sciendo

Physical Culture and Sport. Studies and Research, 2023, 98, 13–26
DOI: 10.2478/pcssr-2023-0002

OPEN ACCESS

Exploring Perceived Learning Among Students of Sports Sciences in Distance Education

Authors' contribution:
A) conception and design of the study
B) acquisition of data
C) analysis and interpretation of data
D) manuscript preparation
E) obtaining funding

Buğra Çağatay Savaş[1A,C,D]*, Murat Turan[A,B,D]

Erzurum Technical University, Faculty of Sport Science, Erzurum, Turkey

Received: 04.11.2022
Accepted: 13.01.2023

***Correspondence**: Buğra Çağatay Savaş, Ömer Nasuhi Bilmen, Erzurum Havaalanı Yolu Caddesi D: No:53, 25050 Yakutiye/Erzurum, Turkey;
E-mail: bugra.savas@erzurum.edu.tr

Abstract

The present study aimed to explore the impacts of e-learning, e-learning attitude in sports, and e-learning satisfaction on perceived learning among students of sports sciences. A total of 371 (108 females, 263 males) undergraduate students of sports sciences participated in this correlational study. The data were collected through a demographic information form, the Online Learning Attitude Scale, the Online Learning Attitude Scale-Sports, the Distance Education Satisfaction Survey, and the Perceived Learning Scale. The data were analyzed using descriptive statistics, SEM, Pearson's correlation test, and multiple regression analysis. The findings revealed that e-learning attitudes and e-learning satisfaction among the participants had significant effects on their perceived learning ($p < .05$), while their e-learning attitudes in sports did not yield a significant impact on their perceived learning ($p > .05$). Accordingly, it may be claimed that as students' e-learning attitudes and e-learning satisfaction increase, their perceived learning levels also increase. In addition to this, the students did not have a positive attitude toward learning applied courses online; therefore, undergraduate applied courses in sports sciences are better conducted face-to-face.

Keywords: perceived learning, satisfaction, attitude, sports sciences

Introduction

Cutting-edge technological improvements enable one to utilize online techniques in cases where face-to-face education is disrupted, particularly in the Coronavirus (COVID-19) pandemic, which has been a persistent threat to public health. Certain behavioral changes are known to prevent infection, and not physically attending classes is an example of a helpful behavioral change to prevent infection spreading (Walker et al., 2020; WHO, 2020).

The concept of e-learning (also called online learning) emerged in the early 1980s and became a significant component of online education in the 1990s and early 2000s. E-learning has often been considered a sound alternative rather than a primary method for maintaining education. However, this situation was reversed when educational institutions were closed indefinitely and distance education was introduced due to the COVID-19 pandemic. It also led to a change in e-learning attitudes in educational institutions among administrators, academics, and students (Ribeiro, 2020). Online learning platforms are now seen in many educational institutions as an integral part of the learning experience for students (Turnbull et al., 2021).

Our university initiated distance education as of March 23, 2020 to the extent of the facilities of its digital infrastructure (YÖK, 2020) and completed the 2020 spring semester with distance education. In addition to this, universities were granted the authority to introduce faculty- and program-based practices to reduce student mobility starting from the fall semester in the 2020-2021 academic year (YÖK, 2020a). In the 2021-2022 academic year, since higher education institutions relied primarily on face-to-face education, 40% of courses were held face-to-face (blended-hybrid education) (YÖK, 2021).

Perceived learning

In addition to the level of learning, learning perceived by students (perceived learning) needs to be considered. The learning perceived by the student, the evaluation of the change felt by the student by himself (Albayrak et al., 2014), the whole of the beliefs and feelings that emerge as a result of learning, and the comparison of the result of the learning experience with the previous situation (Caspi & Blau, 2008) are an important indicator of the realization of learning (Albayrak et al., 2014), Rahman et al., 2022) is expressed as students' perceptions of the information they learn (Prabhu et al., 2022). Since perceived learning is one's personal belief of what one has acquired in the learning process, student-centered learning may be essential in education (Albayrak et al., 2014), such that perceived learning is often shown as an accepted criterion to measure learning achievement (Batista & Cornachione, 2005). Also, students' perceived learning and satisfaction may provide a better understanding of online learning achievement (Gray & Diloreto, 2016).

Attitude

Attitude is a tendency to regularize one's behaviors, thoughts, and feelings (Kağıtçıbaşı, 1999). Offering the infrastructure needed for online education and full preparedness by stakeholders do not always guarantee achievement in education. Instead, students' e-learning attitudes may need to be recognized among the central tenets of achievement in online education (Usta et al., 2016). Attitude is multifaceted and includes cognitive, affective, and behavioral dimensions (Tavşancıl, 2006). One may adopt positive online learning attitudes only if one is sensitive, willing, and oriented toward learning.

It may be assumed that one's behavioral attitudes are directly related to their intentions (Lee et al., 2007; Arı et al., 2015). Likewise, a student's attitude toward learning is linked with their learning intention (Kara, 2010). Positive or negative online learning attitudes substantially affect learning (Alomyan & Au, 2004). Moreover, learning attitudes can alter adaptation to the learning environment and the level of accomplishment (Birişçi et al., 2011).

Students need to adopt positive attitudes (Usta et al., 2016) to succeed in e-learning. In this sense, an e-learning attitude can be described as "one's desire and attitude toward e-learning." Positive attitudes towards online learning are positively associated with perceived learning success (Klein et al., 2021).

Planning the education and preparing e-learning environments according to students' e-learning attitudes seem to facilitate attaining educational objectives such as increased quality of education, retaining successful students, and allowing permanent learning. (Liaw et al., 2007; Özgür & Tosun, 2010).

E-learning

E-learning is an increasingly popular concept in education that prompts the use of technology and has attracted attention in the higher education community in recent years (Eom, 2014). In the literature, it is also called "online learning" and "distance learning" (Isaac et al., 2019). E-learning is defined as an approach based on student-centered learning rather than teacher-centered learning (Aoki, 20101). Horton (2000) considers it a form of education performed through a browser or applications without the need for additional software and learning resources. It is also defined as the use of information and communication technologies to offer access to online learning/teaching services (Aloussef, 2021). In another definition, it is accessing information at any time and place through the internet and conducting teaching in digital environments (Gülbahar, 2009).

Although it has become an integral part of distance education, its efficiency depends on the quality of the communication network, content pool, and social environment (Allen & Seaman, 2014). In general, e-learning has always been considered as an alternative or as complementary to traditional learning. It has also appeared as a critical model for maintaining academic activities in universities and K-12 schools during the pandemic worldwide. E-learning offers various advantages such as low cost, being able to follow the latest developments, freedom to choose teaching materials, accessing education from anywhere and anytime, and being universal (Hamid et al., 2020).

E-learning in sports, on the other hand, is a learning activity independent of time and place that offers theoretical and practical knowledge on sports and adopts the self-learning technique in an online environment (Mutlu-Bozkurt & Tamer, 2020).

E-learning satisfaction

In general, satisfaction is defined as the accumulation of user perceptions and behaviors as a result of the

total benefits earned (Wu et al., 2010), one's pleasure following the goods or services consumed (Pizan & Ellis, 1999), and valuing the outcome of the product or service consumed (Millan & Esteban, 2004).

The availability of e-learning systems leads universities to seek how students learn or are taught and what contributes to student satisfaction (van Rooij & Zirkle, 2016). Student satisfaction has also received extensive attention recently due to increased competition among universities to attract and retain students (Leonnard & Susanti, 2019). Studies show that student satisfaction plays an important role in determining the success or failure of online education (Gopal et al., 2021).

