INTERNATIONAL JOURNAL OF MODERN EDUCATION STUDIES

| Volume 6 - No 2 - June 2022 - ISSN 2618-6209 |

Research

Developing Students' Attitude Scale for the Online Education

Serkan Demirel [1]

Article Type
Original Research
International Journal of Modern Education Studies
2022
Volume 6, No 2
Pages: 448-469.
http://www.ijonmes.net
dergipark.gov.tr/ijonmes

Article Info:

Received : 13.09.2022
Revision : 07.10.2022
Accepted : 24.10.2022

Abstract:

While discussions on the efficiency and adequacy of distance education, which has passed through various stages from the 1700s to the present day, and its accessibility has become easier with the opportunities provided by technology, it has to be experienced by almost everyone after the pandemic in 2019. While there are various scale studies for distance education before 2019 in the literature, there is a need for an up-to-date scale with proven validity and reliability. Therefore, this study aimed to develop an up-to-date scale with proven validity and reliability for the use of researchers who aim to study this subject. The item pool of the scale was designed considering the attitude and its sub-components as positive and negative. The scale, which took its final form before the application with the help of an assessment and evaluation specialist and a language expert, was applied to a group of 341 students consisting of Gazi University Education Faculty, Hacı Bayram Veli University Fine Arts Faculty, Hacı Bayram Veli University Faculty of Literature. As a result of Exploratory Factor Analysis and Confirmatory Factor Analysis, a structure consisting of 30 items with six factors was revealed. Cronbach's alpha values of the factors were measured as 0.84, 0.71, 0.85, 0.70, 0.75, and 0.76, respectively. The total Cronbach's alpha value of the scale, which constituted the whole of the factors, was 0.92. As a result of the analyses performed at the end of this research, a valid and reliable scale was put forward to measure the attitudes toward online education.

Keywords: Keywords: Distance education, Online education, Scale development, Attitude.

Citation:
Demirel, S. (2022). Developing students' attitude scale for the online education. *International Journal of Modern Education Studies, 6*(2), 448-469. https://doi.org/10.51383/ijonmes.2022.239

[1] Dr, Gazi University, Faculty of Education, Department of Music Education, Ankara, Turkey. sekole@gmail.com,
Orcid ID: 0000-0003-3459-2836

INTRODUCTION

Learning is the secret to success today (Davis & Davis, 2001). At the point where technology has come, new habits and new directions have emerged. Given that learning is considered crucial has gradually increased the importance attached to education, and learning has become more accessible with technology. As the expansion of the internet network in the world increased, the accessibility of information increased, so the speed of information transfer increased.

Education is the process of gaining desired behaviours from the individual (Ertürk, 1998). At this point where technology has come, the ways of adopting these behaviours for individuals have also diversified. While there are various positive and negative discussions about distance education continue (Alakoç, 2014; Horzum, 2014), health conditions that affected the whole world in 2019 resulted in compulsory education from a distance, albeit temporarily (Malta et al., 2022; Martínez-Hernández, 2022; Pinchbeck & Heaney, 2022; Tsiligkiris & Ilieva, 2022). Not to interrupt education, Turkey, as well as all over the world, started distance education by working on this issue (Council of Higher Education, 2020).

Although distance education experienced by students and educators is thought to be a new system, the origins of distance education go back to the 1700s (Harting & Erthal, 2005), and the term distance education was used officially in 1982 (Verduin & Clark, 1994). Distance education, carried out for a while with tools, such as letters (Kırık, 2014), continued until the radio station was established in the USA in 1919. In the late 1930s, distance education started to be delivered with television (Gümüşel & Dölen, 2022). At the latest point reached by information technologies, it has become more accessible today with distance education tools (Moore & Kearsley, 2005), which have turned into tools, such as computers, tablets and smartphones.

Distance education is a type of education in which students and teachers physically reside in different places while teaching using technology is used (Bruder, 1989). It has reached very different points with distance education technology, which was previously carried out from the post office. It reached its peak, albeit mandatory, especially during the pandemic in 2019 (Pregowska et al., 2021).

Given two different systems, distance education, synchronous and asynchronous, synchronous education is real-time (Gurung & Stone, 2020; Ogbonna et al., 2019), asynchronous training is known as training (Safavi, 2008) in which participants can participate asynchronously. A study suggests that asynchronous forms in distance education can be an effective tool to encourage student retention (Pinchbeck & Heaney, 2022).

There are also discussions about the effectiveness of distance education, especially after the situation brought about by the COVID-19 conditions, negative attitudes toward online education have emerged. For example, one study suggested that rapid adaptation to

distance education may be complex, especially in fields, such as medicine, computer science, and fine arts (Pregowska et al., 2021). However, a study claims that distance education benefits accessibility, affordability, flexibility, learning pedagogy, lifelong learning, and politics, and online pedagogy (Dhawan, 2020).

In a study investigating student opinions on online education during the COVID-19, thoughts, such as students' generally negative attitudes, ending distance education as soon as possible, and switching to traditional education before the pandemic came to the fore (Drašler et al., 2021).

Students' ideas about distance education were discussed in a study on attitudes toward distance education. In the said study, most students stated that they believed that distance education would never replace traditional education. Despite this, the same research revealed that distance education is helpful, its materials can be used at any time, and it is easy to return to the materials they have completed at any time to remember a topic (Karzhanova et al., 2021).

Before examining the related studies, it is useful to look at the definitions of attitude, which is an important concept of the research. Attitude is a psychological tendency expressed in favour or against an object to a certain degree (Eagly & Chaiken, 2007). Attitudes consist of three components: cognitive, affective and behavioural (Gable et al., 1993; Tavşancıl, 2014). Attitude has a dynamic effect on an individual's behaviour toward an object (Tavşancıl, 2014). In this context, a tool is needed to determine students' attitudes toward online education, which the whole world has experienced.

Because online education is not new, there are many studies on this subject. Kisanga and Ireson developed a tool to measure educators' attitudes toward online education with its subcomponents of Challenges of e-learning, Benefits from e-learning, Attitude to using computer systems, Leisure interest in e-learning innovations, and use of computers (Kisanga & Ireson, 2016). In the Turkish version of this scale, four factors were reconstructed: the tendency to use technology, satisfaction, motivation, and usefulness.

Ağır et al. (2007) developed a 6-factor structure consisting of 21 items to measure teachers' attitudes toward distance education. Another scale developed to measure teachers' online attitudes in Turkey revealed a 5-factor structure titled Technical Issues, Affective Attitude Toward Online Education, Cognitive Attitude Toward Online Education, Psychomotor Attitude of Online Education, Classroom Management (Demirel, 2022).

