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RESEARCH ARTICLE

Adaptation of Blended Teaching Readiness Instrument to Turkish

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Abstract

Today, the change and transformation of technology in many areas have led to the emergence and spread of different models, methods, and techniques in educational environments. Blended learning is one of the most prominent applications in the integration of technology into education. The role of teachers is very important in the effective and efficient implementation of blended learning in educational environments. Determining the level of readiness of teachers for blended teaching is important for the development and implementation of blended learning applications. In this context, the study aims to adapt the "Blended Teaching Readiness Instrument" developed by Archibald et al. (2021) into Turkish. The study was carried out in Istanbul with the participation of 446 teachers from different branches. In the study, descriptive analyses, internal consistency analysis of the instrument, correlation analysis, and confirmatory factor analysis were performed. As a result of the analysis, it was concluded that the "Blended Teaching Readiness Instrument," which was adapted into Turkish, is a valid and reliable instrument that can measure the level of teachers' readiness for blended teaching in Turkey and can determine the readiness of teachers and pre-service teachers.

Keywords: Blended learning, blended teaching, education, instrument adaptation, teacher

Introduction

Since the beginning of human history, educational environments have been shaped according to the needs and conditions of the period. In the context of today's needs and conditions, it has become inevitable to use technology effectively in education environments.

The prevalence, adoption, and accessibility of digital learning technologies have led to the integration of computer-assisted teaching approaches with face-to-face teaching (Bonk & Graham, 2004). Integration of technology into educational environments, on the other hand, is carried out with different models. One of these models is blended learning. Blended learning can be defined as the combination of face-to-face experience and online experience in order to create an effective, efficient, and flexible learning environment in lessons. In addition to physical and online experiences, blended learning provides benefits to teachers, students, and administrators such as accessibility and convenience, advanced learning, and affordability. These benefits can be obtained if the course design process is done in accordance with blended learning standards (Stein & Graham, 2014). Blended learning is a pedagogical approach that provides an active learning opportunity, where the efficiency of the classroom and socialization opportunities are strengthened with online technologies. Blended learning is a model in which students become active and interactive learners. In addition, this model includes a transition to student-centered teaching, an increase in interaction between student–teacher, student–student, student–content, and student–external resources, integrated process, and outcome-evaluation mechanisms for students and teachers (Dziuban et al., 2004).

It is stated that blended learning, which combines different tools and methods in education, will be one of the learning models that will be widely used in the future, together with online education applications that have become widespread during the pandemic (Batdı et al., 2021). Especially with the developments in recent years, the interest in blended learning, which combines face-to-face education and online-supported activities in different ways, has increased (Dziuban et al., 2018; Fleck, 2012; Singh et al., 2021).

In the literature, it has been emphasized that the role of teachers in the effective and efficient implementation of blended learning practices in educational environments is important (Çakır & Bichelmeyer, 2016; Çırak Kurt, 2017; Comas-Quinn, 2011; Geçer, 2013; Ginns & Ellis, 2007; Jeffrey Milne et al., 2014; Oliver & Stallings, 2014). In blended learning, classrooms are shaped as flexible learning environments where students interact with others and learn in various ways by collaborating. In the blended learning approach, learning goes beyond the walls of the classroom and the boundaries of school time. In addition, the blended teaching process differentiates the roles of teachers and ensures that they are in the position of directing and guiding instead of transmitting the information. In order for these changes to be successful, the development of teachers and pre-service teachers should be supported by training (Watson, 2008). Teacher competencies are very important in the effective implementation of blended learning. However, it is seen that teachers do not have sufficient readiness for blended teaching. Blended teaching requires teachers to have both online and face-to-face teaching skills and to integrate these two skills (Graham et al., 2019a). In this direction, the blended teaching model for teachers' readiness for blended teaching is presented in Table 1 (Graham et al., 2019a).

