(Araştırma)

ADAPTATION OF THE E-LEARNING SERVICE QUALITY SCALE TO TURKISH: VALIDITY AND RELIABILITY STUDY

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ABSTRACT

The spread of higher education institutions, the differentiation of students' demands and expectations, the increasing importance of education on the internet, and the increasingly diversified education and training techniques grew the integration of technology with teaching and have led to the creation of various innovative education methods. E-learning, which has become a necessity, has become a part of today's academic world, especially in the face of current conditions. It has a critical role in issues such as measuring the service quality of educational institutions, regarding competition and determining the evaluations of the individuals using the service about the system, gaining competitive advantage, and creating satisfaction. This study aims to demonstrate the validity and reliability of the "E-Learning Service Quality Scale" developed by Pham et al. (2019a) by adapting it to Turkish. It is expected that the findings of this study will contribute to the literature regarding providing an up-to-date scale to measure the e-learning service quality of higher education institutions.

Keywords: E-learning, e-learning service quality, scale adaptation

E-ÖĞRENME HİZMET KALİTESİ ÖLÇEĞİNİN TÜRKÇEYE UYARLANMASI: GEÇERLİK VE GÜVENİRLİK ÇALIŞMASI

ÖZ

Yükseköğretim kurumlarının yaygınlaşması, öğrencilerin istek ve beklentilerinin farklılaşması, internet ortamında eğitimin öneminin artması, eğitim ve öğretim tekniklerinin giderek çeşitlenmesi teknolojinin öğretimle bütünleşmesini artırmış ve çeşitli yenilikçi eğitim yöntemlerinin ortaya çıkmasına neden olmuştur. Bir zorunluluk haline gelen e-öğrenme, özellikle bugünün koşullarında akademik dünyanın ayrılmaz bir parçası haline gelmiştir. Eğitim kurumlarının hizmet kalitesinin rekabet açısından ölçülmesi ve hizmeti kullanan bireylerin sistemle ilgili değerlendirmelerinin belirlenmesi, rekabet avantajı elde edilmesi ve memnuniyet yaratılması gibi konularda kritik bir role sahiptir. Bu çalışma, Pham ve arkadaşları (2019a) tarafından geliştirilen "E-Öğrenme Hizmet Kalitesi" ölçeğinin Türkçeye uyarlanarak geçerlik ve güvenirliğini ortaya koymayı amaçlamaktadır. Bu çalışmadan elde edilecek bulguların, yükseköğretim kurumlarının e-öğrenme hizmet kalitesini ölçmek için güncel bir ölçme aracı sağlaması açısından literatüre katkı sağlaması beklenmektedir.

Anahtar Kelimeler: e-öğrenme, e-öğrenme hizmet kalitesi, ölçek uyarlama

1. Introduction

It is undeniable that internet technology has been developing for two decades, and individuals need the internet more and more in their daily lives. In particular, e-learning systems have become both a competitive tool and a necessity with people's practical use in educational institutions; measuring the service quality perceived by the students using the system has become more critical today, where education is conducted more online than offline in the past. The modernization that emerged by the rapid development in information technologies started to be seen in educational technologies over time. E-learning technology, which has become an alternative education channel in universities, has become one of the requirements (Tsai et al., 2013). E-learning, which is an interactive learning method that crosses out the difference in space and distance between the educator and the student (Li & Masters, 2009), has become a tool that is used more often, especially in the last twenty years, as an internet-based modern education technology (Shahzad et al. 2021). From this point of view, the integration of the e-learning system has provided some benefits to both service providers and service buyers (Kartha, 2006; Bhuasiri et al., 2012; Pham et al., 2018; Pham et al., 2019b). Some of these benefits are that e-learning systems create time and cost advantages in service provider universities (Arbaugh, 2005), provide instant notification of academic studies carried out in different parts of the world on certain academic subjects (Taylor, 2007), and enable them to run programs jointly with various education programs around the world (Lee, 2010). Furthermore, the benefits of e-learning for university students are undeniable regarding allowing education to be carried out from anywhere at any time by exceeding the concept of time and space (Bhuasiri et al., 2012), enabling them to access the information they need at any time (Wisloski, 2011), and participating in training in different parts of the world, both academically equipped and contributing to their personal development (Wagner et al., 2008; Pham et al., 2019a).

In addition to the benefits of e-learning systems for students who are users of the system, although it is considered both to increase the quality of education and as a competitive element for universities (Stodnick & Rogers, 2008), limited studies have been conducted on the importance of the effectiveness of the system and the necessity of measuring its quality (Peltier et al., 2007; Wang et al., 2007; Özkan & Köseler, 2009; Lee, 2010; Amer et al., 2022; Hajpoor et al., 2022; Purwati et al., 2022). In studies conducted from the past to the present, aiming to measure education systems by individuals using the system, researchers have used the SERVQUAL scale developed by Parasuraman, Zeithaml, and Berry (1988) and adapted it to different fields based on service quality measurement in general, or different measurement methods based on this measurement tool (Cuthbert et al., 1996; Hughey et al., 2003).

Researchers have no consensus about which dimensions should be considered to measure e-learning service quality. Despite this, researchers have considered some factors such as responsiveness (Yılmaz, 2017), system quality (Wolfinbarger &

Gilly, 2002), reliability (Wolfinbarger & Gilly, 2002; Yang et al., 2004), accessibility (Yang et al., 2004), effectiveness (Parasuraman et al. 2005), system suitability (Parasuraman et al., 2005). The researchers agree that there is a need for an up-to-date measurement tool suitable for the requirements of the age, easily adaptable to different cultures, and expressed by the different lifestyles of the respondents for future studies on e-learning service quality measurement. From this point of view, it has been determined that there is a gap in the Turkish literature to measure the service quality perceived by the students using the online education system.

