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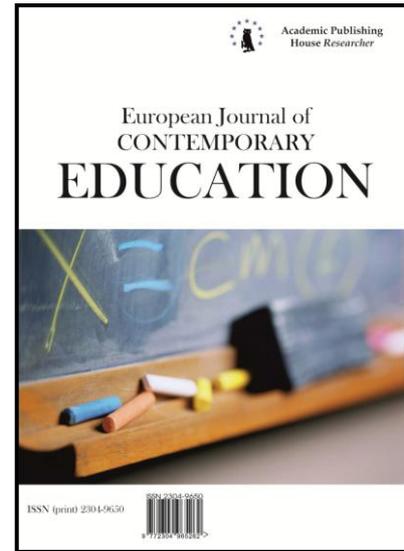
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Examination of University Students' Level of Satisfaction and Readiness for E-Courses and the Relationship between Them

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Abstract

The success of a distance education program can be evaluated according to student satisfaction, aside from comprehensive examinations, projects and presentations. The purpose of this research study is to determine both the relationship between e-course satisfaction and online learning readiness by ascertaining student levels, and the effect of the materials used in e-learning on student satisfaction. A general screening model was used in this study to determine the characteristics of a group and to clarify the existing situation in their own conditions. The study was conducted during the 2014-2015 academic year at Kocaeli University. The E-Course Satisfaction Scale (ECSS), consisting of 35 five-point Likert-type items, and the Online Learning Readiness Scale (OLRS) consisting of 18 five-point Likert-type items, were applied to 352 university students. The data were analyzed by methods of descriptive statistics, independent t-test and regression analysis in the SPSS program.

According to the survey the satisfaction level of the students is moderate; when the sub-dimensions were examined, satisfaction was high in the instructor-student interaction and environment design sub-dimensions while it was moderate in the course content and teaching process, materials used and communication tools, and attitude towards e-learning sub-dimensions. When interaction and communication tools such as a virtual classroom, forum, chat, e-mail, web pages, animation, video, graphics and images as content tools, and questionnaire as assessment tool were used there was a difference in student satisfaction, and satisfaction was higher in these courses. There was not a significant difference in the students' satisfaction with the exams and homework as assessment tools, or content of .pdf and text documents as content tools, but .pdf-text documents and exams were among the most-used tools in the courses. Student satisfaction was high when the number of materials used in courses was 7 and over, that is, as the number of materials increased, so did the satisfaction level.

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The levels of students' readiness for online learning were high in all sub-dimensions in total, and there was a positive significant relationship between students' levels of readiness and their satisfaction level. Moreover, the satisfaction levels of learners who were self-directed, had high motivation and could control their own learning appeared to be affected positively.

In conclusion, to increase the satisfaction level of the students it would be useful to increase the number of materials used in the e-courses; give more importance to interaction; and use more tools such as animation, virtual classroom, video, forum, survey, chat and email. In order to increase satisfaction, student readiness should be considered, students should be able to use technology effectively.

Keywords: E-course satisfaction; Online learning readiness; Interactive materials.

Introduction

Advances in technology have changed education methods as well as social living conditions. The more rapidly technology changes, the more rapidly knowledge increases; so individuals always need to improve themselves in order to maintain and enhance their success. Hence, one of the methods that can be used is e-learning, which provides access to information independent of time and place, communication with a synchronous or asynchronous instructor, the use of internet technologies, and by which the individual manages to learn by self-direction. E-learning refers to individual knowledge, practice and experience of the learner to construct knowledge and support teaching and learning with any electronic tool (Tavangarian, Leypold, Nölting, Röser, & Voigt, 2004).

According to Tessema, Ready, and Yu (2012), the efficacy of an instructional programme can be evaluated by direct performance assessment such as detailed exams, projects and presentations and by indirect assessment such as student satisfaction. For the success of this kind of environment, student satisfaction is an important indicator of the quality of the learning experience. Astin (1993) described student satisfaction as the student's perception of the school experience and the importance of the education provided by the institution.

Yukselturk and Yildirim (2008) state that in order to improve the quality of online programmes under today's conditions, higher education institutions should consider the satisfaction of the students. High satisfaction in e-learning decreases the attrition rate of the institution, provides significant permanence in learning and high motivation for following additional courses (Kuo, Walker, Belland & Schroder, 2013).

In the literature, there have been many research studies to determine the factors that influence e-learning satisfaction. According to Sun, Tsai, Finger, Chen, and Yeh (2008), the students' anxiety about computers, the instructor's attitude towards e-learning, the flexibility of the e-learning course, the quality of the course, the perceived benefit and ease of usage, and variety in assessments are the critical factors that affect students' perceived satisfaction. However, Wu, Tennyson, and Hsia (2010) argue that the learning climate and expectations of performance have a considerable impact on student satisfaction. Aside from this, computer self-efficacy, the functionality of the system, the features of the content and interaction significantly affect the expectations of performance. According to Govindasamy (2001), institutional support, enhancements to the course, teaching and learning, the structure of the course, support for the student and instructor, assessment and evaluation are criteria for a high-quality course.

