DOI:10.34084/bshr.1099530 e-ISSN 2587-1641

Journal of Biotechnology and Strategic Health Research

Araştırma Makalesi /Research Article

http://dergipark.org.tr/tr/pub/bshr

Perceptions of Students on Distance Education and E-Learning in Dentistry Education: Challenges and Opportunities

Diş Hekimliği Eğitiminde Öğrencilerin Uzaktan Eğitim ve E-Öğrenme Algıları: Zorluklar ve Fırsatlar

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Geliş Tarihi / Received : 06-04-2022 **Kabul Tarihi / Accepted:** 08-05-2022 **Yayın Tarihi / Online Published:** 31-08-2022

Toraman A, Sağlam E, Köseoğlu S. Perceptions of Students on Distance Education and E-Learning in Dentistry Education: Challenges and Opportunities, J Biotechnol and Strategic Health Res. 2022;6(2):101-112

Abstract

Aim Developing information and communication technology have led to advent of distance education term and new learning materials in training institutions; unforeseen situations like a pandemic can turn distance education into a necessity rather than an option. This study aimed to evaluate the undergraduate dentistry students' perceptions of distance education implemented to adhere to compulsory social isolation measures.

Material and Method In the current study, a structured e-questionnaire comprising 27 items, including a 5-point Likert scale with 10 items (Google Forms®) was administered to undergraduate dental students in Turkey. A total of 1208 complete responses were received and examined in the final statistical analyses to assess students' perception of distance education.

Results Most students were not familiar with the term evidence-based. Many respondents (n = 723, 59.9%) noted that they were better motivated in their lessons with face-to-face education in the classroom. Cronbach's alpha value of the distance-education perceptions scale was 0.629. Factor analysis identified five sub-dimensions. The distance-education scores of the students at the foundation university were significantly higher than those of students at the state university.

Conclusion The results of this study show that students need more training on seeking and evaluating evidence-based information online. The study found that the training institution is a factor affecting students' perceptions of distance education for dental instruction. Institutions need to re-evaluate their available educational programs as to the effectiveness of training modalities of distance education and e-learning for professional training in dentistry.

Keywords distance education, e-learning, dental education, pandemia

Özet

Amaç *Gelişen bilgi ve iletişim teknolojisi, eğitim kurumlarında uzaktan eğitim döneminin ve yeni öğrenme materyallerinin ortaya çıkmasına neden olmuştur; Pandemi gibi öngörülemeyen durumlar, uzaktan eğitimi bir seçenekten ziyade bir zorunluluk haline getirebilir. Bu çalışma, diş hekimliği lisans öğrencilerinin zorunlu sosyal izolasyon önlemlerine uymak için uygulanan uzaktan eğitime ilişkin algılarını değerlendirmeyi amaçlamıştır.*

Gereç ve Yöntem *Bu çalışmada, Türkiye'deki diş hekimliği lisans öğrencilerine 10 maddelik 5'li Likert ölçeği (Google Forms®) dahil 27 maddeden oluşan yapılandırılmış bir e-anket uygulanmıştır. Öğrencilerin uzaktan eğitim algısını değerlendirmek için toplam 1208 tam yanıt alındı ve nihai istatistiksel analizlerde incelendi.*

Bulgular *Çoğu öğrenci kanıta dayalı terimine aşina değildi. Katılımcıların çoğu (n = 723, %59.9) sınıfta yüz yüze eğitimle derslerinde daha iyi motive olduklarını belirtti. Uzaktan eğitim algıları ölçeğinin Cronbach alfa değeri 0.629'dur. Faktör analizinde beş alt boyut belirlenmiştir. Vakıf üniversitesindeki öğrencilerin uzaktan eğitim puanları devlet üniversitesindeki öğrencilere göre anlamlı derecede yüksekti.*

Sonuç *Bu çalışmanın sonuçları, öğrencilerin çevrimiçi kanıta dayalı bilgileri arama ve değerlendirme konusunda daha fazla eğitime ihtiyaç duyduklarını göstermektedir. Çalışma, eğitim kurumunun öğrencilerin dişhekimliği eğitimi için uzaktan eğitim algılarını etkileyen bir faktör olduğunu bulmuştur. Kurumların, diş hekimliğinde mesleki eğitim için uzaktan eğitim ve e-öğrenme eğitim yöntemlerinin etkinliği açısından mevcut eğitim programlarını yeniden değerlendirmeleri gerekmektedir.*

