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Reliability and Validity of the Turkish Version of the Web-Based Learning Environment Instrument (WEBLEI)

Web-Tabanlı Öğrenme Ortamı Ölçeği Türkçe Formunun Geçerlilik ve Güvenirlilik Çalışması

G. Alev ÖZKÖK*

ABSTRACT: This study was designed to test the validity and reliability of the Web-based Learning Environment Instrument (WEBLEI). Developed by Chang and Fisher (2003), the WEBLEI is a four-factor scale that measures the access, interaction, response and results. The multidimensional construct assesses student perceptions of four core aspects of the Web-based learning environment. The psychometric properties of the Turkish form of the WEBLEI were examined using a sample of 772 post-secondary students from Turkey. A series of CFA were performed to test four models to compare differing conceptualizations of the underlying structure of the WEBLEI to examine whether the WEBLEI comprises four sub-constructs, proposed by Chang and Fisher (2003). Results indicated that the psychometric properties of correlated four-factor model were a satisfactory fit data. Present findings evidence that the WEBLEI is valid and reliable measure of Turkish students' perceived web-based learning environments traits.

Keywords: Web-based education, scale validation, confirmatory factor analysis, psychosocial learning environment.

ÖZ: Bu araştırmada, Web-tabanlı Öğrenme Ortamı Ölçeği'nin (Chang ve Fisher, 2003) Türkçe formunun oluşturulması ve ölçeğin Türkçe formunun Türkiye'nin sosyokültürel yapısına uygunluğu, psikometrik özellikleri açısından araştırılması amaçlanmıştır. Web-tabanlı öğrenme ortamlarının psikolojik ve sosyolojik atmosferine yönelik öğrenci algılarının ölçülmesi için Chang ve Fisher (2003) tarafından geliştirilen Web-tabanlı öğrenme ortamı ölçeği dört farklı boyutta yer alan 32 maddeden oluşmaktadır. Bu boyutlar; erişim, etkileşim, memnuniyet, içerik yönetimi. Ölçeğin Türkçe formu Türkiye'deki dört üniversitede öğrenim gören 772 öğrencisi üzerinde gerçekleştirilmiştir. Web-tabanlı öğrenme ortamı ölçeğinin Türkçe formundan elde edilen ölçümlerin çözümlenmesinde doğrulayıcı faktör analizine başvurulmuş ve beş farklı model sınanmıştır. Bu modellerden elde edilen faktör çözümlemesi sonucunda 32 maddenin dört farklı alt boyuta yer aldığı ilişkili dört faktörlü modele ilişkin veri-model uyum değerleri ve bağıntılarından anlamlı sonuçlar elde edilmiştir. Bununla birlikte ölçme aracından elde edilen verilerin güvenirliği (Cronbach Alfa) ile test edilmiştir. Elde edilen sonuçlar, Web-tabanlı Öğrenme Ortamı Ölçeği'nin Türkçe formunun geçerli ve güvenilir bir ölçme aracı olduğunu göstermektedir.

Anahtar sözcükler: Web-tabanlı öğrenme, ölçek uyarlama, doğrulayıcı faktör analizi, psikososyal öğrenme ortamları.

1. INTRODUCTION

In recent years, like many other developing countries in the world, the Turkish higher education system has had to face an increased adoption of computers and networks and has been strongly challenged by the role and use of Internet/ web technology. Due to the more feasible application of the web for supporting teaching and learning, most Turkish universities have adapted the web-based technologies to support their traditional learning environments.

This impressive movement from traditional learning environments towards web-based learning environments has established a bridge between the functions of the two; however, what is missing is substantial knowledge and understanding of the intricacies of how these new, web-based environments impact the social and psychological factors of this relatively new way of teaching and learning. We know that positively perceived learning environments strengthen higher education (Fraser 1998, Walker 2003) and as Turkish educators, we must have some

* Assist. Prof. Dr., Hacettepe University, Faculty of Education, Ankara-Turkey, e-mail: ozkok@hacettepe.edu.tr

insight regarding web-based learning environments in order to provide meaningful post-secondary education.

Web-based learning research (i.e., blended learning which combines both online and face-to-face approaches, e-learning, and technology enhanced learning) has rapidly brought together Internet-based technologies and learning environments research (Walker & Fraser 2005; Akbıyık & Seferoglu 2012). It is important to conduct research on the social and psychological aspects of online learning environments and draw from it the students' perceptions of those learning environments. The study described here concentrates on online learning in higher education and its effectiveness as a learning environment. This is achieved by investigating students' perceptions of their learning environment in the distance education sphere.