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Table 1.
Description of the Top-Level Constructs in the K-12 Blended Teaching Readiness Model

Constructs	Sub-constructs
Foundational knowledge, skills, and dispositions	Technology literacy Digital citizenship Dispositions
Instructional planning	Planning blended activities Planning blended assessments
Instructional methods and strategies	Personalization of Instruction Facilitating student–student interaction Facilitating student–teacher interaction Facilitating student–content interaction
Assessment and evaluation	Implementation of blended assessment Evaluation and reflecting
Management	Managing the learning environment Managing learning routines

Three main factors are effective in teachers' choice of blended teaching approaches: improving students' learning, accessibility and flexibility, and low cost. However, when it comes to blended learning, online integration, data practices, personalization, and online interaction are core competencies for teachers. These competencies should be supported by trends (values, beliefs, and attitudes) and technological skills (Graham et al., 2019b). This blended teaching framework presented by Graham et al. (2019b) is shown in Figure 1. Within the scope of this study, it is aimed to adapt the "Blended Teaching Readiness Instrument," which was developed for teachers and pre-service teachers based on this framework, into Turkish.

Studies carried out within the scope of blended teaching have mostly been carried out with learners, and factors such as teachers, management, administrative, and cultural factors can be effective in blended learning. In most of the studies, it has been concluded that blended teaching is effective (Zhang & Zhu, 2017). In the research, it is stated that the application of blended teaching at primary, secondary, and high school (K12) levels contributes to the increase of the skills of teachers and administrators and to make effective practices (Drysdale et al., 2013). Although the effective and efficient use of blended learning largely depends on teachers' competence and readiness, many teachers do not have sufficient readiness for blended teaching (Zhao & Song, 2021). Especially during the coronavirus disease 2019 pandemic period, despite the flexibility offered by blended learning, teachers have experienced difficulties such as preparation, technology literacy, access to technology, financial problems, and health risks (Batac et al., 2021). Although blended learning is being implemented in more schools over time, the demand for more qualified teachers is increasing at this point. Teachers' development in the context of blended learning has fallen far behind the research and development of educational materials. Therefore, there is a need to prepare teachers for blended teaching (Archibald, 2020). It is very important that teachers have readiness for blended teaching (Shand & Glassett, 2017). In addition, teachers should be ready to integrate technology into the blended learning process and their perceptions of blended teaching should be positive (Duhaney, 2012). It will be difficult for teachers to adapt to the system if they do not have the knowledge of how to use the tools and materials to help implement blended learning. Therefore, teachers who do not have the qualifications for blended teaching in the near future will fall behind the innovations in education (Ohazuruike, 2021)

When the studies on the blended learning method in our country are examined, Hebebci and Usta (2015) found that the theses on blended learning are especially concentrated at the undergraduate level in their research. It has been determined that the effects of blended learning on subjects such as academic achievement, motivation, and attitude are discussed intensively in the studies. In addition, Karaotcu and Baran (2019) found in their research that there are limited studies on teachers in the sample group of the theses made on blended learning in our country, in which the studies focused on undergraduate, secondary, and high school groups, especially on academic achievement, student perception, motivation, and attitude. It was also emphasized in the research that studies on determining teacher competencies and standards for blended learning should be increased. Although studies on teachers in this field are limited, Türker (2021) found in his research that teachers agree on using the blended learning model to cover all courses at all teaching levels.

In addition to the limited number of studies on teachers' approaches to blended learning, their perceptions, competencies, and opinions in our country, it has been determined that the number of instruments to determine the status of teachers in blended learning is also limited. The flipped learning teacher self-efficacy perception instrument developed by Erensayin (2019) for teachers consists of four sub-dimensions: teacher self-efficacy, technological competence, pedagogical competence, and technological-pedagogical competence. Although the instrument measures teachers' self-efficacy regarding flipped learning, it can be said that it does not theoretically include all dimensions of blended learning and is not comprehensive enough. Therefore, there is a need for more comprehensive, valid, and reliable measurement tools in Turkish.