Anahtar Kelimeler *uzaktan eğitim, e-öğrenme, diş hekimliği eğitimi, pandemi*

INTRODUCTION

In the 21st century, developments in information and communication technology had an important influence on societies and the function of educational institutions[1,2]. Digital learning (d-learning) has become a significant tool in education and training systems due to its potential to provide lower-cost education, its accessibility at any time from anywhere, and because it's lack of dependency on classrooms and faculty[3-5]. D-learning is the combination of electronic learning (e-learning) and mobile learning (m-learning)[6]. During the COVID-19 pandemic, social distancing has forced distance education to play a crucial role in our daily lives. Distance education can disseminate online learning and all forms of instructional delivery and formats to off-campus students, based on any training approach that replaces face-to-face in terms of specific time and place. Physical encounters between students and their teachers are required only rarely[7].

Dental education requires that content be evidence-based and up-to-date and that training methods be extremely experiential and pragmatic[7]. Evidence-based dentistry is the judicious integration of systematic reviews of clinically relevant scientific evidence regarding the patient's oral and medical condition and history with the dentist's clinical expertise and the patient's treatment needs and preferences. Many changes have been made in curricula to directly engage students in learning by improving problem-solving skills, providing continuous and learner-centered learning[8]. Advances in information and communication technology have contributed to these changes. D-learning and online learning are being used increasingly to improve traditional teaching methodology[6,9,10]. It has been reported in the literature that various e-learning or online learning tools and methods may be effective tools and methods for expanding teaching and learning opportunities in healthcare professions, including dental education[3-5,11-13]. However, online learning methods have a greater impact on student satisfaction, motivation, and self-assessment when integrated with traditional instructional formats[3,14,15]. Students in the health professions need to acquire and apply theoretical and clinical knowledge in appropriate teaching environments in order to become safe and competent health professionals. Teaching and learning of clinical skills are key areas for medical education[16,17]. One-to-one supervision and practical training in such areas are requirements that e-learning curriculum and distance education cannot fully meet. Therefore, face-to-face education maintains its importance in education[14,17].

The purpose of this study was to evaluate students' perceptions of distance education and their views on the use of e-/m-learning tools in dental education. In addition, the study evaluated how dental students use online learning to obtain information on vocational topics.

MATERIALS and METHODS

Ethics Statement

The study was approved by the ethics committee of Health Sciences University, Hamidiye Clinical Research Ethics Committee (IRB approval no. 20/53). This study was conducted in accordance with the ethical principles of the Declaration of Helsinki.

Data Collection

The online questionnaire (see Appendix) was administered using Google® Forms. Internet links to the questionnaire were sent to dental students at various Turkish universities by email or WhatsApp messages. Returning the questionnaire was interpreted as indicating willingness to participate in the study. Respondents who agreed to participate in the research with their own consent were included.

Sample Size

The sample size required for instrument development meets the suggested 200 participants[18]. The sample size was calculated to detect the mean distance-learning perception scores with a confidence interval of 99%. It was calculated that 1041 participants were required to detect mean levels with sigma = 0.5 and a margin of error of 0.04[19]. A total of

1208 completed web-based questionnaires were returned, giving a response rate of 40%.

Questionnaire design

A comprehensive literature review[1,9,14,15,20] was carried out regarding the assessment and success factors of distance education, availability of technology as a learning tool, and the use of e-learning platforms in dental education. An expert panel of four specialists-one in restorative dentistry, a periodontist, an oral-maxillofacial surgeon, and a biostatistician-contributed to item development. The content validity index was calculated using the Davis technique. In the Davis technique, the number of experts who stated "appropriate" or "item should be reviewed" was divided by 4 and the "content validity index" for the item was determined. Questions with an index value above 0.80 were included in the questionnaire. The initial item pool for the distance-education perceptions scale consisted of 10 items. These were examined by specialists to evaluate the clarity of the wording and relevance of the items. Two items were removed and minor item disposition corrections were made based on suggestions from the panel of specialists. The questions in this section were developed by the researchers to measure distance-education perception. All the questions were designed using a five-point Likert scale ranging from1 (strongly disagree) to 5 (strongly agree). Higher scored indicate a more positive perception of distance education. Seventeen demographic and comparison questions were also asked, which included a combination of selected answer questions (Likert-type scale) and closed-ended questions (yes / no or select one or all that apply options). The final questionnaire consisted of 27 items.