Ilhan and Cetin (2013) state that the instructor's confidence in education and attitude towards online learning, the quality of the internet and computer technologies used within the online learning process; the perceived ease of usage; and the learner's age, gender, learning style, attitude towards online learning; motivation and technical skills related to computer and internet usage are some of the variances that influence the quality of online learning environments and have a determinant role on student satisfaction. The quality of online learning environments is a critical factor for success. Students' e-learning satisfaction levels play an important role in the evaluation of e-courses by institution managers and instructors.

Factors affecting e-learning satisfaction

This study focused on the materials and communication tools used in online learning and interaction, the student-instructor interaction, the instructional environment design, the attitude

towards e-learning, the course content, the teaching process and the readiness for online learning as factors affecting e-learning satisfaction.

Materials used in online learning: Students should have the abilities to communicate and use communication tools effectively as the e-learning environment requires the student to be in a process of constant communication and interaction with content, instructor and other students. If the course is carried out by taking advantage of instructional materials during teaching-learning process, the material will address students' senses of sight and sound; and when the students are able to express their opinions with the help of the instructor, the number of sense organs participating will increase and what is attempted to be learnt will be more easily recalled (Cekirdekci & Toptas, 2011, p:139).

There is a bidirectional information flow and interaction between student, instructor and content in teaching environments. According to Chou, Peng and Chang (2010), interaction represents the functions or actions that can be utilized by users and enable them to study the content presented via computer and get feedback; furthermore it is an important element for the quality and success of online learning. Within online learning, the instructor and students are far from each other geographically. So it is important to use the communication tools effectively. An efficient learning environment should offer synchronous education (virtual classroom), video, animation, simulation software, discussion and chat environments, games, and self-evaluation environments in addition to text, sound and graphics.

Chou et al. (2010) suggest that there are five types of student centered interaction:

- Student-interface interaction: Students' effective and easy access to and ability to control the interface.
- Student-self interaction: Students' ability to pursue his/her improvement in learning.
- Student-content interaction: Providing interaction with all the materials available in the learning environment.
- Student-instructor interaction: Ensuring interaction between instructor and student by means of communication channels provided by the system.
- Student-student interaction: Ensuring interaction with other students using the system via communication tools.

E-learning can be organized as synchronous or asynchronous. During synchronous e-learning, the instructor and students interact with each other using communication technologies such as a live course, chat rooms, or video conference at different places but the same time. However, during asynchronous e-learning, the instructor and students interact with each other via technologies such as a forum or e-mail at different places and times.

Student-Instructor interaction: The instructor's facilitative presence, prompting the students by means of using tools like forum, chat, live courses, e-mail and giving feedback in e-learning environments are among the most important factors of these environments. The instructor should be able to use course tools, ensure the students' engagement in the process via inquiry and discussion, try to increase the motivation by different learning techniques, ensure collaboration between students, prepare guides for them, manage time properly, plan and monitor the learning stages (Kemshal-Bell, 2001).

In a literature study that was carried out by Chou et al. (2010), the tools used for ensuring student-instructor interaction were: class roster e-mail, bulletin board systems, synchronous communication, social tools, grouping the students, ensuring students' assignment submission and giving the related feedback, online examination, voting and questionnaire, and comments about the course and instructor. Effective usage of these tools will motivate the student and consequently will contribute to positive student satisfaction.

Instructional environment design: The main objective of web based instructional environment design is to draw the student's attention and ensure his or her motivation. That's why the design should include high level cognitive activities, support usage of a wide range of tools and sources, discuss the course and social and life skills together, use technology as a tool, encourage the student to interact with the software, help the student complete learning purposes without getting tired or bored or experiencing any conflict (Guney, 2010, p:69, 76).

The primary goal of an instructional interface design that enables the communication between user and computer is to ensure easy surfing by means of assistant tools during learning

and prompt the student directly to related information by using recognizable clues like subsidiary signs or tools (Sung & Mayer, 2012). Instructional interface design is a difficult process which requires information, teaching and visual design skills, psychology, human factors, ergonomic research, computer science and editorial design (Sung & Mayer, 2012).

In instructional design models, behaviorist, cognitive and constructivist theories that try to explain how teaching occurs are drawn on while the environments are being designed. The principles to be used for the interface and teaching design when preparing effective teaching material at the design and development stages in instructional design models are important for the student to ensure an efficient interaction with the content and environment. When examined in literature, it can be seen that there has been a lot of research about how multimedia design should be, e.g. Nielsen (1993)'s interface design principles and Mayer (2001)'s multimedia design principles.

While designing web based environments, attention must be paid to not use unnecessary visual material, to the design of typographic items, text, and colours, and to the design of visual elements and surfing. Sun and Cheng (2007) suggest that multimedia design is costly and only effective in attracting the student's attention rather than ensuring they understand and learn the content; furthermore, the usage of too many unnecessary multimedia items will distract the student's attention, hence, the performance will decrease and the environment will not be as important as the message to be transferred. Also according to Sung and Mayer (2012), ensuring that students able to focus on the content in e-learning to engage in appropriate cognitive activity during learning without having to do any unnecessary cognitive activity is a substantial problem in interface design.

