Asian Journal of Distance Education

Measuring Teachers' and Instructors' Online Teaching Competencies: A Scale Development Study

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Abstract: The aim of this study was to develop a measurement tool that can be used to determine the online teaching competency levels of teachers and instructors. During the validation, the draft scale was applied to online teachers and instructors actively involved in distance education. After the implementation processes, the sample was divided into two groups randomly (n1 = 158; n2 = 144). The first sample was used for Exploratory Factor Analysis (EFA), and the second sample for Confirmatory Factor Analysis (CFA). The EFA highlighted 17 items and 3 factors found in the final scale. Factors were found as Technology, Pedagogy, Ethical and Institution dimensions. The reliability analysis for the whole scale was 0.90, the Cronbach alpha reliability coefficient of sub-dimensions were found to be 0.87, 0.88, 0.78, respectively. In addition, the composite reliability (CR) value of the whole scale was calculated as 0.953 and the CR values for the sub-factors were calculated as 0.877, 0.871 and 0.832, respectively. As a result of the CFA, it was concluded that the scale could be used to measure online teaching competencies of teachers and instructors.

Keywords: competencies, distance education, online teaching, online instructors, online teaching competencies

Highlights

What is already known about this topic:

- Online teaching competencies are not clearly described in the literature.
- Those studies available in the literature merely describe the roles and responsibilities of online teachers.

What this paper contributes:

- By examining the research made in the direction of the literature, first of all, online teaching competencies are described.
- After determining the theoretical framework of online teaching competencies, questions were formulated by the researchers.
- As a result of the analyses, a 3-dimensional online teaching competencies measurement tool was developed.

Implications for theory, practice and/or policy

- These competencies should be exhibited in online classrooms considering the important role of blended learning which was initiated in response to the pandemic.
- These skills can be included in distance education policies and reports in order to gain all instructors online education.

Published by Asian Society for Open and Distance Education (ASODE), Japan
ISSN 1347-9008 http://www.asianjde.com/

Introduction

With the widespread use of online learning technologies, education has become a new norm. It provides the opportunity for individuals who were unable to receive a formal education prior to the pandemic or those who were forced to take a break from their education for some reason. Consequently, distance education turned into a compulsory venue for learning during the pandemic (Daniel, 2020). And now that it has become a primary tool in academics, researchers have begun utilizing various innovations in order to ensure equal opportunity in distance education and increase the efficiency and quality (Gilani, 2020).

Activities are being geared towards maximizing interaction between the students, teachers, content managers and parents, and they can include online courses, virtual classroom and laboratory applications, student-parent following systems, webinars, and so forth. The hope for these implementations is to increase the continuity and effectiveness of distance education (Chang & Satako, 2020). On the other hand; online teachers (as the literature classifies them) undertake various tasks during distance education activities, including but not limited to course design, planning and presentation of materials, transfer of information to the student by using educational tools effectively, monitoring and management of the student's activities in the course process, and establishing interaction between student-teacher-content-institution (Anderson & Dron, 2011; Evans & Myrick, 2015; Hew & Cheung, 2014; Martin et al.,2019; Mortera-Gutierrez & Murphy, 2000; Pituch and Lee, 2006).

Certain competencies make it easier for instructors to adapt to distance education environments, to accept the technology and materials used, and to reach a sufficient level in the context of organizational, institutional, conceptual, and technological components in distance education. Such competencies are, therefore, quite important when it comes to increasing the efficiency of distance education and planning the field studies (Kirkwood and Price, 2006; Şişman, 2009).

Literature

Online teaching competencies are discussed in terms of the teaching roles that include that were generally considered to be presented for a successful distance education process (Albrahim, 2020; Aydin, 2005; Bawane & Spector, 2009; Berge, 1995; ISTE, 2000; Martin et al., 2019; Varvel, 2007). Many studies have been conducted on the standardization of the education policies of various educational institutions, demands against changing technologies, and the competencies of teachers to meet the requirements of online learning. The competencies of online instructors affect the entire course, which includes the design, management, and evaluation (Anderson & Dron, 2011). Distance educators can prepare for success by using web 2.0 tools and learning management systems in line with their technological competencies in online courses and communicating with students in line with their pedagogical competencies (Can, 2020).