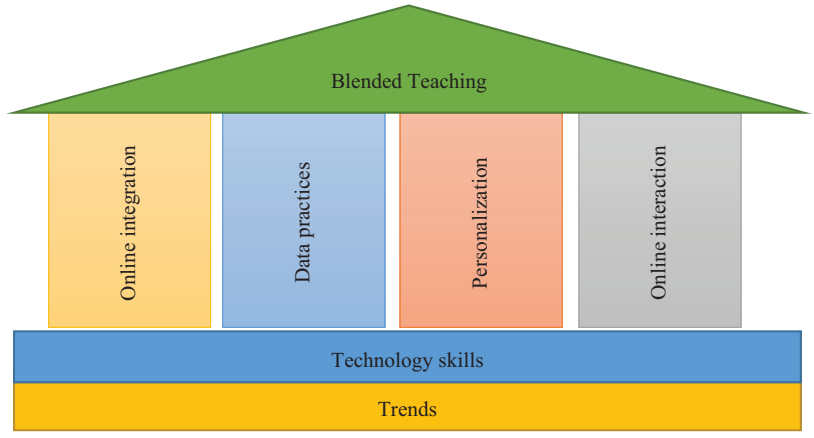


Figure 1.
Blended Teaching Framework (Graham et al., 2019b).

Considering the role of teachers in the effectiveness and efficiency of blended learning practices and the limitations of the studies conducted in this context in our country, studies in this field are very important. It is necessary to determine the readiness of teachers for blended teaching and to develop strategies and practices to make necessary improvements. Archibald et al. (2021) presented a theoretical framework specific to blended learning as a result of long studies and presented an instrument in this direction. In their studies, they suggested that future researchers and teacher educators should benefit from this model and instrument and conduct studies in in-service and international contexts. The aim of this study is to adapt the " Blended Teaching Readiness" instrument developed by Archibald et al. (2021) into Turkish.

Methods

In this adaptation study, the "Blended Teaching Readiness" instrument developed by Archibald et al. (2021) was adapted to Turkish by collecting data from teachers by survey method. The survey method is a scientific research method carried out in order to understand the unique features of a population in general. The purpose of the survey method is to describe the nature and characteristics of objects, societies, institutions, and events (Fraenkel et al., 2012). Within the scope of the study, data were collected from teachers working in different branches and the validity and reliability of the instrument were tested in a sample of teachers.

Study Group

Within the scope of the study, data were collected from teachers working in different branches. Prior to the study, approval was obtained from the ethics committee of Istanbul University-Cerr ahpaşa Educational Sciences (document no: 92466/2021/122). The online survey link, which was prepared by obtaining the necessary application permissions from the relevant authorities, was shared with the teachers working in the province of Istanbul. Teachers participated in the study on a voluntary basis. Of the teachers who participated in the study, 152 (34.1%) were male and 294 (65.9%) were female. Detailed demographic information of teachers is presented in Table 2.

Teachers from 24 different branches were included in the study; 15.9% of the teachers are class teachers, 10.5% are English teachers, 9.6% are mathematics teachers, 8.1% are vocational course teachers, 7.8% are social sciences teachers, 7.2% are Turkish teachers, 6.7% are science teachers, 5.2% are Turkish language and literature teachers, and the remaining 29% are teachers from other branches. Moreover, 17.3% of the teachers have 1–5 years, 30.7% have 6–10 years, 19.3% have 11–15 years, 13.7% have 16–20 years, and 19.1% have 21 years or more experience.

Table 2.
Demographic Information of the Teachers

	f	%		f	%
Branch			**Gender**		
Classroom teaching	71	15.9	Male	152	34.1
English teaching	47	10.5	Female	294	65.9
Mathematics teaching	43	9.6	**Experience (years)**		
Vocational courses teaching	36	8.1	1–5	77	17.3
Social sciences teaching	35	7.8	6–10	137	30.7
Turkish teaching	32	7.2	11–15	86	19.3
Science teaching	30	6.7	16–20	61	13.7
Turkish philology teaching	23	5.2	21 and more	85	19.1
Pre-school teaching	12	2.7			
Religious culture and moral knowledge	16	3.6			
Technology and design teaching	12	2.7			
Guidance and psychological counseling	11	2.5			
History teaching	11	2.5			
Other branches	67	15			