Designing e-learning environments is a long and difficult process. So, during the process, considering the factors like the characteristics of the students and instructor who will use the system, the institution's support and system management in addition to content and interface design is important for the achievement of e-learning systems.

Attitude towards e-course: The factor that has the greatest effect on the success of e-learning is the student as well as the instructor's preparation for the course. One of the determinants that affect the student's success and satisfaction with the system, and helps him/her learn permanently, is the student's attitude towards learning. According to Inceoglu (2010, p:7-8), attitude is a possible way of behavior that an individual can take up towards a situation, an event or case. There is a close relationship between attitude and an individual's personality characteristics, the social and cultural environment in which he/she lives, knowledge and experiences. Attitude is composed of sensual, cognitive and behavioral components. It determines what an individual knows about an issue (mental factor), how he/she will approach it (positive, negative, neutral) and what kind of manner he/she will take up against it (behavioral factor) (Inceoglu, 2010, p:20).

Positive student attitudes towards e-learning and computers will improve their learning levels. Liaw, Huang and Chen (2007) state that students of the instructors who display a positive attitude in e-learning seem to be more willing to use the system and the students who display a positive attitude use the system more effectively. Comprehending the attitude of the instructor and learners towards technology is essential to making learning more efficient and attractive (Liaw et al., 2007). Furthermore, identification of the learner's motivation, confidence, trust, anxiety about computers, fear, anxiety, pleasure, excitement, pride and embarrassment is required for the success of the system (Ozkan & Koseler, 2009). As the students that engage in the system voluntarily for a specific purpose are more motivated than the others, they are likely to be more successful (Gulbahar, 2009, p:65).

Course content and teaching process: In addition to the representation quality of the information, quality of interaction, and perceived benefit and ease of usage, quality of the content has a significant impact on student satisfaction; as the content quality improves, potential users will find the system more useful and adopt it (Calisir, Gumussoy, Bayraktaroglu & Karaali, 2014). E-learning processes that do not adhere to pedagogical principles, lecturers resistant to change, learners who do not know about e-learning, poor student performance and low-quality content hamper the learning process (Govindasamy, 2001).

According to Concannon, Flynn and Campbell (2005), as interaction with the content is essential, the students should be able to surf within the materials easily, notice when new materials

are added, and they should be given feedback like immediate interpreting during interactive exams. Moreover, e-learning content must be designed in the form of learning objects known as manageable and reusable objects (Govindasamy, 2001).

In the teaching process of the course, the instructor must develop constructive techniques to support the students' engagement in the course and make use of teaching strategies in order to ensure the students participate in discussions cognitively. In order for that, the instructor can explain what he/she expects from the students, how they must discuss and how they will be evaluated via a discussion guide during and after discussion (Gulbahar; 2009, p:157). In the teaching process, the quality of the course and student motivation will improve provided that students have frequent and high-quality interaction with the instructor and other students, they are supported when necessary, few technical problems occur and they use many interactive materials (Gulbahar, 2009, p:67).

Readiness for online learning: Online learning environments provide students with flexibility in planning and controlling their learning. The student forms his/her own learning plan by accessing the content he/she chooses in his/her free time, doing exercises and using the material which he/she wants. Learning will be facilitated if the student has enough technical skill, ability to self-learn and communicate, and motivation (i.e. a high level of readiness).

The learner who has a high level of readiness can comment on the topic and do assignments more easily by comprehending the subjects sooner; on learning the previous topic thoroughly, he/she could be ready to move on to the next one (Harman & Celikler, 2012).

Aruk (2008) suggests that readiness has three basic aspects: social, cognitive and educational. Social readiness means ensuring interaction by dual communication in virtual education environments, turning into an information society and undertaking a common responsibility for the outcome and results arising during the education process of interacting learners. Cognitive readiness requires the learner to have the skill of critical thinking. Educational readiness necessitates accessing information through multiple resources, evaluating, sharing and discussing it independently of time and place and using it in life when required (Aruk, 2008).

In web based learning environments, learners' performance is closely related to their computer and internet skills, comprehension of the internet, attitudes and behavior in online environment (Hung et. al, 2010). In addition to external factors like past experiences and educational level, motivation, capacity for self-directed learning and ability to work with the materials offered as text are essential for the learner to be successful in an e-learning environment (Warner, Christie and Choy, 1998).

Online learning readiness focuses on the ability to manage time and adapt to the self-directed nature of online learning which is self-learning, understanding personal learning styles and experiences (Lau, 2008). Self-directed learners have the skills to access and process the information for a specific purpose.

Determining the readiness level of the learners who do not have experience for this method of learning contributes to both the learner and to the instructor's course plan. In order for e-courses to be conducted without any problems, it is essential to assess the effect of students' readiness level on satisfaction.

When the studies regarding readiness in Turkey examined, it is seen that factors such as technical skills, elements affecting success, access to technology, motivation, attitude and personal characteristics, self-directed learning, online skills, online communication, learner control and time management have generally been investigated but only in one study (Kirmizi, 2015) has readiness been associated with satisfaction (Gulbahar, 2012; Ilhan & Cetin, 2013; Kalelioglu & Baturay, 2014).