Learning environments research in relation to its social-psychological context has become a firmly established form of research (Fraser 1998; Haertel et al. 1981) derived primarily from the work of psychologists Walberg (1976) and Moos (1974). Learning environment researchers have recognized that students' perceptions are important social and psychological constructs in classrooms using a range of learning environment instruments (Fraser 1998). Their investigation of the importance of the learning environment in enhancing learning (Fraser & Fisher 1982) has broadened the development of the field of online psychosocial learning environments (Chang & Fisher 1998).

Studies of the web-based learning environments have shown that student perceptions of psychosocial aspects of these learning workplaces account for appreciable amounts of variance in learning outcomes (Fraser 2007; Maor & Fraser 1996; Celen, Çelik & Seferoglu 2013). However, in spite of the increased popularity and presence of web-based learning opportunities, there is a limited study on students' perceptions of psychosocial characteristics of web-based learning environments in Turkey.

There are numerous reliable and valid learning environment instruments which have been used to ascertain students' perceptions of their learning environments. Goh and Tobin went on to suggest the need for the development of a suitable learning environment instrument that would satisfactorily measure students' perceptions in web-based learning environments (Chandra et al. 2012). Due to the increasing number of psychosocial online learning environments scales have been developed to measure students' perceptions of different social and psychological aspects of technology-rich learning environments. The primary problem is that there are too few instruments specifically developed or adapted to measure different social-psychological traits found exclusively in the unique web-based learning environments in Turkish context. Only recently have studies been conducted specifically regarding the Turkish post-secondary learning environment; *Reliability and Validity of a Turkish Version of the DELES* (Özkök et al. 2009), *An Examination of the Factor Structure of the Turkish Version of the Online Learning Environment Survey* (Özkök et al. 2011) and *Validity and Reliability of the Turkish Form of Technology-Rich Outcome-Focused Learning Environment Inventory* (Çakır 2011).

Therefore, there is a need for instruments that measures different dimensions of the psychological and sociological climate of the Turkish post-secondary web-based learning environment. In the present study, it was attempted to fill this gap in Turkish education literature and to facilitate such work by measuring students' perception of psychosocial dimensions of web-based learning environment. Therefore, it has been initially decided to adapt one of the recent web-based learning environment instruments to measure psychosocial dimensions of web-based learning environment in Turkish context, using the latest scale adaptation techniques.

Rather than create a new instrument to aid in the measurement of students' perceptions of different psychosocial domains of web-based education we adapted an existing instrument used in other countries and applied it in the Turkish educational setting. Adapting and validating an

already existing instrument was preferable to developing a new instrument since the construct of web-based learning environments is complex. Adapting tests saves time and money, and allows for comparative studies across cultural and language groups (Hambleton 1999).

1.1. Measuring Student's Perception of Web-Based Learning Environments

The success of research initiatives in this field has relied heavily on the development of economical, reliable and valid learning environment instruments (Chandra et al. 2012). From much of the published research, Likert-type psychosocial online learning environments scales have been developed and validated to measure students' perceptions of different social and psychological aspects of web-based learning environments. The key learning environment instruments are:

(1) *Connecting Communities of Learning* (CCL) which was developed by Tobin (1998) has three dimensions: Emancipatory Activities, Co-Participatory Activities and Qualia. (2) Aldrige and Fraser's (2004) *Technology-Rich Outcomes-Focused Learning Environment Inventory* (TROFLEI) has ten scales: Student Cohesiveness, Teacher Support, Involvement, Task Orientation, Investigation, Cooperation, Equity, Differentiation, Computer Usage and Young Adult ethos. (3) Pearson and Trinidad's (2005) *Online Learning Environment Survey* (OLES) contains nine scales: Computer Usage, Teacher Support, Student Interaction and Collaboration, Personal Relevance, Authentic Learning, Student Autonomy, Equity, Enjoyment, and Asynchronicity. (4) Walker's (2003) *Distance Education Learning Environments Survey* (DELES) has six scale: Instructor Support, Student Interaction and Collaboration, Personal Relevance, Authentic Learning, Active Learning, and Student Autonomy. Other web-based learning environment scales were developed by Jegede et al. (1998), Laurillard (1993), Khan (1997), Palloff and Pratt (1998) and Reeves and Reeves (1997). While the above instruments have been useful to facilitate a greater understanding of student's perceptions of different aspects of online learning environment, few have attempted to use a validated and reliable scale in Turkey.