According to Arbaugh (2000), the most prominent factors affecting student satisfaction with online classes are flexible and helpful software used to meet their needs and an interactive course environment created by instructors. Thus, the quality of e-learning environments, instructor feedback, and course content have become more significant issues in e-learning than in traditional education (Young, 2006).

Sun et al. (2008) previously reported that student e-learning satisfaction is affected by a range of factors, such as the student's knowledge of computer systems, the instructor's attitude toward classes, the flexibility and quality of classes, the student's perceived benefit, and the assessment methods used.

Student e-learning satisfaction can also be defined as the value of the education received in an e-learning environment (Bollinger & Erichsen, 2013) and is used among the indicators of quality assurance in education. High student satisfaction is likely to lead to better academic performance and, thus, increased academic achievement (Martín-Rodríguez et al., 2015). Satisfaction is positively affected by perceived learning (Li et al., 2021).

The previous research showed the following factors that affect e-learning satisfaction: interactive classes, easy-to-use computer systems, quality internet service, instructional quality, autonomy in learning, the attitudes of students and the instructor, and "e-readiness" (Eom, 2014; İmhan & Çetin, 2013; Shee & Wang, 2008; Sun et al., 2008; Wu et al., 2010). In addition, timely and explanatory feedback (Sebastianelli et al., 2015), regular interactions with instructors (Uusiautti et al., 2017), fruitful interactions with peers (Kurucay & İnan, 2017), administration, functionality, and teaching and interaction (Gil, 2008) may be counted as factors that play a role in student e-learning satisfaction.

Technology is constantly developing and being updated and has become an indispensable part of contemporary education. Demonstrating whether the desired educational outcomes are achieved using technology would enable educational stakeholders to take improving or corrective measures. Guilar et al. (2022) stated that during the Covid-19 pandemic, when face-to-face education is interrupted, it may be important to question and investigate the main factors that contribute to students' development and therefore the education provided, such as learning and student satisfaction perceived by students in university education. Today, understanding students' perceived learning and satisfaction and e-learning attitudes would illuminate the way for such measures. Ultimately, the present study aimed to explore the impacts of e-learning, e-learning attitude in sports, and e-learning satisfaction on perceived learning among students of sports sciences.

Materials and methods

Research design

Considering its ultimate purpose and scope, the research employed a correlational design among quantitative models. It is defined as "a research design to uncover the existence and/or degree of the relationship between variables" (Büyüköztürk et al., 2016; Karasar, 2018).

In this design, a researcher investigates the correlations between variables to bring an interpretation to the findings. Accordingly, Structural Equation Modeling (SEM) offers a chance for simultaneous examination of correlations between variables (Fraenkel et al., 2012).

Sample

The target population of the research consisted of undergraduate students enrolled in Faculties of Sports Sciences at Erzurum Technical University and Ataturk University. The convenience sample included 371 students (108 females and 263 males) (Altunışık et al., 2007; Gürbüz & Şahin, 2016). In cases where the data are normally distributed, a sample of approximately ten times the number of variables observed is considered sufficient in SEM research (Ullman, 2001).

Data collection

The data were collected using a demographic information form and three relevant instruments.

Demographic information form

The demographic information form was designed to obtain the participants' demographic characteristics (e.g., university, gender, year of study, department, internet access location, and internet access device).

Online Learning Attitude Scale (OLAS)

Developed for university students by Usta et al. (2016), the Online Learning Attitude Scale (OLAS) consists of 20 items scored on a 5-point Likert-type scale ranging from

1 (Strongly disagree) to 5 (Strongly agree) within four sub-scales: general acceptance, individual awareness, perceived usefulness, and application effectiveness. In the original study, the authors found the scale to explain 63.82% of the variance. They calculated Cronbach's alpha coefficients to be 0.90 for the total score, 0.77 for general acceptance, 0.85 for individual awareness, 0.79 for perceived usefulness, and 0.68 for application effectiveness. In this study, internal consistency the coefficient of the total score was 0.96 (χ^2 = 694.989, df =152.000, χ^2/df = 4.572; $p < 0.000$) in the path analysis.

The Online Learning Attitude Scale-Sports (OLAS-S)

The Online Learning Attitude Scale-Sports (OLAS-S) was designed by Mutlu-Bozkurt and Tamer (2020) for undergraduate students of sports sciences. Unlike the OLAS, the instrument includes items oriented to the applied courses of sports sciences. The OLAS-S is a single-factor 12-item scale and scored on a 5-point Likert-type scale ranging from 1 (Strongly disagree) to 5 (Strongly agree). The single factor on the scale was found to explain 55.98% of the variance and yielded a Cronbach's alpha coefficient of 0.92. In this study, Cronbach's alpha coefficient of the total score was calculated to be 0.940 (χ^2 = 83.132, df = 43 and χ^2/df = 1.933; $p < 0.000$).

Distance Education Satisfaction Survey (DESS)

The Distance Education Satisfaction Survey (DESS), developed by Kafes and Yıldırım (2021), was used to evaluate the satisfaction among the students regarding distance education practices. The scale has two components (interaction and accessibility) that consist of four items (eight items in total) scored on a 5-point Likert-type scale ranging between 1 (does not suit me at all) and 5 (totally suits me). The survey includes no reverse-coded items. In the development study, the authors found Cronbach's alpha values to be 0.82 for the interaction component, 0.77 for the accessibility component, and 0.85 for the total score. It was also found that the survey explained 63.04% of the total variance. In this study, Cronbach's alpha coefficient of the total score was calculated to be 0.93 (χ^2 = 56.742, df = 17 and χ^2/df = 3.338; $p < 0.000$)

Perceived Learning Scale (PLS)

The scale, developed by Rovai et al. (2009), was adapted for Turkish students by Albayrak et al. (2014). The scale consists of 9 items (items 2 and 7 are reverse coded) within three factors: cognitive, affective, and psychomotor. The internal consistency coefficients were 0.65 for the cognitive sub-scale, 0.66 for the affective sub-scale, 0.72 for the psychomotor sub-scale, and 0.83 for the total score. The original study concluded that the scale explained 66.45% of the total variance. The items are scored on a 7-point Likert-type scale ranging from 1 (Not at all) to 7 (Very much so). In this study, Cronbach's alpha coefficient of the total score was found to be 0.94 (χ^2 = 48.317, df = 18 and χ^2/df = 2.684; $p < 0.000$)

Data analysis

The participants' responses to the instruments were first transferred to the computer environment, and the data were tested for normality of distribution. It was found that the Skewness-Kurtosis values ranged from -1.5 to +1.5, implying that the data showed a normal distribution (Tabachnick & Fidell, 2013). Then, the data were analyzed using descriptive statistics, SEM, Pearson's correlation test, and regression analysis.

Scatter plots were considered for testing whether the variables demonstrate a linear relationship. All the variables were included in the regression analysis in order by using the "enter method." In addition, a multicollinearity problem was sought in the model. First, it was discovered that there were no high correlations between the variables (no relationship with $r > 0.80$). Then, it was found that the variance inflation factor (VIF) was lower than 10. Moreover, the collinearity diagnostics table showed no condition index (CI) value to be greater than 30 (Koutsoyiannis, 1989). Thus, it was concluded that the regression model was free of the problem of multicollinearity. It was also found that there were no outliers among the observed values (residual statistics table), that observed errors showed a normal distribution (histogram), and that the errors were independent of each other (the Durbin-Watson coefficient) (Büyüköztürk, 2011). The data were analyzed using SPSS at the 95% confidence interval (CI), and a p-value < 0.05 was considered statistically significant.