Purpose of the research

The purpose of this research study is to determine both the relationship between e-learning satisfaction and online learning readiness by ascertaining their levels, and the effect of the materials used in e-learning on student satisfaction. The sub-purposes developed for the main objective are as follows:

- a) What are the satisfaction levels of students concerning e-courses?
- b) What are the levels of online learning readiness?

c) Do the satisfaction levels of students concerning e-courses vary meaningfully according to demographical variables?

d) Do the satisfaction levels of students vary meaningfully according to the materials used in e-courses?

e) Is there a significant relationship between levels of online learning readiness and satisfaction of students concerning e-courses?

Method

Research Model, Population and Sample

In this research study, an overall scanning model was adopted to determine the features of a group and assess an existing situation under its own conditions. The survey was carried out with the participation of 370 students from various faculties of Kocaeli University, who had completed at least one online course in the 2014-15 academic year. 18 of the surveys were declared invalid as they were not fully filled out; therefore the responses of 352 students were evaluated. 54.3% of the participants were female, 45.7% were male; 22.2% were from the faculty of engineering, 15.3% from the faculty of communication, 14.8% from the school of health sciences, 13.9% from the faculty of arts and sciences, 9.4% from the physical education and sports school, 4.5% from the faculty of architecture and design & fine arts and 4.3% from the faculty of law.

In electronic elective courses that started in Kocaeli University in the fall semester, the Moodle Learning Management System (LMS) is being used as the teaching platform. In order to transfer the content in this system, materials like web pages, pdf and text documents, animations, videos and graphics/images are used; a virtual classroom (synchronous course) is used to ensure interaction; forum (asynchronous applications), chat and e-mail tools are for discussion and communication; finally tools like homework, exams and questionnaires are for evaluation.

There are 28 active elective courses in the system. The students of the 2nd, 3rd and 4th classes must take at least two of these elective courses. Although mid-term evaluations are carried out in the system, finals are implemented in a face to face environment under the instructor's supervision. This research will reveal which tools are most frequently used and at what rate they are used in the system, the students' satisfaction concerning these tools, their overall satisfaction with the system, and their levels of e-courses satisfaction according to faculty, gender and class. Furthermore, it indicates the relationship between online learning readiness levels and satisfaction of the students. As a result of assessing this data, an opinion about what to do for improving satisfaction with the system and efficiency will be formulated.

Data collection tool used in the research

Scale of satisfaction with e-courses

In this research, the data were collected through the E-Course Satisfaction Scale (ECSS), online learning readiness scale (OLRS), and a short form to gather personal data. The E-Course Satisfaction Scale was developed by Kolburan Gecer and Devenci Topal (2015) in order to determine how satisfied the students were with the e-learning method. The E-Course Satisfaction Scale (ECSS) was composed of 35 5-point Likert-type items and five sub-dimensions (course content and teaching process, materials used and communication tools, attitude towards e-learning, environment design and instructor-student interaction). The scale was conducted on 414 students enrolled in various faculties of Kocaeli University, who had completed at least one entirely online course in the fall of the 2013-2014 academic year. In the principal components analysis, the varimax rotation technique was used; a 5-factor structure with an eigenvalue over 1.00 which explained 67.61% of the total variance was obtained. Factor loading of the items in the scale ranged from ".478" to ".833" and item-total correlations were between .526 and .872. The reliability of the scale was measured as Cronbach's Alpha=0.966. [Table 1](#) shows the results of the eigenvalue and explained variance rate of factors obtained from the factor analysis.

Table 1. Eigenvalue and Explained Variance Rate of Factor Obtained from Factor Analysis

Factors	Eigenvalue	Explained variance	Total variance
1	17.104	17.657	17.657
2	2.709	16.985	34.642
3	1.650	12.334	46.976
4	1.188	11.053	58.030
5	1.012	9.580	67.610

The first factor was “Course content and teaching process”. The factor loadings were between .529 and .722 and the alpha internal consistency coefficient was .932. The second factor was “Materials used and communication tools”. The factor loadings were between .546 and .829 and the alpha internal consistency coefficient was .921. The third factor was “Attitude towards e-course”. The factor loadings were between .569 and .690 and the alpha internal consistency coefficient was .881. The fourth factor was “Environment design”. The factor loadings were between .478 and .681 and the alpha internal consistency coefficient was .914. The fifth factor was “Instructor-student interaction”. The factor loadings were between .521 and .833 and the alpha internal consistency coefficient was .900.

Online Learning Readiness Scale

The Online learning readiness scale (OLRS) was developed by Hung and his colleagues (2010) and adapted by Ilhan and Cetin (2013). The scale consisted of 18 Likert-type items and 5 sub-dimensions. It was found out that the corrected item-total correlations ranged from .58 to .87 and there was a significant difference in the means of 27% sub-up groups for all the items in the scale. The results related to the item-total correlation and the internal consistency reliability coefficient were found to be as follows. For “Computer and internet self-efficacy”, the reliability coefficient was between .72 and .79, and Cronbach’s alpha .87; for “Self-directed learning”, the reliability coefficient was between .58 and .85, and Cronbach’s alpha .89; for “Learner control”: the reliability coefficient was between .58 and .70 and Cronbach’s alpha .76. For “Motivation for learning”, the reliability coefficient was between .84 and .87, and Cronbach’s alpha .89. For “Online communication self-efficacy”, the reliability coefficient was between .74 and .80 and Cronbach’s alpha .84.