The Instrument

The "Blended Teaching Readiness Instrument," which was adapted into Turkish within the scope of the research, was developed by Archibald et al. (2021) to determine the level of readiness of teacher candidates and teachers for blended teaching. The instrument was developed based on the blended learning literature (Graham et al., 2019a; Pulham & Graham, 2018; Pulham et al., 2018; Short et al., 2021). The instrument consists of five dimensions: trends, online integration and management, data practices, personalization, and online interaction. These dimensions are described in Figure 2.

The online integration dimension consists of 11 items and the other dimensions consist of 8 items. In the instrument prepared in Likert type, 1 indicates very limited proficiency and 6 indicates high proficiency. Validity studies on the Blended Teaching Readiness instrument were conducted with pre-service teachers. In this context, data were collected online at the beginning and end of the semester through the link sent to the pre-service teachers. The instrument was applied to 532 teacher

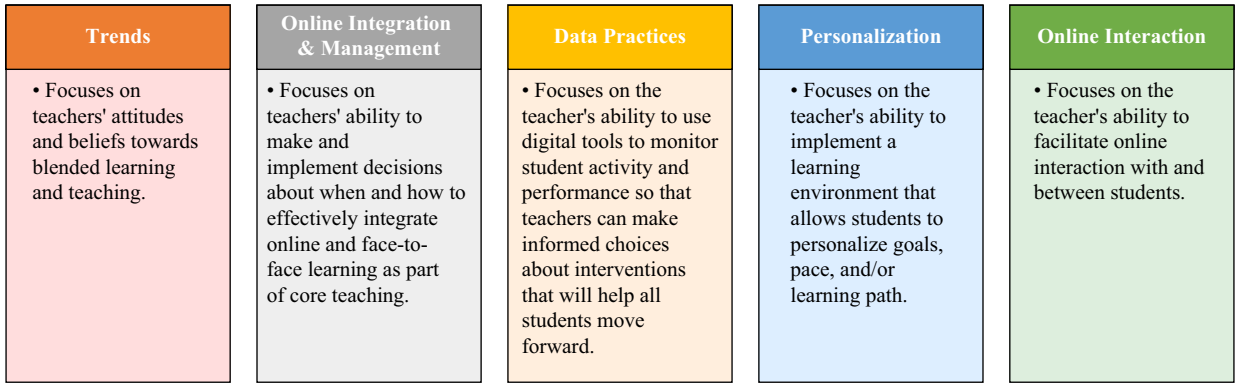


Figure 2.
Dimensions of the Instrument.

candidates in the first application and 402 pre-service teachers in the last application. Confirmatory factor analysis (CFA) was conducted before and after the application regarding the data collected within the scope of the instrument. As a result of factor analysis, it was determined that the instrument is a valid instrument with all competence areas.

Adaptation Process

İnstrument adaptation stages were carried out in accordance with the steps to be followed and the points to be considered in the instrument adaptation studies of Karakoç and Dönmez (2014), Akbaş and Korkmaz (2007), and Carpenter (2018). In this context, the research was carried out in accordance with the following steps.

Identifying the need with a literature review: when the studies on blended learning in our country are examined, it has been determined that most of the studies on blended learning have been conducted with students or pre-service teachers, and the studies involving teachers are limited (Hebebci & Usta, 2015; Karaotcu & Baran, 2019). It has been determined that there is a limited number of studies examining teachers' readiness for blended teaching in our country, and there is no comprehensive instrument that can determine teachers' readiness for blended teaching. In this context, it is planned to adapt the "Blended Teaching Readiness Instrument," which was developed by Archibald et al. (2021), who carried out current and intensive studies in this field, into Turkish. Archibald et al. (2021) conducted validity and reliability studies of this instrument in a sample of pre-service teachers. However, the instrument items are of a quality to reveal the readiness of teachers and pre-service teachers for blended teaching, and it is suggested that the model should be tested in in-service teachers and international contexts. Therefore, in this study, the validation of the instrument's structure was carried out in a sample of teachers.