Ethical Considerations

Permissions were obtained for the use of the instruments from the relevant authors. Moreover, the Ethics Committee of the Faculty of Sports Sciences of Ataturk University granted ethical approval to the present study (No: E-70400699-000-2200131909, Decision No: 54 dated 28.04.2022).

Findings

Descriptive Statistics of the Variables

Table 1 presents the descriptive statistics for the measurements.

As in Table 1, the participants' mean e-learning attitude (3.42) and e-learning satisfaction (3.49) scores were close to the average, but they had a high mean score for perceived learning (4.51) (the average score on the PLS corresponds to 3.22 when converted to a 5-point Likert-type scale). In addition, the scores fell within the cut-off for kurtosis and skewness values (+1.5 and -1.5; Tabachnick

Table 1. Comparison of psychological variables between Polish and Algerian Physical Education students

N = 371	*M*	Skewness	Kurtosis
Perceived Learning	4.51* (3.22**)	-.284	-.473
Cognitive	4.46* (3.18**)	-.184	-.175
Affective	4.58* (3.27**)	-.309	-.826
Psychomotor	4.49* (3.20**)	-.366	-.311
E-learning Attitude	3.42**	-.474	-.810
E-learning Satisfaction	3.49**	-.213	-1.147
E-learning Attitude in Sports	3.08**	-.019	-.687

*7-point Likert-type, **5-point Likert-type.

Table 2. Item scores.

N = 371 Item No.	Instrument			
	E-learning attitude	E-learning satisfaction	Perceived learning	**E-learning attitude in sports**
1	3.57	3.17	4.17*(2.97**)	3.10
2	3.31	3.80	4.77*(3.40**)	3.09
3	3.82	3.42	4.36*(3.11**)	3.07
4	3.57	3.22	4.68*(3.34**)	3.01
5	3.37	3.41	4.42*(3.15**)	2.97
6	3.60	3.49	4.18*(2.98**)	3.08
7	3.41	3.59	4.84*(3.45**)	3.16
8	3.59	3.84	4.28*(3.05**)	3.03
9	3.42	-	4.87*(3.47**)	3.20
10	3.41	-	-	3.09
11	3.28	-	-	3.11
12	3.26	-	-	3.09
13	3.38	-	-	-
14	3.62	-	-	-
15	3.40	-	-	-
16	3.50	-	-	-
17	3.37	-	-	-
18	3.55	-	-	-
19	3.45	-	-	-
20	3.42	-	-	-
Mean total score	**3.42**	**3.49**	**4.51* (3.22**)**	**3.08**

*7-point Likert-type, **5-point Likert-type.

& Fidell, 2013); therefore, the distribution satisfied the assumption of normality.

Individual item scores on the data collection tools are shown in Table 2.

The findings revealed a high mean total score for e-learning attitude (3.42), while it was moderate for e-learning attitude in sports (3.08). Considering the mean scores on the OLAS-S, the lowest score was obtained

on item 5 ("*I practice sports movements through e-learning in sports*" 2.97), while the participant received the second and third lowest mean scores on items 4 ("*E-learning in sports contributes to academic achievement*" 3.01) and 8 ("*I practice sports movements at the same time utilizing e-learning in sports*" 3.03), respectively. On the other hand, the participants scored the highest on item 9 ("*Thanks to e-learning, I think that I can watch/study the topics that I am curious about in sports again and again*" 3.20). Accordingly, the participants seem to have scored the lowest on the OLAS-S items related to "practice."

The score ranges adopted in the evaluation of the participants' responses are shown in Table 3.

The participants' responses were evaluated using the score ranges shown in Table 3. When calculating mean scores, the score range was determined to be 0.80 on the 5-point Likert-type scales and 1.86 on the 7-point Likert-type scales (score range= highest value - lowest value / scale type: 5 - 4 / 5 = 0.80 and 7 - 1 / 6 = 1.86).

Table 3. Score ranges and evaluation.

Score Range	Evaluation
1.00-1.80	Too Negative, Too Poor
1.81-2.60	Negative, Poor
2.61-3.40	Moderate
3.41-4.20	Positive, Strong
4.20-5.00	Very Positive, Very Strong

Path analysis findings of perceived e-learning

To start with, Pearson's correlation analysis was performed to test the relationships between perceived e-learning (outcome variable) and its predictors: e-learning attitude, e-learning satisfaction, and e-learning attitude in sports. Table 4 presents the correlations between the variables.

Table 4. Correlations between variables

N:371	PL	C	A	PM	E-LA	E-LS	E-LAS
Perceived Learning							
Cognitive	.952**						
Affective	.957**	.863**					
Psychomotor	.955**	.879**	.861**				
E-learning Attitude	.723**	.656**	.733**	.674**			
E-learning Satisfaction	.778**	.733**	.782**	.705**	.782**		
E-learning attitude in sports	-.012	.007	-.016	-.025	.034	-.014	
p	.814	.891	.765	.637	.516	.787	

$p < 0.05$

**Significant at 0.01 (two-tailed).

PL: Perceived learning, C: Cognitive, A: Affective, PM: Psychomotor, E-LS: E-learning satisfaction, E-LA: E-learning attitude, E-LAS: E-learning attitude in sports

The findings showed the participants' perceived e-learning to be strongly correlated with their e-learning attitudes and e-learning satisfaction ($p < 0.01$). Yet, there was no relationship between perceived learning and e-learning attitude in sports ($p = 0.814$). This was also the case between e-learning attitude and e-learning attitude in sports ($p = 0.516$).

The impacts of e-learning attitude, e-learning attitude in sports, and e-learning satisfaction on perceived e-learning were tested through path analysis. Figure 1 illustrates the path diagram.

In the model presented in Figure 1, e-learning attitude in sports produced path coefficients of 0.03 and -0.01 between e-learning attitude and e-learning satisfaction,

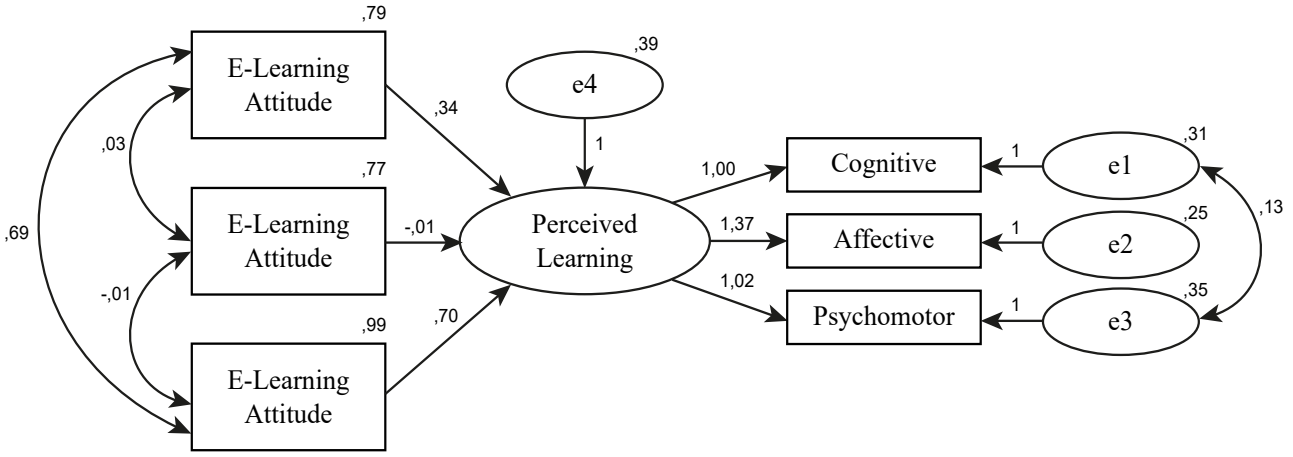

Figure 1. Path diagram for the prediction of perceived e-learning (standardized values)

respectively. In addition, the result was -.01 between perceived e-learning attitude and e-learning attitude in sports. In other words, the participants' attitudes toward e-learning in sports had a negative and poor relationship with their perceived e-learning.

