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Examining the Usability of an Educational Platform Designed for Human Computer Interaction*

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ABSTRACT

In this study, the purpose was to examine the usability level of a digital educational platform designed and developed within the scope of Human Computer Interaction (HCI). In the study, a weak experimental design, one of the quantitative research methods, was used. First of all, the learners' expectations regarding a digital educational platform within the scope of HCI were revealed. Next, the experimental group was asked to use the digital educational platform developed, and the control group was asked to use the digital educational platform currently used by the institution for one semester. The usability levels were compared by applying the System Usability Scale to both groups. In addition, a usability test was performed to compare both digital platforms. A total of 363 university students studying at Van Yüzüncü Yıl University in the 2021/2022 Academic Year Fall and Spring semesters participated in the study. As the data collection tools, the Distance Education System Evaluation Questionnaire in Terms of Human Computer Interaction (HCIEQ), System Usability Scale (SUS) and HCI-Usability Observation Form (HCIOF) were used. The data were entered into SPSS 21 program, and descriptive statistics such as mean, standard deviation, percentage and frequency, independent samples t-test and One-Way ANOVA were performed. Results of the analysis revealed that the digital educational platform developed within the scope of HCI was found by the learners to be more usable.

Keywords: Human computer interaction, usability, digital educational platform, distance education

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1. INTRODUCTION

The interest in digital learning environments for educational purposes has been increasing recently, it is seen that this interest has become almost a necessity with the Covid-19 pandemic. Individuals studying at almost every level of education had to either experience digital educational platforms for the first time or improve their existing experiences. Although the activities carried out in traditional classroom environments are transferred to the digital environment, activities such as opening a class, adding/sharing content, giving homework and test/quiz exams can also be done in these environments. By transferring learner interactions to the digital environment and recording them, these records can be examined and evaluated in more detail (Rangel et al., 2015).

In this century, when there has been change and development in many fields, today's students have also taken their share from this change. As a matter of fact, today's students are characterized by many names such as "Generation Z", "digital natives" and "students of the new millennium" (Igel & Urquhart, 2012; Pedro, 2006; Prensky, 2001). The reason why students are characterized in this way is due to the differences in their lifestyles and learning styles. Prensky (2004) points out that digital natives' skills such as learning, researching, communicating, sharing, analyzing and expressing themselves differ in many ways. Similarly, Bayne and Ross (2007) stated that digital natives perform different operations at the same time; that they are faster when performing these operations; that they constantly need Internet connection; and that they show more interest in visuals. Despite these well-known characteristics, it is clear that trying to train students only in existing traditional learning environments will not be enough. It is important to design digital learning environments by considering the above-mentioned characteristics of students and making them a part of the design process. In this sense, Human Computer Interaction (HCI), an

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interdisciplinary field which examines easier use of technologies, production of better designs in terms of use and functionality, and their impact on the user, offers various solutions (Çağıltay, 2018). Evaluating the usability of the products and developing the product as a result of the evaluations is one of the HCI study areas (Baş, 2013). HCI investigates the interaction between human and computer and the basis of this interaction and tries to understand usability theories by applying them to software interfaces (Lawrence & Tavakol, 2007). With the widespread use of information systems, concepts such as "easy to use", "user friendly" and "usability" are frequently encountered. Usability is a concept which emerged within the scope of HCI and which expresses how easy to learn a system, how it works effectively and efficiently, and how satisfied users are when using the system (Başar & Kul, 2020; Çağıltay, 2018; Kumar & Mohite, 2017). It is important to include the target audience in the design and development stages of the systems and to examine the contribution of the design to usability by considering the expectations and demands of users. Most HCI or interaction design resources seem to focus on issues such as identifying users' needs, setting examples and conducting usability tests (Rosinski & Squire, 2009). Experimental methods and user testing models are frequently used in usability studies, thus enabling real users to test the system within the scope of the given tasks (Sözer, Özdamar & Pilancı, 2020). In this process, where e-learning has become widespread, the evaluation of digital educational platforms by learners, who are their real users, and the examination of the platforms in terms of pedagogical and technical aspects and usability will contribute to the design of e-learning environments to be developed in the future (Gökçe, Önal & Çalışkan, 2021; Sözer, Özdamar & Pilancı, 2020).

As the place of information technologies in human life is very short, it is difficult to make a definite judgment about how the interaction in digital environments will be most effective and about which should be the best way in interface designs. Educators need to work intensively on the interaction design of environments used by learners (Çağıltay, 2018). It is thought that the design, development and evaluation of educational systems in terms of HCI will be important for the education process.