The final online questionnaire included questions regarding the following:

1. Individual characteristics (demographic information, digital skills, e-learning experience) (6 items)
2. Digital learning tools' acceptability, knowledge, and skill (11 items)
3. Distance-education perception scale (10 items)

Face validity of the scale was checked on a sample of 20 participants.

Statistical analyses

Data from the questionnaire were analyzed using SPSS 21.0 statistical software (SPSS Inc., Chicago, IL, USA). The significance level was set at $p < 0.05$. Descriptive statistics were generated with percentages for data reporting. One-way ANOVA, Kruskal-Wallis and independent-samples t-test were used to analyze differences in responses between the groups. The normality assumption was tested using skewness values, and Levene's test was performed to check for homogeneity of variances.

RESULTS

Questionnaire reliability

For reliability and factor analysis, 1208 students were given the final version of the questionnaire. The internal reliability of the distance-education perception scale (10 items) was established using Cronbach's alpha, and reliability of the scale was 0.629.

Individual characteristics

These results were indicated in the Table 1. The mean age of the students was[21]. 3 years (range 18-36), and 66.6% were female. About their institutions, 80.7% were from state, 10.3% were from private, and 8.9% were from the foundation university. The sample consisted of 167 (13.8%) first-year, 367 (30.4%) second-year, 495 (41%) third-year, 140 (11.6%) fourth-year, and 39 (3.2) fifth-year students. Half (50.2%) reported that digital skill proficiency depends on the task, and 36% reported that they are either very skillful or skillful. Most of the participants (81.9%) reported having previous e-learning/distance education experience.

Table 1: Individual characteristics (N=1208)

Variables				
Age, years	Mean	21.3		
	Range	18-36		
Gender (frequence/ percentage)	F	804 (66.6%)		
	M	404 (33.4%)		
Institution (frequence/ percentage)	State university	975 (80.7%)		
	Private university	125(10.3)		
	Foundation university	108 (8.9)		
Year of University (frequence/ percentage)	1	167 (13.8%)		
	2	367 (30.4%)		
	3	495 (41%)		
	4	140 (11.6%)		
	5	39 (3.2)		
		Frequence (percentage)	Mean	SD
Digital skill proficiency	Not sure	26 (2.2%)		
	Inadequate	140 (11.6%)		
	Depends on the task	607 (50.2%)		
	Skillful	336 (27.8%)		
	Very skillful	99 (8.2%)		
			3.28	0.85
		Responses N (Percent)	Percent of Cases	
E-learning/distance education experience#	Online course	189 (11.0%)	15.6%	
	Online lesson (class)	806 (47.0%)	66.7%	
	Online seminar (Webinar)	238 (13.9%)	19.7%	
	Online congress	171 (10.0%)	14.2%	
	No experience	311 (18.1%)	25.7%	

#On these questions, students were asked to check all that apply, so percentages total greater than 100%.

Digital learning tools' acceptability, knowledge, and skill

These results are indicated in the Table 2. Most (91.8%) of the responding students stated that they use smartphones and PCs to research subjects in an electronic environment. Responses identifying the online sites they use to search for information on lecture topics were 92.3% Google, 82.4% academic information websites, and 61.9% Wikipedia. The students reported verifying the reliability of the information they found using the official validity of the site (74.3%), academic references (79.5%), advice (21.9%), and number of followers (8.4%). The results showed that most of the students (66.3%) did not know what the term evidence-based dentistry means. Most reported that technology should be either an important part (51.7%) or an indispensable essential part (33.1%) of dentistry education. The results showed that 30.1% of students generally use and 38.2% of students occasionally used video channels, such as YouTube and Instagram, for further information and guidance after lectures. Most students (74.9%) reported that social media made it easier to access information. A substantial number (40.9%) strongly agreed or agreed that there is social pressure to use technology in education. More than half (59.9%) noted that they are better motivated by lessons with face-to-face instruction in the classroom, 41.6% expressed that they ask questions more easily in the classroom, and 63% reported that in online teaching-distance education, they are generally or occasionally distracted.