In addition, there are some tools developed to measure students' attitudes toward online education (Aixia & Wang, 2011; Arslan, 2021; Bayrak et al., 2020; Haznedar & Baran, 2012; Kışla, 2016; Wang, 2003; Yıldırım et al., 2014). Kışla (2016) revealed a one-factor structure with a participant group of 83 pre-service teachers. Yıldırım et al. (2014) found a 4-factor structure in the scale he developed, with the headings Personal Relevance, Effectiveness, Instructiveness, and Aptitude. The scale developed by Arslan (2021) consists of a 5-factor

structure with the subheadings of Satisfaction with the Facilities of the University in Distance Education, Attitude toward Faculty Members in Distance Education, Attitude toward Online Exams, Communication and Access in Distance Education, Comparison of Distance Education and Face-to-face Education. Wang (2003) developed a scale to measure students' attitudes toward online education with a 4-factor structure Learner Interface, Learning Community, and Content Personalization. Haznedar & Baran (2012) developed a 2-factor scale of e-learning susceptibility and e-learning avoidance to measure students' attitudes toward online education. Bayrak et al. (2020) developed a scale with participants consisting of students who took the online course in the fall and spring of 2017-2018 before the pandemic period. The scale in question includes a single-factor structure consisting of eight items. Aixia & Wang (2011) used an adapted 10-item scale for the research.

Purpose of this research

The attitude that enables people to evaluate certain assets positively or negatively (Eagly & Chaiken, 2007) can also provide a state of success in some jobs. For example, studies have revealed that attitude is associated with success (Güngör, 2021). Moreover, a study concluded that curiosities and concerns about e-learning affect student success (Etlioğlu & Tekin, 2020). For this reason, measuring attitude can be interpreted as revealing one of the building blocks of success. Measuring the attitude toward online education is also essential to examine students' views in an education system that emerged after the pandemic and to work to increase success by associating it with the factors affecting the students' success. Thus, the attitude scale toward online education is an essential tool.

Most of the scales for online education in the literature are developed under conditions before 2019. However, since the perception of online education before the pandemic is a type of education that not everyone has experienced, it is likely to be considered differently. The scale developed after COVID-19 by Arslan (2021), on the other hand, is an up-to-date example, mainly prepared with local items. Thus, there is a need for a scale that has been developed after the pandemic, has up-to-date items, has reliability and validity tests and structural equation model tests, and can have a global impact. In addition, with the development of a new scale regarding quality and quantity, options will be increased for researchers to use scales for online education. In this context, it is aimed to develop an up-to-date, global tool with structural validity and sufficient reliability coefficients to measure students' attitudes toward online education, which can meet all these needs in the present research. The attitude scale toward online education reflects students' thoughts on productivity, functionality, necessity, effectiveness, competence, and instructors can help make inferences when used in research. Hence, the research items were created with these components.

METHOD

Research Research Model

This study was conducted as a scale development study. The processes followed in this research and the characteristics of the study group are shown below. This study was conducted as a scale development study.

Participants

The study group of this research consisted of a student group of 341 students from Gazi University Education Faculty, Hacı Bayram Veli University Fine Arts Faculty, and Hacı Bayram Veli University Faculty of Literature. While determining the study group, the criterion of being a volunteer was considered. The scale development size complied with the five-fold rule of items (Child, 2006). One hundred seventy-seven students participating in the present research were first-year, 50 students were second-year, 55 students were fourth-year, and 59 students were fourth-year.

As of March 23, 2020, the Ministry of National Education of the Republic of Turkey structured its weekly course programs according to distance education. Education has begun to be provided using the Internet and TV (Ministry of National Education, 2020). On the subject of distance education related to higher education, the decision left to the universities in the past is that the Higher Education Institutions will switch to distance education with a decision on March 23, 2020 (Council of Higher Education, 2020). The application time of this research was conducted in May-June 2022. The research students have equally received online education for about two years since the COVID-19 pandemic began. First-year students received online education from the high school period, with at least one year at university, while other classes received online education during the university period. In addition, all participants had the opportunity to experience online education under the same conditions for at least one year. The student's answers in the research were also confirmed on this subject. For this reason, the participants received online training for an equal amount of time.

Developing the Scale and Collecting Data

The following steps were carried out to develop a measurement tool to measure students' attitudes toward online education.

Literature review

Firstly, research on online education was examined. In this research, the good and bad sides of online education, which has been known since the 1700s as a system that everyone is exposed to after COVID-19, were examined. In addition, attitude scales toward online education were also examined. It was observed that there were missing points in the scales. These deficiencies were re-determined by several factors, such as necessity.

Item Pool Phase

A pool was made of items containing the components of the attitude as cognitive, affective, and behavioral, including the deficiencies identified after the literature review. The items consisted of a 5-point Likert-type answer of strongly agree, agree, undecided, disagree, and strongly disagree.

Stage of content validity

To determine the content validity of a structure consisting of 38 items with six factors, assistance was received from a language expert and an assessment and evaluation expert. Conducting an audit accompanied by a language expert is one of the methods used to determine the sufficiency of the items in terms of quantity and quality (Büyüköztürk, 2007). The scale before the application was created by considering whether the questions were grammatical control with a language expert and whether the items were an attitude scale with an assessment and evaluation expert. At the end of the research, the structure consisting of "efficiency," "functionality," "necessity," "effectiveness," "competence," and "attitude toward trainers in online education" was re-evaluated by experts.

Pilot implementation

The scale, developed with experts, was first applied to a group of 30 people, and the student's understanding of the questions was evaluated. The implementation phase started because there were no problems with the prepared questions.

Implementation phase

In the implementation step, 341 responses were received. Step-by-step controls were made at every stage of the application.

Data Analysis

To determine the construct validity of the scale, exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) was performed. SPSS 25 package program was used for EFA, and AMOS 25 package program was used for CFA. It is appropriate to use the direct oblimin method for the scale consisting of related items (Crawford, 1975). Since the attitude scale also contained interrelated items, Kaiser-Mayer-Olkin (KMO) and Bartlett Sphericity tests and the direct oblimin method were used to test the suitability of the model. CFA was conducted to evaluate the fit of the model that emerged as a result of EFA. In analysis, Chi-square/ standard deviation ($\chi 2/sd$), Root-Mean-Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR), Comparative Fit Index (CFI), Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Perioperative measurement of pharyngeal closing pressure (PCLOSE), and values were tested. Finally, the reliability of the scale based on internal consistency was examined with Cronbach's alpha test. In light of the findings, the scale took its final form with 30 items and six factors.