In addition, instructors have an important place in the communication process in the basic theories of distance education. For example, the transactional distance theory states that increasing the dialogue between the learner and the teacher in distance education will decrease the interactional distance. Similarly, in Garrison's (2009) in the community of inquiry model the teaching presence framework includes three responsibilities – design, facilitation, and direct instruction. Garrison & Akyol (2013) also demonstrated the effects of instructors in areas such as communication with students, course design and facilitation in their own theoretical frameworks.

In order to better understand online teaching competencies, studies regarding the historical development of online learning technologies should be taken into consideration. For this reason, a summary of the studies covering the competencies, roles and skills of online teachers are shown in detail in Table 1 below.

Table 1. Studies on online teachers' roles and competencies

Related Studies	Online Teaching Roles and Competencies
Thach and Murphy (1995)	Instructor, instructional designer, technology, expert, technician, administrator, site facilitator, editor, librarian, evaluation specialist, graphic designer
(ISTE, 2000)	Facilitating students learning and creativity, Designing and developing learning experiences and assessments in the digital age, Studying and Learning Model in the Digital Age, Promoting digital citizenship and responsibility, Professional Development and Leadership
Goodyear, Salmon, Spector, Steeples & Tickner (2001)	Process facilitator, advisor/counselor, assessor, researcher, content facilitator, technologist, designer, and manager/administrator
Coppola, Hiltz, & Rotter, (2002)	Cognitive, affective, and managerial
Williams (2003)	Administrative manager, instructor/facilitator, instructional designer, trainer, leader/change agent, technology expert, graphic designer, media publisher/editor, technician, support staff, librarian, evaluation specialist, site facilitator/proctor
Shank (2004)	Administrative, design, facilitation, evaluation, and technical-based instructional theory, research, and experience
Dennis, Watland, Pirotte, and Verday (2004)	Pedagogical, communicational, discipline expertise, and technological
(Aydın, 2005)	Content expert, process facilitator, instructional designer, advisor/counselor, technologist, assessor, material producer, administrator
(Liu et al., 2005)	Course designer, Professional development, Feedback provider, Interaction facilitator, Conference / session manager, Organizer, Social cohesion creator, technical coordinator, Media designer, Technology integrator
(Varvel, 2007)	Administrative, personal, technological, instructional design, pedagogical, assessment, social roles
Alvarez, Guasch and Espaso (2009)	Design/planning, social, cognitive, technological, management
Bawane & Spector (2009)	Professional, pedagogical, social, evaluator, administrator, technologist, advisor/counselor, and researcher
Berge (2008)	Pedagogical, social, managerial, technical
Abdous (2011)	Preparation, planning, design, facilitation, interaction, providing/gathering feedback, reflection
Bigatel, Ragan, Kennan, May, and Redmond (2012)	Active learning, Active teaching/responsiveness, administration/leadership, classroom decorum, policy enforcement, multimedia technology, technical competence
Farmer & Ramsdale (2016)	Leadership & instruction, Active teaching, community & Netiquette, Tools & technology, Instructional design
Diehl (2016)	Institutional context, Technological knowledge, Educational design, Pedagogy, Evaluation, Social situation

Table 1 indicates that although there are many studies on online teaching competencies, pinning down a list of these competencies is still a controversial issue. Though there is an eclectic mix of competencies among the various researchers, a common one is pedagogical competence. Discussions continue on sub-competences and performance indicators (Baran et al., 2011; Carril, Sanmamed, & Sellés, 2013; Coppola & Starr Roxanne Hiltz, 2002). The studies also point out that teachers or instructors have a key role in the success of distance learning (Arah, 2012; Baran et al., 2013; Diehl, 2016). And although studies have been conducted on online teacher competencies, only a few scales have been developed to measure these competencies. Kavrat and Turel (2013) defined the important attributes of the teacher as communicative, technical, social, and pedagogical in their scale development study. However, their studies were conducted with teacher candidates, not professional instructors. Simsek, et al. (2021) discusses four factors of online instructors' competencies: pedagogy, facilitation, technology, and course administration. The scale consists of 15 items. However, Confirmatory Factor Analysis of the

scale was not performed. In addition, the scale does not include items regarding ethical conditions, which are very important in the online environment, and data were collected from only one university.