When it comes to fit indices in the path analysis, it was found that the data did not meet the criteria for the model-data fit (χ^2 = 31.950, df = 6, χ^2/df = 5.325, RMSEA = 0.108, SRMR = 0.014, CFI = 0.98, GFI = 0.97, NFI = 0.98, TLI = 0.96, AGFI = 0.90). However, when the proposed modifications were applied between the variables "cognitive" and "psychomotor" through bidirectional covariances, it was then concluded that the data showed a perfect-to-acceptable fit to the model (χ^2 = 15.129, df = 5, χ^2/df = 3.026, RMSEA = 0.074, SRMR = 0.010, CFI = 0.99, GFI = 0.98, NFI = 0.99, TLI = 0.98, AGFI = 0.94; Table 5).

Table 5. SEM fit indices

Fit Index	Acceptable Fit	Perfect Fit	Pre-modification	Post-modification
χ^2			31.950	15.129
Df			6	5
χ^2/df	1-5	$0 \leq \chi 2/df \leq 2$	5.325	3.026
GFI	0.90≤GFI≤0.95	0.95≤ GFI ≤1.00	0.97	**0.98**
AGFI	0.85≤AGFI≤0.90	0.90≤AGFI≤1.00	0.90	0.94
SRMR	0.05≤SRMR≤0.10	0≤ SRMR ≤0.05	0.014	0.010
RMSEA	0.05≤RMSEA≤0.08	0≤ RMSEA ≤0.05	0.108	0.074
CFI	0.95≤CFI≤0.97	0.97≤ CFI ≤1.00	0.98	**0.99**
TLI	0.95≤TLI≤0.97	0.97≤TLI≤1.00	0.96	**0.98**
NFI	0.90≤NFI≤0.95	0.95≤ NFI≤1.00	0.98	**0.99**

Table 5 presents pre- and post-modification fit indices. Accordingly, the chi-square (χ^2) value of the model was 15.129, and the degrees of freedom (df) was 6. Dividing χ^2 by df resulted in a value less than 5.00 (3.026). Among the fit indices, GFI (0.98), CFI (0.99), TLI (0.98) and NFI (0.99) values were found to be perfect. Other indices were also within acceptable limits (Arbuckle, 2003; Byrne, 2001; Hair et al., 2009; Schermelleh-Engel & Moosbrugger, 2003).

Table 6. Parameter estimates and coefficients for the structural model

N = 371	*R*	R^2	Durbin-Watson	B	*β*	*t*	*p*	Correlation		VIF
								Bivariate	Partial	
Predictors Constant				.445						
E-learning attitude				.452	.299	.928	.000	.723	.296	2.585
E-learning satisfaction	.800	.636	1.713	.735	.544	10.794	.000	.778	.491	2.582
E-learning attitude in sports				-.023	-.015	-.468	.640	-.012	-.024	1.005

Outcome variable: Perceived e-learning
$p < 0.05$

It was found that perceived e-learning (outcome variable) showed a strong correlation with a model including the predictor variables (e-learning attitude, e-learning satisfaction, and e-learning attitude in sports; $R = 0.800$). Moreover, 63.6% of the change in perceived e-learning was explained by the predictor variables. While perceived e-learning was significantly associated with e-learning attitude and e-learning satisfaction ($p < 0.001$), it was not the case with e-learning attitude in sports ($p > 0.05$). Therefore, a one-unit increase in e-learning attitude and e-learning satisfaction corresponds to an increase of 0.452 and 0.723 units in perceived e-learning, respectively. Considering the standardized values, a one-unit standard deviation increase in e-learning attitude and e-learning satisfaction corresponds to an increase of 0.299 and 0.544 standard deviation on perceived learning, respectively. To put it another way, while e-learning attitude and e-learning satisfaction significantly predicted perceived e-learning, it was not the case for e-learning attitude in sports.

Discussion

This section discusses the findings of this study based on the relevant literature. The present research explored the impacts of e-learning, e-learning attitude in sports, and e-learning satisfaction on perceived learning among students of sports sciences. The findings revealed that the participants received average-to-high scores on e-learning attitude and e-learning satisfaction and moderate scores on perceived e-learning and e-learning attitude in sports (Table 1). In addition, the participants had poor attitudes toward applied courses in the online environment (Table 2). This finding may be because the participants adopt positive attitudes toward e-learning, like other students, but may not appreciate e-learning in sports, despite their high level of e-learning satisfaction. Another possibility is that while the participating students may have positive attitudes toward attending theoretical courses online, they might think that attending applied courses online will reduce their academic achievement. It was concluded that the participants' negative responses to the items related to applied courses covering physical movements also reduced their mean scores. The inability of students to create their own sports environment for their applied courses, to have sports equipment, and to benefit from instant instructor feedback may be considered factors affecting their attitudes toward online applied courses.

The literature often highlights that e-learning attitudes among students are key to their academic performance (Love et al., 2010); in other words, any adverse performance may be associated with negative attitudes (Sadik & Reisman, 2004). In this study, the participants had clear attitudes toward e-learning. As a matter of fact, Usta et al. did not recruit undergraduate students of sports sciences to confirm the psychometric properties of the OLAS. Moreover, the scale does not contain items for applied courses and measures students' overall e-learning attitudes. Therefore, it may be claimed that the participating students of sports sciences had positive attitudes toward e-learning, since the OLAS considers only overall e-learning attitude. In their research investigating the impact of e-learning attitudes of sports science students on their e-learning readiness, Hergüner et al. (2021) stated the necessity of using e-learning environments for both theoretical and applied courses in sports sciences, and that their participants adopted positive attitudes toward e-learning environments. Their designation for theoretical courses is in line with the present findings. Mutlu-Bozkurt and Erdoğan (2022), in their research examining the relationship between physical education and sports teacher candidates' attitudes towards e-learning in sports and their academic success in distance education, concluded that as the positive attitude towards e-learning in

sports increases, their academic achievement levels will also increase. They argued that students who prefer the method of hybrid learning are more successful. Similarly, Kuşcu and Sancar (2022) stated that both faculty members and students evaluate the blended education process as a permanent option in their research in which they comparatively examined the attitudes of faculty members and students regarding emergency distance education in the COVID-19 pandemic. On the other hand, unlike the present findings, Özdemir and Aydoğan (2021) found the mean e-learning attitude score of undergraduate students of sports sciences to be 3.02 (moderate). Similarly, in her research examining students' attitudes toward web-based teaching in distance education, Akgün (2018) found that the students' mean attitude score was close to "neutral." Durmuş and Bağcı (2013) also concluded the same finding in their research on pre-service teachers' attitudes toward web-based teaching. Yet, Tüzün and Yörük-Toraman (2021) reported that university students were not satisfied with distance education during the pandemic and that most of them preferred face-to-face education. Similarly, Acar (2022) stated that a significant portion of the students of the faculty of sports sciences had a negative perception of distance education during the distance education process.