1.1. Problem

Many educational activities have been transferred to the digital environment due to both compulsory reasons such as the pandemic and the requirements of our age. With the expectations and wishes of students, it has become inevitable for educational institutions to renew and develop digital educational platforms according to the models that can use the systems more effectively and efficiently. Some educational institutions use existing digital educational platforms, while others use platforms they have developed themselves. It is expected that these systems, the number of users of which have increased rapidly in a short time, will be able to respond to the demands and requests of today's learners, whose characteristics are mentioned above. It will not be enough for developed systems just to look good visually. Software developers are expected to - know such issues as why users will use the system, how they will do it, how they will interact with the interface, which all shortly mean including the user in the design process. However, İnal and Güner (2016), in their study, stated that a significant portion of software developers did not receive any training on user experience or usability; that their awareness level was low; and that they had incomplete or incorrect information about these issues. At this point, HCI, which is an interdisciplinary field, has developed various methods and applications. Despite the developments in technology, it will not be possible to talk about usable HCI systems if the quality of the developed software cannot catch up with the technology (Bozyer, 2019). A system should be found effective, efficient and satisfactory by users, and resources such as time, cost and labor should be used efficiently (Bertiz, 2017). Correcting the deficiencies or errors that will occur after the design of a system is completed will mean extra time and cost. However, from the beginning to the end of the process, designing according to the expectations and wishes of the target audience is considered to be more economical in terms of time and cost as well as to be beneficial in terms of user satisfaction.

HCI theories and methodologies can support the design of e-learning environments that respond to the rapidly changing needs of society. With the recent increase in the interaction between humans, machines and contextual environments, the design and use of user-centered systems related to the interfaces that people interact with the computer have gained importance (Kujala et al., 2011). E-learning systems should also have high standards of accessibility and usability to make users' interactions with the system as natural and intuitive as possible (Dix, Roselli, & Sutinen, 2006). In an unavailable learning environment, learners spend the time they should spend on content figuring out how the system works, and this can negatively affect the learning process (Wong et al., 2003). Knowing who will be the stakeholders who will use the system is not enough alone, and it is necessary to know the stakeholders well through various analyses. Stakeholders' demands should be determined, and future expectations should be predicted using analytical and algorithmic methods (Karatop & Güler, 2020; Zaphiris & Kurniavan, 2006). An effective process management will be beneficial for designed digital environments to be successful. In order to design new tools, HCI researchers need to use the feedback they have obtained from user scenarios throughout the process (Dix, Roselli & Sutinen, 2006). In this way, it is thought that systems designed effectively and efficiently will be beneficial in terms of user satisfaction. Sancar-Tokmak, Doğusoy and Bilgiç (2020) stated in their study that there was no clear trend regarding usability in the field of HCI in Türkiye. Software developers' adoption and ownership of usability studies is important for the success of the project (Radle & Young 2001).

Besides being used at all levels of education, computer systems have an important role. Technology companies are making significant investments in software development. Although advanced studies are carried out on information systems and software development in our country, it is seen that there are very few scientific and applied studies on the usability of the educational systems developed. However, this issue is of vital importance in terms of future gains (Çağıltay, 2016).

1.2. Purpose of the Study

In this study, the purpose was to examine the usability level of a digital educational platform designed and developed within the scope of HCI. First, the points that learners see as missing form a digital educational platform were revealed. Thus, the usability level of the digital educational platform designed and developed within the scope of HCI was compared with the use of experimental and control groups.

1.3. Research Problem

What is the usability level of the digital educational platform designed within the scope of human computer interaction? In line with this problem, answers to the following sub-problems will be sought.

1.3.1. Research sub-problems

1. What are the points considered by learners to be deficient in the scope of HCI in the digital educational platform they use?
2. What is the usability level of the educational platform developed within the scope of Human Computer Interaction?
3. Is there a significant difference between the usability scores of the experimental and control groups within the scope of HCI?
4. Is there a relationship between the usability scores and some demographic variables?

2. METHODOLOGY

In this study, a weak experimental design, one of quantitative research methods, was used. There is no randomness in the weak experimental design. In the weak experimental design, existing groups that have already been created are used. One of the groups is determined as the experimental (E) group and the other as the control (C) group (Büyüköztürk et al., 2014). In this study, permission was obtained for the course of Deontology and Ethics, taken by 3rd grade students from classes A and B with the highest population at the Faculty of Health Sciences of Van Yüzüncü Yıl University. In the study, it was not thus possible to randomly assign the participants to the groups. The digital educational platform developed within the scope of HCI for the experimental (E) group and the educational platform currently used by the institution for the control (C) group were used during the 2021-2022 Spring semester (14 weeks). Posttest was applied to both groups. Information about the experiment process is presented in Table 1.

Table 1.
Experimental Process of the Research

Group	Class/Branch	Frequency	Process	Posttest
Experimental (E)	Midwifery 3/B Branch	39	Implementation of the Developed Educational Platform for 1 Semester	SUS HCIOF
Control (C)	Midwifery 3/A Branch	35	Implementation of the Existing Educational Platform for 1 Semester	SUS

As seen in Table 1, a total of 74 students, 39 from the experimental (E) group and 35 from the control (C) group, participated in the experimental process. As the posttest, the measurement tools of SUS and HCIOF were applied to the experimental (E) group, while the measurement tool of SUS was applied to the control (C) group.