In the end, the WEBLEI is a Web-based Learning Environment Instrument was designed with four sub-scales to capture student's perceptions of web-based learning environments. WEBLEI became a 32-item scale covering access, interaction, response, and results. Three scales (Access, Interaction, and Response) are built upon the work of Tobin (1998). While the last scale (Results), developed by Chang and Fisher, focuses on information structure and the design of online material. The scales are as follows: (1) *Access* (Scale 1) consists of 8 items that measured accessing the online materials. (2) *Interaction* (Scale 2) consists of 8 items that measured the interaction and participation of all parties involved in the online learning. (3) *Response* (Scale 3) consists of 8 items that measured the responses and perceptions of students learning in this environment. (4) *Results* (Scale 3) consists of 8 items that measured students' learning outcome and achievement in this learning environment.

Typical items in the WEBLEI are "I can access the learning activities at times convenient to me." (Scale 1), " I communicate with other students in this subject electronically (email, bulletin boards, chat line.)" (Scale 2), "I enjoy learning in this environment." (Scale 3), "The organization of each lesson is easy to follow." (Scale 4). The four scales are rated on a 5-point scale (Almost Never; Seldom; Sometimes; Often; Almost Always). Based on a sample of 334 students in the Australia, using principal component analysis with varimax rotation, Chang and Fisher (2003) identified four components, which assesses student perceptions of four core aspects of the web-based learning environment. Internal consistency for each component and the WEBLEI as a whole was calculated using Cronbach's Alpha and these resulted in Access (0.79), Interaction (0.68), Response (0.69), and Results (.87).

1.2. Purpose of the Present Study

The purpose of the present study is to examine the factorial validity of the Web-based Learning Environment Instrument (WEBLEI), which has investigate students' perceptions of psychosocial characteristics of web-based learning environments, for use by post-secondary students in Turkey.

2. METHOD

2.1. Data Collection

A primary requirement in research involving multi-group comparisons is to ensure instrument equivalence, or invariance, of scales and tests (Byrne & Watkins, 2003). Due to the importance of invariance in all cross-group comparisons, translation is an especially important criterion when using a measure designed in a source language (e.g., English) that is translated in into a target language (e.g., Turkish) (Villagran et al. 2005). The goal of the translation process of instrument is to ensure that the attributes of interest are measured equivalently across linguistic and cultural differences (Behling & Law 2000). Since the translation and back-translation technique is rated relatively high on informativeness, source language transparency, security and practically (Behling & Law 2002), it is used in this research. The steps of translation and back-translation technique are as follows (Behling and Law 2002, p.19):

1. Bilingual individual translates the source language instruments into the target language.
2. The second bilingual with no knowledge of the wording of the original source language document translates this draft target language rendering back into the source language.
3. The original and back-translated source language versions are compared.
4. If substantial differences exist between the two source language documents, another target language draft is prepared containing modifications designed to eliminate the discrepancies.

In this research, the original WEBLEI was translated into Turkish by using a translation and back-translation method defined by Behling and Law (2002) to ensure semantic equivalence between the English version of the WEBLEI and the Turkish version of the WEBLEI. First, the WEBLEI was translated from English into Turkish by five bilingual translators who were PhDs in Education at universities in Turkey. Second, researcher and two colleagues independently reviewed and collectively compared all five translations to determine the best translation for each item. Third, three other bilingual translators who had PhD in education were asked to translate the Turkish version of WEBLEI from Turkish back into English.

During this process, the first draft of the Turkish version, three researchers who had no knowledge of the source instrument translated it from Turkish back into English. After these processes, researcher and two colleagues who work on education in Turkey reviewed the two back-translations. Finally, researchers ascertain that the WEBLEI items were culturally valid and matched the intent of the original instrument. After final development, the Turkish version of the WEBLEI was administered to 772 students who were studying online in four Turkish universities. The instrument was administered through Web-based survey form compiled in an SQL database (Shannon, Johnson, Searcy & Lott 2002).