Table 2: Digital learning tools' availability, acceptability, and knowledge (N=1208)

		Responses		Percent of Cases
		N	Percent	
Which device do you use to research on a subject in electronic environment?#	Smartphone	829	42.3%	68.6%
	PC	970	49.5%	80.3%
	Tablet	147	7.5%	12.2%
	Other (Kindle etc.)	12	0.6%	1.0%
Which online sites do you use when searching for information on lecture topics?#	Google	1115	30.2%	92.3%
	YouTube	629	17.0%	52.1%
	Instagram	110	3.0%	9.1%
	Twitter	49	1.3%	4.1%
	Akademik bilgi sites	995	27.0%	82.4%
	Facebook	20	0.5%	1.7%
	Wikipedia	748	20.3%	61.9%
	Diğer	24	0.7%	2.0%
How do you check reliability on the internet?#	By the number of followers	101	4.5%	8.4%
	By the official validity of the site	897	40.1%	74.3%
	By the academic reference	960	42.9%	79.5%
	By advice	265	11.9%	21.9%
	Other	13	0.6%	1.1%
Do you have any ideas about evidence-based dentistry?	Yes	407	33.7%	
	No	801	66.3%	
How do you think the place of technology in dentistry education should be?	Should not be used in education	17	1.4%	
	Partially helpful tool	166	13.7%	
	Important part	625	51.7%	
	Indispensable essential part	400	33.1%	
Social media easies access to information.	Strongly disagree	23	1.9	
	Disagree	114	9.4	
	Neutral	167	13.8	
	Agree	648	53.6	
	Strongly agree	256	21.2	
Do you use video channels on social media (YouTube, Instagram etc.) for further information and guidance after the lectures?	Never	68	5.6%	
	Rarely	210	17.4%	
	Occasionally	462	38.2%	
	Generally	364	30.1%	
	Every time	104	8.6%	
Do you think there is social pressure to use technology in education?	Strongly disagree	35	2.9%	
	Disagree	282	23.3%	
	Neutral	397	32.9%	
	Agree	394	32.6%	
	Strongly agree	100	8.3%	

Do you ask questions more easily in the lesson, with distance education or in classroom education?	Distance education	168	13.9%	
	Classroom education	503	41.6%	
	I can ask for both	285	23.6%	
	I cannot ask for both	178	14.7%	
	Neutral	74	6.1%	
Are you better motivated by lessons with distance learning or classroom education?	Distance education	167	13.8%	
	Classroom education	723	59.9%	
	I can motive for both	152	12.6%	
	I cannot motive for both	123	10.2%	
	Neutral	43	3.6%	
Do you find electronic instruction-distance education distracting?	Never	65	5.4%	
	Rarely	177	14.7%	
	Occasionally	352	29.1%	
	Generally	409	33.9%	
	Every time	205	17.0%	
#On these questions, students were asked to check all that apply, so percentages total greater than 100%.				

Distance-education perception scale

Factor analysis

Principal-component analysis with varimax rotation was used for factor analysis, which summarized the 10 questionnaire items into five underlying factors. The minimum coefficient was 0.602 (Table 3). 75% of the total variance can be explained by five dimensions. (Table 3). The five factors with mean scores in Table 4 are defined as follows:

- Factor 1. The importance of distance education: This includes items relating to students' opinions of the integration of distance learning into classroom education and its usefulness.
- Factor 2. Learning online training techniques: This consists of questions about the need for training on searching for information online relating to the course.
- Factor 3. Internet and digital competence: This comprises questions focusing on areas such as students' knowledge and skills in using the internet and digital media as learning tools.
- Factor 4. Human and equipment infrastructure: This comprises items relating to the infrastructure competence of the educational institution to provide distance education and the competence of trainers in using distance education tools.
- Factor 5. Internet as a learning tool: This includes questions relating to students' use of the internet as a learning tool and verifying the accuracy of information from the internet.

The five factors above were used to assess students' perception of distance education in dental education.