Ethical considerations

Quantitative data were collected electronically. Participants were informed that they would voluntarily participate in the present study and that they could quit or leave the study at any time.

Ethical approval was obrained from Gazi University Ethics Committee's decision numbered 2022/005 to conduct this study. In this study, all rules stated to be followed within the scope of the "Higher Education Institutions Scientific Research and Publication Ethics Directive" were followed. None of the actions stated under the title "Actions Against Scientific Research and Publication Ethics," which is the second part of the directive, were not taken.

Ethical review board name: Gazı University Ethics Committee

Date of ethics review decision: 09.03.2022

Ethics assessment document issue number: E-77082166-604.01.02-310170

RESULTS

In this part of this research, reliability, validity and structural data related to online education are included.

Results on Validity

The scale, which was applied to 350 people, reached a sufficient number within the development processes (Bryman & Cramer, 2001; Kass & Tinsley, 1979; Kline, 1994; Tavşancıl, 2014). “Kaiser Meyer Olkin (KMO)” and “Barlett Sphericity” values were calculated for the convenience of factor analysis of the data obtained before the EFA. The KMO value obtained in the study was 0.94. This number must be bigger than 0.60 to do factor analysis (Field, 2005; Pallant, 2001; Tabachnick & Fidell, 2006). The values found showed that the data were sufficient for factor analysis. As a result of the Bartlett sphericity test, the significant chi-square test statistics proved that the data showed a normal distribution. The results ($\chi 2$ = 821,684, p=0.000) revealed that the research data showed a normal distribution.

Based on the results found before the EFA, it can be considered that the data obtained were suitable for factor analysis. Since it is appropriate to use the direct oblimin method in scales with related items (Crawford, 1975), direct oblimin was used as the rotation method in factor analysis.

In the scale consisting of 38 items, after removing eight items that did not meet the necessary conditions in the analysis results, a structure of 30 items and six factors emerged with EFA. This part of the research includes reliability, validity and structural data related to online education.

As a result of EFA, it was observed that the scale items were grouped under six factors with an Eigenvalue higher than 1 (Figure 1).

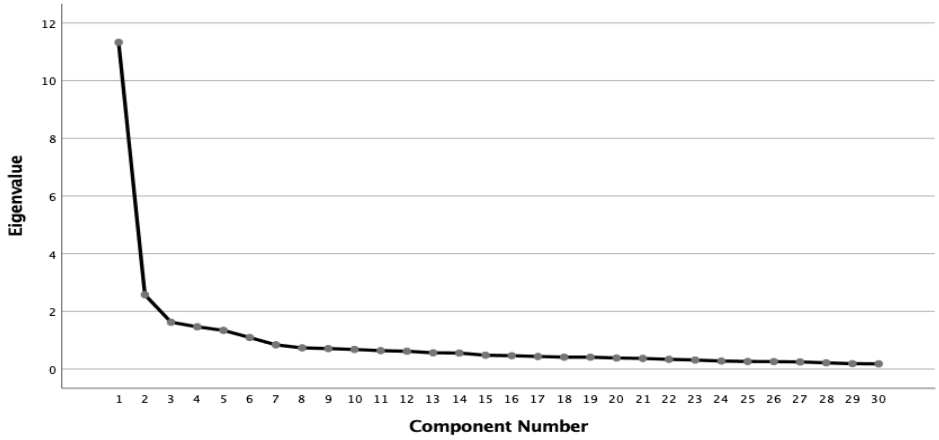

Figure 1. Scree plot

Six factors explained 64.76% of the total variance regarding the attitude variable. The factor loads of the factors that made up the scale ranged from 0.40 to 0.88. Items with a factor load of less than 0.30 and burdening more than one factor were removed. Table 1 shows the scale items, factors and factor loads.

Table 1

EFA Results of the Attitude Scale toward Online Education

	Componend	Common Factor Variance	Item-total correlation	Factor loading value	Eigenvalue	Explained variance
1. factor	**VAR00007**	.665	.554	.831	11.328	37.761
	VAR00005	.676	.625	.726		
	VAR00001	.676	.669	.717		
	VAR00008	.653	.584	.716		
	VAR00015	.686	.708	.656		
	VAR00002	.571	.593	.567		
	VAR00017	.582	.690	.515		
	VAR00009	.457	.583	.474		
2. factor	**VAR00028**	.698	.502	.776	2.578	8.592
	VAR00027	.698	.549	.759		
	VAR00024	.482	.507	.568		

	VAR00029	.531	.358	.528		
3. factor	**VAR00033**	.792	.604	-.863	1.623	5.411
	VAR00034	.769	.611	-.833		
	VAR00036	.785	.665	-.800		
	VAR00035	.673	.558	-.774		
	VAR00022	.643	-.575	.706		
	VAR00023	.526	.535	-.504		
4. factor	**VAR00011**	.664	.398	.776	1.465	4.884
	VAR00012	.644	.479	.735		
	VAR00014	.616	.503	.644		
5. factor	**VAR00021**	.736	.664	.771	1.341	4.469
	VAR00019	.790	.756	.689		
	VAR00037	.703	.643	.679		
	VAR00038	.605	.534	.667		
	VAR00020	.683	.701	.568		
	VAR00016	.573	.610	.458		
6. factor	**VAR00026**	.744	.282	.907	1.095	3.649
	VAR00031	.622	.483	.680		
	VAR00032	.487	.471	.509		

While developing the scale, the factor load should be at least 0.40 (Field, 2005). According to the results obtained, it was seen that this condition was met. As can be seen in Table 1, the factor load values of the first dimension consisting of eight items ranged from 0.47 to 0.81. The load values of the second factor consisting of four items were distributed between 0.52 and 0.77. The third-factor loading values, which consisted of six items, were distributed between 0.50 and 0.86. The fourth-factor load values consisting of three items varied between 0.64 and 0.77. The fifth-factor loading values, consisting of six items, ranged from 0.45 and 0.77. The sixth-factor load values, which consisted of three items, were distributed between 0.50 and 0.90. The lowest item load value of the six factors consisting of 30 items was 0.47, while the highest was 0.90. It was seen that six factors explained 63.1% of the total variance. The first factor explaining 37.761% of the total variance was

"productivity," the second factor explaining 8.59% of the total variance was "functionality," the third factor was "necessity," explaining 5.41% of the total variance, the fourth factor was "effectiveness" explaining 4.84% of the total variance," the fifth factor explaining 4.46% of the total variance was named as "competence," the sixth factor explaining 3.64% of the total variance was named as "attitude toward trainers in online education."