2.1. Participants

The participants in the study were associate, undergraduate and graduate students studying at Van Yüzüncü Yıl University in the Fall and Spring semesters of the academic year of 2021/2022. The purposeful sampling method, one of the non-random sampling methods, was used for the experimental process in the study. Weak experimental designs require the use of non-random methods. Purposeful sampling is preferred in special cases which meet certain criteria or which have certain characteristics (Büyüköztürk et al., 2014). In this study, the application of the developed platform to as many users as possible and the determination of the classes where the application would be conducted by the school administration necessitated the use of this method. Table 2 shows information about the participants regarding the different stages of the study.

Table 2.
Information about Participants

Time Period	Participants	Frequency	Measuring Tool
2021/2022 Fall Semester	University Students	283	HCIEQ
2021/2022 Fall Semester	University Students	74	SUS
2021/2022 Fall Semester	University Students	6	HCIOF

The measurement tool of the Distance Education System Evaluation Questionnaire in Terms of Human Computer Interaction (HCIEQ) was applied to 283 university students in order to determine the points that they considered to be deficient with respect to HCI in a digital educational platform. A digital educational platform was designed by the researchers in line with HCI,

after identifying the points considered to be deficient by the learners within the scope of HCI. The digital educational platform designed was used by the experimental group for one semester within the scope of the course determined. The control group used the existing digital educational platform provided by the institution. A total of 74 students, 39 from the experimental group and 35 from the control group, participated in the experimental study. In addition, certain tasks were given to six participants through the HCIOF form, and both educational platforms were compared within the scope of HCI.

2.2. Data Collection Tools

While observation, interview, questionnaire and scales can be used as data collection methods in usability studies, laboratory or field work can be done as the data collection process (Kumar & Mohite, 2017). Within the scope of this study, Distance Education System Evaluation Questionnaire in Terms of Human Computer Interaction (HCIEQ), System Usability Scale (SUS) and HCI-Usability Observation Form (HCIOF) were used.

2.2.1. Distance education system evaluation questionnaire in terms of human computer interaction (HCIEQ)

The Distance Education System Evaluation Questionnaire (HCIEQ) was developed by the researchers in order to determine the expectations of learners from a distance education platform in terms of HCI and to identify the missing points. With the help of this questionnaire, the distance education platform used by the learners was evaluated from the perspective of the target audience; the demands and expectations of the target audience were revealed; and the missing points were determined. The questionnaire developed was made up of 42 5-point Likert-type items. The students were asked to rate the items from 1 to 5 ("Strongly Disagree", "Disagree", "Partly Agree", "Agree" and "Strongly Agree"). The questionnaire generally consists of items in which the learners could express their cases such as finding the system complex within the scope of HCI, liking it in terms of its design, making mistakes, consistency, and satisfaction. In this way, it was ensured that the learners' expectations from an educational platform within the scope of HCI would be revealed. While preparing the questionnaire items, firstly, the literature was reviewed by the researchers. The draft questionnaire items were checked by field experts and revised in line with expert opinions. The final form of the questionnaire was applied to university students.

2.2.2. System usability scale (SUS)

In order to evaluate the usability of the platform developed, the System Usability Scale (SUS) in the literature was used by taking the related permission. The Scale (System Usability Scale-SUS) was developed by Brooke (1996) and adapted into Turkish by Çağıltay (2018). The scale was made up of 10 5-point Likert-type items. The scale system consisted of items that generally evaluated usability in terms of ease of use, consistency, complexity, and willingness to reuse. It is ensured that the system to be evaluated with SUS is reduced to a single result in terms of usability level. In the scale, there were negative judgments in items 1,3,5,7 and 9 and positive judgments in items 2,4,6,8 and 10. As a result, a score between 0 and 100 is calculated for each user. The close correlation between the items in the original scale (±0.7 / ±0.9) and the use of the scale in many usability evaluation studies in the literature revealed that SUS was a valid and reliable measurement tool. The Cronbach Alpha reliability coefficient of the scale was found to be .78 (Kadirhan, Gül, & Battal, 2015).

2.2.3. HCI-usability observation form (HCIOF)

The distance education platform developed was to be tested in terms of usability within the scope of HCI. In line with this, the HCI-Usability Observation Form (HCIOF) was prepared by the researchers. While preparing the form, the related literature was reviewed, and the form was checked by field experts. The form allowed obtaining data regarding how long it took the learners to complete certain tasks, how many attempts they made to do so and whether they made mistakes. Thus, whether the platform developed reached the determined goals was checked. In addition, the users were asked to do the same tasks for the digital educational platform that they currently used within the scope of other online courses, and their responses were recorded. This made it possible to compare both educational platforms with each other. In the HCIOF form, there were 12 tasks such as logging in to the system, sending a message to the lecturer, uploading content and viewing the exam date. The users were given time and a 2nd right to complete each task. On the other hand, if the task was not completed, the users were given hints. The time and the number of times the users completed the tasks were recorded.