On the other hand, the COVID-19 epidemic, which has been observed worldwide, primarily since the early months of 2020, has raised the demand for distance education in addition to the contributions provided by the growth of internet technology. As of the current research date, a hybrid education model is being implemented in Turkey, in which online and face-to-face education is carried out together. According to the official figures of the Higher Education Institution (2020), 90 percent of the courses in the spring semester of the 2019-2020 academic year were delivered online, and 98.9 percent of Turkish universities made a move to online education between 23 March and 6 April 2020. On the other hand, according to the same data, while 99.2% of the universities held their theoretical courses online, 89% of them taught the theoretical parts of the applied courses online, and in 22% of the online courses opened, the lessons were held with the live class application. For this reason, the current research will likely be an essential tool for measuring the service quality perceived by users of the online education system, which is being implemented in higher education institutions in Turkey.

This research aims to implement the Turkish adaptation of the "E-Learning Service Quality Scale" developed by Pham, Kim, Walker, DeNardin, and Le (2019a). In the literature review carried out within the scope of this research, it has been determined that there are no original studies on the existence of a measurement tool in which university students in Turkey can evaluate the service quality of the e-learning system objectively, with current variables and in particular the quality of the e-learning system. Thus, a research gap has been identified in this area. From this point of view, three unique aspects of the study were determined: 1) The measurement tool in this research can evaluate the quality of the system from which the students who are the users of the system are educated in the e-learning process from different perspectives 2), Unlike other scales, developed to measure the e-learning service quality, this scale is focused only on the e-learning service quality, and It is a unique measurement tool 3) With the adaptation of this scale, which is claimed to be valid and reliable in different cultures, into Turkish, a unique measurement tool that can measure e-learning service quality has been brought to the Turkish literature.

The methodological stages related to scale adaptation were followed sequentially for the research. In the study, the findings related to the validity and reliability of the measurement tool adapted for measuring e-learning service quality in universities

in Turkey were examined. It is expected that this research will contribute to the literature with the idea that it can be used as a reliable measurement tool in studies to be carried out in Turkey for the quality of e-learning system services.

2. Conceptual Framework

2.1. Service Quality and E-Service Quality Measurement

Service is a marketing concept that cannot be seen with the naked eye, whose existence can only be noticed based on experience, and therefore, consumed as soon as they are produced, has no durability and cannot be standardized regarding quality and satisfaction, although it is supplied from the same service provider (Kotler & Armstrong, 2016). The service concept is the various benefits or activities the supplier offers to the appealing party, which are not based on a tangible and physical product, and whose ownership does not pass to the asking party (Blythe, 2005). Although these features of the service have made it difficult to measure both competition and in terms of evaluating the service's success in the market, the measurement of the service quality perceived by the consumers is also one of the essential market researches for the measurement of marketing success.

According to modern marketing approaches, different researchers have defined quality closely. For example, it is possible to define quality from various perspectives, such as the ability of a product or service to meet consumer requests or needs (Crosby et al., 1990; Perreault et al., 2015); its suitability for use (Juran, 1992), and the benefit that satisfies the consumer (Kotler et al., 2013). On the other hand, service quality is defined as the degree of overlap between the expectation created by the service to meet consumer demand or need and the actual situation (Kotler & Armstrong, 2016). Services that exceed expectations are called "high quality", whereas those that fall short of expectations and do not prompt a client to make a repeat purchase are "bad quality". Services that satisfy the demands and expectations of the customer can be described as high quality. (Parasuraman et al., 1988).

Using the internet, which has become widespread with the millennium age, has led to new concepts for service providers and individuals consuming the service. One of them is service-based activities offered in the electronic environment. E-services are internet-based (Zeithaml et al., 2002), interactive (Fassnacht & Koese, 2006), and consumer-managed services (De Ruyter et al., 2001) between the service provider and the service recipient. While in the past, the existence of simple internet service with a low price was emphasized as a success indicator of e-service quality, today, consumers perceived quality of the system is considered an indicator of success (Al-dweeri et al., 2017). According to the modern approach, which deals with the perceived e-service quality in a consumer-oriented way, the indicator of quality; it is possible to indicate the degree of satisfaction of consumer demands and expectations by the realized e-service (Bauer et al., 2006).

Measuring online service quality in line with internet services that have become more popular worldwide since the early 2000s, WEBQUAL (Loiacono et al., 2002) scale, which is based on the SERVQUAL scale developed by Parasuraman et al. (1985) and later revised by Parasuraman et al. (1988) SITEQUAL (Yoo & Donthu, 2001) scale and E-SERVQUAL (Parasuraman et al., 2005) scale were developed and used for quality measurement in different service sectors. Although researchers have developed various scales for measuring service quality, they could not agree on which dimensions should be considered.

Various studies have been carried out on e-service quality measurement in different fields from the past to the present. Studies on the measurement of e-service have been carried out in many different fields, such as libraries (O'neill et al., 2001), the tourism industry (Li et al., 2009), banking (Ibrahim et al., 2006), retailing (Yoo & Donthu, 2001; Wolfinbarger & Gilly, 2002; Collier & Beinstock, 2006), websites and portal quality (Yang et al., 2005; Bauer et al., 2006; Swaid & Wigand, 2009). Researchers have diversified the measurement dimensions they usually base on the SERVQUAL scale in almost every study. Jayawardhena (2004) has enriched the literature by examining the credibility, efficiency, problem handling, and security dimensions, while Finn (2011) studied functionality, compliance, professionalism, and speed. Cristobal et al. (2007) studied website design, customer service, assurance, and order management. Parasuraman et al. (2005) studied efficiency, availability, fulfillment, privacy, responsiveness, compensation, and contact. Fassnacht and Koese (2006) studied its dimensions of graphic quality, layout, attractiveness of selection, information, ease of use, technical quality, reliability, functional benefit, and emotional benefit.