The construct validity of the model that emerged from the EFA analysis was evaluated by confirmatory factor analysis (CFA). EFA included $\chi 2$/df (Chi-Square/Degree of Freedom), RMSEA (Root Mean Square Error of Approximation), SRMR (Standardized Root Mean Square Residual), CFI (Comparative Fit Index), GFI (Goodness of Fit Index), AGFI (Adjusted Goodness of Fit Index), and PCLOSE tests were performed (Table 2).

Table 2

Compliance Values of the Six-factor Structure of the Attitude Scale toward Online Education

Criterion	Good fit	Acceptable	Value fit	Fit of the scale	Citation
($\chi 2$/df)	≤ 3	4-5	2.140	Good fit	Byrne, 1989
RMSEA	≤ 0,05	0,06-0,08	0.058	Acceptable fit	Brown, 2006.
SRMR	≤ 0,05	0,06-0,08	0.061	Acceptable fit	Hu & Bentler, 1999.
CFI	≥ 0,96	0,90-95	0.92	Acceptable fit	McDonald & Marsh, 1990
GFI	≥ 0,90	0,89-0.85	0.85	Acceptable fit	Jöreskog & Sörborn, 1993
AGFI	≥ 0,90	0,89-0.80	0.82	Acceptable fit	Jöreskog & Sörborn, 1993
PCLOSE	≥ 0,05	0,01-0.05	0,09	Good fit	Hu & Bentler, 1999

According to CFA analysis data, $\chi 2$/sd and PCLOSE values had a good agreement. RMSEA, SRMR, CFI, GFI, and AGFI values in the structural equation model findings were among the acceptable ranges defined by the researchers, shown in the source part of Table 2. It was understood that the tested model showed sufficient fit criteria to be statistically compatible.

All path coefficients shown in the model were statistically significant at the $p<0.00$ level (Figure 2).

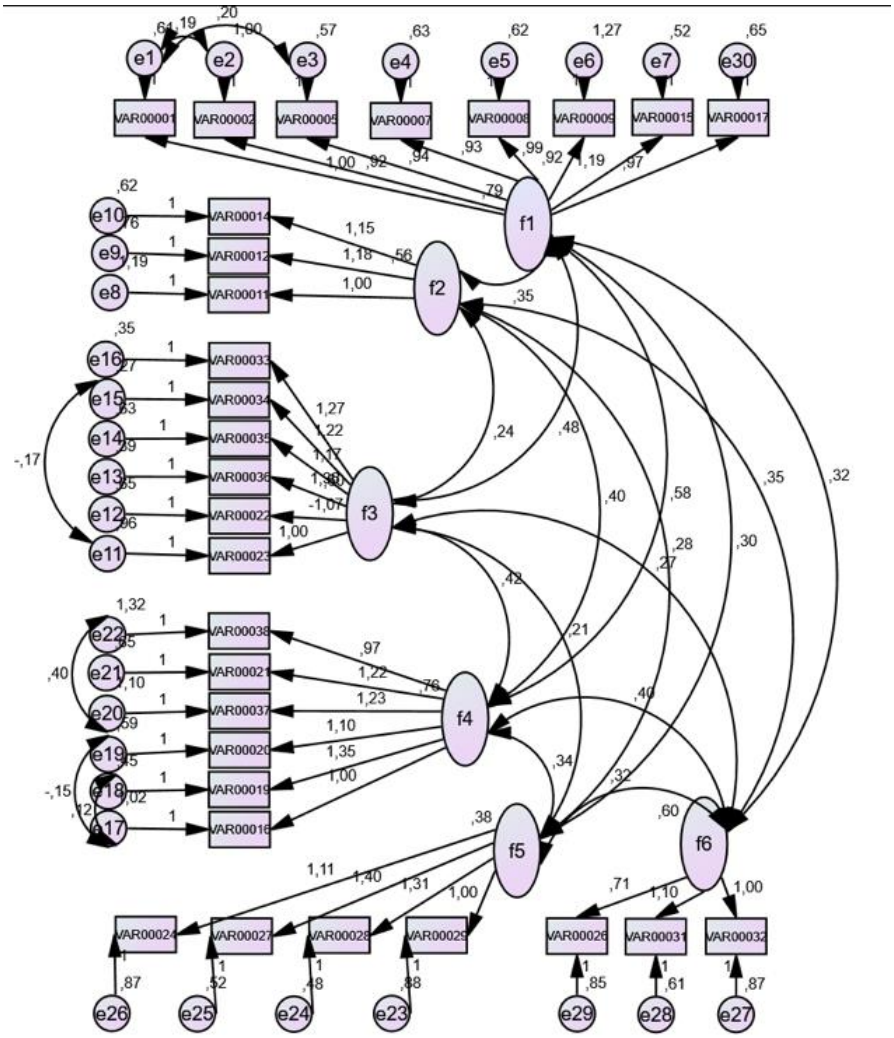

Figure 2. Confirmatory factor analysis results

Chi-square, Chi-square/degree of freedom and fit indices values of the model with CFA were $\chi 2$= 821.684 DF:384 P=0.000, RMSEA= 0.058. According to these data, the model has an acceptable fit (Brown, 2006).

Results on Reliability and Item Analysis

The reliability coefficients of the whole scale and its sub-dimensions are given in Table 3.