Obtaining permissions for the instrument: The responsible author of the instrument, Prof. Dr. Charles Graham, was contacted via e-mail, and the necessary permissions were obtained from him for the adaptation of the "Blended Teaching Readiness" instrument into Turkish.

Checking the cohesion of the basic structure of the instrument: The instrument study was examined in terms of the fit of the basic structure of the instrument to measure the readiness for blended teaching. In determining the fit of the basic structure of the instrument, the opinions of the field experts who have done studies on blended learning were consulted. The field expert stated that the basic structure of the instrument has a fit structure to determine the teachers' readiness for blended learning. The validity studies on the instrument were examined and it was determined that the instrument was valid.

Translation of the instrument: After obtaining the necessary permissions for the instrument and examining the fit of the basic structure of the instrument, the instrument was translated into Turkish. Support was received from two language experts in the translation of the instrument into Turkish. The translation of the instrument was done independently by two linguists. The translations were checked by a field expert who is fluent in Turkish and English. The differences in the translations were reviewed, and the draft translation was agreed upon.

Re-translation to English: The instrument, which was translated into Turkish, was translated back into English by two linguists. The translations were checked and it was determined that the instrument retained the same structure when translated into English.

Adaptation process: After determining the fit of the instrument's translation into Turkish, semantically adapting it to Turkish was started. In this context, the opinions of Turkish language experts and field experts were consulted. The instrument was created with the agreement of Turkish language experts and field experts.

Pilot study: The pilot study of the instrument was carried out with 50 teachers from different branches. In the pilot study, it was determined whether the teachers understood the instrument items.

Re-revision and correction: As a result of the pilot study, some items were rearranged according to the opinions of the teachers. At this revision stage, a Turkish language expert, a field knowledge expert, and an English language expert made a joint evaluation. The corrections were in the form of language corrections to increase the intelligibility of the instrument items. As a result of the evaluation, the instrument was given its final form.

Application and analysis: After the instrument was finalized, an application was made to conduct validity and reliability studies of the instrument. In this application, 477 teachers from different branches were reached. After the application, the analyses were carried out and the instrument was given its final form.

Data Analysis

Since it was aimed to test a strong theoretical structure that was determined before, CFA was applied in the study. Descriptive analyses and determination of the internal consistency coefficient of the instrument were performed using the Statistical Package for the Social Sciences (SPSS) 21.0 software, and CFA was performed using the SPSS 21.0 AMOS software. The maximum likelihood method was chosen as the estimation method in the CFA software. Multivariate normality and extreme values, linearity, and multicollinearity assumptions were checked, and the data set was made suitable for analysis (Tabachnick et al. 2007). The data set, which originally consisted of the data of 477 people, decreased to 446 when the extreme values were removed. Kline (2015) states that more than 200 samples are needed for complex models. Therefore, the sample size of the study is sufficient to perform CFA. In the study, the fit of the model was tested by examining the Goodness of fit index.

Ethics Committee Approval: Istanbul University-Cerrahpaşa Educational Sciences ethics committee Social and Human Sciences Research Ethics Committee dated May 7, 2021, and numbered E-745 55795-050.01.04-92466 is available for the research.

Results

Results Regarding the Reliability of the Instrument

The Cronbach alpha internal consistency coefficients of the instrument and its sub-dimensions were calculated in order to test the reliability of 43 items in the instrument developed to evaluate the readiness for blended instruction of teachers and pre-service teachers and the findings are presented in Table 3. The reliability of the instrument is aα=.986, and the values for all factors are over .90. The obtained values show that the instrument is highly reliable (Cohen et al., 2007).