2.2. Participants

The sample consisted of 772 post-secondary students who enrolled in online education classes during the study period the academic year 2008-2009. There were 441 (57%) males and 331 (43%) females in the sample. Students in the sample were enrollees in different degree programs from four universities. Participation in the study was voluntary. Demographic characteristics of the students are presented in Table 1.

Table 1: Sample distribution by age, gender and school type, *N=772*

	20≤		**21-25**		**≥26**		
	Female	**Male**	**Female**	**Male**	**Female**	**Male**	**Total**
1. Public University	78	64	61	73	34	56	381
2. Public University	-	-	9	19	26	44	98
3. Public University	6	15	7	21	-	-	49
1. Private University	32	24	57	102	21	23	244
Total	116	103	134	215	81	123	772

2.3. Data Analysis

In recent years, many researchers have used Confirmatory Factor Analysis (CFA) to examine the factorial validity of measures. In this study, CFA was used to examine the structure of the WEBLEI (Chang & Fisher 2003) in the Turkish context. CFA within the framework of structural equation modeling provides a methodological tool for the representation and investigation of structures on the level of latent variables (Bentler 1976; Bentler & Weeks 1980).

Moreover, CFA can produce further information of the dimensionality and the psychometric properties of a scale. By testing various models against one another, one can glean additional details about how the items and constructs of a scale are related to one another. In order to retain the model of best fit, rather than simply confirming a model through one test, CFA was selected because it provides a strong test of various models, which are tested against one another. It can test a variety of conceptualizations of the data and allow investigators to compare differing models. These models are variations of one another, with sets of them often being nested (Maruyama 1998). Finally, this technique can enhance confirmation that the psychometrics of a scale and the structure of a scale in a set of data (Rubio et al. 2001).

A series of CFA was conducted to test several models and compare differing conceptualizations of the factor structure. These included the following: (1) the *null model* that assumes the factors are unrelated. It is a baseline model from which comparisons to other models can be made. (2) the *one-factor model* tests whether the scale is measuring one overall factor, rather than multidimensional factors. This model suggests that this phenomenon is best represented by a unidimensional construct. (3) the *uncorrelated factors model* tests the multidimensional structure of scale – whether factors are independent or orthogonal. Support for this model would suggest that the influence strategies are independent constructs and thus not related to one another. (4) the *correlated factors model* tests the idea that the multidimensional structure of scales are related to one another. Retention of this model suggests that the factors are intercorrelated with one another (Noar 2003).

The model of best fit was decided according to (1) consistency with previous research and theory (Harlow & Rose 1994), and (2) indexes of fit. Hair et al. (2006) suggested using fit indices from various categories: To examine the measurement models, indices of model fit, the chi-square to degrees of freedom ratio ($\chi 2/df$) (Wheaton, et al. 1977), Comparative Fit Index (CFI), and Root Mean Square Error of Approximation (RMSEA), the Non-Normed Fit Index (NNFI), and Standardized Root Mean Residual (SRMR) (Maruyama 1998) as well as robustness across estimation method and misspecification error (Hu & Bentler 1999) were used in this study.

RMSEA values should be less than 0.05 to indicate good fit (Browne & Cudeck 1993). Well fitting models obtained through SRMR will have values less than .05 (Byrne, 1998). CFI values above 0.95 indicate good model fit (Byrne 1998). Non-Normed Fit Index (NNFI), and

Standardized Root Mean Residual (SRMR) values greater than 0.90 (Maruyama, 1998) are meaningful. Because $\chi 2$ has been found to be too sensitive to an increase in sample size and to the number of observed variables (Hair at al. 2006), the ratio of $\chi 2$ to its degree of freedom ($\chi 2$/df) was used, with a range of not more than 3.0 being indicative of an acceptable fit between the hypothetical model and sample data (Carmines & McIver 1981).

3. FINDINGS

To analyze of data, three statistical procedures were employed. a) Descriptive analyses used to obtain from data set, b) Confirmatory factor analyses (CFA) were used to investigate the dimensionality of the WEBLEI, c) Reliability analysis using Cronbach's alpha.

3.1 Descriptive statistics

In this section, the range of means is between 2.41 to 4.13 on a scale of 1 to 5, suggesting that most students agree with Almost Never or Almost Always regarding their perceptions of their web-based learning environment with the items in the WEBLEI. Table 2 presents the mean, standard deviation (SD), skewness, and kurtosis for the 32 items of the WEBLEI within four scales. The recommendations of Kline (2005) that the skew and kurtosis indices should not exceed 3 to ensure normality of the data, the data in this study are regarded as normal for further analysis (see Table 2).

