THE EFFECT OF KNOWLEDGE SHARING, ATTITUDE, AND SATISFACTION ON NOVICE UNIVERSITY STUDENTS' ONLINE LEARNING ACHIEVEMENT

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ABSTRACT

In the academic year 2020-2021, students who had been accepted onto a university in Turkiye began their studies with the use of emergency remote teaching (ERT). The aim of this study is to examine the causal relationship between academic achievement, online course satisfaction, attitudes towards online learning and knowledge sharing behaviors of these novice university students in terms of the emergency remote teaching process. This research was designed to make use of correlational research methods. The study group consisted of 437 freshmen students studying in the Faculty of Education at a public university in Turkiye. Research data were collected using the Knowledge Sharing Behavior scale, the Online Course Satisfaction scale, the Online Learning Attitude scale, and a learning achievement test. Research data were analyzed using descriptive statistics, Pearson correlation analysis, and path analysis. The results showed that general acceptance, knowledge receiving, individual awareness and perceived usefulness significantly affected online course satisfaction. On the other hand, knowledge giving and application effectiveness factors did not significantly affect online course satisfaction. It is noteworthy that individual awareness, which compares face-to-face teaching activities with ERT to identify the preferences and awareness of the students, had a negative impact on their satisfaction. Finally, it was determined that online course satisfaction had a significant but low-level effect on learning achievement. In order to increase student satisfaction with regard to the ERT process, it is recommended that the university makes the opportunities more visible and provide support for students' acceptance of the process. Future avenues and precautions about designing the ERT courses have been suggested in light of the research findings.

Keywords: Online learning, knowledge sharing, course satisfaction, online learning attitude, learning achievement, COVID-19 pandemic.

INTRODUCTION

The Covid-19 outbreak was declared a pandemic by the World Health Organization on March 11, 2020 (Cucinotta & Vanelli, 2020) ater which almost all educational institutions in the world switched to Emergency Remote Teaching (ERT). ERT is a temporary and often limited educational activity that is used to continue the teaching process in extraordinary conditions such as pandemics and natural disasters (Keskin et al., 2022; Nicolai & Triplehorn, 2003; Sinclair, 2002). According to Isman (2011), Distance Education (DE) was used for different purposes in the period before the introduction of ERT. A number of countries have benefited from the advantageous aspects of DE, given their particular circumstances. In terms of the ERT process, DE technologies started to be used in all levels of education due to the circumstances pertaining. The DE technologies were used as a lifebuoy in this extraordinary process. The data to be obtained with the research to be done with regard to the ERT process may present different results from those of previous DE studies (Ferri et al., 2020; Shisley, 2020).

The instruction process can also be thought of as a communication process. In this process, the teacher is the source, and the student is the receiver of the message. The message is transmitted from the source to the receiver via a communication channel. The efficiency of the teaching process increases in proportion to the quality of these communication channels (Yalin, 2006). Information and Communication Technology (ICT) assumes the role of the channel. In the educational context, ICT is also called instructional technology (Seels & Richey, 2012). In terms of DE and ERT, the internet infrastructure, Learning Management Systems (LMS) and synchronous/asynchronous communication tools are used as channels (Keskin et al., 2022). Therefore, these tools are important with regard to the efficiency of the teaching process. To the extent that they increase the interaction of students, they can make positive contributions to the teaching process. One of the ways of providing interaction between students is knowledge sharing (KS) (Tseng & Kuo, 2014). In other words, social participation is an important indicator of the extent of KS. KS can simply be thought of as sharing the knowledge acquired or produced by an individual in a virtual community with others (Yu et al., 2010). KS is different from information sharing (IS). The former is expressed in terms of an exchange of ideas and sharing of experience among individuals rather than the sharing of raw information as in the case of IS (Tong et al., 2013).