Results Related to Confirmatory Factor Analysis

Confirmatory factor analysis was applied to test the fit of the factor structure in the adapted Turkish form of the instrument with the factor structure of the original instrument. The model that emerged according

Table 3.
Internal Consistency Coefficients for İnstrument and Factors

Factors	Number of Items	Cronbach Alpha
Trends	8	.943
Online integration and management	11	.956
Data practices	8	.970
Personalization	8	.971
Online interaction	8	.962
Total	**43**	**.986**

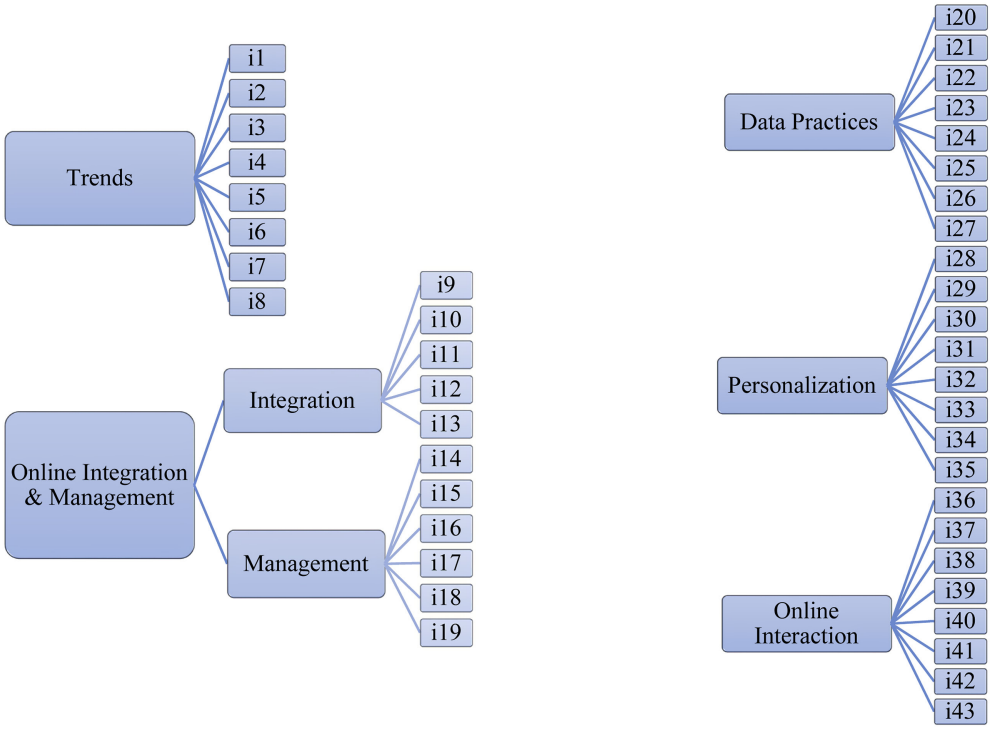


Figure 3.
The Factors in the Tested Model and the Representation of the Items in the Factors.

to the five factors in the instrument and the items in each factor and tested in CFA is presented in Figure 3.

As a result of the analyses, standardized factor loading values, error variance values, and *t* values showing the statistical significance level of the relationships are given in Table 4. In CFA, factor loadings should be above .30. The factor loadings of all items in the instrument, except for item 1, are above .71, and it can be said that the values are at an excellent level (Harrington, 2009). It is stated that the *t* values of the items in the instrument should be equal to or greater than 1.96 and the error variance values should be less than .90 (Kline, 2015; Tabachnick et al., 2007). When the values in Table 4 are examined, it is seen that these conditions are met.

