students who say they know. Students who stated that online education will be effective with synchronous methods were 0.741 times less likely to prefer online education to face-to-face education, compared to students who think that both synchronous and asynchronous together will be more efficient. In contrast, students who choose asynchronous as a method of online education are 1.489 times more likely to prefer online education to face-to-face education than students who think that both synchronous and asynchronous together will be more efficient. Students who choose synchronous or asynchronous as an online teaching model are 0.744 and 0.740 times less likely to prefer hybrid education to face-to-face education, respectively, compared to students who choose synchronous and asynchronous methods together. Students who think that participation should be tracked and graded are 0.619 times less likely to prefer online education to face-to-face education than students who think that participation should not be tracked and graded.

According to the results, the coefficient of social and cognitive presence mean scores in both online and hybrid models are positive and statistically significant ( $p < 0.05$ ). The increase in the social presence and cognitive presence score increases the probability that students prefer online or hybrid education compared to face-to-face education, which is the base category. The coefficient of teaching presence means the score is negative and statistically significant ( $p < 0.05$ ). The increase in teaching presence score decreases the probability of students preferring online or hybrid education compared to face-to-face education, which is the base category.

## DISCUSSION

The pandemic has been an opportunity for higher education institutions to compare and improve their research capacity and expertise with regard to distance education. So, after experiencing emergency distance education, it is clear that institutions should revise their mission about digitalization in teaching and learning more innovatively. By taking into consideration the perception of university students who are internal stakeholders of the university, this study aims to give ideas to educators and decision-makers to design future online/hybrid classrooms. The major finding of this study indicated that 45.4% of the students preferred online education, 28.8% preferred face-to-face education, and 25.8% preferred hybrid education. This result is especially important in terms of accepting the distance education system as a valid model in emergency situations that restrict human life.

Secondly, there was a meaningful relationship between the teaching model preferences and gender. In detail, female students were eager to participate face-to-face and hybrid courses while male students preferred online courses. Open and distance education is important because it will provide equal opportunities in education in the context of gender. Besides, it was shown in the studies that females are at a disadvantage compared to men in accessing education and females were more successful in online education (Hilton et al., 2020; Aktas et al., 2019). Considering these results, directing female students to online education will be beneficial in terms of equal opportunities in education. This study revealed that researchers should examine why men prefer online education while females prefer face to face and hybrid.

The complexity of the learning management system affected students’ teaching model preferences. The majority of students who prefer online education stated that the learning management system used was not complex. Learner interest in the learning management system increases their participation in online courses (Klobas and McGill, 2010). Students who think that the LMS is not complex are more likely to prefer online or hybrid education over face-to-face education than students who think that the LMS is complex. This situation makes orientation training inevitable for the use of LMS for students who will be first-year students in higher education. In addition, Individuals with special needs may encounter different difficulties in the use of learning management systems. Therefore, it is important that open-source learning management systems should be user-friendly.

Problem-solving competency in digital environments which is included in the DigComp framework is one of the factors of this study. The Digcomp framework defines problem-solving, which is one of the aspects of digital competency as solving technical problems, identifying needs and technological responses, using digital technologies, and identifying digital competence gaps (Carretero Gomez et al., 2017). The results indicated that problem-solving competency in digital environments was related to teaching model preferences. This study showed that some of the students still did not know how to solve problems they faced in digital environments. In addition, 76.8% of the students who preferred face-to-face education thought that they did not have enough knowledge to solve problems they encountered while using the learning management system. European Commission (2019) reported that developing digital competencies is essential to citizens for personal fulfillment, a healthy and sustainable lifestyle, employability, active citizenship, and social inclusion. Another variable closely related to this subject in the literature is students’ attitudes. Some studies reveal moderate or low-level online learning attitudes (Akcil and Bastas, 2021; Guven Ozdemir and Sonmez,

2020). However, this study shows that these negative experiences and attitudes may be due to students' lack of digital competencies. For this reason, providing university students with training on the learning management system, teaching, and supporting the solutions to potential problems they may encounter will contribute positively to their preference for online education.

This study revealed that the quality of the educational materials affected teaching model preferences. The students who were satisfied with the availability and quality of educational materials in online education tended to participate in online courses. Online instructors play a critical role in helping their students reach sufficient and important resources as a guide. The quality of information, which has a high impact on the success of the learning management system, can be increased by the instructors preparing better materials for students to understand and uploading content that meets their expectations (Jafari et al., 2015). Undoubtedly, this will increase content-student interaction. In sum, providing sufficient educational materials to students during online education is an essential contribution to leading students into online education and a hybrid teaching model.

Online education can be carried out synchronously or asynchronously. For the student group in this study, the courses were mainly carried out synchronously. The students were asked whether they preferred synchronous, asynchronous, or both in online education, and how this affected their teaching preferences. Students who believed that online education will be more successful asynchronously are 1.489 times more likely to prefer online education to face-to-face education than students who believed that synchronous and asynchronous education will be more successful. At this stage, the question of which structure (synchronous, asynchronous, or both) to implement online education can be considered a question that is worth investigating.

The students' opinions about their participation and attendance records being monitored by the instructors were asked and the effect of this on their education preferences was examined in the distance education courses. Students who answered "for the course to be effective in online courses, attendance must be mandatory and it should be graded" are 0,619 times less likely to prefer online education to face-to-face education than students who answered, "should not be a requirement". This situation shows that the absence of the requirement to attend the classes is a factor in the student's attitude toward online education.

Finally, in this study, it was examined how the Community of Inquiry framework elements (teaching presence, cognitive presence, social presence) affected students' teaching model preferences. According to the results obtained, the coefficients of the mean scores of social and cognitive presences in both online and hybrid models are positive and statistically significant. The increase in social and cognitive presence scores increases the probability that students prefer online and hybrid models compared to face-to-face education. The CoI framework provides more opportunities for students to interact and work together to construct knowledge across a variety of learning resources (Syarifuddin et al., 2020). It is an interesting result here that the teaching presence score was found to be an important factor. The probability of students preferring online or hybrid education is lower than the probability of choosing face-to-face education accepted as the basic class. As Arbaugh et al. (2008) mentioned, this fulfills the need for instructors to share and inform about course activities before the courses start as online education.

## CONCLUSION

Higher education institutions can apply their distance education activities as quickly as it is needed to be able to be adaptive through emergent situations. In this process, both instructors and students have to adapt quickly to emergency distance education. In this study, the opinions of the students who experienced this process were asked which of the face-to-face, online, and hybrid learning methods they preferred as teaching methods. Teaching model preferences were examined according to gender, the complexity of using LMS, adequacy of digital materials, and problem-solving skills in the learning environment. In conclusion, it is revealed how the CoI elements affect online education preferences.

Distance education is a suitable model for maintaining educational activities in extraordinary situations. The complexity of the learning management system used and the fact that they do not know how to solve the problems they experience may cause students not to prefer online education. The fact that the instructor provides sufficient educational material to students during online education leads students to prefer online education or hybrid teaching models. Based on this, studies should be carried out to enrich the digital materials to be used in online education. Content preparation training can be given to instructors. In addition, instructors should be guided to use open education resources more. One of the most important problems influencing education in emergency remote teaching is learning loss. It is a clear reality that learning losses are not equal for all students because of social inequity and learning opportunities (OECD, 2021). Therefore, the number of studies aimed at eliminating social inequality and increasing readiness should be increased in order to prevent learning losses.

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