2.2. Service Quality and Measurement in Education

Approaches to the importance and measurement of service quality in education have emerged since the mid-90s. The services provided in education also have some features that are similar to other services and differ from them (Gupta & Kaushik, 2018). The features such as the fact that the education service is intangible (Khodayari & Khodayari, 2011), varies according to different education levels, course content, evaluation criteria, and purpose, and that the service provider and the service recipient are an inseparable whole (Çerri, 2012), show the similarity of the education service with other service types. On the other hand, educational services are often seen as non-profit services; their features, such as being seen as a tool to attract more students and providing a competitive advantage (Gupta & Kaushik, 2018), are unique (Ibrahim et al., 2012), and having more than one stakeholder (Mahapatra & Khan, 2007) distinguish educational services from other services.

Oliver and Herrington (2001) emphasized that internet-based education will be preferred more in the future due to the reasons such as flexibility, sophistication, interactive learning opportunities, time and cost advantages it offers depending on its technological infrastructure. Because of this, e-learning emerged as a result of conducting education in an online environment, just as other services are now transferred

to online environments in parallel with the widespread use of internet technology, and has become more and more common in the past 20 years. An e-learning service is an innovative type of learning offered to contribute to students' knowledge with some electronic information and help them develop their various abilities (Fazlollahtabar & Muhammadzadeh, 2012). The quality of the e-learning service is evaluating the power and effectiveness of the e-learning system (Satuti et al., 2020).

Since education services differ from other services, measurement is also tricky compared to other services (Lagrosen et al., 2004:63). The measurement of service quality in education is essential for all stakeholders in education. Srikanthan and Dalrymple (2003) categorized the stakeholders in education as funders, students, employers in the education system, and education sector employees, namely academics. After the first studies (Joseph & Joseph, 1997; Li & Kaye, 1998; Abdullah, 2005) that initially focused on some differences in the measurement and evaluation of service quality in education based on countries, cultures, and institutions, researchers focused on identifying the antecedents of perceived service quality in the field of education (Sultan & Wong, 2010). The first studies determined that knowledge and experiences (Sultan & Wong, 2011) affect perceived service in education. Frazer (1994) revealed that the first and most important evaluation criteria for the perceived quality of the services provided in education were the level of education, standard, effectiveness, and efficiency.

Many researchers have developed the measurement of service quality in education in the last twenty years, based on different dimensions of the SERVQUAL scale. For example, while Kara and DeShields (2004) studied faculty, advising staff, and classes; Tan and Kek (2004) studied the course, assessment, workload, learning, teaching, and advising, communicating with the University's management, university facilities, social activities, university facilities. Unlike other researchers, Telford and Masson (2005) studied course design, course marketing, student recruitment, induction, course delivery, course content, assessment monitoring, miscellaneous, and tangibles. Abdullah (2006) took into account the dimensions such as non-academic aspects, reputation, access, program issues, and understanding to measure online education service quality. Mahapatra and Khan (2007) also studied learning outcomes, responsiveness, physical facilities, personality development, and academics, while Butt and Rehman (2010) examined dimensions such as teachers' expertise, courses offered, learning environment, and classroom facilities.

For the measurement of e-learning services, researchers have focused on many dimensions in the past. For example, Haryaka, Agus, and Kridalaksana (2017) examined the dimensions such as service quality and information quality, while Nikolic (2018) studied social support and influence. While Lee et al. (2005) took into account the dimensions of perceived ease of use; Uppal et al. (2018) studied reliability, assurance, empathy, responsiveness, learning content, and course website; Naveed et al. (2021) also discussed the dimensions of reliability, information quality, social influence, perceived ease of use, and actual system usage.

In the current study, the Turkish adaptation of the e-learning service quality scale developed by Pham, Kim, Walker, DeNardin, and Le (2019a), which is based on the SERVQUAL scale and consists of the dimensions of e-learning system quality, e-learning instructor and course materials quality and e-learning administrative and support service quality. The reasons for selecting this scale and its detailed Turkish adaptation process are discussed in detail in the research method section.

3. Research Methodology

Research Ethics

Since this study was conducted with qualitative and quantitative approaches, which requires data collection from the participants using a questionnaire and experts' opinions, it is among the studies requiring ethics committee approval. In this direction, at the beginning of the research, Ethical approval dated 07.05.2021 and numbered E-61923333-050.99-29137 was obtained from Sakarya University Rectorate Ethics Committee.

3.1. Study: 1

3.1.1 Method

When the literature on the adaptation of measurement tools is examined, it has been determined that three different ways have been followed regarding the measurement tools and their use in different countries or cultures (Huseynli, Engizek & Kurtuluş, 2018):

- An improved measurement tool is used in all countries or cultures without being modified or adapted to the local situation.

- Improved measurement tools are reconstructed and adapted to the local sample for use in different countries or cultures.

- Instead of using the developed measurement tools in different countries or cultures, a new tool is being developed for the relevant country or culture.

This study followed the second method since it is related to adapting a scale developed in a different culture into Turkish. The Turkish adaptation of the scale developed by Pham et al. (2019a) on e-learning service quality was carried out by the scale adaptation process (Hambleton & Patsula, 1999; Beaton et al., 2000; Sousa & Rojjanasrirat, 2011; Borsa et al., 2012). At the beginning of the study, permission was obtained from the authors, including the original scale, via e-mail. In the second stage, the scale items were translated into Turkish. In the next step, expert opinions about the translated items were consulted, and necessary corrections were made. Afterward, final corrections were made on the pretested scale. In the last stage, the scale was tested on a determined sample, validity and reliability analyzes were made, and the final version adapted to Turkish was obtained.