Table 2: Descriptive statistics for the WEBLEI-TR (*N=772*)

Factors	Item	Mean	SD	Skewness	Kurtosis
Access	1	3.87	1.17	-0.83	-0.32
	2	3.61	1.27	-0.59	-0.69
	3	3.89	1.09	-0.72	-0.35
	4	3.56	1.24	-0.62	-0.50
	5	4.13	1.01	-1.21	1.03
	6	3.66	1.27	-0.70	-0.55
	7	3.81	1.25	-0.77	-0.54
	8	3.42	1.26	-0.42	-0.81
Interaction	9	4.01	1.15	-0.58	-1.15
	10	3.57	1.27	-0.29	-1.19
	11	3.22	1.23	-0.10	-1.02
	12	3.40	1.24	-0.07	-1.23
	13	3.42	1.25	-0.14	-1.18
	14	3.15	1.32	-0.09	-1.17
	15	3.18	1.28	-0.01	-1.15
	16	3.35	1.26	-0.03	-1.25
Response	17	2.72	1.33	0.30	-1.00
	18	2.67	1.27	0.32	-0.88
	19	2.84	1.31	0.15	-1.07
	20	3.04	1.29	0.04	-1.04
	21	2.67	1.23	0.36	-0.80
	22	2.41	1.18	0.56	-0.52
	23	2.89	1.32	0.16	-1.07
	24	2.72	1.28	0.30	-0.93
Results	25	3.83	1.18	-0.78	-0.28
	26	3.28	1.38	-0.23	-0.17
	27	3.64	1.20	-0.43	-0.88
	28	3.49	1.30	-0.37	-1.01
	29	3.30	1.41	-0.27	-1.18
	30	3.68	1.31	-0.65	-0.75
	31	3.77	1.26	-0.70	-0.61
	32	3.69	1.28	-0.57	-0.88

The means and SD for the scales are shown in Table 3. The means for Access, Interaction, and Results are higher than Response although all standard deviations were similar.

Table 3: Means and Standard Deviations for WEBLEI-TR Dimensions

	Mean	SD	Alpha	Access	Interaction	Response	Results
Access	3.74	0.79	0.82	1			
Interaction	3.41	0.80	0.80	-0.01	1		
Response	2.74	0.82	0.83	0.37	-0.04	1	
Results	3.58	0.75	0.78	0.46	-0.04	0.21	1

3.2 Confirmatory Factor Analysis (CFA)

In this section, to investigate the dimensionality of the WEBLEI, a series of CFA were conducted to test the five models described above using the data set from the 772 students. Further, to estimate factor loading of variables, CFA is conducted, because it can show the level of regression path of latent to its indicators.

Table 4: Confirmatory factor analysis of alternate models

Model	$\chi 2$	df	χ^2/df	NNFI	CFI	RMSEA	SRMR
Null	11530.41	496	23.25	-	-	0.16	-
One-factor	5843.59	464	12.59	0.7	0.72	0.12	0.11
Uncorrelated factor	1025.89	464	2.21	0.94	0.95	0.04	0.07
Correlated factor	841.36	458	1.84	0.96	0.96	0.03	0.03

First, the CFA yielded unsatisfactory model fit for the *null model* that assumes all the factors to be unrelated. Second, a *one-factor model* tests whether all the factors load on one overall factor. The one-factor model suggests that the students in this study do not differentiate among the factors and that all items are representative of a unidimensional construct. Third is an *uncorrelated factor model* that tests whether all the four factors in the model are independent. This model suggests that these four factors are not related to one another and are indeed four different constructs. As can be seen in Table 3, fit indices improved immensely when comparing both the *one factor* and *uncorrelated factors models* to the *null model*. However, none of these models fit well. Fourth is a *correlated factor model* that tests whether the four factors are related to one another. The *correlated factor model* structure was hypothesized, considering a multidimensional WEBLEI consisting of four factors, access, interaction, response, and result.

Finally, the dimensionality of the WEBLEI and the relations item-factor validity of factor-solutions extracted from data set were explored by CFA. The numerical results of the correlated factor model are presented in Table 4. The relationships of WEBLEI factorial structure, as it was a Turkish form of the original scale, are given in Figure 1. The dominant relation with its path coefficient value of 0.46 is obtained between Access and Results. Next higher relation obtained between Access and Response is 0.37. The lowest level value (-0.01) is obtained between Access and Interaction (see Table 3).