Data Analysis

The SPSS 20.0 program was used for data analysis and the significance level was adopted as .05 in reading the results. The arithmetic mean, frequency, independent sample t-test, variance analysis and regression were checked during independent variables analysis. The analyses were based on sub-factors and total scores.

Findings

In this part, the data were analyzed and read in accordance with the purpose and sub-purposes of the research and the related research results were supported.

Findings related to demographic characteristics of students

The findings related to the demographic characteristics of the students who participated in the research are shown in [Table 2](#). 54.3% of the participants were female, 45.7% were male; 22.2% were from the faculty of engineering, 15.3% from the faculty of communication, 14.8% from the school of health sciences, 13.9% from the faculty of arts and sciences, 9.4% from the physical education and sports school, 4.5% the from faculty of architecture and design & fine arts and 4.3% from the faculty of law.

42.3% of the students were enrolled in their 4th year, 36.9% were in their 3rd year and 20.7% were in their 2nd year. 61.1% of the students had a good or very good command of internet usage. 39% of them were using the internet for more than 15 hours per week.

Table 2. Findings related to the demographic characteristics of the students

Gender	N	%
Female	191	54.3
Male	161	45.7
Faculty		
Faculty of Education	33	9.4
Faculty of Arts and Sciences	49	13.9
Faculty of Law	15	4.3
Faculty of Economics and Administrative Sciences	32	9.1
Faculty of Communication	54	15.3
Faculty of Architecture and Design - Faculty of Fine Arts	16	4.5
Faculty of Engineering	78	22.2
Physical Education and Sports School	23	6.5
School of Health Sciences	52	14.8
Class		
2nd year	73	20.7
3rd year	130	36.9
4th year	149	42.3
Internet usage frequency (weekly)		
1-2 hours	15	4.3
3-5 hours	64	18.2
6-10 hours	75	21.4
11-15 hours	60	17.1
15 hours and above.	137	39
The level of Internet use		
Little	8	2.3
Medium	78	22.2
Good	172	48.9
Very good	94	26.7

Findings related to satisfaction levels of students

Satisfaction rate was measured as follows: Satisfaction rate=(obtained mean score/the highest that could be obtained)*100. If the satisfaction rate was 49% or less, the satisfaction was regarded as low; if it was between 50% and 69%, the satisfaction level was moderate; and if the rate was over 70%, the satisfaction level was regarded as high and read accordingly.

Table 3. Satisfaction rates related to scale of satisfaction with e-courses and its sub-dimensions

Dimensions of the scale	N	Min	Max	\bar{x}	S.d.	Satisfaction rate (%)
Materials used and communication tools	352	8	40	23.9	8.1	60
The instructor-student interaction	352	4	20	14.1	4.4	71
Instructional environment design	352	8	40	28.7	7.5	72
Attitudes towards e-course	352	6	27	19.7	4.7	66
Course content and teaching process	352	16	41	30.4	4.9	68
Total	352	47	164	116.8	25.2	67

Table 3 shows that students' satisfaction with the materials used and communication tools in e-courses was at a moderate level (60%), their satisfaction with instructor-student interaction and environment design was at a high level (71% and 72%), and their satisfaction with the attitude towards e-course, and course content and teaching process was at a moderate level (66% and 68%). Overall the students' satisfaction was determined to be at moderate level (67%).

Table 4. Students' satisfaction levels based on their faculty

Faculty	N	Min	Max	\bar{x}	S.d	Satisfaction rate (%)
Faculty of Education	33	47	161	110.2	23.6	63
Faculty of Arts and Sciences	49	56	159	119.7	23.9	68
Faculty of Law	15	93	144	124.1	16.2	71
Faculty of Economics and Administrative Sciences	32	60	149	117.0	20.6	67
Faculty of Communication	54	48	164	113.7	26.9	65
Faculty of Architecture and Design - Faculty of Fine Arts	16	47	150	111.9	35.2	64
Faculty of Engineering	78	61	163	123.5	23.4	71
Physical Education and Sports School	23	47	159	114.0	31.1	65
School of Health Sciences	52	62	163	112.2	25.1	64
Total	352	47	164	116.8	25.2	67

When the satisfaction levels of students based on their faculty are examined in Table 4, it is seen that satisfaction levels in Faculties of Engineering (71%) and Law (71%) were high whereas those in other faculties were moderate.

Table 5. T-test results related to satisfaction levels of students based on gender

Gender	N	\bar{x}	S.d	Df	t	p
Female	191	115.75	24.879	350	0.867	.387
Male	161	118.09	25.632			

Table 5 shows how the t-test results related to satisfaction levels based on students' gender revealed that there was not any significant difference between females ($\bar{x}=115.8$) and males ($\bar{x}=115.81$), ($t(350)=0.867$, $p>.05$). In other words, students' satisfaction levels did not differ across gender.