2.3. Data Collection Process

Within the scope of the study, the measurement tools of HCIEQ, SUS and HCIOF were used in the data collection phase. Written permission was obtained from the developers of the scale for SUS, and it was used after the ethics commission's approval of the measurement tools. HCIEQ and HCIOF were checked by field experts before they were put into practice, and the evaluation continued until a joint decision was made on the items to make the questionnaire ready for use. The participants were given general information about the study and informed that their personal information would be kept confidential. It was ensured that the participants were included in the study on a completely voluntary basis. For the experimental part of the study, the "Informed Consent Form for Participants" was signed in line with the decision of the ethics commission. The date and time of the interviews with the participants were recorded. The measurement tools were prepared separately both in digital media (Google Form) and in print, and data were collected with the method preferred by the participants. For the data collection tools, an informative note was prepared regarding the purpose of the study according to the characteristics of the target audience,

and sufficient time was given to the participants to respond. First of all, HCIEQ was applied in order to determine not only the expectations and demands of the university students regarding educational software within the scope of HCI but also the points they saw missing in the digital educational platform. Next, the experimental group used the educational software developed within the scope of HCI, and the control group used the current educational software used by the university within the scope of the course of Deontology and Ethics for one semester. At the end of the term, data were collected by applying SUS to both the experimental group and the control group. In addition, the experimental group was asked to evaluate both the educational platform developed and the current platform they used for other courses by applying HCIOF. Necessary arrangements were made for the missing or incorrectly entered data, and the data were made ready for analysis.

2.4. Data Analysis

After the data collected were entered into the SPSS 21 program, whether the data showed normal distribution was examined. It was seen that the data showed normal distribution. This allowed deciding on the application of parametric tests. For this purpose, for the analysis of the data, descriptive statistics such as mean, standard deviation, percentage and frequency as well as independent samples t-test and one-factor analysis of variance (ANOVA) were used for comparisons between the groups.

2.5. Implementation of the Digital Educational Platform Designed

Before the Digital Educational Platform was developed, the deficiencies of the existing systems in terms of HCI were determined, and the expectations of the learners from an educational system were revealed with the help of the questionnaires. In line with the expectations of the learners, the platform was designed and finalized within the scope of HCI. The educational platform designed consisted of components such as registration to the system, opening / adding courses, adding content, events, chat, forum, calendar and announcements. Weekly course contents were uploaded to the platform designed by the course instructor, and the courses were taught asynchronously (offline) for both the experimental group and the control group. The same contents were loaded, and the same tasks were assigned for both groups. The educational platform designed was actively used in the course of Deontology and Ethics during the spring semester of the academic year of 2021/2022. Username and password definitions were made for the users to log into the system.

3. FINDINGS

3.1. Findings regarding the Distance Education System Evaluation Questionnaire in Terms of Human Computer Interaction (HCIEQ)

Within the scope of the research problem, the students were asked to evaluate the current distance education system in terms of HCI which they used. In this respect, the "Distance Education System Evaluation Questionnaire in Terms of Human Computer Interaction" (HCIEQ) was developed by the researchers. In this way, it was possible to reveal the expectations and demands of the students regarding a distance education system in terms of HCI and to reveal the related missing points. Table 3 presents information about the gender of the students who participated in the study, their education level, their ability to use computer/Internet, their ability to use the distance education system and information about the device they used to connect to the distance education system.

Table 1.
Distribution of Participants by Demographic Variables

Demographic Variables	**f**	**%**
Gender		
Woman	150	53
Man	133	47
Total	283	100
Education Level		
Associate Degree	173	61.1
Undergraduate	103	36.4
Graduate	7	2.5
Total	283	100
Ability to Use Computer/Internet		
Inexperienced	24	8.5
Medium Level	149	52.6
Experienced	110	38.9
Total	283	100
Ability to Use the Distance Education System		
Inexperienced	30	10.6
Medium Level	150	53
Experienced	103	36.4
Total	283	100

Device They Used to Connect to the Distance Education System		
Desktop	28	9.9
Laptop	73	25.7
Smartphones	164	58
Tablet	2	1
Other	3	1
Total	279	98.6

As can be seen in Table 3, 53% (150) of the participants were women and 47% (133) were men. Among them all, 61.1% (173) were associate degree students; 36.4% (103) were undergraduate students; and 2.5% (7) were graduate students. In addition, 52.6% of the students stated that they were at a medium level in terms of their computer/Internet use skills, while 38.9% considered themselves to be experienced and 8.5% to be inexperienced. Similarly, 53% of the students saw themselves at a medium level in terms of their ability to use the distance education system, while 36.4% stated that they regarded themselves as experienced and 10.6% as inexperienced in this sense. In addition, 58% of the participants stated that they mostly used smartphones while using the distance education system; 25.7% preferred laptop computers; and 9.9% preferred desktop computers.