The four factors of WEBLEI are latent variables shown in ellipses. Each latent variable is assessed indirectly by observed variables (i.e., scale items) shown in rectangles. In this study, all of latent variables in each area had at least eight items. Acceptable value for factor loading is more than 0.5 and it is good indicator if it is equal to 0.7 and above (Hair et al., 2010). Figure 1 is presented four WEBLEI latent variables and their indicators with standardized factor loading of them.

Table 5: Parameter estimates of the 32-item WEBLEI *(4-correlated factors)*

Factors	Item	unstandardised estimate	standardized estimate	t-value**
Access	1	1.00*	0.49	-
	2	1.40	0.63	11.37
	3	1.20	0.62	11.35
	4	1.26	0.58	10.91
	5	1.04	0.58	10.96
	6	1.51	0.67	11.79
	7	1.33	0.61	11.18
	8	1.37	0.62	11.31
Interaction	9	1.00*	0.48	-
	10	1.42	0.62	10.59
	11	1.27	0.57	10.48
	12	1.43	0.64	11.06
	13	1.26	0.56	10.38
	14	1.24	0.52	9.92
	15	1.38	0.60	10.73
	16	1.43	0.63	10.98
Response	17	1.00*	0.60	-
	18	1.06	0.67	13.96
	19	1.05	0.65	13.62
	20	0.82	0.51	11.50
	21	0.89	0.59	12.72
	22	0.82	0.56	12.31
	23	0.77	0.47	10.73
	24	0.92	0.58	12.59
Results	25	1.00*	0.37	-
	26	1.80	0.57	18.16
	27	1.20	0.44	7.31
	28	1.74	0.59	8.23
	29	1.84	0.57	8.16
	30	1.52	0.51	7.81
	31	0.95	0.33	6.26
	32	1.71	0.58	8.20

* This value was set at 1.00 to set the metric for estimation purpose. *p<.05

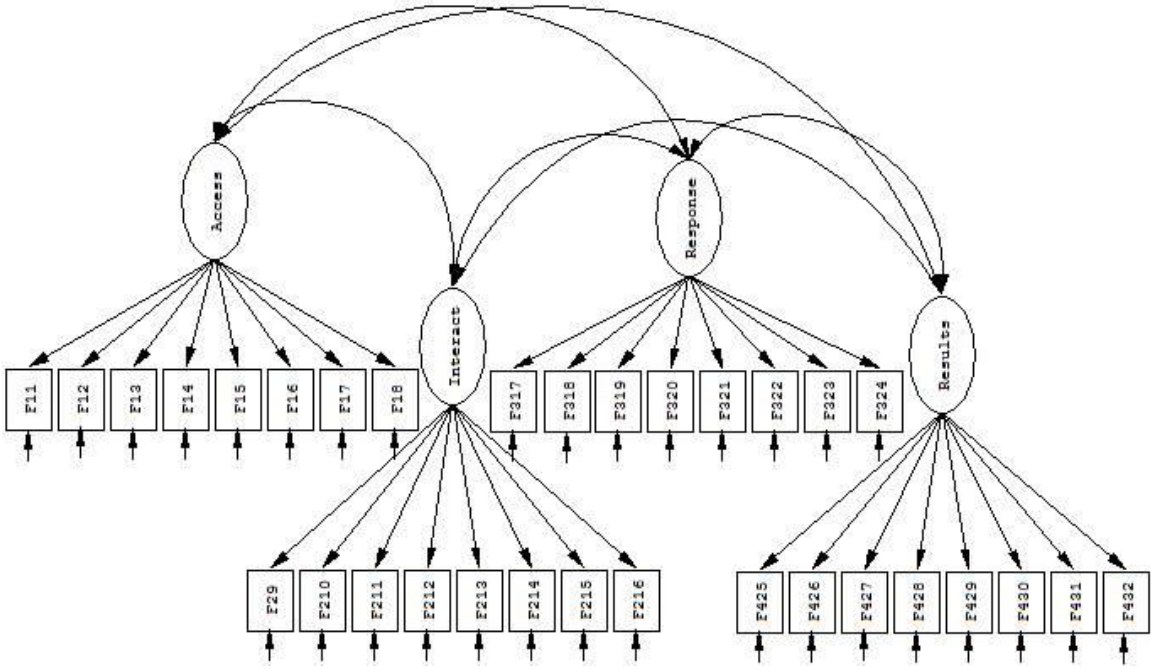

Figure 1. Correlated Four Factor Model of Web-based Learning Environment Instrument