Table 3

Item-Total Correlation Values and Cronbach's Alpha Confidence Coefficients

	Item-Total Correlation	**Cronbach's Alpha if Item Deleted**	**Factor Cronbach's alpha**
VAR00001	.669	.924	.894

VAR00002	.593	.925	
VAR00005	.625	.925	
VAR00007	.554	.926	
VAR00008	.584	.925	
VAR00009	.583	.925	
VAR00011	.398	.928	
VAR00012	.479	.927	
VAR00014	.503	.926	
VAR00015	.708	.923	.711
VAR00016	.610	.925	
VAR00017	.690	.924	
VAR00019	.756	.923	
VAR00020	.701	.924	.857
VAR00021	.664	.924	
VAR00022	-.575	.938	
VAR00023	.535	.926	
VAR00024	.507	.926	
VAR00026	.282	.929	
VAR00027	.549	.926	.706
VAR00028	.502	.926	
VAR00029	.358	.928	
VAR00031	.483	.926	
VAR00032	.471	.927	
VAR00033	.604	.925	.750
VAR00034	.611	.925	
VAR00035	.558	.926	

VAR00036	.665	.924	
VAR00037	.643	.924	.766
VAR00038	.534	.926	
		Scale Cronbach's Alpha	.928

The overall Cronbach's alpha reliability coefficient of the scale was measured as 0.92. At the sub-dimensions level, it was determined as 0.89 for the first factor, 0.71 for the second, 0.85 for the third, 0.70 for the fourth, 0.75 for the fifth, and 0.76 for the sixth factor. Since the reliability coefficient above 0.70 is sufficient (Nunnally, 1978), it can be considered that all the reliability coefficients calculated are at an acceptable level. Therefore, it can be said that 30 items are sufficient for measurement, provided that the item-total test correlation is considered valid as above 0.30 (Nunnally & Bernstein, 1994).

CONCLUSION AND DISCUSSION

This research aimed to develop a tool that can be used to measure the attitude of university students toward online education. For this purpose, 341 students, consisting of Gazi University Education Faculty, Hacı Bayram Veli University Fine Arts Faculty, and Hacı Bayram Veli University Faculty of Letters students, participated in this research conducted to test reliability and validity levels and develop tools to be used. To develop an attitude scale toward online education, a 5-point Likert-type form consisting of 33 items was created with the help of an expert after scanning the subject. After the created form was applied to a trial group of 30 people, it was evaluated with content validity, and five items were added. It took its final form before the analysis was applied in a 38-item structure. After the exploratory factor analyses (EFA) of the scale were performed with the help of the SPSS package program, a structure consisting of 30 items revealed, explaining 63.1% of the total variance of six factors.

The 30-item final scale had a 6-factor structure with Exploratory Factor Analysis (EFA). According to the results of confirmatory factor analysis (CFA) performed to ensure the accuracy of the structure obtained, x2/sd was calculated as 2.14, RMSEA 0.058, SRMR 0.061, CFI 0.92, GFI 0.85, AGFI 0.82. It has been seen that the scale prepared according to the data obtained has acceptable and good fit values; therefore, it is structurally compatible.

Cronbach's alpha reliability coefficient values were tested in the reliability analyses of the scale. The reliability coefficient of the first factor of the scale was 0.89, the reliability coefficient of the second factor was 0.71, the reliability coefficient of the third factor was 0.85, the reliability coefficient of the fourth factor was 0.70, the reliability coefficient of the fifth factor was 0.75, and the reliability coefficient of the sixth factor was 0.76. In general, the total

reliability coefficient of all scale items was measured as 0.92. It can be said that the obtained values will reliably serve the purpose of all of the scale items.

The scale obtained in the present study has 19 positive and 11 negative items. Negative items were translated and analyzed in the statistical program. The factors that make up the scale are named “efficiency,” “functionality,” “necessity,” “effectiveness,” “competence,” and “attitude toward trainers in online education.”

The factors revealed in this research were designed to measure students' attitudes toward online education with different themes. For this reason, a multidimensional scale has emerged. Unlike this research, Bayrak et al. (2020) developed a single-factor scale of eight items before COVID-19. Aixia & Wang (2011) used an adapted 10-item scale for the research. Although the items used are for online education, a few items are thought to have a limited measurement capacity with only one factor.

Wang (2003) developed a scale to measure students' attitudes toward online education with a 4-factor structure Learner Interface, Learning Community, and Content Personalization. Kışla (2016) developed a single-factor scale, and the author suggests that it is appropriate for teacher candidates. Since these scales were made before the COVID-19, they differ slightly from the scale developed in the research. For example, the scale in this study also includes items related to COVID-19.

In this research, while the items were designed, only a specific local community was not targeted. The questions prepared in a more global sense and the scale developed by Arslan differ in this sense. Arslan (2021) has designed questions that aim to obtain answers relatively locally, consisting of the components of Satisfaction with the Facilities offered by the University in Distance Education, Attitude toward Faculty Members in Distance Education, Attitude toward Online Exams, Communication and Access in Distance Education, Comparison of Distance Education and Face-to-Face Education. For example, Arslan created a structure that questions the thoughts and attitudes of students studying at Sivas Cumhuriyet University with articles, such as "I believe our university does its best in the distance education process." Arslan has developed an updated scale after the pandemic. In this respect, it is a significant scale.

The present research was conducted with the students of the faculty of education, faculty of literature, and faculty of fine arts. The scale, in which Haznedar & Baran (2012) developed a 2-factor scale of e-learning susceptibility and e-learning avoidance, was developed with participants consisting of pre-pandemic education faculty students, and it was suggested to be repeated in different sections by the researcher. In the scale developed by Haznedar and Baran, positive items were classified with the theme of susceptibility, and negative items with the theme of avoidance.

The effectiveness factor, which is one of the factors revealed in the research, is also present in the scale developed by Yıldırım et al. (2014), albeit in different items. In this study, while the effectiveness factor was revealed with a 6-item structure, Yıldırım, Yıldırım, Çelik,

and Karaman created this component with a 5-item factor structure. Other factors are Personal Suitability, Effectiveness, and Instructional factors that differ from those designed for research.

The necessity factor is one of the most striking factors in the developed scale. Earlier scales did not have a necessity factor. Before COVID-19, online education was known to most people as just an option. COVID-19 resulted in the compulsory education of students online in March 2020. This incident revealed that online education might be necessary for some people. In addition, using this scale, it can be investigated whether the theoretical or applied courses are more suitable for the students to be given online, with the research to be conducted on the students studying in the departments with different weights of theoretical and applied courses.

At first glance, the focus of the items in the attitude factor toward instructors in online education seems to be only on the perception of difficulty. Looking at the items, it can be seen that this factor is not just the perception of difficulty. While designing the items, this factor aimed to measure whether the situation of teachers' changing perception toward online education for good or bad affects the students' attitude. Looking at the items in this factor; The item *"I believe that exams are difficult in online education"* has been prepared to measure hidden items, such as the situation of instructors preparing students for the exam in online education, the way they prepare the exam, and the student's readiness for these exams. In other words, this item can be interpreted as the perception of difficulty and the evaluation of students' self-efficacy through exams. *"I believe that instructors make it difficult for students for online education"* was prepared with the aim of sub-items, such as how much teachers help students in online education, the perception that they will help, and whether there is a concession situation against them. This item is the item that most includes the perception of difficulty in online education. Education is more than just a classroom. Education is learned even better by reinforcing the subject covered in the lesson. For example, the item *"I find it difficult to reach teachers outside the classroom in online education"* is about education in and out of school. In this article, there is the subject of how teacher-student relations change the perception toward online education. This item, prepared as a behavioral attitude, examines the perception of difficulty and how teacher-student relations contribute to the attitude toward online education.