The findings showed that e-learning attitude and e-learning satisfaction significantly predicted perceived e-learning. However, despite not being statistically significant, e-learning attitudes in sports negatively predicted perceived e-learning (Table 4), which may be because the participating students encountered difficulties during applied courses held online. In general, the present findings are in line with the previous research. In their study, Wan et al. (2008) found that online education provides satisfaction in learning, and Hsieh and Cho (2011) documented a strong relationship between satisfaction and e-learning. Similarly, Öztürk-Demir and Eren (2021) determined that students enrolled in a vocational school had a high degree of e-learning satisfaction. Aktaş et al. (2020) attempted to measure undergraduate students' attitudes toward distance education through a survey consisting of five questions. They found that one-third of the participants responded "Yes" to the question "*Does online or take-home homework contribute to your proficiency in the course?*" In the same study, the authors inferred that students would not prefer distance education due to the excess number of applied courses in sports sciences. In the study by Can et al. (2020), the participating pre-service physical education teachers reported that e-learning would not be an integral part of education due to the gaps in applied courses in online education. In line with these findings, Ünlü et al. (2021) reported that students of sports sciences found the disadvantages of distance education to become a significant barrier to their educational activities. In this regard, the authors suggested that the mental "imagery" technique can be adopted in applied courses in distance education and that software and hardware allowing virtual reality for applied courses would contribute to the quality of distance education. The participants in the study by Yaman (2009) agreed that it might not be convenient to teach applied physical education courses online, since it would be challenging to correct mistakes in physical movements in distance education. Aras and Karakaya (2020) sought the views of academic staff in sports sciences about distance education and found that the participants were not in favor of holding courses online and considered distance education disadvantageous in sports sciences. Similarly, Ünlü et al. (2021) stated that it is almost impossible for sports science students to practice tennis, basketball and swimming at home, and therefore not every applied lesson can be conducted through distance education. As a matter of fact, Iuliano et al. (2021), emphasize the importance the continuing preference learning for face-to-face activities as a learning method when it comes to the acquisition of applied skills in education. Similarly, Can et al. (2020) determined that pre-service physical education teachers showed the inadequacy for practical courses as a negative aspect of e-learning. Murad and Kamal (2020) found that online classes had no effect on the efficiency of learning sports skills online.

In the research, Figure 1 and Table 5 show the model generated to explore the impacts of predictive variables on perceived e-learning. The findings demonstrated that perceived e-learning was significantly predicted by e-learning attitude and e-learning satisfaction, whereas it was not the case with e-learning attitude in sports (Table 6). These findings overlap with the findings of Lo (2010). In addition, Gray and Diloreto (2016) reported a strong ($r = 0.85$) and significant ($p < 0.01$) relationship between perceived learning and student satisfaction. In his research on undergraduate students, Baber (2020) determined a moderate, significant relationship between perceived learning and student satisfaction ($r = 0.46$; $p < 0.01$). Richardson and Swan (2003) suggested a strong correlation between students' overall perceived e-learning and their satisfaction with e-learning, and this relationship was also confirmed by Duque (2014).

The literature also offers previous data related to the present findings on perceived learning, and it can be asserted that the findings of this study are consistent with the previous research. Turan et al. (2022) investigated how academic motivation and attitudes toward mobile learning are linked with perceived learning among students of sports sciences and found perceived learning to be moderately related to academic motivation ($p < .05$) and weakly correlated with mobile learning ($p < .05$). Islam (2013) documented the substantial effect of an e-learning system on perceived learning. McGill and Klobas (2009) also showed online education to affect perceived learning

positively. Topal et al. (2017) concluded that the overall perceived learning levels of postgraduate students were 78% in distance education, which was shown as sufficient in terms of satisfying the learning expectations of the students. Similarly, Aguilar et al. (2022) have recently found that factors such as ICT use and student satisfaction have a positive effect on perceived learning. In line with the present findings, Baber (2020) found that the perceived learning level of undergraduate students was moderate (M = 3.06). In the literature, there are also studies that reach different conclusions from our research findings. Bozavlı (2021) investigated the opinions of Turkish students learning English as a foreign language on online teaching and reported that online education was not as effective as classroom teaching, and therefore they were not satisfied with online education. In terms of perceived learning, it can be said that the results of this research are compatible with the literature.

Studies measuring the satisfaction levels of university students in distance education show that there is much more to be done about the effective use of information and communication technologies, partly due to an unsatisfactory level of student satisfaction and partially because of positive student attitudes towards e-learning.

Conclusion

Overall, the present study, employing SEM for exploring perceived e-learning levels among students of sports sciences, concluded that the students' e-learning attitudes and e-learning satisfaction significantly predicted their perceived e-learning, whereas their attitudes toward e-learning in sports did not work in the model. In this sense, it may be claimed that students' increased e-learning attitudes and e-learning satisfaction contribute to their perceived e-learning. Not surprisingly, the students adopted negative attitudes toward learning applied courses through distance education, which may revive an increasing demand for returning to face-to-face education for these courses. On this issue, it seems appropriate that the Council of Higher Education in Turkey decided to implement a hybrid method (holding some courses face-to-face) in the 2021-2022 academic year.

It is believed that further research on the perceptions of students enrolled in other programs about applied courses in online education may steer future educational regulations and measures.

In order to increase students' perceived learning levels in distance education, it can be suggested to investigate the level of benefit from technological developments and the use of Metaverse technologies (Augmented reality-AR, virtual reality-VR and mixed reality-MR) in this context.

Declaration of interests

No potential conflict of interest was reported by the authors

Funding

The authors did not receive financial support from any organization for the submitted work.

References

Acar, K. (2022). Covid-19 sürecinde spor bilimleri fakültesi öğrencilerinin uzaktan eğitime yönelik algıları: Bir metafor analizi [Perceptions of sports science faculty students towards distance education during the Covid-19 process: A metaphor analysis]. *Kırşehir Eğitim Fakültesi Dergisi*, *23*(2), 1764–1796.

Aguilar, O. G., Apaza, F. T., & Huanca, S. C. (2022). Influencing factors in perceived learning mediated by satisfaction in university students in times of Covid-19. 20th LACCEI International Multi-Conference for Engineering, Education, and Technology: "Education, Research and Leadership in Post-Pandemic Engineering: Resilient, Inclusive and Sustainable Actions", Hybrid Event. Boca Raton, Florida- USA, July 18–22, 2022.

Akgün, F. (2018). Uzaktan eğitim öğrencilerinin web tabanlı öğretime yönelik tutumları ve çevrim içi teknolojilere yönelik öz-yeterlik algılarının incelenmesi [Investigation of distance education students' attitudes towards web-based teaching and their self-efficacy perceptions towards online technologies]. In *9th International Computer & Instructional Technologies Symposium-ICITS2015 Full Paper Proceedings*.

Aktaş, Ö., Büyüktaş, B., Gülle, M., & Yıldız, M. (2020). COVID–19 virüsünden kaynaklanan izolasyon günlerinde spor bilimleri öğrencilerinin uzaktan eğitime karşı tutumları [Attitudes of sports science students towards distance education during the days of isolation caused by the COVID-19 virus]. *Sivas Cumhuriyet* Üniversitesi *Spor Bilimleri Dergisi*, *1*(1), 1–9.