In this study, the interactions of the learners using instructional technologies were handled in the context of KS. Many variables are likely to affect KS behavior. There are individual, organizational, and technological variables that can act as barriers to KS behavior (Sohail & Daud, 2009). In addition, there are also variables that positively affect KS behavior. For example, if there is a sense of community among students communicating in the virtual environment, the KS behavior also increases (Yilmaz, 2016). In other words, as the interaction between students increases, they exhibit KS behavior. Similarly, KS behavior increases student engagement to the extent that it is exhibited (Kapur & Kinzer, 2007; Mazzolini & Maddison, 2007; Rasheed et al., 2020). In addition, as academic self-efficacy, which is a variable associated with academic success, increases, so too does the tendency to exhibit KS behavior (Yilmaz, 2016). As a result, KS interactions emerge as a decisive variable for satisfaction (Liao 2006) and course outcomes (Ghadirian et al., 2014).

The concept of attitude, which constitutes a large part of the affective domain (Balaban-Sali, 2006), can be defined as the mental state that has a decisive role to play on the behavior of the individual in certain situations (Gagne, 1985). There is a close connection between affective learning and behaviors (Krathwohl et al., 1973). In other words, the more positive and stronger the attitude one has about a situation, this mental state is reflected in behaviors. In this study, students' attitudes towards online learning were discussed. Attitude is discussed about four dimensions: acceptance, awareness, usefulness, and effectiveness (Usta et al., 2016). We investigated whether students' attitudes toward online learning have an impact on student satisfaction and course achievement in terms of ERT.

Learner satisfaction is one of the important quality indicators of distance education (Bayrak et al., 2020; McQuillan & James, 2010; Parahoo et al., 2016). The experiences of the learners affect their satisfaction level. In the context of DE, interactions, the presence of an instructor, content, communication channels, attitudes, and technological competencies appear as important predictors of satisfaction (Baber, 2020; Harsasi, & Sutawijaya, 2018; Nortvig et al., 2018). Dinh and Nguyen (2020) revealed that technical difficulties such as connection experienced in the online learning process affect students' satisfaction and

learning modality preferences. Learner satisfaction also guides researchers and practitioners when it comes to improving distance education programs (Khiat, 2013) and determining teaching effectiveness (Merisotis & Olsen 2000). Some studies reveal that learner satisfaction has a significant effect on continuance intentions towards e-learning (Chow & Shi, 2014; M. C. Lee, 2010; Pham et al., 2019). This situation, which can also be thought of as the loyalty of the learners, increases the probability of successful completion of the relevant course. In his research during the Covid-19 pandemic, Baber (2020) revealed that interaction, motivation, the structure of the lesson, and facilitation influence learner satisfaction. Zeng and Wang (2021) concluded in their literature review study that the synchronous opportunities provided to learners during the Covid-19 process suit the students' demand for face-to-face communication, which had a direct impact on their satisfaction.

During the pandemic process, educational activities continued by using online learning opportunities. However, the effectiveness of the teaching activities involved in this process was a topic of interest (Baber, 2020; Bdair, 2021; Bojovic et al., 2020; Gandasari & Dwidienawati, 2020; Keskin et al., 2022; Stevanovic, Bozic, & Radovic, 2021). In the evaluation of effectiveness, in addition to the above-mentioned affective characteristics such as attitude and satisfaction, student achievement was also an important indicator. Tung Son et al. (2020) revealed that the DE provided during the Covid-19 pandemic did not affect learner success either positively or negatively. In other words, they determined that learning performance was similar to that found in traditional learning environments (Tung Son et al., 2020). According to equivalency theory (Simonson, 1999), if learners receive equal learning experiences, learning results will not differ, regardless of the teaching modality. Similarly, Baber (2020), who carried out research during the pandemic, stated that the perceived learning outcomes were affected by opportunities, interaction, and motivation. As a matter of fact, while some studies state that there is a relationship between learner satisfaction and academic achievement (Kamemera et al., 2003; Khiat, 2013; Kim & Park, 2021), others stated that satisfaction with regard to DE does not always result in success (Khan & Iqbal, 2016; Moore & Kearsley, 2011). In this study, in order to eliminate this uncertainty, the effect of satisfaction on achievement was tested.

PURPOSE OF THE STUDY

In this research, the effect of knowledge sharing and attitude structures on online course satisfaction was examined first. Revealing the causal relationship between satisfaction and learning achievement constituted the final problem dealt with by this study. In this context, the research questions are as follows:

RQ1. What is the level of novice university students'

a) online course satisfaction,

b) knowledge sharing behavior in online learning environments,

c) attitude towards online learning?