As a result of the questionnaire applied, the mean of the scores assigned by the students in terms of HCI to the distance education system they used and the items with the lowest and highest grades are given in Table 4.

Table 2.
Items with the Lowest Average with Survey Total Score

Item Number	**Item Subject**	**N**	**Mean**
n1	Similarity to previous software	283	2,37
n16	Font size and color	283	2,50
n25	Help button	283	2,50
n24	Guiding navigations	283	2,55
n37	Communication with other students	283	2,61
n34	Guidance in the face of errors	283	2,67
n36	Communication with the lecturer	283	2,82
n35	Non-working links	283	2,87
n22	Uploading files to the system	283	2,90
n38	Requiring technical skills	283	2,91
n32	Fear of making mistakes	283	2,93
n23	Search button	283	2,95
n7	Use of metaphors	283	2,97
n40	Recommending it to others	283	3
n12	Consistency across screens	283	3,01
n28	Tables, graphs, etc. descriptions	283	3,01
n14	Distracting factors	283	3,06
n39	Training required	283	3,07
Mean of the Questionnaire Scores			**3,08**

When Table 4 is examined, it is seen that the mean of the questionnaire scores was 3.08. In addition, the participants were found to have assign lower scores than the mean to such subjects as similarity to previous software, font size and color, help button, guiding navigations, communication with other students, guidance in the face of errors, communication with the lecturer, non-working links, uploading files to the system, requiring technical skills, fear of making mistakes, search button, use of metaphors, recommending it to others, consistency across screens, tables, graphs, etc. descriptions, and training required.

3.2. Findings Regarding System Usability Scale (SUS)

Table 5 presents frequency and percentage values in relation to the System Usability Scale (SUS) with respect to gender, ability to use distance education system, ability to use computer/Internet, the device used most to access the distance education system, access to the Internet, access to the Internet tools, and finding distance education useful.

Table 5.
System Usability Scale (SUS) Scale Frequencies and Percentages in Terms of Various Demographic Variables.

Demographic Variables	**Experimental (E)**		**Control Group (C)**	
	f	**%**	**f**	**%**
Gender				
Woman	39	100	35	100
Man	0	0	0	0
Total	39	100	35	100

Ability to Use Distance Education System				
Inexperienced	4	10.3	1	2.9
Medium Level	20	51.2	20	57.1
Experienced	15	38.5	14	40
Total	39	100	35	100
Ability to Use Computer/Internet				
Inexperienced	4	10.3	2	5.7
Medium Level	21	53.8	24	68.6
Experienced	14	35.9	9	25.7
Total	39	100	35	100
The Device Used Most to Access the Distance Education System				
Smartphones	33	84.5	29	82.9
Laptop	4	10.3	2	5.7
Desktop	1	2.6	4	11.4
Tablet	1	2.6	0	0
Total	39	100	35	100
Access to the Internet				
I can't access easily	5	12.8	8	22.9
I can partially access	17	43.6	19	54.2
I can access easily	17	43.6	8	22.9
Total	39	100	35	100
Access to the Internet Tools				
I can't access easily	1	2.5	4	11.4
I can partially access	15	38.5	16	45.7
I can access easily	23	59	15	42.9
Total	39	100	35	100
Finding Distance Education Beneficial				
Unbeneficial	7	18	7	20
Partially beneficial	16	41	16	45.7
Beneficial	16	41	12	34.3
Total	39	100	35	100

When Table 5 is examined, it is seen that all of the participants were women. The majority of both the experimental group (E) and the control group (C) (f=59) considered themselves to be moderate or experienced in terms of their ability to use the distance education system, and in the same way, both groups mostly considered themselves to be moderate or experienced in terms of their ability to use computer/Internet (f= 68). The users stated that the tool used most to enter the distance education system was the smartphone (f=62). It was seen that both groups had access to the Internet partially or easily (f=61) in terms of easy access to the Internet and that they could partially or easily access the tools for access to the Internet (f=69). The majority of the participants reported that they generally considered distance education to be partially beneficial or beneficial (f=60).

The usability scores of the experimental and control groups were compared. The t-test results of the participants' usability scores with respect to the experimental and control groups are shown in Table 6.

Table 6.
t-Test Results on Comparison of Usability Scores by Experimental and Control Groups

Group	**N**	**Mean**	**SD**	**df**	**t**	**p**
Experimental (E)	39	73,21	9,15	72	-11,94	,000
Control (C)	35	41,64	13,38			

According to Table 6, the usability scores showed a significant difference in terms of the experimental groups ($t(72)=-11.94$; $p<0.5$). When the usability scores of the experimental and control groups were examined, it was seen that the students in the experimental group found the digital educational platform more usable ($\bar{x}=73.21$; $SD=9.15$) than the students in the control group ($\bar{x}=41.64$; $SD=13.38$). ANOVA findings are presented in Table 7 with respect to the usability scores of the participants, their ability to use the distance education system, their ability to use a computer/Internet, the device used most to access the distance education system, their status of Internet access, their access to Internet-enabled tools, and their use of distance education.