Albayrak, E. Güngören, Ö. C., & Horzum, M. B. (2014). Algılanan Öğrenme ölçeğinin Türkçeye uyarlaması [Turkish adaptation of the Perceived Learning Scale]. *Ondokuz Mayıs* Üniversitesi *Eğitim Fakültesi Dergisi*, *33*(1), 1–14.

Allen, I. E., & Seaman, J. (2014). *Grade Change: Tracking Online Education in the United States*. Retrieved from http://www.onlinelearningsurvey.com/reports/gradechange.pdf

Alomyan, H., & Au, W. (2004). Exploration of instructional strategies and individual difference within the context of web-based learning. *International Education Journal*, *4*(4), 86–91.

Altunışık, R., Coşkun, R., Bayraktaroğlu, S., & Yıldırım, E. (2007). Sosyal bilimlerde araştırma yöntemleri: SPSS uygulamalı [Research methods in social sciences: SPSS applied]. Sakarya Yayıncılık.

Alyoussef, I. Y. (2021). E-Learning Acceptance: The Role of Task–Technology Fit as Sustainability in Higher Education.

Sustainability, 13, 6450. 1–15. https://doi.org/10.3390/su13116450

Aras, E., & ve Karakaya, Y. E. (2020). Spor eğitimi kurumlarında görev yapan akademik personelin uzaktan eğitime yönelik görüşleri: Nitel bir çalışma [Opinions of academic staff working in sports education institutions on distance education: A qualitative study]. *Spormetre The Journal of Physical Education and Sport Sciences*, *18*(2), 1–12.

Arbaughi, J. B. (2000), Virtual Classroom Characteristics and Student Satisfaction with Internet-Based MBA Courses. *Journal of Management Education, 24*(1), 32–54. https://doi.org/10.1177/105256290002400104

Arbuckle, J. L. (2003). *Amos 5.0 update to the AMOS user's guide.* Chicago: Small Waters Corp.

Arı, E., Yılmaz, V., & Doğan, M. (2015). Üniversite öğrencilerinin internet üzerinden alışverişlerine ilişkin tutum ve davranışların önerilen bir yapısal eşitlik modeliyle araştırılması [Investigation of university students' attitudes and behaviors towards online shopping with a proposed structural equation model]. *Yönetim ve Ekonomi, 22*(2), 385–399.

Baber, H. (2020). Determinants of students' perceived learning outcome and satisfaction in online learning during the pandemic of COVID19. *Journal of Education and eLearning Research*, *7*(3), 285–292

Batista, I. V. C., & Cornachıone, E. B. (2005). Learning styles influences on satisfaction and perceived learning: Analysis of an online business gamel, Developments in Business Simulation and Experiential Learning, Proceedings of the Annual ABSEL conference 32, 22–30.

Birişçi, S., Metin, M., & Demiryürek, G. (2011). İlköğretim öğretmenlerinin bilgisayar ve internet kullanımına yönelik tutumlarının incelenmesi: (Artvin ili örneği) [Examination of primary school teachers' attitudes towards computer and internet use: (Artvin province example)]. *Eğitim Teknolojileri Araştırmaları Dergisi, 2*(4), 1–18.

Büyüköztürk, Ş. (2011). Sosyal Bilimler İçin Veri Analizi El Kitabı [Manual of data analysis for social sciences]. Ankara: Pegem Akademi.

Bollinger, D. U., & Erichsen, E. A. (2013). Student satisfaction with blended and online courses based on personality type. *Canadian Journal of Learning & Technology, 39*(1), 1–23. Retrieved from https://files.eric.ed.gov/fulltext/EJ1007071.pdf

Bozavlı, E. (2021). Is foreign language teaching possible without school? Distance learning experiences of foreign language students at Ataturk University during the Covid-19 pandemic. *Arab World English Journal (AWEJ)*, *12*(1), 3–18.

Büyüköztürk, Ş., Akgün, Ö. E., Demirel, F., Karadeniz, Ş., & Çakmak, E. K. (2017). Bilimsel araştırma yöntemleri. (23. Baskı) [Scientific research methods]. Ankara: Pegem Akademi.

Byrne, B. M. (2001). Structural equation modeling with AMOS, basics concepts, applications, and programming. Hillsdale, NJ: Lawrence Erlbaum Associates.

Can, H. C., Özdemir, H., & Işım-Türksoy, A. (2020). What does e-learning mean for physical education teacher candidates: Mixed method research. İnönü *University Journal of the Faculty of Education, 21*(3), 1374–1386.

Caspi, A., & Blau, I. (2008). Social presence in online discussion groups: Testing three conceptions and their relations to perceived learning. *Social Psychology of Education*, *11*(3), 323–346.

Duque, L. C. (2014). A framework for analysing higher education performance: Students' satisfaction, perceived learning outcomes, and dropout intentions. *Total Quality Management & Business Excellence*, *25*(1–2), 1–21.

Durmuş, A., & Bağcı, H. (2013). Öğretmen adaylarının web tabanlı öğretime yönelik tutumlarının farklı değişkenler açısından incelenmesi [Examination of pre-service teachers' attitudes towards web-based teaching in terms of different variables]. *Eğitim ve* Öğretim *Araştırmaları Dergisi*, *2*(4), 225–231.

Eom, S. B. (2014). Understanding e-learners' satisfaction with learning management systems. *Bulletin of the IEEE Technical Committee on Learning Technology*, *16* (2/3), 10–13.

Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2012). How to design and evaluate research in education. New York: McGraw Hill.

Gil, H. (2008). The challenge of the transition from online delivery to online teaching and learning. In K. McFerrin, R. Weber, R. Carlsen, D. A. Williset. (Eds.), *Proceedings of Society for Information Technology and Teacher Education International Conference* (pp. 2589–2594). Chesapeake, VA: AACE.

Gopal, R., Singh, V., & Aggarwal, A. (2021). Impact of online classes on the satisfaction and performance of students during the pandemic period of COVID-19. *Education and Information Technologies*, 6923–6947.

Gülbahar, Y. (2009). *E-öğrenme*. Ankara: Pegem Akademi.

Gürbüz, S., & Şahin, F. (2016). *Research methods in social sciences*. Ankara: Seçkin Publishing.

Gray, J. A., & Diloreto, M. (2016). The effects of student engagement, student satisfaction, and perceived learning in online learning environments. *International Journal of Educational Leadership Preparation*, *11*(1), n1. Retrieved from https://files.eric.ed.gov/fulltext/EJ1103654.pdf

Hamid, Y., Al-Karaki, J. N., Nseobot, I. R., Effiong, A. I., Dinnoo, V., & Edet, A. U. (2020). A simple and predictive model for COVID-19 evolution in large scale infected countries. *Journal of Theoretical and Applied Information Technology*, *98*(24), 3961- 3971.

Hair, J. F, Black, W. C., Babin, B. J., Anderson, R. E. (2009). *Multivariate data analysis* (7th ed.). Upper Saddle River, NJ: Prentice Hall.

Hergüner, G., Yaman, Ç., Çağlak-Sarı, S., Yaman S., & Dönmez, A. (2021). The effect of online learning attitudes of sports sciences students on their learning readiness to learn online in the era of the new coronavirus pandemic (Covid–19). *TOJET: The Turkish Online Journal of Educational Technology*, *20*(1); 68–77.

Hsieh, P. A. J., & Cho, V. (2011). Comparing e-Learning tools' success: The case of instructor–student interactive vs. self-paced tools. *Computers & Education, 57*(3), 2025–2038.