RQ2. Does knowledge sharing behavior in online learning environments and attitude towards online learning affect online course satisfaction?

RQ3. Does online course satisfaction affect students' learning achievements?

METHOD

In this section, the study group, the instruction process, the data collection tools, and the data analysis method are explained. This study is based on correlational research methods. There are two basic purposes of correlational research, exploratory and predictive (Fraenkel et al., 2012). This research was conducted as a predictive correlational study, in which the effect of predictor variables on the dependent variable was tested. The patterns between the predictor and dependent variables were revealed using path analysis, which is a special type of structural equation modeling (Olobatuyi, 2006).

Study Group

The study group consisted of 553 freshmen students studying in the Faculty of Education of a public university located in the eastern region of Turkiye. The university has been in existence for more than 40 years and has an important position in its region. It provides an education to approximately 30,000 undergraduate students. The Faculty of Education is also one of the major faculties of the university. The participants came together during the ERT process and did not see each other face-to-face. Ninety-two students who did not regularly participate in DE activities, and 24 students who did not respond to the data collection tools were excluded from the study group. The research was carried out using the data obtained from the remaining 437 students. In terms of gender, 68.2% of the participants were female and 31.8% were male. The distribution of the participants according to their departments are presented in Table 1.

Table 1. Distribution of the participants according to their departments.

Department	f	%	Cumulative %
ELT	67	15.33	15
Science Education	30	6.86	22
Fine Arts Education	36	8.24	30
Primary Mathematics	42	9.61	40
Mathematics Education	21	4.81	45
Pre-school Education	56	12.81	58
Guidance and Psychological Counselling	56	12.81	70
Primary School Teaching	59	13.50	84
Social Sciences	35	8.01	92
Turkish Language and Literature	22	5.03	97
Turkish Language Education	13	2.97	100
Total	437	100.0	

Data Collection Tools

In this study, four data collection tools were used: (I) Online Course Satisfaction scale, (II) Online Learning Attitude scale, (III) Knowledge Sharing Behavior scale in online learning environments and (IV) a learning achievement test. The Online Course Satisfaction scale (Bayrak et al, 2020) is a single factor scale consisting of eight items. The scale was prepared as a five-point Likert form. CFA fit indexes are $\chi^2(17)= 61.272$; RMSEA=0.046; GFI=0.988; CFI=0.995; NNFI=0.992. The second data collection tool is the Online Learning Attitude scale (Usta et al., 2016) consisting of 20 items and a four-factor structure. The sub-dimensions of the scale were named as general acceptance, individual awareness, perceived usefulness, and application effectiveness. The scale was structured as a five-point Likert type. Factor loadings of the scale's vary between 0.811 to 4.27. The third data collection tool used in the research is the Knowledge Sharing Behavior scale in online learning environments developed by Tseng and Kuo (2014) and adapted into Turkish by Avci Yucel and Ergun (2015). The scale consists of a total of nine items under two factors. Scale factors are named as knowledge receiving and knowledge giving. The scale is structured as a seven-point Likert type. CFA fit indexes are RMSEA=0.07; S-RMR=0.036; NNFI=0.98; CFI=0.99; GFI=0.96; AGFI=0.92; IFI=0.99. Table 2 shows the original and recalculated Cronbach's alpha values for the scales.

Table 2. Cronbach's alpha values for the scales

Data Collection Tool	Original Cronbach's alpha	Calculate Cronbach's alpha
Online course satisfaction scale	0.95	0.90
Online learning attitude scale	0.90	0.93
Knowledge sharing behavior scale	0.90	0.89

When Table 2 is examined, it is understood that the Cronbach alpha internal consistency coefficients of the scales are quite high. Accordingly, it was decided that the measurements were reliable. The validity analysis (EFA, CFA, Barlett test, fit indices) results of the scales used in this study were examined in their original articles and it was decided that these tools were suitable for collecting research data. Finally, the achievement test used in the research was developed by the researchers. There are 25 items in total in the test. In order to ensure the content validity of the test, particular attention was paid to covering the topics dealt with in the Information Technologies course as shown in Table 3. Test items were prepared to measure each acquisition, and experts examined the test items.