3.1.2. Aim of The Research

Measuring e-learning service quality has become one of the most critical issues with changing consumer behaviors. The starting point of this study is to present a valid and reliable measurement tool for measuring e-learning service quality that can be used in higher education institutions in Turkey. Various measurement tools have been developed in the literature to measure e-learning service quality. It was concluded that the e-learning service quality scale developed by Pham et al. (2019a) is an up-to-date and innovative measurement tool regarding the scale development process, the scale being developed directly for university students, and the originality of the scale's dimensions. Pham et al. (2019a) consider the increasing number of information technology applications in universities, the creation of student-oriented development strategies for the future, user satisfaction with the effective and efficient use of information technology systems, and online customer service, the perceptions of university students in Vietnam in the e-learning environment. This study aimed to adapt the E-learning Service Quality Scale developed by Pham et al. (2019a) into Turkish.

3.1.2. Original E-Learning Service Quality Scale

Pham et al. (2019a) argue that different stakeholders create the e-learning environment in universities and that the e-learning service quality scales previously developed in the literature are limited and inconsistent. Moving in this direction, Pham et al. (2019a) developed the E-learning Service Quality Scale based on the data they obtained from a detailed literature review. The items related to factual information, reliability, sensitivity, and empathy are from Han and Baek's (2004) studies; items on ease of use, accuracy, and security/privacy from the work of Jun and Cai (2001) and Yang et al. (2004); content and topicality were adapted from the studies of DeLone and McLean (2003), Jun and Cai (2001) and Parasuraman et al. (2005).

In the initial phase, the scale consisting of 60 items in total; was evaluated for content validity by two independent groups in the first consisting of six instructors with experience teaching online courses such as management information systems, e-commerce, and service quality management, and in the second, six students who had completed at least one online course. In line with suggestions from the members of these two groups, 12 items that contain meaning shifts or are unsuitable for the e-learning environment were removed from the scale. The revised questionnaire was sent back to the members of the two groups to ensure that the e-learning service quality scale had content validity.

In the next stage, the scale consisted of 48 items measuring the e-learning service quality perceived by students according to their latest e-learning experience; 17 items were removed after the pilot study, and a measurement tool consisting of 31 items was finally obtained. As a result of the exploratory factor analysis applied to the scale, the items were collected in three dimensions: 1) E-learning system quality; 2) E-learning trainer and course materials quality; and 3) E-learning management and support service quality. Among these three dimensions, the quality of the e-learning system explains 29.91% of the total variance; the quality of the e-learning trainer

and learning/training materials explains 25.763%; the e-learning management and support service quality explains 16.304% of the total variance. In the next step, the factor structure of the measurement tool was examined with the help of confirmatory factor analysis. As a result of the analysis, the scale's factor structure was confirmed, and it was determined that the standardized factor loads were more outstanding than .7, and the average explained variance values were more significant than .5.

The internal consistency value of the scale was interpreted by considering the composite reliability value. Accordingly, the composite reliability for e-learning system quality was .965, .959 for e-learning instructor and course materials, and .944 for e-learning administrative and support service quality. As a result of these results, it was determined that the scale is a valid and reliable measurement tool to measure e-learning service quality.

3.1.4. Translation Study

The scale items were translated into Turkish by two lecturers, one of whom has a Ph.D. in marketing and the other with a doctorate in educational sciences, who can speak both English and Turkish and have teaching experience. The main reason for benefiting from the translations of these two lecturers was to avoid possible inconsistencies and provide an understandable and accurate translation by taking opinions from two different disciplines. After both lecturers agreed on the translation results, the next step was taken, and expert opinion was sought to check the accuracy and consistency of the translations. At this stage, the Turkish version of the scale and the English version were sent to two academics working as faculty members at two different universities in the USA, who are fluent in English and Turkish, for review. One of the experts expressed his thoughts and suggestions to translate eight expressions more understandable. The other expert expressed his views and suggestions for translating 13 expressions to be more understandable. Both experts' thoughts and suggested words were evaluated, and necessary changes were made. After confirming that both versions of the English questionnaire were utterly understandable and consistent, the scale was pretested on students who were the target audience. To check whether the translated expressions were understandable, they were tested on a sample of 40 Turkish students, ten from each, from 1st to 4th grades studying at the undergraduate level. The feedback received from these students helped organize the Turkish version of the scale. To check whether the scale items adapted into Turkish were understandable, they were sent to a translator with Turkish-English expertise, and feedback was received. Some of the translator's suggestions for changes were accepted, and necessary corrections were made to some items in the scale. In the next stage, the views of faculty members who have academic publications in Turkish and English in marketing and education science were used to provide the face validity of the scale.

3.1.5. Content Validity of the Adapted Scale

In the behavioral sciences, the measurement process required for quantitative research models generally tends to measure a psychological structure and is carried out with scales developed by field experts (Yurdugül, 2005). Studies

on expert opinions are essentially qualitative studies. Content Validity Ratios (CVR) and Content Validity Indexes (CVI) are calculation methods used to transform qualitative studies based on expert opinions into quantitative statistical studies (Lawshe, 1975; Yurdugül, 2005). The correlation between the feature to be measured and the scale items are related to the validity of the measurement tool. Pretests are needed to determine the scope of the scale item to measure, the measurement (content validity), or the power of the statement in the scale to define the relevant construct (construct validity) (Rubio et al., 2003).

Since the aim of this study was to adapt the scale developed by Pham et al. (2019a) for the measurement of e-learning service quality in Turkish, the CVR method was used to test the scale's content validity after the expressions in the original scale were translated into Turkish. While calculating the content validity ratios developed by Lawshe (1975), experts are asked to state their opinions for each statement on the scale as "the statement can measure the targeted", "the statement can measure the targeted but insufficient", or "the statement cannot measure the targeted". The content validity rate is obtained by dividing the number of participants stating the opinion that "the statement can measure what is aimed" for each statement by half of the total number of participants expressing an opinion on the item, minus 1 (Yurdugül, 2005). The minimum content validity values for the items that can be included in the scale according to the number of experts (Lawshe, 1975: 568) are given in Table 1.