Isaac, O., Aldholay, A., Abdullah, Z., & Ramayah, T. (2019). Online learning usage within Yemeni higher education: The role of compatibility and task-technology fit as mediating variables in the IS success model. *Computers & Education*, *136*, 113–129.

İmhan, M., & ve Çetin, B. (2013). Çevrimiçi öğrenmeye yönelik hazır bulunuşluk ölçeğinin (ÇÖHBÖ) Türkçe formunun geçerlik ve güvenirlik çalışması [The validity and reliability study of the Turkish form of the online learning readiness scale (ÇÖLLÖ)]. *Eğitim Teknolojisi Kuram ve Uygulama*, *3*(2), 72–101.

Islam, A. N. (2013). Investigating e-learning system usage outcomes in the university context. *Computers & Education*, *69*, 387–399.

Kafes, A.Y., & Yıldırım, A. (2021). Üniversite öğrencilerinin uzaktan eğitim memnuniyeti ölçeğinin geliştirilmesi: Geçerlik ve güvenirlik çalışması [Developing university students' distance education satisfaction scale: Validity and reliability study]. *Turkish Studies*, *16*(6), 1641–1657.

Kağıtçıbaşı, Ç. (1999). Yeni İnsan ve İnsanlar [New Man and People]. İstanbul: Evrim Yayınevi.

Kara, A. (2010). Öğrenmeye ilişkin tutum ölçeğinin geliştirilmesi [Developing an attitude scale towards learning]. *Elektronik Sosyal Bilimler Dergisi*, *9*(32), 49–62.

Karasar, N. (2018). Bilimsel araştırma yöntemleri: Kavramlar, ilkeler ve teknikler [Scientific research methods: Concepts, principles and techniques]. (32.Baskı). Ankara: Nobel Yayın Dağıtım.

Klein, P., Ivanjek, L., Dahlkemper, M. N., Jeličić, K., Geyer, M.-A., Küchemann, S., & Susac, A. (2021). Studying physics during the COVID-19 pandemic: Student assessments of learning achievement, perceived effectiveness of online recitations, and online laboratories. *Physical Review Physics Education Research*, *17*, 010117, 1–11.

Kuşcu, E., & Sancar, R. (2022). A comparative examination of faculty members' and students' meanings regarding emergency remote teaching in the COVID-19 process. *Educational Academic Research*, *47*, 93–107.

Kurucay, M., & Inan, F. A. (2017). Examining the effects of learner-learner interactions on satisfaction and learning in an online undergraduate course. *Computers & Education*, *115*, 20–37.

Koutsoyiannis, A. (1989). Ekonometri kuramı. Çeviren: Şenesen Ü. 1. Baskı [Econometric theory. Translated by Şenesen Ü. 1st Edition]. Ankara: Verso Yayıncılık.

Lee, H. Y., Qu, H., & Kim, Y. S. (2007). A study of the impact of personal innovativeness on online travel shopping behavior-A case study of Korean travelers. *Tourism Management*, *28*(3), 886–897.

Iuliano, E., Mazzilli, M., Zambelli, S., Macaluso, F., Raviolo, P., & Picerno P. (2021). Satisfaction levels of sport sciences university students in online workshops for substituting practice-oriented activities during the COVID-19 Lockdown. *Education Sciences*. *11*(10), 600.

Li, R., Meng, Z. Tian, M., Zhang, Z., & Xiao, W. (2021). Modelling Chinese EFL learners' flow experiences in digital game-based vocabulary learning: The roles of learner and contextual factors. *Computer Assisted Language Learning*, *34*(4), 483–505.

Susanti, L., & Fairina, Y. (2019). The Advocacy Model of Indonesian Chinese Students, the Affluent Market. *International Journal of Instruction*, *12*(1), 625–640. https://doi.org/10.29333/iji.2019.12140a

Liaw, S. S., Huang, H. M. ve Chen, G. D. (2007). An activity-theoretical approach to investigate learners' factors toward e-learning systems. *Computers in Human Behavior*, *23*(4), 1906–1920.

Lo C. C. (2010). How student satisfaction factors affect perceived learningl, *Journal of the Scholarship of Teaching and Learning*, *10*(1), 47–54.

Love, E. G, Love, D. W., & Northcraft, G. B. (2010). Is the end in sight? Student regulation of in-class and extra-credit effort in response to performance feedback. *Acad Manag Learn Educ*, *9*, 81–97.

McGill, T. J., & Klobas, J. E. (2009). A task–technology fit view of learning management system impact. *Computers & Education*, *52*(2), 496–508.

Martín-Rodríguez, O., Fernández-Molina, J. C., Montero-Alonso, M. A, & González-Gómez, F. (2015). The main components of satisfaction with e-learning. *Technology, Pedagogy and Education*, *24*(2), 267–277. https://doi.org/10.1080/1475939X.2014.888370

Millan, A., & Esteban, A. (2004). Development of a multiple-item scale for measuring customer satisfaction in travel agencies services. *Tourism Management*, *25*(5), 533–546. https://doi.org/10.1016/ j.tourman.2003.07.002.

Murad, F. A., & Kamal, A. A. (2021). The impact of e-learning on university students' learning of sport skill subjects during the COVID-19 Pandemic. *The European Journal of Social and Behavioural Sciences*, EJSBS, XXX, (III), 201–216.

Mutlu-Bozkurt, T., & Tamer, K. (2020). Sporda e-öğrenmeye yönelik tutum ölçeği [Scale of attitude towards e-learning in sports]. *International Social Mentality and Researcher Thinkers Journal, 6*(36), 1761–1771.

Mutlu-Bozkurt, T., & Erdoğan, R. (2022). Investigation of the relationship between the attitudes of physical education and sports teacher candidates towards e-learning in sports and academic success in the distance education process. *The Turkish Online Journal of Educational Technology (TOJET)*, *21*(2), 47–53.

Özdemir, E., & Aydoğan, H. (2021). Spor eğitimi alan üniversite öğrencilerinin e-öğrenmeye yönelik tutumlarının incelenmesi [Examining attitudes of university students taking sport education towards elearning]. *Spor Eğitim Dergisi*, *5*(3), 187–195.

Özgür, H. ve Tosun, N. (2010). İnternet destekli eğitimin e-öğrenme tutumlarına etkisi [The effect of internet assisted education on e-learning attitudes]. XV. Türkiye'de İnternet Konferansı, 2–4. İstanbul.

Öztürk-Demir, S. ve Eren E. (2021). Üniversite öğrencilerinin çevrimiçi öğrenme ortamına ilişkin memnuniyet düzeyleri [Satisfaction levels of university students regarding the online learning environment]. *Uluslararası Bilim ve Eğitim Dergisi*, *4*(2), 67–84.

Pizan, A., & Ellis, T. (1999). Customer satisfaction and its measurement in hospitality enterprises. *International Journal of Contemporary Hospitality Management*, *11*(7), 326–339.

Pokhrel, S., & Chhetri, R. (2021). A literature review on impact of COVID-19 pandemic on teaching and learning. *Higher Education for the Future*, *8*(1), 133–141.

Prabhu, M. N. B., Bolar, K., Mallya, J., Roy, P., Payini, V., & Thirugnanasambantham, K. (2022). Determinants of hospitality students' perceived learning during COVID-19 pandemic: Role of interactions and self-efficacy. *Journal of Hospitality, Leisure, Sport & Tourism Education*, *30*, 100335.