Instruction Process

This research was conducted over the period of 14 weeks in the autumn semester of the academic year of 2020-2021 as part of an Information Technologies course. The lessons were conducted in a single 40-minute session on a weekly basis. Sessions mainly consisted of video presentations on the part of the lecturer in the form of video conferences, with the students participating in these sessions as listeners. Students could ask questions and interact through written communication whenever they wanted. In addition, students had the opportunity to communicate with the instructor through asynchronous communication channels such as e-mail and messaging.

Course contents were presented through the ALMS (Academic Learning Management System) which is widely used in Turkiye. There were nine groups in total and each group size was 60 people on average. The Turkish Council of Higher Education (CoHE, 2021) determines the course outline of undergraduate teacher training programs in Turkiye. The contents presented within the scope of the course are summarized in Table 3.

Table 3. Course content.

Week	Course content
1	Introduction of the LMS to be used within the course
2	Hardware, Software, Programming and Algorithm concepts
3	Operating system concept
4	Internet, Browser, Search Engine concepts
5	use of e-mail
6	safe internet use
7	IT ethics and copyrights
8	word processor
9	word processor
10	spreadsheets
11	spreadsheets
12	presentations
13	cloud technologies
14	basic website design tools

Data Collection and Analysis

This research was conducted at a time when education was delivered via ERT due to the COVID-19 pandemic. Participants normally enrolled in a face-to-face education program. The data were collected in the last week of the term. The Information Technologies course aimed to both increase students' general information technology skills, and to enable them to recognize and use distance education technologies effectively. Since the participants of the research were in their first year of their university education, and the education process was carried out remotely, they had not previously met face-to-face on the university campus. Students undertook a 14-week distance learning experience via ERT. A local LMS environment was

used as the online learning environment. Virtual classroom, asynchronous video recordings, presentations, online quizzes, forums, and messaging tools were used in the lessons. Research data was analyzed using descriptive statistics, Pearson correlation analysis, and path analysis. Path analysis, which is a type of structural equation modeling, was used to show causal relationships between variables (Olobatuyi, 2006, p. 4).

FINDINGS

Students' Online Course Satisfaction, Knowledge Sharing Behaviors, Attitudes toward Online Learning and Achievement Levels (Findings related to RQ1)

The first research question of this study aims to reveal the current extent of students' online course satisfaction, knowledge sharing, attitude, and achievement variables. The descriptive statistics relating to the first research question are given in Table 4.

Table 4. Descriptive statistics.

Construct	Factors	N	Min.	Max.	Mean	Category	Sd
Knowledge sharing	Knowledge receiving	437	1	7	5.06	↑	1.40
	Knowledge giving	437	1	7	3.42	↓	1.50
Attitude towards online learning	General acceptance	437	1	5	2.96	↓	0.89
	Individual awareness	437	1	5	2.42	↓	1.21
	Perceived usefulness	437	1	5	3.58	↑	1.23
	Application effectiveness	437	1	5	3.35	o	0.95
Online course satisfaction	Satisfaction	437	1	5	3.71	↑	0.89
Learning Achievement	-	432	36	100	79.17		11.94

↑ Above Moderate o Moderate ↓ Below Moderate

The minimum, maximum, mean, and standard deviation calculated for the variables are as shown in Table 4. The mean scores were interpreted in three categories as high, low, and moderate. Accordingly, when the mean scores with regard to the knowledge sharing behavior in online learning environments were examined, the factor of knowledge receiving ($\bar{x}$=5.06) was above the moderate, while the factor of knowledge giving ($\bar{x}$=3.42) was below the moderate. When the mean scores of the sub-dimension of the attitude towards online learning were examined, the perceived usefulness ($\bar{x}$=3.58) factor was above the moderate, the application effectiveness ($\bar{x}$=3.35) was moderate, and the general acceptance ($\bar{x}$=2.96) and individual awareness ($\bar{x}$=2.42) factors were below moderate. Considering the mean scores regarding online course satisfaction ($\bar{x}$=3.71), it was above the moderate level. When the standard deviation values were examined, the highest value were calculated to exist for the knowledge giving factor (SD=1.50). The standard deviation values of the general acceptance and application effectiveness sub-factors of the online course satisfaction measurement and the attitude scale towards online learning were relatively low. Accordingly, the students showed a more homogeneous distribution in these dimensions. In terms of academic achievement, the mean scores of the students were generally high ($\bar{x}$=79.17; Sd=11.94).