Table 7.
ANOVA Test Results of System Usability Scale (SUS) with Respect to Some Variables

	Source of Variance	Sum of Squares	df	Mean Square	F	p
The Ability to Use a Distance Education System	Intergroup	1664,071	2	732,035	1,985	,145
	Within groups	26185,000	71	368,803		
	Total	27649,071	73			
The Ability to Use a Computer/Internet	Intergroup	1065,315	2	532,657	1,423	,248
	Within groups	26583,756	71	374,419		
	Total	27649,071	73			
The Device Used Most to Access the Distance Education System	Intergroup	1951,685	3	650,562	1,772	,160
	Within groups	25697,386	70	367,106		
	Total	27649,071	73			
The Status of Internet Access	Intergroup	1274,687	2	637,343	1,716	,187
	Within groups	26374,384	71	371,470		
	Total	27649,071	73			
The Access to the Internet-Enabled Tools	Intergroup	1383,226	2	691,613	1,870	,162
	Within groups	26265,845	71	369,941		
	Total	27649,071	73			
The Use of Distance Education	Intergroup	1158,195	2	579,097	1,552	,219
	Within groups	26490,876	71	373,111		
	Total	27649,071	73			

In Table 7, ANOVA test was performed to determine whether the usability scores of the participants showed a significant difference with respect to their ability to use the distance education system, their ability to use the computer/Internet, the device used most to access the distance education system, their access to the Internet, their access to Internet tools, and finding distance education useful. and the findings obtained were presented. As can be seen in Table 7, no significant difference was found for any of the variables (p>.05).

3.3. Findings Regarding HCI-Usability Observation Form (HCIOF)

In order for the target audience to test the usability of the educational platform developed within the scope of the study, a summative user test was conducted. Six people from the experimental group who wanted to be included in the study voluntarily participated in the study. Various tasks were given to the participants, and records of how much they did and how long it took to complete them were kept. The participants were asked to perform the given tasks both on the digital educational platform developed and on the existing educational platform they used for their other courses. In this way, it was possible to compare both platforms.
Nielsen (1993) states that five evaluators are sufficient to detect usability problems in a system and that 75% of the problem can be revealed with five participants. The relationship between the number of users and the percentage of problems for usability tests can be seen in Figure 1.

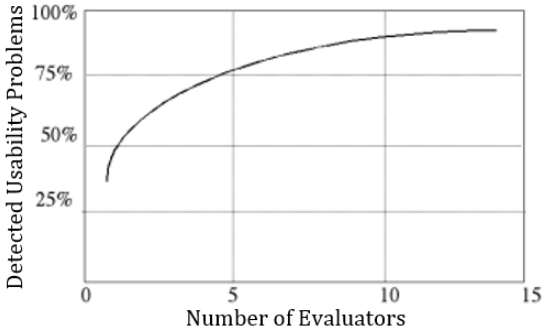

Figure 1. The relationship between usability problems and the number of users according to Nielsen (Nielsen, 1993)

According to Figure 1, a number of participants being between five and 10 reveals only about 15% of the problems. Table 8 shows the tasks given to the participants and presents whether they completed the tasks and how long it took them to complete the tasks.

Tablo 8.

Tasks Given to Participants within the Scope of Usability Test and Completion of These Tasks and Completion Times

DEVELOPED EDUCATIONAL PLATFORM

TASKS	U1	U2	U3	U4	U5	U6	1st TRIAL	2nd TRIAL	WİTH HELP	COULD NOT
1-Login the system and change your password.	1st Trial	1st Trial	1st Trial	1st Trial	1st Trial	1st Trial	6/6	0/6	0/6	0/6
2-View the lecturer of the course and return to the main screen.	1st Trial	1st Trial	1st Trial	1st Trial	1st Trial	1st Trial	6/6	0/6	0/6	0/6
3-Go to the content of the 2nd week of the course and return to the main page.	1st Trial	1st Trial	1st Trial	1st Trial	1st Trial	1st Trial	6/6	0/6	0/6	0/6
4-View class attendance status.	1st Trial	1st Trial	1st Trial	1st Trial	1st Trial	1st Trial	6/6	0/6	0/6	0/6
5-Write a message to your teacher about the 1st week lesson.	1st Trial	1st Trial	2nd Trial	1st Trial	1st Trial	1st Trial	5/6	1/6	0/6	0/6
6- Send a message to any classmate.	1st Trial	1st Trial	1st Trial	1st Trial	2nd Trial	1st Trial	5/6	1/6	0/6	0/6
7- View your online friends	2nd Trial	1st Trial	2nd Trial	1st Trial	1st Trial	1st Trial	4/6	2/6	0/6	0/6
8- View the course's midterm exam date and return to the home page.	1st Trial	1st Trial	1st Trial	1st Trial	1st Trial	1st Trial	6/6	0/6	0/6	0/6
9- Download the 4th week course content to your computer.	1st Trial	1st Trial	1st Trial	1st Trial	1st Trial	1st Trial	6/6	0/6	0/6	0/6
10- View course success.	1st Trial	1st Trial	1st Trial	1st Trial	1st Trial	2nd Trial	5/6	1/6	0/6	0/6
11- View recent announcements and return to home screen.	1st Trial	1st Trial	1st Trial	1st Trial	1st Trial	1st Trial	6/6	0/6	0/6	0/6
12- Log out of the system.	1st Trial	1st Trial	1st Trial	1st Trial	1st Trial	1st Trial	6/6	0/6	0/6	0/6
Total							67/72	5/6	0/72	0/72
Completion Time (minute)	2	2	4	2	3	2				
Total Time (minüte)	15									