As a result, the factor of attitude toward trainers in online education includes the following sub-attitudes: The effect of instructors' exam preparations on students' attitudes toward online education (cognitive), the effect of instructors' online exam preparations on students' self-efficacy (affective), whether instructors facilitate online learning for students (behavioral), the effect of teacher-student relationships on online attitude (behavioral). Besides these, the perception of difficulty is seen. Therefore, the "attitude factor toward instructors in online education" is more than the perception of difficulty. However, when researchers who want to use the scale do not want to use this factor, the eigenvalue is

61,117%. When the talking factor is added, a rate of 64,766% stands out. The presence of this factor in the study shows the diversity of the scale.

Although this scale developed in the present research was only made with undergraduate students, it is considered that it can be used for all students as well. Therefore, it is thought that the scale will effectively study the relationship between attitudes toward online education and other variables.

In light of the findings, the scale developed for students' attitudes toward online education has convenient features. For this reason, the use of the scale revealed in the research for online education at the level of university students may be appropriate for researchers. In addition, it is evaluated that this research can be used as a more effective tool than other scales if the scales developed for the attitude towards online education developed before the pandemic are developed with students who need more experience in this subject. Finally, it was an advantage for the research that all study groups participating in the research had experienced and participated, because it was compulsory.

REFERENCES

Ağır, F., Gür, H., & Okçu, A. (2007). Uzaktan eğitime karşı tutum ölçeği geliştirmesine yönelik geçerlik ve güvenirlik çalışması [Development of the attitude scale toward distance learning: Reliability and validity]. *e-Journal of New World Sciences Academy, 3*(2), 128-139.

Aixia, D., & Wang , D. (2011). Factors influencing learner attitudes toward e-learning and development of e-learning environment based on the integrated e-learning platform. *International Journal of e-Education, e-Business, e-Management and e-Learning, 1*(3), 264-268.

Alakoç, Z. (2014). Genel olarak uzaktan öğretim ve konuya öğretim üyelerinin bakış açıları [Distance education in general and faculty members' perspectives on the subject]. *Sakarya University Journal of Education Faculty,* (3), 403-413.

Arslan, R. (2021). Salgın döneminde uygulanan uzaktan eğitime yönelik tutum ölçeği geliştirilmesi [Developing an attitude scale towards distance education applied in the period of the outbreak]. *Journal of the Faculty of Economics and Administrative Sciences of Kafkas University. 12*(23), 369-393. https://doi.org/10.36543/kauiibfd.2021.017

Bayrak, F., Tibi, M. H., & Altun, A. (2020). Development of online course satisfaction scale. *Turkish Online Journal of Distance Education-TOJDE, 21*(4), 112-123.

Brown, T. A. (2006). *Confirmatory factor analysis for applied research.* Guilford Publications.

Bruder, I. (1989). Distance learning: What's holding back this boundless delivery system? *Electronic Learning, 8*(6), 30-35.

Bryman, A., & Cramer, D. (2001). *Quantitative data analysis with SPSS release 10 for Windows: A guide for social scientists.* Routledge Press.

Büyüköztürk, Ş. (2007). *Sosyal bilimler için veri analizi el kitabı [Manual of data analysis for social sciences]*. Pegem Publications.

Byrne, B. (1989). A primer of lisrel, basic assumptions and programming for confirmatory factor analysis models. *Springer-Verlag Publishing*. http://dx.doi.org/10.1007/978-1-4613-8885-2

Child, D. (2006). *The essentials of factor analysis (3th ed.).* Continuum.

Crawford, C. (1975). A Comparison of the direct oblimin and primary parsimony methods of oblique rotation. *British Journal of Mathematical and Statistical Psychology, 28*(2), 201-213.

Council of Higher Education. (2020). Basın açıklaması Yükseköğretim Kurulu Başkanı Prof. Dr. M. A. Yekta Saraç [Press release President of the Council of Higher Education Prof. Dr. M. A. Yekta Saraç]. https://www.yok.gov.tr/Sayfalar/Haberler/2020/universitelerde-uygulanacak-uzaktan-egitime-iliskin-aciklama.aspx

Davis, J. R., & Davis, A. B. (2001). *Kendi kendine öğrenmek [Self-learning]*. (A. Baykara, Trans.). Mediacat. (Original work published 2000).

Demirel, S. (2022). Teachers' attitudes towards online education and a scale study. In A. Kabadayı (Ed.), *Action Research in Educational Sciences* (pp. 133-148). Livre de Lyon.

Dhawan, S. (2020). Online Learning: A panacea in the time of COVID-19 crisis. *Journal of Educational Technology Systems, 49*(1), 5–22. https://doi.org/10.1177/0047239520934018

Drašler, V., Bertoncelj, J., Korošec, M., Žontar, T. P., Ulrih, N. P., & Cigić, B. (2021). Difference in the Attitude of Students and employees of the University of Ljubljana towards work from home and online education: Lessons from COVID-19 Pandemic. *Sustainability*, (13), 1-24. https://doi.org/10.3390/su13095118

Eagly, A. H., & Chaiken, S. (2007). The advantages of an inclusive definition of attitude. *Social Cognition, 25*(5), 582-602. https://doi.org/10.1521/soco.2007.25.5.582

Ertürk, S. (1998). *Eğitimde program geliştirme [Curriculum development in education].* Meteksan.

Etlioğlu, M., & Tekin, M. (2020). Elektronik öğrenmede öğrenci tutum ve akademik başarı arasındaki ilişkide öğrenci merak ve kaygısının aracılık rolü [The mediating role of student's curiosity and anxiety in the relationship between student attitude and

academic achievement in electronic learning]. *Selcuk University Journal of Social Sciences Institute,* (43), 34-48.

Field, A. (2005). *Discovering statistics using SPSS.* Sage Publications.

Gable, R. K., Wolf, M. B., & Keilty, J. W. (1993). *Instrument development in the affective domain (2nd ed.).* Springer Science+Business Media, LLC.