Table 6. Results of variance analysis performed on the mean scores of satisfaction levels based on students' class year

Variability Source	Sum of Squares	df	Mean Square	F	Sig.
Between groups	803.902	2	401.951		
Within groups	222401.178	349	637.253	.631	.533
General	223205.080	351			

Table 6 shows, as a result of one-way variance analysis, it was found that there was not any statistically significant difference in mean scores of satisfaction based on students' class year ($F(2,349)=.631$, $p=.533$).

Table 7. T-test results related to students' satisfaction levels based on materials used in e-courses

		N	\bar{x}	S	sd	T	p
Interaction and communication tools							
Virtual classroom	Not	209	113.91	24.417	349	2.563	0.011
	Exist	142	120.87	25.81			
Forum	Not	238	114.96	25.291	349	2.01	0.045
	Exist	114	120.71	24.723			
Chat	Not	293	114.69	25.356	349	3.605	0.000
	Exist	59	127.44	21.769			
E-mail	Not	277	115.29	25.824	349	2.207	0.028
	Exist	75	122.49	22.210			
Content tools							
Pdf and text documents	Not	101	113.22	26.614	349	1.707	0.089
	Exist	251	118.27	24.538			
Web pages	Not	238	114.46	25.376	349	2.563	0.011
	Exist	114	121.76	24.256			
Graphic-Images	Not	192	112.66	25.745	349	3.445	0.001
	Exist	160	121.82	23.697			
Animation	Not	278	114.48	25.458	349	3.434	0.001
	Exist	74	125.64	22.331			
Video	Not	227	114.65	24.837	349	2.189	0.029
	Exist	125	120.77	25.523			
Assessment tools							
Survey	Not	246	113.46	24.911	349	3.884	0.000
	Exist	106	124.62	24.288			
Exam	Not	71	113.49	27.745	349	1.247	0.213
	Exist	281	117.67	24.519			
Homework	Not	248	117.33	24.934	349	0.582	0.561
	Exist	104	115.62	25.962			

Students' satisfaction with the tools of the virtual classroom ($t(349)=2.01$, $p<.05$), chat ($t(349)=3.60$, $p<.01$) and e-mail ($t(349)=2.21$, $p<.05$) among interaction and communication tools used in e-courses; web pages ($t(349)=2.56$, $p<.05$), animation ($t(349)=3.43$, $p<.01$), video ($t(349)=2.02$, $p<.05$), graphics-images ($t(349)=3.45$, $p<.01$) among content tools; and questionnaire ($t(349)=3.88$, $p<.01$) among assessment tools revealed a significant difference in favor of courses in which these tools were used (Table 7). In other words, students' satisfaction levels were higher in courses where these tools were used. The mean scores of students' satisfaction in courses where particularly the tools of animation, chat, questionnaire and e-mail were used were found to be higher. However, there was not any significant difference in student satisfaction levels related to tools such as exam ($t(349)=1.25$, $p>.05$) and homework ($t(349)=.58$, $p>.05$) among assessment tools, pdf and text documents ($t(349)=1.71$, $p>.05$) among content tools. On the other hand, it was understood that the most-used tools in courses were pdf-text documents and exam.

Table 8. Satisfaction levels of students based on the number of materials used in courses

Number of material	N	Min	Max	\bar{x}	S.d	Satisfaction rate (%)
1	29	47	153	109.7	27.6	63
2	48	47	153	111.2	27.0	64
3	59	56	158	107.8	23.4	62
4	62	61	163	120.3	24.4	69
5	46	57	163	117.1	26.2	67
6	38	47	148	115.3	22.0	66
7	19	87	163	124.6	22.5	71
8	15	78	163	130.5	25.0	75
9	20	90	158	124.5	15.8	71
10	6	113	151	128.7	14.5	74
11	10	93	164	143.7	24.2	82
Total	352	47	164	116.8	25.2	67

When the number of materials and satisfaction rate are examined (Table 8), it is understood that provided the number of materials was 7 and over, student satisfaction was at a high level. As the numbers of material increased, satisfaction level got higher.

Findings related to levels of students' readiness for online learning

The results of the analyses performed to check students' readiness for online learning have been summarized below.

Table 9. Results of Online Learning Readiness Scale (OLRS)

Dimension of scale	N	Min	Max	\bar{x}	S.d	Satisfaction rate (%)
Computer/Internet self-efficacy	352	3	15	11.1	3.1	74
Self-directed learning	352	5	25	18.5	4.6	74
Learner control	352	3	15	10.8	2.8	72
Motivation for learning	352	4	20	16.1	3.6	81
Online communication self-efficacy	352	3	15	11.4	3.0	76
Total	352	18	90	68	1.5	76

The levels of students' readiness for online learning appeared to be high in all sub-dimensions and in total (Table 9). This also means that students were ready for online learning.

Table 10 shows that there was a positive significant relationship between students' satisfaction with e-courses and levels of readiness for the courses ($R=0.565$, $R^2=0.32$, $F(1, 350)=163.889$, $p<.01$). 32% of the total variance related to satisfaction in e-courses could be explained by how ready the students were.

There was a positive significant relationship between students' scores of materials used and communication tools, and readiness levels ($R=0.430$, $R^2=0.18$, $F(1, 350)=79.543$, $p<.01$). 18% of the total variance related to materials used and communication tools in e-courses could be expressed by students' relative readiness.