Examining the Model of Attitude towards Online Learning, Knowledge Sharing Behavior, Course Satisfaction, and Learning Achievement (Findings of RQ2 and RQ3)

Within the scope of the second and third research questions of this study, a model was created by using path analysis. First, the findings on data-model fit were examined. The effect of knowledge sharing behavior in online learning environments and the attitude towards online learning on online course satisfaction were then investigated. Finally, the effect of online course satisfaction structure on learning achievement was presented. The fit indices of the model (χ2 / df, RMSEA, S-RMR, GFI, NNFI, CFI and IFI) were examined and summarized in Table 5.

Table 5. The research model fit indices.

	χ^2 / df	RMSEA	S-RMR	GFI	NNFI	CFI	IFI
Model Results	1.98	0.048	0.021	0.99	0.99	0.99	0.99
Acceptable fit	<3	<.080	<.080	>.90	>.90	>.90	>.90
Perfect fit	<2	<.050	<.050	>.95	>.95	>.95	>.95

χ2 = 11.91, df =6

In Table 5, acceptable and perfect fit values were given (Tabachnick & Fidell, 2007; West et al., 2012). When the calculated values were examined according to these values, our structural model fit perfectly. Table 6 shows the Pearson correlation coefficients and significance values calculated to explore the correlation between the variables.

Table 6. Pearson correlations.

	Correlations							
Variable	1	2	3	4	5	6	7	8
Knowledge receiving [1]	1	,532(r)	,262(r)	,170(r)	,321(r)	,317(r)	,466(r)	,086(r)
Knowledge giving [2]	0.00(p)	1	,345(r)	,267(r)	,200(r)	,335(r)	,371(r)	,075(r)
General acceptance [3]	0.00(p)	0.00(p)	1	,764(r)	,572(r)	,604(r)	,537(r)	,068(r)
Individual awareness [4]	0.00(p)	0.00(p)	0.00(p)	1	,620	,601(r)	,355(r)	,102(r)
Perceived usefulness [5]	0.00(p)	0.00(p)	0.00(p)	0.00(p)	1	,599(r)	,449(r)	,184(r)
Application effectiveness [6]	0.00(p)	0.00(p)	0.00(p)	0.00(p)	0.00(p)	1	,421(r)	,084(r)
Satisfaction [7]	0.00(p)	0.00(p)	0.00(p)	0.00(p)	0.00(p)	0.00(p)	1	,160(r)
Learning achievement [8]	0.07(p)	0.12(p)	0.16(p)	0.03(p)	0.00(p)	0.08(p)	0.00(p)	1

When Table 6 was examined, there was only a significant relationship between learning achievement and individual awareness, application effectiveness, and satisfaction ($p<0.05$). Learning achievement was not correlated with other constructs. Apart from this, all other structures were interrelated ($p<0.05$). In addition, the lowest correlation coefficients were mostly calculated for the learning achievement structure. The hypothesized model with standard coefficients is given in Figure 1.