Independent sample t-test statistics indicated a significant difference between genders in only Factor 3: internet and digital competence ($p = 0.011$) (Table 5). Significant differences were observed among types of institutions in ANOVA and Tukey statistics (Table 6) in the mean scores for distance-education perception. Distance education scores of students at the foundation university (mean = 3.76; SD = 0.47) were significantly higher than those of students at the state university (mean = 3.55, SD = 0.47; $p < 0.001$). The Kruskal-Wallis and Dunnett T3 statistics (Table 6) showed that Factor 3 mean scores of students at the foundation university (mean = 4.07; SD = 0.53) were significantly higher than those of students at the state university

Table 3: Component factors from the distance education perception scale

Rotated Component Matrixa Component					
	Factor 1	**Factor 2**	**Factor 3**	**Factor 4**	**Factor 5**
I find distance education useful	0.910				
Education in the classroom should be supported by distance education	0.792				
An expert training should be given to search for information, to find evidence-based and academically adequate information and about applications, in the online environment.		0.778			
Education should be given about how to access information about the course.		0.789			
I know how to use the internet as a learning tool			0.804		
I know how to digitally research a topic related to the course			0.881		
The infrastructure of my university is sufficient to provide distance education				0.888	
Instructors have competence to use technology in education				0.725	
I search for accuracy when searching for course information on the internet.					0.846
I find it right to use the internet as a learning tool.					0.602
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 6 iterations.					

Table 4: Factor Means

	Mean	**Std. Deviation**
Distance education perception score	3.58	0.47
Factor 1: The importance of distance education	3.03	1.09
Factor 2: Learning online training techniques	3.97	0.67
Factor 3: Internet and digital competence	3.90	0.61
Factor 4: Human and equipment infrastructure	3.07	0.98
Factor 5: Internet as a learning tool	3.90	0.68

Table 5: Comparative test of mean values between gender

	Gender	**Mean SD**	**t**	**p value**
Factor 1: The importance of distance education	F	2.991 (1.065)	-1.878	0.061
	M	3.119 (1.137)		
Factor 2: Learning online training techniques	F	3.984 (0.664)	0.793	0.428
	M	3.952 (0.701)		
Factor 3: Internet and digital competence	F	3.866 (0.610)	-2.550	0.011*
	M	3.962 (0.630)		
Factor 4: Human and equipment infrastructure	F	3.098 (0.967)	1.503	0.133
	M	3.007 (1.016)		
Factor 5: Internet as a learning tool	F	3.891 (0.675)	-0.788	0.431
		3.925 (0.703)		
Significant values at p <0.05				

Appendix					
Individual characteristics					
1. Age					
2. Gender					
O Male	O Female				
3. Institution					
O State university	O Private university	O Foundation university			
4. Year of University					
O 1	O 2	O 3	O 4	O 5	
5. Digital skill proficiency					
O Not sure	O Inadequate	O Depends on the task	O Skillful	O Very skillful	
6. E-learning/distance education experience (You can check multiple options)					
O Online course	O Online lesson (class)	O Online seminar (Webinar)		O Online congress	O No experience
Digital learning tools availability, acceptability, knowledge					
7. Which device do you use to research on a subject in electronic environment? (You can check multiple options)					
O Smartphone	O PC	O Tablet	O Other (Kindle etc.)		
8. Which online sites do you use when searching for information on lecture topics? (You can check multiple options)					
O Google	O YouTube	O Instagram	O Twitter	O Akademik bilgi sites	O Facebook
O Wikipedia	O Other				
9. How do you check reliability on the internet? (You can check multiple options)					
O By the number of followers		O By the official validity of the site		O By the academic reference	
O By advice	O Other				
10. Do you have any ideas about evidence-based dentistry?					
O Yes	O No				
11. How do you think the place of technology in dentistry education should be?					
O Should not be used in education (Kindle etc.)			O Partially helpful tool		
O Important part		O Indispensable essential part			
12. Social media easies access to information.					
O Strongly disagree	O Disagree	O Neutral	O Agree	O Strongly agree	
13. Do you use video channels on social media (YouTube, Instagram etc.) for further information and guidance after the lectures?					
O Never	O Rarely	O Occasionally	O Generally	O Every time	
14. Do you think there is social pressure to use technology in education?					
O Strongly disagree	O Disagree	O Neutral	O Agree	O Strongly agree	
15. Do you ask questions more easily in the lesson, with distance education or in classroom education?					
O Distance education		O Classroom education		O I can ask for both	
O I cannot ask for both		O Neutral			
16. Are you better motivated by lessons with distance learning or classroom education?					
O Distance education		O Classroom education		O I can motive for both	
O I cannot motive for both		O Neutral			
17. Do you find electronic instruction-distance education distracting?					
O Never	O Rarely	O Occasionally		O Generally	O Every time