There was a positive significant relationship between students' scores of instructor-student interaction and readiness levels, $R=0.417$, $R^2=0.174$, $F(1, 350)=86.75$, $p<.01$. 17% of the total variance related to instructor-student interaction could be expressed by students' relative readiness.

There was a positive significant relationship between students' scores of environment design and readiness levels, $R=0.542$, $R^2=0.29$, $F(1, 350)= 145.223$, $p<.01$. 29% of the total variance related to environment design could be expressed by students' relative readiness.

There was a positive significant relationship between students' scores of attitude towards e-courses and readiness levels, $R=0.448$, $R^2=0.20$, $F(1, 350)= 87.781$, $p<.01$. 20% of total variance related to attitude towards e-courses could be expressed by students' relative readiness.

Table 10. Results of basic regression analysis performed to estimate scores of student satisfaction in e-courses according to the scores of the OLRs

	B	T	p	R²	F	p
Materials used						
Regression coefficient	7.485	3.989	.000	.185	79.543	.000
OLRS score	.430 ^a	8.919	.000			
Student-instructor interaction						
Regression coefficient	5.378	5.509	.000	.174	86.750	.000
OLRS score	.417 ^a	9.314	.000			
Instructional environment design						
Regression coefficient	9.830	6.130	.000	.293	145.223	.000
OLRS score	.542 ^a	12.051	.000			
Attitudes towards e-course						
Regression coefficient	9.909	9.280	.000	0.20	87.781	.000
OLRS score	.448 ^a	9.369	.000			
Course content and teaching process						
Regression coefficient	16.990	16.680	.000	.343	182.393	.000
OLRS score	.585 ^a	13.505	.000			
Total						
Regression coefficient	50.186	9.429	.000	.319	163.889	.000
OLRS score	.565 ^a	12.802	.000			

There was a positive significant relationship between students' scores of course content and teaching process, and readiness levels, $R=0.585$, $R^2=0.343$, $F(1, 350)= 182.393$, $p<.01$. 34% of total variance related to course content and teaching process could be expressed by students' relative readiness.

Table 11. Regression analysis to estimate students' readiness scores according to satisfaction rate

Sub factors	B	S.E.	β	t	p
(Constant)	49.622	5.435		9.130	.000
Computer/Internet self-efficacy	.895	.501	.109	1.787	.075
Self-directed learning	1.099	.411	.199	2.678	.008
Learner control	1.410	.672	.154	2.097	.037
Motivation for learning	1.195	.530	.170	2.256	.025
Online communication self-efficacy	.206	.597	.025	.345	.730
$R=.57$; $R^2=.32$; $F=32.99$; $p=.00$					

The results of multi regression analyses (Table 11) revealed a positive significant relationship between students' scores in the sub-dimensions of the readiness scale and their satisfaction levels, $R=0.57$, $R^2=0.32$, $F(1, 350)= 32.99$, $p<.01$. According to the results of the analysis, there was a significant positive relationship between the sub-dimensions of self-directed learning ($\beta=.199$, $p<.01$), motivation for learning ($\beta=.170$, $p<.05$) and learner control ($\beta=.154$, $p<.05$) in the OLSR, and students' satisfaction levels. There was not any significant relationship between the sub-dimensions of computer/internet self-efficacy ($\beta=.109$, $p>.05$) and online communication self-efficacy ($\beta=.025$, $p>.05$), and the satisfaction of students. That is, satisfaction levels of the students who had high motivation and the skills of self-direction and control over their learning were higher.

Discussion and Conclusion

The objective of this research study was to ascertain students' levels of satisfaction with e-learning and their readiness for online learning, and to determine the relationship between these factors along with the effect of the materials used in e-learning on student satisfaction. So as to check students' satisfaction with e-courses, the E-Course Satisfaction Scale (ECSS) which was developed by Kolburan Gecer and Deveci Topal (2015) was used and in order for levels of students' readiness for online learning, the online learning readiness scale (OLRS) which was developed by Hung and his colleagues (2010) and adapted by Ilhan and Cetin (2013) was applied.

The E-Course Satisfaction Scale (ECSS) consisted of 35 5-point Likert-type items and five sub-dimensions of course content and teaching process, materials used and communication tools, attitude towards e-learning, environment design and instructor-student interaction. Meanwhile, the Online Learning Readiness Scale (OLRS) consisted of 18 items and 5 sub-dimensions of computer/internet self-efficacy, self-directed learning, learner control, motivation for learning and online communication self-efficacy.

When the findings obtained from the results of this research study are examined, it is seen that students' overall satisfaction with e-courses were at a moderate level, and if the sub-dimensions are examined, it is understood that satisfaction was high with instructor-student interaction and environment design while it was moderate with course content and teaching process, attitude towards e-learning, materials used and communication tools. As Liaw et al. (2007) state, learners who believe that an e-learning environment is an effective learning tool display a positive attitude towards e-learning. However, Levy (2007) has determined that learners' satisfaction is an important indicator for the drop-out rate for e-courses and satisfaction of the learners who leave the system seem to be lower than those who are successful. Also Ozkan and Koseler (2009) suggest that there is a positive relationship between learners' attitude and their satisfaction. Within e-learning environments, students' satisfaction is affected by factors such as an environment with high interaction, which is well-designed and user-friendly, where the learner can control his/her own learning and easily access information, a learner interface in which students are given the content based on their needs, the flexibility and quality of the course, the perceived practicality of the environment, variety in assessment, the instructor's attitude, and the student's readiness (Eom, 2014; Shee & Wang, 2008; Sun et al., 2008). According to Liaw and Huang (2013), perceived satisfaction may be influenced by interactive learning environments, perceived self-efficacy and anxiety.