Narrowing down online teaching competencies will make it more possible to understand the role of instructors in distance education. Since one of the major issues surrounding these competencies is that of measurement, acquiring valid data collection tools must be a high priority. In focusing on scale development, this study will hopefully contribute to the field of distance education by offering a means of measurement. This may in turn shed light on how to improve the transfer of knowledge in online programs.

Methodology

Research Model/Design

The research is a scale development study, and the typical scale development steps were implemented throughout the process. The scale developed was named the "Online Teaching Competencies Scale (OTCS)".

Participants

The study group of the research consisted of purposefully and volunteer selected 135 male (44.7%) and 167 female (55.3%) teachers and instructors from various branches and levels of seniority. The selection was done among the teachers and instructors who conduct courses actively via distance education. Table 2 shows the characteristics of these participants.

Table 2**.** Characteristics of the participants

Profession		**Professional Year**	**Total (%)**
Teachers (n)	**Faculty Members (n)**		
54	24	0-5 years	%25,8
50	28	5-10 years	%25,8
26	32	10-15 years	%19,2
53	35	15 years and up	% 29,1

Data Analysis

Before analyzing the data, the validity and reliability studies of the scale were carried out on 302 out of 340 participants by correcting extreme, outlier, missing or incorrect values. According to some researchers, the ideal situation in scale development studies is to conduct EFA and CFA analyses on data from different sample groups. However, when the scale development studies in the area were examined, it was seen that EFA and CFA studies could be carried out on the data obtained by randomly dividing the same sample group in two (Kilic-Cakmak, Cebi, & Kan, 2014; Noar, 2003). In this study, the group participating in the study was randomly divided into two sub-groups (n1 = 158; n2 = 144). Exploratory Factor Analysis (EFA) was implemented on the first group and Confirmatory Factor Analysis (CFA) on the other group, so this may be acknowledged as a limitation of the study.

Data Sources

The draft scale was distributed through the Google form electronic tool to the faculty and teachers. The Google form link was sent out via text, mail, and the WhatsApp application. The recruitment message contained information such as the purpose of the study and that data that was to be collected, and the time allotted to fill out the form. Also, it was stated in the message that this survey was to be completed

only by those who have taught online. A Google form link address was sent to 350 instructors whose contact information could be accessed, including teachers working in the Ministry of National Education and faculty members working at universities in Turkey. A total of 440 faculty responded to the survey, of whom 119 (39,4%) were faculty and 183 (60,5%) were teachers. Thirty-eight of the answers (8,6 %) were omitted as they contained missing or incorrect values. As a result, all respondents were grouped together for further analyses. Table 2 presents a description of the participants, including profession, years of service, and percentile.

Validity and Reliability

Within the scope of the research, it was first evaluated whether the data was suitable for factor analysis (Kaiser-Meyer Olkin [KMO] coefficient and Bartlett Sphericity Test). In order to determine the structure validity of the Online teacher Competence Scale, EFA was implemented using principal component analysis with varimax orthogonal rotation. The varimax orthogonal rotation is recommended in principal components analysis to determine the independent sub-dimensions as it provides the most sensitive distinction among the dimension and is one of the most used rotation methods (Ho, 2006). Cronbach's alpha coefficient was calculated to provide evidence for the sub-dimensions and total reliability of the scale, and item test correlations were determined to supply evidence. In addition, CFA was implemented to test the accuracy of the theoretical factor structure revealed by EFA.

Scale Development Process

First, articles between the years 2000 and 2020 in "Web of Science", "ERIC" and "Google Scholar" databases related to distance learning competencies were researched using document analysis methods. As a result of searching the keywords "online teaching competency", "online teaching role", "distance instructor competencies", "distance instructor roles", "online instructor competencies", "online instructor roles" and evaluating the summary and titles of each, 40 articles matching the criteria were reviewed. Articles that did not provide sufficient data under competency headings were excluded from the study.