Distance education perception scale					
	Strongly disagree	Disagree	Neutral	Agree Agree	Strongly agree
18. I find distance education useful	O 1	O 2	O 3	O 4	O 5
19. Education in the classroom should be supported by distance education	O 1	O 2	O 3	O 4	O 5
20. An expert training should be given to search for information, to find evidence-based and academically adequate information and about applications, in the online environment.	O 1	O 2	O 3	O 4	O 5
21. Education should be given about how to access information about the course.	O 1	O 2	O 3	O 4	O 5
22. I know how to use the internet as a learning tool.	O 1	O 2	O 3	O 4	O 5
23. I know how to digitally research a topic related to the course.	O 1	O 2	O 3	O 4	O 5
24. The infrastructure of my university is sufficient to provide distance education.	O 1	O 2	O 3	O 4	O 5
25. Instructors have competence to use technology in education.	O 1	O 2	O 3	O 4	O 5
26. I search for accuracy when searching for course information on the internet.	O 1	O 2	O 3	O 4	O 5
27. I find it right to use the internet as a learning tool.	O 1	O 2	O 3	O 4	O 5

(mean = 3.86, SD = 0.61; p = 0.001).

DISCUSSION

The current study provides contemporary insight into students' perception of e-learning and distance education, their adaptation, and their use of online tools in dental education. The primary outcome of our study is that students have a positive perception of the use of distance education as a supporting tool. The results of this study conducted with undergraduate dentistry students who are globally encountering social isolation due to the COVID-19 infection that has been recently experienced by the whole world may provide important informations.

Previous researches[7,14,21] have reported the relative weaknesses and threats associated with distance education from a professional perspective. Similar to those studies, we noted a problem with students losing their motivation to learn. Another problem is distraction. In line with other studies, our results indicated that distance education causes distraction and a lack of motivation for students. Previous studies have reported that issues with student distraction can be attributed to phones, web browsing, noise in the room where the lesson is being followed, and people coming in and out[22,23]. It has been suggested that for effective learning, students need individual learning motivation to focus their attention to the e-lesson and to be able to ask questions during it[21,24]. Therefore, student participation and motivation were seen as important factors for successful e-learning; intrinsically motivated students can control their own learning processes.

Social pressure refers to a student's perception of normatively appropriate behavior with regard to the use of technology—the internet and the web-in dental education[25]. It has been reported that the level of peer pressure exerted by one student on another fostered greater internet use in distance learning[25-27]. In this study, a significant number of students (40.9%) thought that there was social pressure to use technology in education. Not all students may be capable or willing enough to keep up with new devices and tools. In our results, male students were more efficient in their use of the internet and digital platforms than female students ($p < 0.05$). According to the results of a study 14, students did not want electronic/mobile learning to be the core or essential part of dental education. It has been expressed that not all students may be adequately skilled in using new devices and tools straight away. In the current study, 65.4% of students stated that they preferred to use technology as a complement to their education. Loss of motivation, distraction, and perception of social pressure may have affected this result. These factors that may

cause some students to feel excluded or left behind should be considered when integrating distance education and e-learning into the dental curriculum.

A major concern is whether the information transferred using distance education and e-learning in dentistry education can adequately achieve educational learning outcomes to ultimately graduate competent professionals. It has been reported that the learning benefits for students are not inherent in the technology but depend upon interactions between them and their teachers[4,15]. The fact that many students (41.6%) in the current study stated that they asked questions more easily in the classroom affirms the importance of this interaction.

Literature has shown that the capability of the university and the training of faculty members are also very important in the effective implementation of e-learning and distance education in dental education. In addition, it has been noted that dental schools need an infrastructure framing the expectations of future professionals and students providing comfortable use of new technology[7,9,28]. Students participating in this study were not completely negative about the human and equipment infrastructure competence of their educational institutions. However, it was seen that they did not find the current conditions sufficient. Furthermore, foundation university students had a more positive perception ($p < 0.05$) of the use of distance education in dental education. Our results showed that students' educational institutions were a factor affecting their perceptions of the usefulness of distance education in dental education. Foundation university students' perception of internet and digital competence was significantly higher than that of students at state universities. The scores from private universities were high but statistically insignificant. It can be concluded that socioeconomic status affects the results obtained.