Based on the faculties the students enrolled in, the satisfaction levels of those in the Faculties of Engineering and Law were found to be high whereas those of other faculties were moderate. In addition, it was found that there was not a significant difference in overall student satisfaction across gender and class year. In one of the studies that supported these findings, Cole, Shelley, and Swartz (2014) could not find a significant difference in student satisfaction across gender and age. On the other hand, Gómez, Guardiola, Rodríguez and Alonso (2012) mention that the females' satisfaction level with e-learning is higher than the males', and the females find it more important to communicate with the instructor and control their own learning.

It was determined that in courses where the e-course interaction and communication tools such as a virtual classroom, forum, chat, e-mail; web pages, animation, video, graphics/images as content tools; and questionnaire as an assessment tool were used there was a difference in student satisfaction, and satisfaction was higher in these courses. The mean scores of students' satisfaction were observed to be higher in courses where particularly the tools of animation, chat, questionnaire and e-mail were used. On the other hand, there was not a significant difference in student

satisfaction regarding exams and homework as assessment tools, or pdf and text documents as content tools, but pdf-text documents and exams were among the most used tools in the courses. According to these findings, it may be more practical to use interactive web pages instead of pdf-text documents. Wei, Peng and Chou (2015) point out that all the interaction tools in the e-learning system, especially homework processing and monitoring, following the scores, system announcements and updates, multimedia presentations, discussion boards and e-mail are useful for the learners and that case is correlated with their targets of learning and needs. Chou et al. (2010), however, state that interactive functions like self-directed learning, retrieving and sharing information and material, communication with the instructor and other students are essential for the learners. According to Cole et al. (2014), the system's ease of usage affects learner satisfaction positively while lack of interaction has a negative influence on it.

It was revealed that students' satisfaction was at high level when the number of materials used in courses was 7 and over, that is, as the number of materials increased, satisfaction levels did so as well. As Ilgaz and Gulbahar (2015) mention, satisfaction is influenced by the teaching content, communication and usability, and the teaching process; in addition, the usage of various interaction tools, activities organized to enhance interaction and different types of assessment methods are important factors that affect learner satisfaction.

It was identified that levels of students' readiness for online learning was high in all sub-dimensions and in total, and students were ready for online learning. Also, it was seen that there was a positive significant relationship between students' levels of readiness and their satisfaction with e-courses, and that readiness mostly influenced the scores of course content and teaching process, teaching environment design, attitude towards e-courses, materials used and communication tools and instructor-student interaction, respectively. Moreover, the satisfaction levels of learners who were self-directed, had high motivation and could control their own learning appeared to be positively affected. Kirmizi (2015) suggests that learner motivation from readiness sub-dimensions is the one that influences satisfaction most. According to Ilgaz and Gulbahar (2015), elements such as individual factors, accessibility to the system, graduation, close deadline of submission and time management affect learner readiness. Liaw et al. (2007) states that there is a close correlation between learning at one's own pace, multimedia teaching, the instructor and effective learning, but Kuo et al. (2013) claim that while instructor-student interaction, student-content interaction and levels of confidence in internet self-efficacy are considerable determinants of student satisfaction, interaction between students and self-regulatory learning do not have any impact on student satisfaction.

According to Holmberg (1996), encouraging learners to create their own knowledge in terms of flexibility, hypertext approaches, a convenient environment, courses functioning as guides to selected texts, discourse and empathy, homework for teaching cognitive skills, quick-response instructor-student interaction (via fax or e-mail), teleconference and computer conference, a traditional teaching design and constructivist approaches help to increase the potential of distance education.

In conclusion, for more satisfaction, the materials used in e-learning and content must give the student chances for interaction, synchronous or asynchronous, and different interaction methods must be provided for student-instructor interaction; while transferring the content, tools such as different dynamic web pages, video, animation, graphics, and images should be used; a variety of assessment methods should be offered together and the opportunity to learn by practicing and doing exercises during their free time should be provided. In order to increase satisfaction, student readiness should be considered, students should be able to use technology effectively and activities that enhance student motivation should be developed and used frequently throughout the course. Administrators and teachers can see even better which tools should be used more to make e-learning environment more efficient and useful, the importance of student-teacher interaction, the impact of motivation and readiness on academic achievement. Thus, a better corporate support, teaching and learning environment, student support, teacher support, better quality measurement and evaluation will be able to be provided.

In future research, the relationship between satisfaction and readiness, which has been examined in terms of learners only, can be studied regarding the relationship between instructors' readiness and student satisfaction. In addition, institutional support and readiness may also be investigated in future.

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