First, after the 40 articles were examined by researchers, 867 indicator items of online teaching competencies were extracted. Then, similar items were eliminated. All told, 482 competencies items were accepted. Considering the most common categories in the studies covering these competencies, 15 indicators and 62 competency items related to seven dimensions (“Technology", "Instructional Design", "Managerial", "Evaluation", "Facilitation", "Pedagogical and "Social") were determined as expressions that can be used in the scale within each dimension.

Dimensions, indicators, and items in the scale for online teaching competencies are presented in Table 3. The 62-item pre-scale form, which was created to evaluate the appropriateness of the competency items, was shown to four field experts who studied in the field of Computer Education and Instructional Technology and Distance Education. In addition, it was given to one expert from the field of Turkish Education in order to evaluate the clarity of the items, comprehensibility of the expression and the suitability of the language.

Table 3. Scale items written for online teacher competence dimensions and indicators.

Dimension of Competency	Indicator of Competency	Definition	Item	Reference
Technology	Basic Technology Skill	Online teachers to be aware of new technologies, to be able to access and use these technologies	I2, I3, I8, I9, I5	Bjekic et al., 2010 Eyal, 2012
	Learning Management System			
	Technical			
	Available Technology Selection			
	Material Provider			

Management	Time Management Course Management Institutional	Online teachers can manage synchronous or asynchronous courses	I15, I13, I16, I18, I6, I7	Gustafson & Gibbs, 2000 Mortera et al., 2000
Instructional Design	Course Content Course Materials	Online teachers can make pre-course, during and post-course analyses and reveal the components to be used in teaching as a result of these analyzes.	I4, I9, I27	Altınay et al., 2004 Gómez et al., 2017
Evaluation	Evaluations	Online teachers are able to correctly evaluate students during and at the end of the process.	I20, I21	Berge, 2008 Isman et al., 2004
Facilitation	Learning Facilitation Discussion Facilitation	The ability of online teachers to prevent students from leaving the course environment by taking steps to facilitate the processes experienced by students.	I24, I10, I1, I23	Smith, 2005 Isman et al., 2004 Kavrat & Türel, 2013
Pedagogical	Communication Teaching- Learning Process Personal	Online teachers can provide active and effective education and direct online applications.	I1, I19, I22 I28, I25, I26	Bjekic et al., 2010 Malik,2013
Social	Social	Online teachers can develop a sense of community and socially support students in lessons.	I12, I14, I17	Gómez et al., 2017

In line with the opinions of the experts, the competency items were evaluated in terms of content validity, and some items were removed from the scale. Revisions were made to combine items that were similar to others. A scale constructed of 28 items to determine these competencies levels of online teachers that five-point Likert-type was used as "strongly disagree (1)", "disagree (2)", "undecided (3)", "agree (4)" and "strongly agree (5)".

Limitations

This research has some limitations. The sample of the study consisted of only of 301 online teaching and instructors. The developed scale consists of 3 factors and 17 items. Also sample sizes for both the EFA and CFA analyses were smaller than general recommendations. Despite the small sample size, some satisfactory indices such as KMO and good factor loads made it preferable to continue the analysis.

Findings

Exploratory Factor Analysis for the EFA

Exploratory Factor Analysis (EFA) was conducted to test the construct validity of the scale developed in the study. However, the literature has insinuated that in order to best test EFA the sample size must be 10 times the number of total items in the scale (Kline, 1994; Tinsley and Kass, 1979). Other studies have remarked that five samples for each item is sufficient (Kass and Tinsley, 1979; Kline, 1994; Pett, Lackey and Sullivan, 2003).

Considering the opinions regarding sample size, EFA was conducted on 158 people. Before implementing factor analysis, Kaiser-Meyer-Olkin (KMO) coefficient was calculated and Barlett Sphericity Test was implemented to determine the appropriateness of the data. As a result of the analysis, KMO value was determined as 0.894. In many studies, it has been emphasized that EFA can be tested if the KMO value is higher than 0.5 or 0.6 values (Kaiser, 1974; Pallant, 2001). The value of 0.894 KMO revealed in this study indicates that the required sample size for EFA is provided, and so factor analysis can be tested.