Gurung, R. A., & Stone, A. M. (2020). You can't always get what you want and it hurts: Learning during the pandemic. *Scholarship of Teaching and Learning in Psychology.* Advance online publication. https://doi.org/10.1037/stl0000236

Gümüşel, G., & Dölen, H. (2022). Dünyada ve Türkiye'de uzaktan eğitime tarihsel bir bakış ile gelecek eğilimler [Future trends in the world and in Turkey with a historical perspective to distance education]. *Socrates Journal of Interdisciplinary Social Studies, 8*(15), 166-152. https://doi.org/10.51293/socrates.191

Güngör, C. (2021). The relationship between attitudes towards learning and success orientation in undergraduate students. *International Online Journal of Education and Teaching (IOJET), 8*(3), 1774-1796.

Harting, K., & Erthal, M. J. (2005). History of distance learning. *Information Technology, Learning, and Performance Journal; Morehead, 23*(1), 35-44. https://www.proquest.com/scholarly-journals/history-distance-learning/docview/219815808/se-2

Haznedar, Ö., & Baran, B. (2012). Eğitim fakültesi öğrencileri için e-öğrenmeye yönelik genel bir tutum ölçeği geliştirme çalışması [Development of a general attitude scale towards e-learning for faculty of education students]. *Educational Technology Theory and Practice, 2*(2), 42-59. https://doi.org/10.17943/etku.84225

Hu, L., & Bentler, P. (1999). Cutoff criteria for fit indices in covariance structure analysis: conventional criteria versus new alternatives. *Structural Equation Modeling, 6*(1), 1-55. https://doi.org/10.1080/10705519909540118

Horzum, M. B. (2014). Sakarya Üniversitesi eğitim fakültesinde görev yapan öğretim elemanlarının internet destekli eğitime yönelik düşünceleri [Sakarya University faculty of education teaching staff's thoughts on internet supported education]. *Sakarya University Journal of Education Faculty,* (6), 245-262. https://dergipark.org.tr/tr/pub/sakae

Jöreskog, K. G., & Sörbom, D. (1993). *LISREL 8: Structural equation modeling with the simplis command language.* Scientific Software International, Inc.

Karzhanova, N. V., Ishmuradova, A. M., Nazarenko, S. V., Korzhuev, A. V., & Ryazanova, E. L. (2021). Student attitude to distance education: Pros and cons. *Cypriot Journal of Educational Sciences (CJES), 16*(3), 1319-1327. https://doi.org/10.18844/cjes.v16i3.5857

Kass, R. A., & Tinsley, H. E. (1979). Factor analysis. *Journal of Leisure Research,* (11), 120-138. https://doi.org/10.1080/00222216.1979.11969385

Kırık, A. M. (2014). Uzaktan eğitimin tarihsel gelişimi ve türkiye'deki durumu. [Historical development of distance education and the situation in Turkey]. *Marmara Communication Journal, 21*(21), 73-94. https://doi.org/10.17829/midr.20142110299

Kışla, T. (2016). Uzaktan eğitime yönelik tutum ölçeği geliştirme çalışması [Attitude scale development study towards distance education]. *Ege Eğitim Dergisi*, 258-271. https://doi.org/10.12984/eed.01675

Kisanga, D. H., & Ireson, G. (2016). Test of e-learning related attitudes (TeLRA) scale: Development, reliability and validity study. *International Journal of Education and Development using Information and Communication Technology (IJEDICT), 12*(1), 20-36.

Kline, P. (1994). *An easy guide to factor analysis.* Routledge Press.

Malta, G. D., Bond, J., Conroy, D., Smith, K., & Moller, N. (2022). Distance education students' mental health, connectedness and academic performance during COVID-19: A mixed-methods study. *Distance Education, 43*(1), 97-118. https://doi.org/10.1080/01587919.2012.723165

McDonald, R. P., & Marsh, H. W. (1990). Choosing a multivariate model: Noncentrality and goodness of fit. *Psychological Bulletin, 102*(2), 247–255. https://doi.org/10.1037/0033-2909.107.2.247

Ministry of National Education. (2020). Bakan Selçuk, Koronavirüs'e karşı eğitim alanında alınan tedbirleri açıkladı [Minister Selçuk announced the measures taken in the field of education against the Coronavirus]. https://www.meb.gov.tr/bakan-selcuk-koronavirusekarsi-egitimalaninda-alinan-tedbirleri-acikladi/haber/20497/tr

Moore, M. G., & Kearsley, G. (2005). *Distance Education: A Systems View (Second Edition).* Cengage Learning.

Nunnally, J. C. (1978). *Psychometric testing.* McGraw-Hill.

Nunnally, J. C., & Bernstein, I. (1994). *Psychometric theory.* McGraw-Hill.

Ogbonna, C. G., Ibezim , N. E., & Obi, C. A. (2019). Synchronous versus asynchronous e-learning in teaching word processing: An experimental approach. *South African Journal of Education, 39*(2), 1-13. https://hdl.handle.net/10520/EJC-168a98cd12

Pallant, J. (2001). SPSS survival manual: *A step by step guide to data analysis using SPSS for Windows (versions 10–11).* Open University Press.

Pinchbeck, J., & Heaney, C. (2022). Case report: The impact of online forum use on student retention in a level 1 distance learning module. *Athens Journal of Education, 9*(1), 103-118. https://doi.org/10.30958/aje.9-1-7

Pregowska, A., Masztalerz, K., Garlińska, M., & Osial, M. (2021). A worldwide journey through distance education—from the post office to virtual, augmented and mixed realities, and education during the COVID-19 Pandemic. *Education Sciences, 11*(3), 118. https://doi.org/10.3390/educsci11030118

Safavi, A. A. (2008). Developing countries and e-learning program development. *Journal of Global Information Technology Management, 11*(3), 47-64. https://doi.org/10.1080/1097198X.2008.10856473

Tabachnick, B. G., & Fidell, L. S. (2006). *Using multivariate statistics* (5th ed.). Allyn and Bacon.

Tavşancıl, E. E. (2014). *Tutumların ölçülmesi ve SPSS ile veri analizi [Measuring attitudes and data analysis with SPSS].* Nobel Akademy Publications.

Tsiligkiris, V., & Ilieva, J. (2022). Global engagement in the post-pandemic world: Challenges and responses. Perspective from the UK. *Higher Education Quarterly, 76*, 343-366. https://doi.org/10.1111/hequ.12390

Verduin, J. R., & Clark, J. T. (1994). *Uzaktan eğitim: etkin uygulama esasları [Distance education: Principles of effective practice].* (İ. Maviş, Trans.). Anadolu University.