The fit values of the model obtained as a result of CFA are presented in Table 5. Since the *p* value of the χ^2 value was .00 ($p < .05$), it turned out to be a good fit. Tabachnick et al. (2007) state that χ^2/standard deviation (SD) ratio and other indices should be evaluated since χ^2 value will be significant in large sample sizes. In order to improve this value, error correlations were created by controlling the modification indices among some items under the same factor. In this way, the fit value was found as χ^2/SD (2919.941/838)=3.48. Root mean square error of approximation, comparative fit index, incremental fit index, root mean square residual, goodness of fit index (GFI), and adjustment goodness of fit index (AGFI) values were also examined. The obtained values generally show good fit (GFI) or close to good fit (AGFI). Goodness of fit index value is calculated as .76 and AGFI value as .73. It is stated that since the AGFI and GFI values are close to .90, these two values can be interpreted as close to the good agreement (Yılmaz et al., 2015). According to the obtained values, it can be said that the model was confirmed with the five-factor structure tested.

Results Related to the Correlation Between the Sub-factors of the Instrument

In order to determine the criterion validity of the instrument adapted to Turkish, the correlation coefficients between the sub-factors of the instrument were examined. In addition, the mean and SD values for each factor are presented in Table 6. The highest mean belongs to the online interaction and the lowest mean belongs to the personalization dimension. It is seen that the correlations between the factors have positive, medium, and high-level correlations. The fact that the relationship between the factors of the instrument is higher than .85 can create a problem in terms of the discriminant validity of the factors (Farrell & Rudd, 2009). Only a high level of correlation was found between the personalization and data practices dimension, but since these two structures are theoretically important and different, the model was not tested by combining these structures.

Discussion, Conclusion, and Recommendations

In the study, the instrument developed by Archibald et al. (2021) was adapted into Turkish in order to measure the readiness of pre-service teachers and teachers for blended teaching. The model based on the instrument has been revealed as a result of many researches and covers the components of blended teaching well (Archibald et al., 2021; Graham et al., 2019b; Pulham & Graham, 2018; Pulham et al., 2018). Archibald et al. (2021) tested the structure by applying the instrument as a pretest and posttest in a blended teaching course provided to pre-service teachers during a semester. Adapted to Turkish, this instrument includes dimensions of trends, online integration and management, data practices, personalization, and online interaction. Different from the original instrument, the instrument was applied to the sample of teachers. Similarly, Archibald et al. (2021) suggested testing this model in in-service teachers and international contexts. In the reliability analysis, it was determined that the Turkish form of the instrument and its sub-dimensions were highly reliable. In the CFA, the five-factor structure of the instrument was generally confirmed at the level of good fit.

Archibald et al. (2021) performed structural invariance analyses to test the measurement invariance in the second phase of their study, and at this stage, they had to remove the trends dimension from the instrument. Since they demonstrated the measurement invariance of the other four constructs in their study, they stated that future researchers could also safely use these constructs to examine interventions on

Table 4.
Item Analysis

Factor	Item	Factor Loading	Error Variance	t^*
Trends	M1	.630	.060	15.138
	M2	.818	.044	22.743
	M3	.830	.045	23.336
	M4	.854	.043	24.666
	M5	.891	.039	26.830
	M6	.847	.042	24.244
	M7	.821	.038	27.114
	M8	.874	–	–
Online integration and management	M9	.752	.046	18.591
	M10	.804	.044	20.626
	M11	.752	.054	18.474
	M12	.865	.043	23.206
	M13	.846	–	–
	M14	.854	.035	26.123
	M15	.748	.037	20.219
	M16	.894	.033	29.091
	M17	.849	.036	25.867
	M18	.897	–	–
	M19	.876	.034	27.706
Data practices	M20	.863	–	–
	M21	.857	.041	24.797
	M22	.907	.036	27.838
	M23	.827	.045	23.202
	M24	.930	.036	29.424
	M25	.914	.037	28.296
	M26	.933	.036	29.629
	M27	.926	.037	29.161
Personalization	M28	.924	–	–
	M29	.929	.028	36.084
	M30	.892	.031	31.687
	M31	.889	.033	31.451
	M32	.864	.036	29.090
	M33	.896	.031	32.136
	M34	.885	.033	30.998
	M35	.860	.034	28.682
Online interaction	M36	.853	–	–
	M37	.758	.051	19.606
	M38	.887	.040	25.682
	M39	.876	.043	25.074
	M40	.938	.038	28.843
	M41	.928	.039	28.163
	M42	.880	.041	25.237
	M43	.867	.045	24.613

*For all t values $p < .01$.

teachers and teacher educators. However, measurement invariance was not tested because the design of this study did not include a pretest–posttest application. By designing intervention-based studies, measurement invariance in the structure of the instrument can also be tested using the Turkish form.