Bartlett's Sphericity Test, which was conducted to check whether the research data had multivariate normal distribution, was found to be significant. This meant that the test had produced significant results ($\chi 2=1363,805$; $p \leq 0.00$, $df = 136$). The findings implied that the collected data was appropriate for conducting factor analysis (Field, 2017; Leech, Barrett, & Morgan, 2005).

The analyses showed that the scale consisted of three dimensions that explained 61.826% of the total variance and eigenvalue greater than 1.0. The items with the factor loadings less than 0.40 and the overlapping items were removed from the scale by Rotated Component Matrix, respectively (Çokluk et al., 2016; Stevens, 2009). The commonality and factor loading values were checked each time, and the items to be removed from the scale were sequentially eliminated after taking into account the significance value. After the repeated analysis, the three-dimension structure with 17 remaining items explains 61.826 % of the total variance. According to researchers, for an item to be shown in a factor, the factor load must be at least 0.40 (DeVellis, 2003; Field, 2017). Table 4 shows that the first-dimension factor load ranges from 0.66 to 0.80; the second-dimension factor loading values range from 0.64 to 0.79; and the third-dimension factor ranges between 0.60 and 0.80. Therefore, rotated factor loadings of the items range from 0.60 to 0.80. These obtained results were adopted as satisfactory (Kline, 2011).

Table 4. The variance values obtained from the EFA.

Dimensions	**Items**	**Factor 1**	**Factor 2**	**Factor 3**	**Common Factor Variance**
Technology	I3	,805			,667
	I2	,772			,663
	I5	,766			,663
	I8	,727			,625
	I6	,693			,628
	I9	,660			,612
Pedagogy	I1		,792		,672
	I20		,769		,637
	I21		,767		,705
	I19		,705		,563
	I15		,691		,652
	I28		,643		,692
Ethical and Institutional	I17			,800	,531
	I26			,721	,650
	I14			,705	,440
	I7			,692	,571
	I23			,606	,540
Eigenvalue		7,103	1,948	1,459	-
Explained variance		22,601	22,096	17,128	-
Explained total variance			**61,826**		-

Table 4 shows that the first factor, Technology, explains 22.60% of the total variance. Pedagogy explains 22.09% of the total variance. And the final factor, Ethnical and Institutional, explains 17.28% of the total variance. In order to show that the model that emerged as a result of EFA was significant, the correlation between factors was questioned. Table 5 illustrates how all of the correlations between factors are

significant at the 0,01-error level, and the correlations that they have significant correlation values between 0.39 and 0.62 between the factors.

Table 5. Correlations between the factors

Factors	**Technology**	**Pedagogy**	**Ethical and Institutional**
Technology	1.00	,627 **	,391**
Pedagogy	-	1.00	,462**
Ethical and Institutional	-	-	1.00