EXISTING EDUCATIONAL PLATFORM

TASKS	U1	U2	U3	U4	U5	U6	1st TRIAL	2nd TRIAL	WİTH HELP	COULD NOT
1-Login the system and change your password.	With Help	2nd Trial	2nd Trial	With Help	1st Trial	1st Trial	2/6	2/6	2/6	0/6
2-View the lecturer of the course and return to the main screen.	1st Trial	2nd Trial	1st Trial	1st Trial	1st Trial	1st Trial	5/6	1/6	0/6	0/6
3-Go to the content of the 2nd week of the course and return to the main page.	Could Not	Could Not	Could Not	Could Not	1st Trial	2nd Trial	1/6	1/6	0/6	4/6
4-View class attendance status.	2nd Trial	Could Not	1st Trial	2nd Trial	1st Trial	1st Trial	2/6	2/6	0/6	2/6
5-Write a message to your teacher about the 1st week lesson.	1st Trial	1st Trial	Could Not	Could Not	1st Trial	1st Trial	4/6	0/6	0/6	2/6
6- Send a message to any classmate.	Could Not	Could Not	Could Not	Could Not	2nd Trial	Could Not	0/6	1/6	0/6	5/6
7- View your online friends	Could Not	With Help	1st Trial	Could Not	Could Not	Could Not	1/6	0/6	1/6	4/6
8- View the course's midterm exam date and return to the home page.	Could Not	2nd Trial	Could Not	2nd Trial	Could Not	2nd Trial	0/6	3/6	0/6	3/6
9- Download the 4th week course content to your computer.	With Help	Could Not	With Help	2nd Trial	1st Trial	1st Trial	2/6	1/6	2/6	1/6
10- View course success.	Could Not	With Help	With Help	Could Not	Could Not	2nd Trial	0/6	0/6	2/6	4/6
11- View recent announcements and return to home screen.	2nd Trial	1st Trial	1st Trial	1st Trial	1st Trial	1st Trial	5/6	1/6	0/6	0/6
12- Log out of the system.	1st Trial	1st Trial	1st Trial	1st Trial	1st Trial	1st Trial	6/6	0/6	0/6	0/6
Total							28/72	12/72	7/72	25/72
Completion Time (minute)	5	7	7	5	4	4				
Total Time (minute)	32									

As seen in Table 8, the tasks given for the digital educational platform developed were completed by the users either in their 1st trial or in their 2nd trial. The users completed the tasks given in an average of 2.5 minutes, with the fastest in 2 minutes and the slowest in 4 minutes. It is seen that the users could not fulfill some tasks for the platform they were currently using and that they completed some of them by getting help. The users completed the tasks given in an average of 5.3 minutes, with the fastest in 4 minutes and the slowest in 7 minutes for the platform they were currently using.

According to Table 8, it is seen that the learners completed all the tasks given for the digital educational platform developed either in their 1st trial or in their 2nd trial. However, it is seen that with 44.4%, the same learners either completed the tasks with help given for the digital educational system they were currently using or failed to complete them.

4. CONCLUSION, DISCUSSION AND RECOMMENDATIONS

Within the scope of the research problems below, this chapter focuses on the findings obtained in the study.

1. What are the points that learners find missing within the scope of HCI in the digital educational platform they use?
2. What is the usability level of the educational platform developed within the scope of Human Computer Interaction?
3. Is there a significant difference between the usability scores of the experimental and control groups within the scope of HCI?
4. Is there a relationship between usability scores and certain demographic variables?

It is important to keep today's learners, who have quite short time to focus on any task, in digital educational platforms, to provide them with the opportunity to access the content they are looking for with minimum error, and, in short, to offer them a more usable system. With the recently increasing interest in distance education activities, the interaction of learners with digital educational platforms has increased as well. Therefore, it is expected that these digital platforms will be designed in accordance with the expectations and wishes of learners and will be used effectively and efficiently and that users will be satisfied at the highest level possible.