Table 1. Minimum CVR Values for the Items to be taken into the Scale Based on the Number of Experts

Number of Experts	Minimum	Number of Experts	Minimum
5	.99	13	.54
6	.99	14	.51
7	.99	15	.49
8	.78	20	.42
9	.75	25	.37
10	.62	30	.33
11	.59	35	.31
12	.56	40+	.29

For the content validity rate, NG - the number of experts who answered "the statement can measure what was targeted", N - to show the total number of participants who gave their opinion on the item; the result obtained from the formula CVR= [(NG) / (N/2)] is interpreted. According to Lawshe (1975), in cases where the number of experts is ten or more, the minimum value for CVR is .62. In this context, as indicated in Table 2, the CVR values for 31 items within the scope of the current study are consistent with the values specified in the literature.

Table 2. CVR Values of Scale Expressions

Items	No	Rate	CVR
SQ1	12	100%	1.00
SQ2	9	75%	.5
SQ3	12	100%	1.00
SQ4	12	100%	1.00
SQ5	11	92%	.83
SQ6	12	100%	1.00
SQ7	11	92%	.83
SQ8	11	92%	.83
SQ9	11	92%	.83
SQ10	11	92%	.83
SQ11	12	100%	1.00
SQ12	12	100%	1.00
ICMQ1	10	83%	.67
ICMQ2	12	100%	1.00
ICMQ3	12	100%	1.00
ICMQ4	12	100%	1.00
ICMQ5	12	100%	1.00
ICMQ6	10	83%	.67
ICMQ7	11	92%	.83
ICMQ8	11	92%	.83
ICMQ9	10	83%	.67
ICMQ10	12	100%	1.00
ICMQ11	12	100%	1.00
ICMQ12	11	92%	.83
ASSQ1	10	83%	.67
ASSQ2	11	92%	.83
ASSQ3	12	100%	1.00
ASSQ4	10	83%	.67
ASSQ5	9	75%	.50
ASSQ6	10	83%	.67
ASSQ7	11	92%	.83

SQ: E-Learning Service Quality; ICMQ; E-Learning Instructor and Course Material Quality; AASQ: E-Learning Administrative and Support Service Quality; No: Number of experts who answered "measurable"; Rate: Proportion of experts who answered "measurable"; CVR: Coverage Validity Rate

The CVI for the scale, adapted into Turkish, was .85, which is acceptable considering that the minimum value is .62 in cases where the number of experts is ten or more (Yurdugül, 2005; Geçkil & Tikici, 2015). After this stage, it was decided that 31 items in the measurement tool were finally reliable. For this reason, a scale was performed on a specific sample.

3.2. Study:2

3.2.1. Pilot Study

Although it is known that a pilot study is one of the essential methodological steps that researchers in social sciences should implement, especially in scale adaptation studies, it is one of the often-neglected steps. However, pilot studies can be seen as a guide to increase the quality of the research and guide the researcher in applying the proper methodological method. In general, pilot studies can be carried out for feasibility and trial studies. In the feasibility study, the applicable version of the measurement tool used is tested before the main study regarding whether it is applicable or not (Polit et al., 2001:467). The results obtained in the trial phase provide predictions about possible problems encountered in primary research (Baker, 1994). Forecasts may allow giving an idea about which or which of the statements in the measurement tool may cause a problem in the main study, whether there is a problem in the research design or methodological steps, why the problem may have arisen, and how a possible problem can be resolved, and even whether the primary research is worth completing. (Teijlingen & Hundley, 2001).

The pilot study phase was started after the measurement tool was translated from its original language into Turkish and determined that each item provided content validity. In the pilot study, along with 31 items determined previously, some questions that determine the participants' demographic profiles, such as age, gender, and educational status, were also included. The survey form also included basic, decisive questions about the participants' university education and e-learning experiences. While determining the sample size in the pilot study, at least 155 participants were targeted for a total of 31 items, with at least five samples for each item to be able to analyze the main components and calculate the item reliability and the general reliability coefficient of the scale. The survey form was transferred to the online survey provider environment, which provides service free of charge, and it was delivered to 160 participants who were located around the researchers, with the convenience sampling method for the participants to access the survey link. Several measures have been taken to prevent potential problems that may arise in conducting the survey online, which may harm the validity and reliability of the study. Accordingly, access to the questionnaire was limited to one IP address, and as a threshold question, the participants were asked to confirm that they were university students and had taken courses through the e-learning system. Additionally, while participants were allowed to follow the process with the progress bar as long as they answered the questionnaire, other participants were not allowed to view their answers or save the questionnaire for later completion.

As a result of the pilot study, data were obtained from 160 participants. According to this, 54.4% of the individuals participating in the research were women; 95.6% were single, with an average age of 21.72 and an individual monthly income of 692.07 Turkish Liras. While 81.3% of the participants are studying at a university in Turkey at the undergraduate level, 18.1% are studying in an associate degree program, and 36.9% are in postgraduate education. While 70.6% of the participants preferred laptop or desktop computers while connecting to the e-learning system in their university, 25% preferred mobile phones, and 4.4% preferred tablets.

In the findings related to the measurement tool, the reliability value of the scale was examined first, and the Cronbach's Alpha coefficient was calculated as .967 for all 31 items. Other values related to the items in the scale are summarized in Table 3.