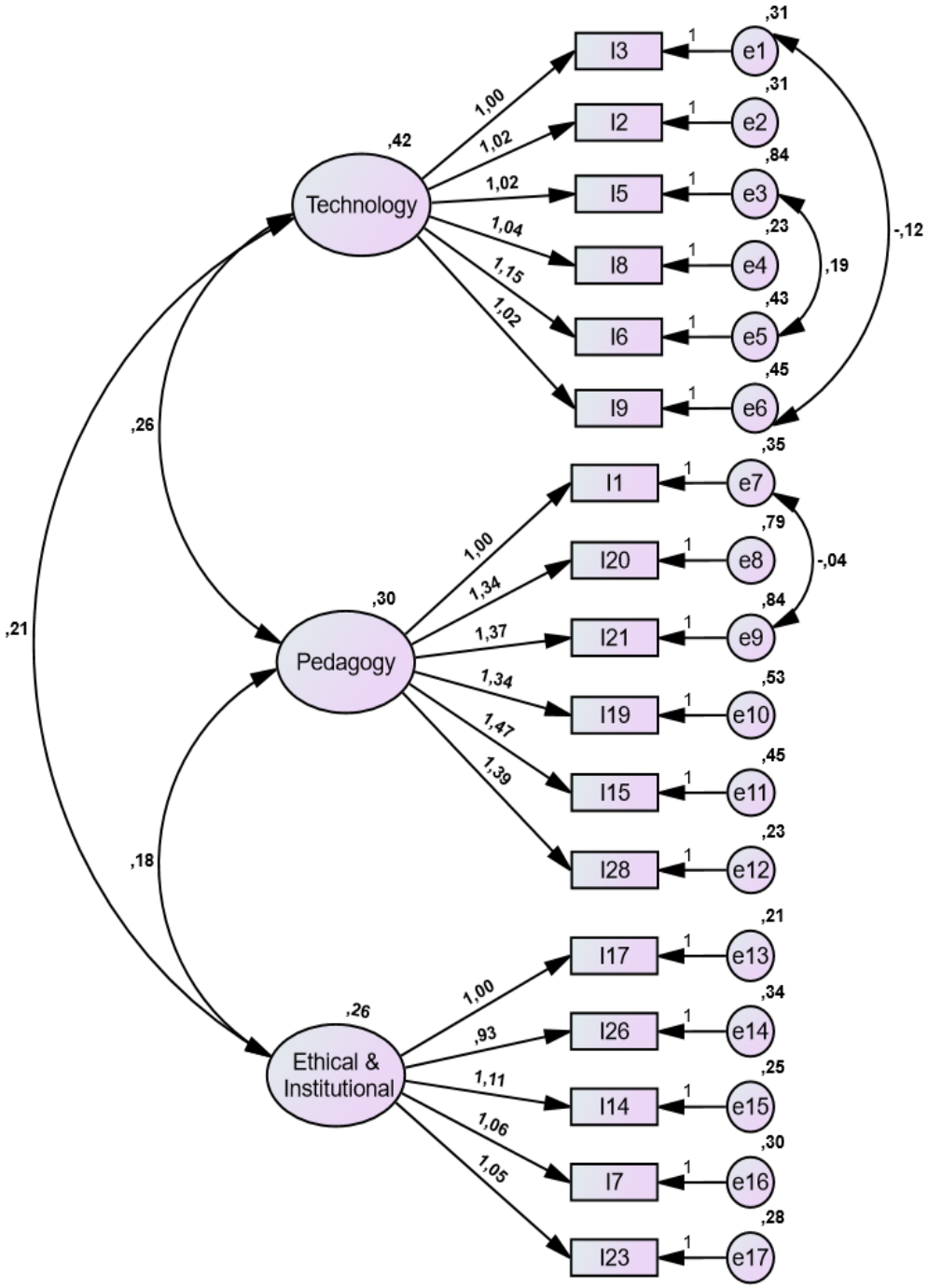
**p<0.001

Confirmatory Factor analysis for CFA

The model structure that emerged after the Exploratory Factor Analysis was tested with Confirmatory Factor Analysis (CFA). CFA is used to determine the structural validity of data (Kline, 2011). The construct validity of the model consisting of 17 items and 3 factors was evaluated by the AMOS 20.0 package program. As model fit indices in examining the construct validity; χ2 /df (Chi-Square/Degree of Freedom), RMSEA (Root Mean Square Error of Approximation), NFI (Normed Fit Index), CFI (Comparative Fit Index), AGFI (Adjusted Goodness of Fit Index), GFI (Goodness of Fit Index) and SRMR (Standardized Root Mean Square Residual) values are considered.

When the modification suggestions that emerged as a result of the analysis regarding the structure consisting of three factors were examined (I3 to I9) there were three between I5 and I6; I1 and I21 items. After the modification processes, the goodness of fit indexes for the model were formed as follows: [X^2/df =2.17 (p=.000); RMSEA= 0.08; GFI= 0.85; AGFI= 0.80; CFI=0.91; NFI=0.83; SRMR= 0.07]. The CFA model regarding the three-factor structure is presented in Figure 1 below.

Figure 1. Confirmatory Factor Analysis



X^2/df =2.17; RMSEA= 0.08; GFI= 0.85; AGFI= 0.80; CFI=0.91; NFI=0.83; SRMR= 0.07

The goodness of fit indices of the model show the X^2/df value is 1.94. In the literature, it is stated that there is a perfect fit in models where this value is lower 2.5 for small samples (Kelloway, 1998; Kline, 2011). The RMSEA value was found to be 0.08. Studies remarked that these values were good fit indices beside this for GFI values are over 0.85 and for AGFI values are over 0.80 (Brown, 2006; Jöreskog and Sörbom, 1993). Obtained values for CFI = 0.91, NFI = 0.83, and SRMR=0.07. In essence, values for RMSEA, CFI, GFI, AGFI and NFI indicate perfect model fit. Therefore, the 17 items scale is considered acceptable and implementable (Brown, 2006; Byrne, 1994; Thompson, 2004).