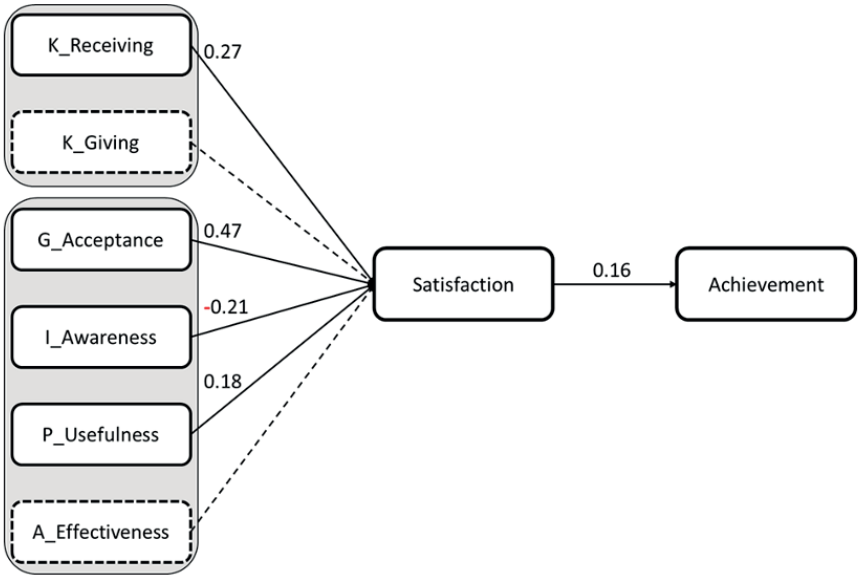

Figure 1. The hypothesized model with standard coefficients

The research model and the path coefficients showing the relationships between structures is given in Figure 1. T-values were calculated to test the significance of the path coefficients. According to these values, the factors of knowledge giving (t=1.58) and application effectiveness (t=0.86) did not significantly predict online course satisfaction (p<.05). The paths related to these variables are shown with dashed lines. The general acceptance (β=0.47, t=7.84), knowledge receiving (β=0.27, t=5.89), individual awareness (β=-0.21, t=-3.42) and perceived usefulness (β=0.18, t=3.56) factors significantly predicted online course satisfaction. The individual awareness factor had a negative effect. These factors explained 43% of the variance in the satisfaction variable. The online course satisfaction variable had a significant effect on learning achievement (β=0.16, t=3.36). This was the lowest coefficient in the model. Satisfaction explained only 3% of the variance in the achievement variable.

DISCUSSION AND CONCLUSIONS

This study aimed to examine the causal relationship between academic achievement, online course satisfaction, attitudes towards online learning, and the knowledge sharing behaviors of university students in the ERT process. The most important limitation and strength of this study was that it was conducted in the context of ERT under the unique circumstances of the pandemic. Therefore, it is not appropriate to evaluate the results obtained from this research in the general context of the DE. In this research, firstly, descriptive statistics were calculated for variables. While the mean scores of the knowledge receiving, the perceived usefulness, and online course satisfaction were above moderate; knowledge giving, general acceptance and individual awareness were found to have averages below moderate. Students had a moderate mean score with regard to the application effectiveness. Class sizes within the scope of the course were around 60 students. In this process, a domestic LMS which is widely accepted within higher education in Turkiye was used. The teaching process was mainly carried out through virtual classrooms, video recordings and presentations. In the applied ERT process, a teaching approach that could be described as traditional was used. In other words, the students went through a learning process where they rarely engaged in online social interaction and became the recipient of information on the screen. Therefore, it was considered that the students' predominantly one-way knowledge-sharing behaviors influenced knowledge receiving mean scores which were above the moderate level and that knowledge giving was low. According to Gandasari and Dwidienawati (2020), although the teaching methods applied in the Covid-19 process vary, most of the methods applied were not learner-centered. In addition, it was stated that the weakness observed in the quality of communication between stakeholders might be due to weak communication networks, low usage of two-way communication tools, insufficient infrastructure, and insufficient financing (Bdair, 2021; Bojovic et al., 2020; Gandasari & Dwidienawati, 2020; Keskin et al., 2022). Knowledge sharing is an important structure that is closely related to online learning interaction (Chao et al., 2011). The result of this research showed that the ERT offered during the pandemic period was insufficient to create a learning community with a high level of interaction and a full exchange of knowledge.