Table 3. Item Reliability Values Obtained as a Result of the Pilot Study

Items	Mean	Standard Deviation	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
SQ1	4.90	.42	.645	.967
SQ2	4.61	.87	.537	.968
SQ3	4.74	.67	.702	.966
SQ4	4.89	.41	.803	.966
SQ5	4.85	.47	.760	.966
SQ6	4.88	.56	.741	.966
SQ7	4.66	.74	.640	.967
SQ8	4.79	.59	.805	.966
SQ9	4.87	.55	.682	.966
SQ10	4.77	.62	.810	.966
SQ11	4.91	.32	.422	.966
SQ12	4.73	.61	.777	.966
ICMQ1	4.78	.58	.641	.967
ICMQ2	4.80	.53	.710	.966
ICMQ3	4.78	.55	.848	.966
ICMQ4	4.60	.77	.640	.967
ICMQ5	4.79	.53	.718	.966
ICMQ6	4.72	.56	.745	.966
ICMQ7	4.78	.56	.770	.966
ICMQ8	4.75	.67	.711	.966
ICMQ9	4.79	.54	.759	.966
ICMQ10	4.83	.50	.687	.966
ICMQ11	4.84	.50	.589	.967
ICMQ12	4.71	.67	.563	.967

ASSQ1	4.73	.59	.671	.966
ASSQ2	4.74	.64	.762	.966
ASSQ3	4.71	.69	.818	.966
ASSQ4	4.62	.75	.755	.966
ASSQ5	4.61	.82	.686	.967
ASSQ6	4.57	.87	.733	.966
ASSQ7	4.77	.65	.663	.967

After it was understood that the scale has a very high overall reliability value, the corrected correlation coefficient for each item is more significant than .3, and even if one item is removed from the scale, it will not cause a significant increase in the overall reliability (George & Mallery, 2018), the descriptive data set factor analysis was applied. At the beginning of the exploratory factor analysis, the interpretation was made step by step, considering the prerequisites for applying the analysis. In this direction, firstly, the anti-image correlations table between variables was interpreted, and it was determined that the values ranged between .751 and .965. In the next step, the commonalities table was examined, and it was seen that only the "service quality-2" item had a value of .358, while the other items took values between .532 and .835. In the following stage, the factor loading value of each item was examined, and it was determined that the lowest factor loading value (.442) was in the "service quality-2" item. According to the results of the pilot study, it was determined that the "service quality-2" item had an acceptable reliability value. Although factor loading was acceptable, its covariance remained below .5, and it was predicted that it could be removed from the study if it presented a similar problem in the final study. At this stage, it has been seen that the e-learning service quality scale is reliable for measuring e-learning service quality perceived by students in Turkey and can be used for measurement and evaluation, and the sample application phase of the scale has been started.

3.2.2. Performing the Turkish Form of the E-learning Service Quality Scale

A field study was conducted to test whether there would be a valid and reliable scale that could measure the quality perceptions of university students in Turkey towards e-learning services. The factor structure of the e-learning service quality scale, adapted into Turkish by successfully passing the remaining methodological stages, is to determine the factor structure, verify the resulting structure, and verify the scale. In addition to the questions in the pilot study, descriptive questions about the university where the participants were currently studying were also included.

The study's basic assumption is that the e-learning service quality scale consists of 31 items and three dimensions and is a scale suitable for Turkish culture. The universe of the research is university students in Turkey. However, since it was impossible to reach the entire population, the scale was tested on a specific sample as in the pilot study. While determining sample size, it is impossible to reach the whole population, but considering the total population size, it targeted at least 384 people, as suggested by Hair et al. (2019). The prerequisite for participating in the survey is to be a university

student in Turkey, to be 18 years of age or older, and to have received education using the e-learning system of universities. In this study, the convenience sampling method was preferred; the data were collected between 14.11.2021 – 10.12.2021; as in the pilot study, the online survey method was preferred, and the same safety and application procedures were fully used for this study.

The questionnaire for the final study reached 663 participants. It was seen that 51.9% of the participants were women; 94.9% were single; the age range was between 18-60, the average age was 22.20, and the individual monthly income was 1004.5 Turkish Liras. 17.8% of the participants refused to participate in the survey without giving a specific reason, and 545 participants answered all the questions in the survey voluntarily. The return rate of the questionnaire is 82.2%, which is an acceptable level to make healthy comments about the data (Büyüköztürk, 2005).

Students from 125 universities, including 19 foundation and 106 state universities, have participated in this research. 68% of the students were in the undergraduate program, 24.8% in the associate degree program, and 7.2% in the graduate programs. While 67.2% of the participants preferred laptop or desktop computers, 29.9% preferred mobile phones, and 2.9% preferred tablets to connect to the e-learning system in their universities.

The Cronbach's alpha coefficient of the 31-item scale was .984. Each item's mean, standard deviation, and reliability details are summarized in Table 4.

Table 4. E-learning Service Quality Scale Item Reliability Values

Items	Mean	Standard Deviation	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
SQ1	4.45	.97	.750	.983
SQ2	4.16	1.15	.646	.984
SQ3	4.33	1.09	.716	.983
SQ4	4.56	.86	.750	.983
SQ5	4.36	1.04	.842	.983
SQ6	4.41	1.02	.835	.983
SQ7	4.03	1.25	.764	.983
SQ8	4.29	1.06	.811	.983
SQ9	4.38	1.01	.821	.983
SQ10	4.23	1.12	.810	.983
SQ11	4.61	.76	.678	.983
SQ12	4.21	1.12	.848	.983
ICMQ1	4.50	.92	.725	.983
ICMQ2	4.39	1.03	.820	.983
ICMQ3	4.22	1.14	.876	.983

ICMQ4	4.11	1.20	.737	.983
ICMQ5	4.30	1.08	.864	.983
ICMQ6	4.26	1.11	.866	.983
ICMQ7	4.33	1.05	.884	.983
ICMQ8	4.23	1.14	.855	.983
ICMQ9	4.28	1.10	.857	.983
ICMQ10	4.36	1.05	.848	.983
ICMQ11	4.40	1.00	.843	.983
ICMQ12	4.24	1.14	.793	.983
ASSQ1	4.22	1.08	.874	.983
ASSQ2	4.27	1.09	.836	.983
ASSQ3	4.16	1.18	.840	.983
ASSQ4	4.12	1.18	.838	.983
ASSQ5	4.05	1.28	.788	.983
ASSQ6	4.02	1.31	.797	.983
ASSQ7	4.23	1.16	.828	.983

According to Table 4, each of the items in the scale has a high level of reliability, and even if any item is removed from the scale, it has been observed that there will not be an increase in the overall reliability, and it has been observed that the scale provides internal consistency.