Item Analysis and Reliability

Item-total correlation values were examined in order to determine whether the scale items measured the property. The fact that these values are 0.30 and over provides evidence for the validity of the items in the scale (Büyüköztürk, 2008). Item-total correlations for each item in the scale and Crα reliability coefficients for each factor are presented in Table 6. In this study, 0.87 was discovered to be the Crα reliability coefficient for whole of the scale, it was also 0.87 for the first factor, 0.88 for the second factor, and 0.78 for the third factor (Nunnally, 1994).

Table 6. Item-total correlations and Cronbach Alpha Reliability coefficients regarding items
Cronbach alpha values and corrected item total correlations

Factors and Items	X	S	Item Total Correlation	Cronbach's Alpha Corrected Items
Factor 1: Technology (α=0,877)				
I3	4,18	,913	,700	,853
I2	4,43	,838	,668	,859
I5	4,03	1,031	,718	,850
I8	3,88	1,070	,686	,857
I6	4,38	,710	,692	,859
I9	4,00	,921	,675	,857
Factor 2: Pedagogy (α=,884)				
I1	3,50	1,190	,720	,860
I20	3,18	1,261	,669	,870
I21	3,87	,955	,735	,861
I19	3,85	1,038	,634	,874
I15	3,79	1,081	,719	,861
I28	3,14	1,257	,730	,859
Factor 3: Ethical and Institutional (α=,781)				
I17	4,46	,785	,584	,730
I26	4,50	,826	,519	,753
I14	4,62	,664	,625	,724
I7	4,41	,789	,573	,734
I23	4,38	,884	,504	,761

In order to determine whether the scale items serve the purpose of measuring the feature desired items, analysis results summarized in Table 6 were examined. According to this, the item-total test correlations in the technological factors' values vary between (r =0.66) and (r =0.71), on pedagogical factor item-total test correlations values vary between (r=0.63) and (r=0.73) ethical and institutional factor values vary between (r=0.72) and (r=0.76). The value was over (r = 0.30) for each item of the item-test correlations. When item total correlations are 0.30 and over, they can be seen as evidence for the validity of the scale items in the literature (Nunnally & Bernstein, 1994). This indicates that the items of the scale serve the purpose of measuring the feature desired to be measured.

Composite reliability (CR) calculations were also performed testing scale reliability. CR analysis for the entire 17-item scale is 0.953. Composite reliability of the first factor, the technology dimension, was calculated as 0.877. The CR of the second factor, the pedagogy dimension, was calculated as 0.871 and the CR of the last factor, the ethical and institutional dimension, was estimated to be 0.832. Analysis of the composite reliability estimates showed that the scale had strong internal consistency (Fornell & Larcker, 1981).

Discussion

In this study, a valid and reliable the scale was developed to determine the online teaching competencies. The face validity of the items of the scale, expert opinions were taken into consideration in determining the content validity, and so EFA and CFA were implemented to provide structure validity.

The fit indices considered in the evaluation of the model indicate that there is an acceptable level of fit between the data and the model structure. Results of the validity and reliability tests of the developed scale appear to be acceptable on the basis of both general and dimensions. This means that the psychometric properties of the scale show that it is valid and reliable. The final scale is comprised of 17 items and 3 dimensions: *Technological, Pedagogical, Ethical and Institutional.*