The lack of encouragement for social connection, the technological divide, and the technical and socio-economic difficulties students face when participating in ERT have all resulted in lower general acceptance and individual-awareness levels. In addition, it was thought that the students' learning through DE for the first time, and their unsatisfactory experience resulted in the low individual awareness scores. The individual awareness component in this study contains remarks concerning the differences between online education and face-to-face learning (Usta et al., 2016). The students' lack of experience, along with the fact that ERT was an obligatory, non-optional process, may have had a negative impact on their awareness. The course satisfaction of the students was above the moderate level and could have been associated with the fact that the lecturers conducting the course were subject area experts, the teaching process was supported with different types and quality of materials, the quality of support service and the university's DE infrastructure (J. W. Lee, 2010; Pham et al., 2019). In the Covid-19 situation, instructor knowledge and interaction elements were positively reflected in the satisfaction of the learners (Baber, 2020). In their research, Al-Hawari and Mouakket (2010) determined that design features, perceived usefulness, and enjoyment, had a decisive role to play with regard to learner satisfaction with the e-learning process. The faculty members who delivered the course with regard to which this research data was collected are competent both in the subject area dealt with by the course and in DE and instructional design. Although there were various limitations

(technical, financial, etc.) related to the pandemic situation, it could be said that they had a relatively good DE experience within the scope of the course under consideration. It was thought that this situation reflected positively when it came to learner satisfaction.

When the averages related to the perceived usefulness were examined, it was seen that student perception was at a good level. As a matter of fact, when the literature was examined, it was seen that learner self-efficacy, ease of use, experiences and skills had a positive effect on perceived usefulness (Irani, 2000; Landrum, 2020; Venkatesh & Davis, 2000; Yucel & Gulbahar, 2013). It can be thought that the ease of use and low complexity of LMS had a positive effect on the perception of usefulness.

Application effectiveness, which is a component of the attitude towards online learning, refers to the active participation of stakeholders (Tseng & Kuo, 2014). As a result of this research, it was determined that the students were similar to each other in terms of active participation and they partipicated to ERT activities at moderate level. The fact that students were receivers in an online learning environment and that they had only a low level of knowledge sharing behaviors, was another sign of their moderate participation in the environment. Although online learning offers advantages such as easy access to materials, independence in terms of time and place, and the ability to learn at one's own pace, this situation did not create enough perception of effectiveness on the part of the learners. Charissi et al. (2020) noted that the lack of experience, lack of interaction, and feelings of social isolation were the most important disadvantages associated with the ERT process. It is thought that these disadvantages influenced the active participation of the learners.

In this study, a path model was created to answer the second and third research questions. The model had perfect fit values. The variables of knowledge sharing behaviors and attitudes towards online learning significantly predict online course satisfaction and explain 43% of the variance with regard to online course satisfaction. The main findings from the model are discussed below in order of importance.

The most important predictor of online course satisfaction was the general acceptance dimension of the attitude towards online learning. It can be said that the satisfaction of the students who accepted the online learning environment was also high. The general acceptance structure contains statements about the learners' finding the environment effective, their intention to use it, and their perception of it as productive (Usta et al., 2016). Saxena et al. (2021) found that educational opportunities provided during the Covid-19 epidemic had a positive impact on students' perceptions of quality and satisfaction. As technology adoption advances, students might find it easier to adapt to the learning process. Ghazal et al. (2018) stated that there was a significant relationship between technology acceptance and learner satisfaction with regard to the use of learning environments. The temporal and spatial autonomy advantages of e-learning also positively affected learners' perception of acceptance and satisfaction (Al-Hawari & Mouakket, 2010). It can be thought that these advantages offered in this challenging period facilitate the student's acceptance and satisfaction.

The second important predictor of online course satisfaction was the knowledge receiving dimension. On the other hand, the dimension of knowledge giving didn't have a significant effect on satisfaction. Knowledge sharing behavior, which has a complex structure, could be associated with many variables (Ghadirian, Ayub, Silong, Bakar & Zadeh, 2014). For example, while variables such as trust among team members (Pangil & Chan, 2014; Kipkosgei et al., 2020), self-efficacy (Alajmi, 2011; Nguyen & Malik, 2020), perceived enjoyment (Lin et al., 2020), and sense of spirituality (Rahman, Fattah, Hassan & Haque, 2020), could affect this behavior positively. On the other hand, individual, organizational, and technological barriers (Sohail & Daud, 2009) could affect behavior negatively. The role of the instructor also appeared as an important variable (Ghadirian, Ayub, Silong, Bakar & Zadeh, 2014). Knowledge giving in online environments can operate in two ways: The first is the way in which experts share knowledge directly through the use of multimedia, and the second is the ways in which people come together to solve a problem (Jadin, Gnambs & Batinic, 2013). Within the scope of this study, it was mainly the case that instructors shared knowledge. In this process, even if the students had the opportunity to communicate with the lecturers and other students, they participated as passive listeners in general. Knowledge sharing behaviors effects learning performance positively (Eid & Al-Jabri, 2016). A similar finding was obtained in the current study. Knowledge receiving positively affected students' satisfaction, which indirectly reflected on learning achievement. Finally, one-way communication within the ERT process could be attributed to the low mean scores in terms of knowledge giving and application effectiveness.