Rahman, L. A., Omar, N., Fatzel, F. H. M., & Isa, N. S. M. (2022). Predictors of student satisfaction and perceived learning in online distance learning: The effects of self-efficacy and interaction. *International Journal of Academic Research in Business and Social Sciences*, *12*(10), 785–803.

Ribeiro, R. (2020). How university faculty embraced the remote learning shift. *EdTech Magazine*. Retrieved from https://edtechmagazine.com/higher/article/2020/04/how-university-faculty-embraced-remote-learning-shift (Erişim Tarihi: 23 Şubat 2022).

Richardson, J., & Swan, K. (2003). Examining social presence in online courses in relation to students' perceived learning and satisfaction. *JALN*, *7*(1), 68–88.

Rovai A. P., Wighting M. J., Baker J. D., & ve Grooms L. D. (2009). Development of an instrument to measure perceived cognitive, affective, and psychomotor learning in traditional and virtual higher education classroom settings. *Internet and Higher Education*, *121*(1), 7–13.

Sadik A, & Reisman S. (2004). Design and implementation of a web-based learning environment: Lessons learned. *Q Rev Distance Educ*, *5*, 157–71.

Sebastianelli, R., Swift, C., & Tamimi, N. (2015). Factors affecting perceived learning, satisfaction, and quality in the online MBA: A structural equation modeling approach. *Journal of Education for Business*, *90*(6), 296–305. https://doi.org/10.1080/08832323.2015.1038979

Schermelleh-Engel K., & Moosbrugger, H. (2003). Evaluating the fit of structural equation models: tests of significance and descriptive goodness-of-fit measures. *Methods Psychol Res Online*, *8*, 23–74.

Shee, D. Y., & Wang Y. S. (2008). Multi-criteria evaluation of the web-based e-learning system: A methodology based on learner satisfaction and its applications. *Computers and Education*, *50*, 894–905.

Sun, P. C., Tsai, R. J., Finger, G., Chen, Y. Y., & Yeh, D. (2008). What drives a successful e-Learning? An empirical investigation of the critical factors influencing learner satisfaction. *Computers & Education, 50*(4), 1183–1202.

Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics*, 6th edn Boston. Ma: Pearson.

Tavşancıl, E. (2006). Tutumların ölçülmesi ve SPSS ile veri analizi. (3. Baskı) [Measuring attitudes and data analysis with SPSS. (3rd Edition)]. Ankara: Nobel Yayınları

Topal, M., Akgün, Ö. E., & Aydın, F. (2017). Lisansüstü uzaktan eğitim öğrencilerinin algılanan öğrenme düzeylerinin çeşitli değişkenler açısından incelenmesi: Sakarya Üniversitesi örneği [Examining the perceived learning levels of graduate distance education students in terms of various variables: Sakarya University example]. VIII. International Graduate Education Symposium Proceedings Book, 126–140.

Turan, S., Yaman, M. S., Genç, H. İ., Ahmet Dönmez, Gülten Hergüner, & Yaman, Ç. (2022), Predictive of perceived learning: academic motivation and attitudes to mobile learning, *The Turkish Online Journal of Educational Technology*, *21*(1), 106–113.

Turnbull, D., Chugh, R., & Luck, J. (2021). Problems in the application of learning management systems: Comparison of research perspectives between Australia and China. *Education and Information Technologies*, *26*(2), 3789–3810.

Tüzün, F. ve Yörük-Toraman, N. (2021). Pandemi döneminde uzaktan eğitim memnuniyetini etkileyen faktörler [Factors affecting distance education satisfaction during the pandemic period]. Ömer *Halisdemir* Üniversitesi İktisadi *ve* İdari *Bilimler Fakültesi Dergisi*, *14*(3), 822–845.

Ullman, J. B. (2001). Structural equation modeling. In B. G. Tabachnick, & L. S. Fidell (Eds.), *Using Multivar Stat. 4th ed.* (pp. 653–771). Boston, MA: Allyn, & Bacon.

Uusiautti, S., Maatta, K., & Leskisenoja, E. (2017). Succeeding alone and together-university students' perceptions of caring online teaching. *Journal of Studies in Education*, *7*(2), 48–66.

Usta, İ., Uysal, Ö., & Okur, M. R. (2016). Çevrimiçi öğrenme tutum ölçeği: Geliştirilmesi, geçerliği ve güvenirliği [Online learning attitude scale: Development, validity and reliability]. *Journal of International Social Research*, *9*(43), 2215–2215.

Ünlü, H., Aktaş, Ö., & Büyüktaş, B. (2021). Spor bilimleri öğrencilerinin uzaktan eğitime yönelik tutum ve görüşlerinin incelenmesi [Examining the attitudes and views of sports science students towards distance education]. *Spor Bilimleri Araştırmaları Dergisi*, *6*(2), 294–306.

Van Rooij, S. W., & Zirkle, K. (2016). Balancing pedagogy, student readiness and accessibility: A case study in collaborative online course development. *The Internet and Higher Education*, *28*, 1–7.

Walker, P., Whittaker, C., Watson, O., Baguelin, M., Ainslie, K., Bhatia, S., . . . Cattarino, L. (2020). Report 12: The global impact of covid-19 and strategies for mitigation and suppression. *Science*, *369*(5602), 413–422. https://doi.org.10.1126/science.abc0035

Wan, Z., Wang, Y., & Haggerty, N. (2008). Why people benefit from e-learning differently: The effects of psychological processes on e-learning outcomes. *Information & Management*, *45*(8), 513–521.

Wu, J. H., Tennyson, R. D., & Hsia, T. L. (2010). A study of student satisfaction in a blended elearning system environment. *Computers & Education*, *55*(1), 155–164.

WHO. (2020). Coronavirus disease (COVID-19) pandemic. World Health Organization. Retrieved from https://www. who.int/

emergencies/diseases/novel-coronavirus-2019 (Erişim Tarihi: 23 Şubat 2022).

Yaman, M. (2009), Perceptions of students on the application of distance education in physical education lessons. *The Turkish Online Journal of Educational Technology*, *8*(1), 1–10.

Young, S. (2006). Student views of effective online teaching in higher education. *The American Journal of Distance Education*, 65–77.

YÖK. (2020). Basın Açıklaması [Press briefing] (18 Mart 2020), Retrieved from https://www.yok.gov.tr/Sayfalar/Haberler/2020/universitelerde-uygulanacak-uzaktan-egitime-iliskin-aciklama.aspx (Erişim Tarihi: 23 Şubat 2022).

YÖK. (2020a). Basın ve Halkla İlişkiler Müşavirliği, Yükseköğretim kurumlarımızdaki 2020–2021 eğitim ve öğretim dönemine yönelik açıklama [Press and Public Relations Consultancy, Statement for the 2020–2021 academic year in our Higher Education Institutions], 13.08.2020, 1–2.

YÖK. (2021). YÖK Başkanı Erol Özvar, Üniversitelerde Yüz Yüze Eğitimin Detaylarını Açıkladı, 8 Eylül 2021 [YÖK President Erol Özvar Announced the Details of Face-to-face Education at Universities, 8 September 2021.]. Retrieved from https://www.yok.gov.tr/Sayfalar/Haberler/2021/yok-baskani-ozvar-dan-yuz-yuze-egitime-iliskin -aciklamalar.aspx (Erişim Tarihi: 23 Şubat 2022).

This is Open Access article distributed under the terms of CC-BY-NC-ND 4.0 International License.