The *Technology* dimension in the scale was examined by indicators such as being aware of new technologies (Bjekic et al., 2010), and being able to access and use these technologies (Diehl, 2016; Eyal, 2012). In addition, the technological competence dimension includes the competencies that teachers and instructors should have for learning management systems (LMSs) platforms, technical terms, the selection of technologies suitable for the course content, and the provided of appropriate technological resources for students (Varvel, 2007). The technological competence dimension is one of the most important competencies for online teachers and it was also a remarkable finding of our scale.
The second dimension is the *Pedagogical* dimension. Pedagogical competence includes the task of trainers to facilitate students' learning (Arah, 2012). This dimension includes teaching qualifications such as communication, learning-teaching process and personal competencies. It is important in increasing the quality of distance education (Akkoyonlu et al., 2020; Baran et al., 2013; Bawane & Spector, 2009; Carril et al., 2013). For instance, during online learning programs brought about by the pandemic, teachers were implementing traditional teaching methods in online environments. It also meant that they were spending long hours in front of the screen and struggling to implement traditional assessment and evaluations. Therefore, similar situations affecting distance education should become areas of study to better understand the pedagogical roles of teachers and instructors.

The last dimension of the scale is Ethical and Institutional. The rules and ethical rules of the institution where they teach and communicate in written, audio and video as a social entity (Diehl, 2016) were considered in this dimension. According to Varvel (2007), institutional support is crucial for enhancing student-teacher interaction. In addition, when stakeholders (students, teachers, management) who belong to the machine of distance education bring materials on the web to online environments, they must consider how to incorporate the material ethnically and responsibly. In fact, it is best for online teachers to select open educational resources as course material (Aydın & Çebi, 2020; Marin et al., 2020; Huang et al., 2020). Other issues to be considered under this dimension are that students should respect, love and follow the most important ethical rules in their communication and interactions with each other during the courses, and they should stay away from behind-the-screen cyberbullying (Al-Rahmi et al., 2020; Barlett, 2017). In addition, as an Ethical and Institutional dimension, distance education centers should provide the process and coordination of student-teacher-system interactions in order to show ethical processes and operational rules. Moreover, the ethical-institutional dimension, which is revealed in the developed scale in this study, is considered as an important dimension in distance education and online learning environments (Voronin et al., 2020).

Within these dimensions, distance education has many factors such as student, teacher, institution, management and online learning environments such as LMSs, Web 2.0 tools, etc. However, the most significant factor is the teacher him/herself, being the one that communicates closely with students and has a critical role in their success. In fact, online teachers have many tasks which include communicating with students during the course, developing materials, designing the course content, and evaluating the students' progress. In order to fulfill these tasks, they must have certain competencies. These online teaching competencies require a scale, such as the one in this study, for accurate evaluation.
Unlike other scale development studies, the Ethical and Institutional factor that arose in this study is thought to result from the collection of data from both university instructors and teachers as a sample in this study. When the relationship between the factors of the scale was examined, positive relationships were found between the factors. Therefore, in scoring the scale, each factor is summed by scoring and an effective evaluation can be made upon considering the total score. There is no reverse item in the scale. Using this scale, the proficiency levels of instructors who teach online courses at K-12 and

university level can be determined. Thus, studies can be carried out to improve the skills of instructors for online teaching.

Conclusion and Suggestions

The scale developed in this study consists of three factors*: Technology, Pedagogy and Ethical and Institutional. Technology and Pedagogy* factors are also included in previous scale studies (Kavrat and Turel, 2013; Simsek, et al., 2021). The factor structure of the scale such technology, pedagogy, ethical and instructional are also can be considered as in line with the technology integration theoretical frameworks such as TPACK, Technology acceptance model of others.

Future work can be conducted on how to use the scale for understanding the nature of online teaching via TPACK or Technology acceptance model of others. This study has hoped to provide a valid measurement tool for revealing instructors' qualifications when teaching via distance education.

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Merve Aydın: Conceptualization, Methodology, Visualization, Writing – original draft; Muharrem Aydın: Methodology, Analysis of Data, Writing – review & editing.

Acknowledgements

Not applicable

Funding

Not applicable.

Ethics Statement

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000. Informed consent was obtained from all participants for being included in the study.

Conflict of Interest

The authors do not declare any conflict of interest.

Data Availability Statement

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Suggested citation:
Aydın, M., & Aydın, M. (2023). Measuring Teachers' and Instructors' Online Teaching Competencies: A Scale Development Study. *Asian Journal of Distance Education, 18*(1), 131-146. https://doi.org/10.5281/zenodo.7750704