Individual awareness had a significant and negative effect on online course satisfaction. The individual awareness structure is related to the awareness of the extent to which the learning service received by the individual is effective (Usta et al., 2016). The result of this research may be due to the inability of the ERT process to meet the expectations of students. The disruptions in social, organizational, and personal time management brought on by the pandemic had a negative impact on learners' views of the learning process (Charissi et al., 2020). In addition, the low interaction in the ERT process, the limited distance education activities, the technical problems, and other limitations were thought to be the reason why the expectations of the students with a high level of awareness could not be met.

Student satisfaction was favorably influenced by students' perceptions of the online learning environment as being useful, or favorable in terms of efficiency. Various studies found perceived usefulness to be an important predictor of learner satisfaction in the e-learning environment (Ghazal et al., 2018; Jo et al., 2018; Lwoga, 2016; Park & Kim, 2012; Saxena et al., 2021). As the system's functionality grows, so would the learners' productivity, learning performance, and control over the system and the learning process, all of which contribute indirectly to learning satisfaction (Lwoga, 2016). Learners' flexibility with regard to conveniently accessing learning resources, being independent in terms of time and place, being autonomous in the learning process, managing the learning process, and working in an effective and efficient atmosphere all contribute to their satisfaction (Al-Hawari & Mouakket, 2010). On the other hand, the technology acceptance model (Davis, 1989) reminds us how perceived usefulness was an important determinant of the users' intention and behavior when it comes to using the e-learning environment. i

Learning achievement was explained by the online course satisfaction variable, which had a significant but small effect. In their research conducted during the pandemic process, Kim and Park (2021) revealed that distance e-learning satisfaction affects learning outcomes. On the other hand, although student satisfaction with regard to DE was an indicator of the quality of the educational services provided, Khan and Iqbal (2016) reported that there was no significant correlation between learning achievement and learner satisfaction. Similarly, Moore and Kearsley (2011) state that satisfaction with DE may not be correlated with learning achievement. Moreover, according to the findings of this study, learner satisfaction resulting from resources provided during the ERT process had little impact on learning achievement.

Suggestions

This study has noteworthy implications in terms of addressing students' knowledge sharing, attitudes, satisfaction, and academic achievement during the Covid19 pandemic. It reveals the role of satisfaction in the ERT in many ways. The findings provide important indicators for a comparison of the pre-pandemic and post-pandemic periods. So here are a few suggestions in this particular respect:

(1) When the individual awareness factor score was examined, it was understood that the students did not find ERT particularly advantageous compared to face-to-face learning. An in-depth examination of the underlying causes of this situation is recommended.

(2) In order to increase student satisfaction in the ERT process, it was recommended that there was a need to make the opportunities more visible, and to provide support for students' acceptance of the process.

(3) Another major indicator of satisfaction was that students find the ERT process informative, and benefit from the e-learning environment. Therefore, it is thought that the richness of the material and the contents in this environment will contribute to the level of satisfaction.

(4) Being aware of the negative aspects and challenges encountered had a detrimental impact on satisfaction. In this context, it is obvious that there is a need for interventions that will positively affect individual awareness.

(5) In future studies, existing variables can be retested in courses in which bidirectional knowledge sharing is carried out. Thanks to subsequent studies to be carried out in this way, it will be possible to retest whether or not the sub-measures of knowledge giving, application effectiveness, and individual awareness alter results.

(6) An established DE process might be subjected to research similar to that which is now being done with regard to the ERT process. Thus, a comparison can be made between ERT and DE approaches.

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