In a study with a flipped classroom model, students expressed that the video lectures were better than face-to-face lectures for understanding the content. The opportunity to listen to the lecture again was an advantage they noted[20]. The fact that students have positive perceptions (mean = 3.575) of the use of distance education and e-learning in dental education in this study supports studies[7,9,20,29] in which students report that e-learning is advantageous. Our findings revealed that students attach importance to distance education in their dentistry education. Online knowledge, lectures, educational films help only at the early stage of education or expand already acquired knowledge and clinical practice. However, they cannot replace practical exercises on phantoms and treating patients.

Healthcare students may lack adequate skills and knowledge to search for, evaluate, and synthesize evidence-based information on the internet. Studies have reported that students rely on well-known websites such as Google and YouTube instead of using evidence-based research tools to search for information[12,14,30]. Previous studies suggest that dental students need specific training and detailed instructions to differentiate misleading and non-evidence-based information from reliable sources[14,31]. Our study results showed that the majority of students (66.3%) are not familiar with the term "evidence-based"; the number of those in the first three years of education who did not know this term was very high. Based on this result, it was concluded that information literacy and awareness increase in the later years of university. This study illustrated that students tend to use familiar websites, such as Google, YouTube, and Wikipedia, to search for dental lecture topics. Some students in the present study said they check the reliability of the information on the internet by the number of followers, comments, advice, and likes. Previous studies[12,32] have determined that YouTube is being used increasingly for dental- and medical-related videos, especially by professionals. Findings from the current study showed that video channels on social media (YouTube, Instagram, etc.) are used by most students for supplemental information and guidance after the lectures. On the other hand, there is a perception among students that they need training in

using online tools. Today, when technology is used very actively, students should be educated in earlier years of university to make the distinction of evidence-based knowledge. There are concerns regarding professionalism and ethical guidelines related to the use of social media tools in dental education[33,34]. This issue should be taken into account by educators.

There were some limitations in our study. First, this questionnaire did not include a question to determine the year of university in which clinical education begins. Therefore, the perceptions of students with clinical experience could not be evaluated separately. Second, the fact that the first-year students included in the study were not familiar with a dentistry education other than distance education before may be insufficient for comparison. Third, it may not accurately reflect the population from which the sample was taken due to the use of voluntary participants. Students who do not use the internet and online tools frequently may not have responded to the online survey. These research limitations should be considered for future studies. So that research can be developed and the knowledge obtained can be further increased.

CONCLUSION

Digital technology will play an important role in the future of dental education. The recent pandemic the world has experienced has made distance education a mandatory alternative. However, it is necessary to emphasize the aspect of the form of online education as insufficient, regardless of the reconstruction of educational programs during the pandemic. Because the knowledge transferred in online exercises will not replace the practical aspect during the education of students from dental faculties. Besides all these, the integration of e-learning models with conventional education models may have the potential to overcome the shortages of face-to-face education. Dental schools need to re-evaluate their available educational programs and implement online learning methods in their curricula. Universities should focus on improving information literacy among their students to graduate students who have the ability to search and evaluate evidence-based information online and through apps/videos. Further research is needed to uncover the concerns and needs of students, educators, and institutions in order to prepare dentistry students to learn and practice through online learning technologies and enhance the quality of the training.

Acknowledgment

The authors of this study have no conflict of interest.

Conflict and Interest

The authors have stated explicitly that there are no conflicts of interest in connection with this article.

Author Contributions

Idea/Concept: Ayşe Toraman, Ebru Sağlam; Design: Ayşe Toraman, Ebru Sağlam, Serhat Köseoğlu; Supervision/Consulting: Ayşe Toraman, Ebru Sağlam, Serhat Köseoğlu; Data Collection and/or Processing: Ayşe Toraman, Ebru Sağlam, Serhat Köseoğlu; Analysis and/or Interpretation: Ayşe Toraman, Ebru Sağlam; Literature Review: Ayşe Toraman; Writing the Article: Ayşe Toraman, Ebru Sağlam, Serhat Köseoğlu; Critical Analysis: Serhat Köseoğlu;

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