Wang, Y. S. (2003). Assessment of learner satisfaction with asynchronous electronic learning systems. *Information & Management* (41), 75-86. https://doi.org/10.1016/S0378-7206(03)00028-4

Yıldırım, S., Yıldırım, G., Çelik, E., & Karaman, S. (2014). Perception of distance education students about distance education: A scale development study. *Journal of Research in Education and Teaching, 3*(3), 365-370.

Biographical notes:

Serkan Demirel: After holding his master's degree from Gazi University Music Education Department in 2017, he entered the doctorate department of this program in the same year. Demirel, who has been awarded his doctorate degree from Gazi University Music Education Department in 2021, has studies on musical hearing in children, scale development in education, and educational programs.

Author(s)' statements on ethics and conflict of interest
Ethics statement: We hereby declare that research/publication ethics and citing principles have been considered in all the stages of this study.
Statement of interest: We have no conflict of interest to declare.
Funding: None
Acknowledgements: None

Students' Attitude Scale for The Online Education

	efficiency
1	I use my spare time more actively thanks to online education
2	For me, it is difficult to use time effectively in online education.
3	Thanks to online education, there is time for my other works in the time left after the lesson.
4	I believe that repeating the course in online education reinforces learning.
5	The privilege of being able to take the course I want, whenever I want, and wherever I want in online education makes me feel good.
6	9. I think "my own internet speed" is sufficient for online education
7	15. I believe that the absence of time and place limits in online education increases the efficiency of the lesson.
8	17. Resources used in online education increase the efficiency of the course
	functionality
9	I think the technical capacity of my "own devices" (computer, tablet, phone, etc.) that I use for online education is insufficient.
10	I think there is an audio and video synchronization problem in online education.
11	I think the interface I use in online education (the program on the educational device) is insufficient.
	necessity
12	I think that online education is a necessity in terms of health.
13	I feel safe in terms of health in online education
14	I believe online education reduces the spread of disease
15	During illnesses such as a pandemic, I prefer to conduct classes online.
16	I think that online education is a necessity in pandemic diseases such as covid.
17	Even if there is a pandemic, I think that online education should not be done.
	effectivenes
18	I believe that the exams in online education will not cause any technical problems (such as connection problems).
19	A student who graduates from online education will be at least as competent as those who graduate from face-to-face education.
20	I think the student cannot receive the course gains in the online course only.
21	I think that the online education system cannot replace face-to-face education.
22	If I had the authority, I would transfer the theoretical lessons to the online system even after the pandemic.
23	I think that one day, all training will switch to online training.
	competence
24	I believe that the competence of the online education system in our country is in a good position among other countries.
25	I think that the trainers are sufficient for online education
26	Instructors come with adequate preparation for online training
27	I think the trainers I train online should improve themselves a little more in this regard.
	attitude towards trainers in online education
28	I believe that exams in online education are difficult.
29	I believe that instructors make it difficult for students to learn online.
30	I find it difficult to reach teachers in online education outside of the classroom.

Online Eğitime Yönelik Öğrenci Tutum Ölçeği

	verimlilik
1	Online eğitim sayesinde dersten arta kalan zamanımı daha aktif kullanırım
2	Bana göre online eğitimde zamanı etkili kullanmak zordur
3	Online eğitim sayesinde dersten arta kalan zamanlarda diğer işlerime zaman kalır
4	Online eğitimde, ders tekrarı yapabilme konusunun öğrenmeyi pekiştirdiğine inanırım.
5	Online eğitimde istediğim zaman, istediğim yerde, istediğim derse girebilme ayrıcalığı beni iyi hissettirir
6	Online eğitim için "kendi internet hızımın" yeterli olduğunu düşünürüm
7	Online eğitimde zaman ve mekân sınırının olmamasının ders verimliliğini artırdığına inanırım.
8	Online eğitimde kullanılan kaynaklar dersin verimini artırır
	işlevsellik
9	Online eğitim için kullandığım "kendi cihazlarımın" (bilgisayar, tablet, telefon vs) teknik kapasitesinin yetersiz olduğunu düşünürüm
10	Online eğitimde ses ve görüntü senkronizasyon sorunu olduğunu düşünürüm
11	Online eğitimdeki kullandığım arayüzün (eğitim için kullanılan cihazdaki programın) yetersiz olduğunu düşünürüm
	gereklilik
12	Sağlık açısından online eğitimin gereklilik olduğunu düşünürüm
13	Online eğitimde sağlık açısından kendimi güvende hissederim
14	Online eğitimin hastalık yayılmasını düşürdüğüne inanırım
15	Pandemi gibi Hastalık dönemlerinde, derslerin online yapılmasını tercih ederim
16	Covid gibi pandemi hastalıklarında online eğitimin bir gereklilik olduğunu düşünürüm
17	Pandemi olsa bile online eğitimin yapılmaması gerektiğini düşünürüm
	etkililik
18	Online eğitimde yapılan sınavların teknik olarak (bağlantı sorunu gibi) bir sorun çıkarmayacağına inanırım.
19	Online eğitimden mezun olan bir öğrencinin en az yüz yüze eğitimden mezun olan bir öğrenci kadar yetkin olacağını düşünürüm
20	Sadece online olarak alınan derste, öğrencinin ders kazanımını alamayacağını düşünürüm
21	Online eğitim sisteminin yüz yüze eğitimin yerini tutamayacağını düşünürüm
22	Yetkim olsa, pandemi sonrası bile teorik dersleri online sisteme aktarırım
23	Bir gün bütün eğitimlerin online eğitime geçeceğini düşünürüm
	yeterlik
24	Ülkemizdeki online eğitim sistemi yeterliğinin, diğer ülkeler arasında iyi konumda olduğuna inanırım
25	Eğitmenlerin online eğitim için yeterli olduğunu düşünürüm
26	Eğitmenler online eğitime yeteri kadar hazırlık yaparak gelir
27	Online eğitim aldığım eğitmenlerin bu konuda kendini biraz daha geliştirmesi gerektiğini düşünürüm
	eğitmenlere yönelik tutum
28	Online eğitimdeki sınavların zor olduğuna inanırım
29	Eğitmenlerin online eğitim için öğrencilerin işini zorlaştırdığına inanırım
30	Online eğitimdeki öğretmenlere ders dışında ulaşmakta zorlanırım