Exploratory factor analysis was applied to the data obtained from 545 people participating in the study; the item "service quality-2", which is one of the two expressions with the lowest content validity rate and whose common variance was below .5 both in the pilot study and in the application, was not excluded from the study as suggested by Fabrigar and Wegener (2012). The results obtained from the exploratory factor analysis are summarized in Table 5.

Table 5. Findings Related to the Validity and Reliability Values of the E-learning Service Quality Scale

Exploratory Factor Analysis (Rotation: Varimax. Kaiser-Meyer-Olkin Measure of Sampling Adequacy: .982; Bartlett's Test of Sphericity: Approx. Chi-Square=19333.950; df=465; It was calculated as sig.=.000)						Confirmatory Factor Analysis		
Items	Commu-nalities	Ei-gen-value	Factor Loadings	% of Variance	Alpha	St. Factor Load-ings	AVE	CR
Factor-1		2.996		36.442	.975		.74	.97
ASSQ5	.813		.863			.800		
ASSQ6	.811		.856			.803		
ASSQ4	.818		.827			.850		
ASSQ3	.783		.780			.851		
ASSQ2	.777		.777			.848		
ICMQ9	.775		.720			.884		
ASSQ7	.727		.706			.833		
ICMQ6	.778		.690			.888		
ICMQ8	.759		.678			.882		
ICMQ5	.770		.675			.883		
ASSQ1	.784		.669			.883		
ICMQ7	.800		.663			.898		
ICMQ3	.786		.654			.882		
ICMQ12	.655		.623			.805		
ICMQ4	.578		.613			.749		
SQ7	.606		.583			.754		
Factor-2		1.309		35.509	.965		.67	.96
SQ1	.714		.789			.792		
SQ11	.639		.766			.718		
SQ4	.687		.760			.780		
SQ6	.763		.744			.862		
SQ5	.769		.739			.866		
SQ9	.736		.726			.853		
SQ10	.715		.709			.834		
ICMQ2	.711		.669			.838		
SQ12	.748		.664			.862		
SQ3	.578		.658			.735		
SQ8	.689		.645			.856		
ICMQ10	.745		.640			.825		
SQ2	.493		.628			.667		
ICMQ11	.733		.611			.844		
ICMQ1	.564		.595			.738		
Total				71.951	.984			

AVE: Average Variance Explained; CR: Composite Reliability.

One of the most important points to consider when adapting measurement tools developed for a different language and culture to another culture or language is whether the theoretical structure of the measurement tool can be used by a sample group belonging to a different language and culture. Determining whether the scale can be used in the appropriate language or culture, confirmatory factor analysis should be applied, and the compatibility of the previously determined scale structure with the data obtained from the relevant sample should be examined (Şeker & Gençdoğan, 2014:35). To ensure the construct validity of the scale, a first-order multi-factor confirmatory factor analysis was performed. It was seen that the fit values were within acceptable limits. (CMIN/DF: 3.422; GFI: .852; IFI: .948; CFI: .947; NFI: .928; TLI: .942; RMR: .036; RMSEA: .067). The standardized factor loads obtained from the first order multi-factor confirmatory factor analysis applied to the measurement tool are summarized in Table 5. The mean explained variance (AVE) and composite reliability values, as the construct validity determinant of the measurement tool, were calculated over standardized factor loads, and the scale provided construct validity (Hair et al., 2019).

4. Conclusion and Discussion

In this research, the "E-learning Service Quality" scale developed by Pham et al. (2019a) was adapted into Turkish, and the adapted scale was examined regarding validity and reliability. In this context, the methodological steps related to scale adaptation were followed, and firstly, the Turkish form of the scale was obtained by performing a translation study, and expert opinions were sought. In line with expert opinions, it was seen that the statements in the scale provide an acceptable level of content validity with a very high rate. In this respect, the translations of the measurement tool contain reliable and valid expressions that can be used in future studies.

In the framework of the study, the measurement tool, whose Turkish adaptation process was completed successfully, was carried out. In this context, first, a pilot study was carried out to make correct predictions about the applicability of the scale. As a result of the pilot study, it was determined that all of the statements in the scale were reliable and that the overall reliability of the scale was relatively high. The measurement tool, which produced good results in the pilot study, was delivered to the people determined by the convenience sampling method from the population for the final application. The final data obtained from the questionnaires with a high response rate were tested with the help of various statistical analyzes regarding validity and reliability, similar to the application in the pilot study. As a result of the tests, it was determined that the measurement tool consisted of 2 dimensions, unlike the study of Pham et al. (2019a). When the expressions under each dimension were examined, it was decided to name the first dimension "E-learning Support Services and Instructor Quality" and the second dimension "E-learning System Quality".

This result, which is seen in the factorability of the scale, is a situation often encountered in studies where measurement tools are adapted to different languages

and cultures. For this reason, the main thing in such studies is that the methodological work is error-free and based on accurate data. In this respect, it was determined that the internal consistency coefficient Cronbach's alpha obtained from the current scale was highly reliable. On the other hand, in the final study, the table of correlation coefficients between the items was examined, and it was seen that the values ranged between .446 and .868; each coefficient was significant and predominantly above .5. After this stage was achieved, the anti-image correlations table between variables was examined, and it was determined that the values varied between .967 and .988. In the next step, the commonalities table was examined, and it was seen that only the "service quality-2" item had a value of .493, similar to the result in the pilot study, while the other items took values between .564 and .818. In the following stage, the factor load of each item was examined, and it was determined that the factor load of the "service quality-2" item was .628. As a result of the analysis, it was seen that the measurement tool was two-dimensional, and it was seen that 16 items with an eigenvalue of 20.996 belonging to the first dimension were placed under this dimension, and the first dimension explained 36.442% of the total variance. Under the second dimension, it was seen that there were 15 items. The eigenvalue was 1.309, which explained 35.509% of the total variance. According to exploratory factor analysis, the scale consists of two dimensions. The scale explains 71.951% variance in university students' e-learning service quality perceptions. The general reliability of the scale adapted according to the literature is relatively high.