When the teachers' readiness for blended teaching was examined according to the sub-dimensions of the instrument, the highest mean was found in the online interaction dimension, which focuses on the teacher's ability to facilitate online interaction with and between students and students. This was followed by the trend dimension focusing on teachers' attitudes and beliefs toward blended learning and teaching. The lowest mean was found in the personalization dimension, which focused on the teacher's ability to provide a learning environment that allows students to customize objectives, pace, or

Table 5.
Fit Values Obtained as a Result of DFA

Fit Value	Sample Value	Evaluation	Resource
χ^2/SD	3.48	Close to good fit	Sümer (2000)
RMSEA	.075	Good fit	Browne and Cudeck (1993)
CFI	.92	Good fit	Tabachnick et al. (2007)
IFI	.92	Good fit	Baumgartner and Homburg (1996)
TLI	.91	Close to good fit	Tabachnick et al. (2007)
GFI	.76	Close to good fit	Sümer (2000)
AGFI	.73	Close to good fit	Sümer (2000)
RMR	.09	Acceptable fit	Browne and Cudeck (1993)

Note: RMSEA=root mean square error of approximation; CFI=comparative fit index; IFI=incremental fit index; RMR=root mean square residual; GFI=goodness of fit index; AGFI=adjustment goodness of fit index; SD=standard deviation; TLI=Tucker-Lewis index.

learning path. Archibald et al. (2021) also stated in their study that the greatest improvement after the education given to pre-service teachers occurred in the dimension of personalization. Similarly, as a result of this study, it can be said that teachers need the most improvement in the personalization dimension of blended teaching. In the correlation analysis performed to determine the criterion validity of the instrument, positive, moderate, and high-level correlations emerged between the factors of the instrument, similar to the original instrument study. The study revealed a high level of correlation between data practices and personalization factors. The fact that the correlations between the factors of the instrument are higher than .85 may pose a problem in terms of the discriminant validity of the factors (Farrell & Rudd, 2009). However, since these two factors are theoretically important in blended teaching, they are not combined. Although these two factors theoretically represent different structures, the things performed in data practices in the blended teaching process support personalization. Therefore, these two factors may have been highly correlated. Similarly, Archibald et al. (2021) also found a high level of correlation between some factors in the pretest and posttest applications in their study. However, when they tested the model by combining the factors with high correlation, the model fit worsened. For this reason, they did not combine the factors and left them in the same structure.

As a result, in the study, it was determined that the original form of the instrument of readiness for blended instruction and the form adapted into Turkish had the same structure. The instrument adapted to Turkish is a valid and reliable measurement tool to measure teachers' readiness for blended teaching in Turkey. Blended teaching and learning have become more important than ever after the pandemic. It is expected that teachers at all educational levels, from primary school to higher education, have the skills to apply blended teaching. The blended teaching proficiency model, which forms the basis of this study, and the instrument adapted to Turkish can be used to reveal the development of teachers and pre-service teachers in the education to be

Table 6.
Mean, Standard Deviation, and Correlation Values of the Factors of the İnstrument

Factors	Mean	SD	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Trends	4.59	1.15	1				
Online integration and management	4.44	1.09	.77*	1			
Data practices	4.33	1.26	.65*	.85*	1		
Personalization	4.17	1.28	.61*	.81*	.91*	1	
Online interaction	4.65	1.16	.68*	.76*	.77*	.79*	1

Note: SD=standard deviation.

organized. In this study, the instrument structure of the Turkish form was verified by applying the instrument to the teachers. In future studies, the instrument can be applied to pre-service teachers and the instrument structure can be verified in this sample group, and the results can be compared.

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