System designers should first analyze the real users who will use the system (Sözer, Özdamar & Pilancı, 2020). In this study, firstly, learners' expectations from a digital educational platform and the shortcomings of the platform were revealed. It was seen that the users found the digital educational platform they used inefficient in terms of such aspects *similarity to previous software, font size and color, help button, guiding navigations, communication with other students, guidance against errors, communication with the lecturer, links that do not work, uploading files to the system, requiring technical skills, fear of making mistakes, search button, use of metaphors, recommending others* and *consistency between screens*. The users' experiences regarding the use of the systems and their perceptions and habits formed as a result of these experiences should be evaluated (Baskın, 2022). Evaluating the system from the eyes of real users and revealing the expectations and wishes served as a kind of a guide for the digital educational platform to be designed.

A digital educational platform was by the researchers taking into account the learners' expectations within the scope of HCI. It could be stated that the experimental group had a high level of finding the digital educational platform designed usable ($\bar{x}$=73,21; SD=9.15; p=.000). The digital educational platform designed was used by the experimental group for one semester. The control group, on the other hand, used the existing digital educational platform provided by the university for one semester within the scope of the same course. The SUS usability scores of the experimental and control groups were compared, and it was seen that these scores showed a statistically significant difference. It was seen that the experimental group students' level of finding the digital educational platform usable was more positive than that of the control group students. The widespread use of digital educational platforms requires the evaluation of these platforms with different processes and methods that will allow them to be more effective and efficient (Bertiz, 2017). In this respect, the usability test was applied to the learners as well. It was revealed that the learners completed the tasks given for the digital educational platform developed within the scope of HCI both in a shorter time and with fewer errors compared to the digital educational platform they were currently using. These results suggest that involving users from the very beginning can help design more usable digital educational systems. Şahin, Hebebci and Çelik (2014) stated that the use of more than one method in the evaluation of digital environments can contribute to the development of more usable systems. By designing digital educational platforms that can be used within the scope of HCI, learners will be able to allocate the time they would spend on understanding the system to educational activities.

Many software do not meet the expectations of users or do not work as desired. This problem can be eliminated by including real users in the development process (Bertiz, 2017). It was seen that while using the current educational digital platform, the learners had the most difficulty in performing the tasks of *displaying success in the course, sending a message to any classmate, viewing online friends, viewing the lecturer of the course*, *returning to the main screen, going to the 2nd week content of the course* and *returning to the main page*. When the current digital educational platform is examined, it was seen that the course instructors did not share any results of student success on the relevant platform; that communication with the lecturer or classmates was through other channels; and that the course contents were uploaded to the platform not on weekly basis but in a mixed manner. For this reason, it is thought that the users did not use these menus much during the process and thus experienced difficulties in completing the tasks. However, as the digital educational platform designed was developed within the scope of HCI with the expectations of the learners, it could be stated that the relevant menus were actively used throughout the academic term and that the learners gained a habit of use.

Another result of the study was that the usability scores of the participants did not show any significant difference with respect to ability to use the distance education system, ability to use computer/Internet, the device used most to access the distance education system, access to the Internet, access to the tools to access the Internet, and finding distance education useful. Based on this result, it could be stated that the users had already acquired some skills during the pandemic period and that they might

have prepared themselves for the distance education process. In addition, it could be thought that the learners' level of finding the digital educational platform usable depended on the design and development of the platform within the scope of HCI rather than on external factors.

It is obvious that those who request education are more selective and that the increasing number of distance education users will prefer more usable and problem-free education environments (Turan & Canal, 2011). Today, educational institutions allocate certain budgets to digital educational platforms. It is important whether these platforms achieve their purpose and to what extent users find it usable. Availability of systems is indispensable both for the image of institutions or individuals and for the quality of use (Baimurzayev & Tekedere, 2019). Therefore, when the effort and costs are considered, it is expected that digital educational platforms will be able to respond to HCI expectations and to meet the usability criteria. It is not possible to explain HCI with just a few design rules. HCI is an interdisciplinary approach which includes the user in the system from the very beginning of the process and which seeks answers to their wishes and expectations. HCI aims at adapting the technology to the user rather than adapting the user to the technology (Çağıltay, 2018). In this respect, the following suggestions can be made for educational institutions, researchers and software developers;

For educational institutions,

- While supplying digital educational platforms, real users of the system must be included in the process.
- • Usability tests of the digital educational platform, which is provided by spending serious budgets, should be done. This can lead to savings in terms of labor and cost.

For researchers and software developers,

- Usability tests within the scope of HCI can also be conducted for mobile applications of digital educational platforms.
- Real users of the system should be included in the process in order to eliminate usability problems that may occur later while the software is being developed.
- Fewer mistakes occur when the systems are evaluated with different usability tests.
- Studies could be conducted on what educational institutions pay attention to when choosing the digital educational platforms they use and on the extent to which they consider usability.
- HCI studies could be replicated with more participants and with such other users of digital educational platforms as lecturers, student affairs and similar groups.

Research and Publication Ethics Statement

This study has not been presented in any congress or symposium. In addition, it has not been sent to any other journal for publication.

Contribution Rates of Authors to the Article

The authors contributed equally to the study.

Statement of Interest

There is no conflict of interest between the authors.

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