The factor structure of the e-learning service quality scale, adapted into Turkish after the exploratory factor analysis, was examined regarding construct validity with the help of confirmatory factor analysis. According to the findings obtained from the analysis, the theoretical structure of the measurement tool and the data collected were verified. All these results reveal that the measurement tool is a valid and reliable measurement for e-learning service quality.

5. Implications for Future Research

This research is an exploratory study in nature. The study aims to introduce a scale developed to measure the online education service perceived by consumers, based on a specific theoretical basis, to the Turkish literature. Therefore, no causal inferences were made within the scope of the study. Future studies are expected to enrich the literature on service quality and measurement by determining the antecedent variables that affect service quality perceived by individuals regarding e-learning.

On the other hand, within the scope of the research, the difference between the various demographic characteristics of individuals and the averages of their perceived e-learning service quality has not been examined. Future studies should investigate how perceived service in e-learning differs according to various demographic characteristics of individuals.

Besides, university students were chosen as the sample population both in the original scale and in the scale adapted into Turkish within the scope of the current research. Future studies will contribute to the literature by conducting studies

on students from different levels and age groups and individuals who receive e-learning services from more local education institutions or course centers other than chain education institutions. Additionally, within the scope of the current study, it is not aimed at searching for differences by making a unique distinction based on the educational attainment of individuals. For this reason, it can be investigated what kind of differences are observed between the students in private-state institutions and the e-learning service quality based on the field of education in future studies.

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Appendix: E-Öğrenme Hizmet Kalitesi Ölçeği Türkçe Versiyonu

Faktör-1: E-öğrenme Destek Hizmetleri ve Eğitmen Kalitesi

1. Üniversitem, e-öğrenme destek hizmetini ilk denemede tam doğru olarak sağlamaktadır.
2. Üniversitemin personeli, e-öğrenimim hakkında bana tam olarak ihtiyacım olan hizmetin ne zaman gerçekleştirileceğini bildirir.
3. E-öğrenimim için üniversitemin personeli bana hızlı hizmet verir.
4. E-öğrenim için, üniversite personeli benim çıkarlarına yürekten sahip çıkar.
5. Üniversitemin personeli e-öğrenimim için özel ihtiyaçlarımı anlar.
6. Üniversitemin personeli bana e-öğrenimim için özel ilgi gösterir.
7. E-öğrenimim için üniversitemin destek biriminin uygun çalışma saatleri vardır.
8. Üniversitemin e-öğrenme ders materyalleri düşünme becerilerimi geliştirmemi teşvik eder.
9. Üniversitemin e-öğrenme derslerindeki sınavları süre ve zorluk açısından makuldür.
10. Üniversitemin e-öğrenme eğitmenleri öğrenci ihtiyaçlarına hızlı ve verimli bir şekilde yanıt verir.
11. Üniversitemin e-öğrenme eğitmenleri sürekli olarak kaliteli ders anlatır.
12. Üniversitemin e-öğrenme eğitmenleri iyi hazırlanmış ve organize olmuştur.
13. Üniversitemin e-öğrenme eğitmenleri etkileşimli katılımı teşvik eden bir ortam sağlar.
14. Üniversitemin e-öğrenme eğitmenleri, öğrencilerin çıkarlarına yönelik en uzun süreli hedeflerini göz önünde bulundurur.
15. Üniversitemin e-öğrenme dersindeki ödevler süre ve zorluk açısından makuldür.
16. Üniversitemin e-öğrenme web sitesi görsel olarak ilgi çekicidir.

Faktör-2: E-öğrenme Sistem Kalitesi

1. Üniversitemin e-öğrenme web sitesindeki bilgi akışını takip etmek kolaydır.
2. Üniversitemin e-öğrenme web sitesindeki e-işlemlere bağlı risklerin düşük olduğu kanısındayım.
3. Üniversitemin e-öğrenme sistemindeki e-işlemler için kişisel bilgilerimi verme konusunda kendimi güvende hissederim.
4. Üniversitemin e-öğrenme web sitesindeki bilgiler günceldir.
5. Üniversitemin e-öğrenim web sitesi bana değerli bilgiler sağlar.
6. Üniversitemin e-öğrenme web sitesi aradığım bilgileri bulmamda bana kolaylık sağlar.

7. Üniversitem, e-öğrenme aracılığıyla yerine getirmeyi taahhüt işlemleri tam zamanında yerine getirmektedir.

8. Üniversitemin e-öğrenme web sitesi üzerinden bir işlemi tamamlamak benim için çok kolaydır.

9. Üniversitemin e-öğrenme web sitesinde bilgi ararken uzun gecikmeler yaşamam.

10. Üniversitemin e-öğrenme web sitesindeki bilgiler doğrudur.

11. Üniversitemin e-öğrenme web sitesindeki işlemler sorunsuz bir şekilde yapılır.

12. Üniversitemin e-öğrenme eğitmenleri kendi alanlarında bilgilidir.

13. Üniversitemin e-öğrenme ders materyallerinin kullanımı pratiktir.

14. Üniversitemin e-öğrenme ders materyalleri kullanışlıdır.

15. Üniversitemin e-öğrenme ders materyalleri günceldir.