3.2 Confirmatory Factor Analysis (CFA)

Internal consistency was calculated using Cronbach's alpha for each component of the WEBLEI. Results demonstrated that while the reliability index for the WEBLEI as a whole was acceptable (0.79), those of the separate component fell below the minimal level of >0.70 suggested by Nunnally (1978). The results (see Table 3) showed strong reliability coefficients for each construct; the coefficient alpha for the WEBLEI factors ranged from 0.78 to 0.83 in Turkish data.

4. DISCUSSION and CONCLUSION

The Web-based Learning Environment Instrument (WEBLEI)—developed by Chang et al. (2003) provides educators and researchers with information about the psychosocial dimensions found in web-based learning environments. The goal of this study was to attempt to examine factor structures of the WEBLEI. Toward this goal, a series of CFA's were conducted to test the models described above and CFA was used to examine the factorial structure of the WEBLEI using the maximum likelihood estimator with Lisrel 8.80 (Jöreskog and Sörbom 2003) to determine whether the four scale loadings previously reported by Chang and Fisher (2003) could be replicated using a Turkish data set. Model-data fit of four models was assessed using several goodness-of-fit indexes.

Some reasons for the popularity of CFA as method for assessing scale validity are the following: First, CFA provides a strong test of a model. Instead of testing one model, CFA tests various models against one another. These models are variations of one another, also known as nested models (Maruyama 1998). Hence, instead of confirming a model through one test, CFA tests a variety of conceptualizations of the data and allows a comparison of different models in order to identify the model of best fit for retention.

Second, CFA provides additional information about the dimensionality of a scale (e.g., Rubio, Berg-Weger, & Tebb 2001). When models are tested against each other, further details about how the items and constructs of a scale are related to one another are uncovered. The researcher may rely on such information to decide on the appropriate uses of a scale, alternative versions of a scale, or to further theory in a particular area.

From the above-mentioned benefits of using CFA to establish scale validity, several models were computed as part of the CFA to allow for comparisons of different conceptualizations of the factor structure to be made (Noar 2003). Confirmatory factor analyses exhibited satisfactory fit with the observed data from Turkish samples. The models we tested, only the correlated four-factor model (WEBLEI-TR) appeared to account best for the covariance between WEBLEI items. The result of CFA suggests that the WEBLEI-TR is as satisfactory as the original English version in regard to model fit and lack of fit indices. Given the evidence from CFA that the items well represented their factors. The results of this research provide strong evidence of the psychometric properties of Turkish form of WEBLEI. The results of the confirmatory factor analyses confirmed that there were indeed four scales in the WEBLEI. Results of the studied instrument showed appropriate construct validity. It means in assessing students' perceptions of web-based learning environments. The results of reliability analysis indicated that this instrument has a good reliability.

The WEBLEI can be used as an assessment tool in further development and monitoring of web-based learning programs in Turkish universities to offer more options for web-based education. In addition, there is reason for the WEBLEI to be used in the Turkish higher education contexts because of the following constructs: Access, Interaction, Response, and Result.

Since the validity results of the instrument suggest that WEBLEI can be used for future research on web-based learning environments in Turkey. This instrument will allow researchers and educators to evaluate their own web-based learning environments in accordance with the suggested scales. It is crucial that these suggested scales are (a) *accessing the online materials*, (b) *the interaction and participation of all parties involved in the online learning*, (c) *the responses and perceptions of students learning in this environment* and (d) *the students' learning outcome and achievement in this learning environment* affect students' perception toward web-based learning environment. As a result, this study will facilitate the growth of online learning environment research at post-secondary education in Turkey.

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Uzun Özet

Geleneksel sınıf ortamıyla ilgili araştırmaların en yaygın olanı, öğrencilerin sınıf ortamı algılarına dayanarak, onların bilişsel ve duyuşsal becerilerinin tahmin edilebilmesi üzerinedir (Fraser 1998; Fraser & Walberg 1991). Öğrenme ortamları, birçok öğrenme ortamı ölçme aracı kullanılarak 1930'lardan beri çalışılmıştır. Öğrenme ve öğretme şekillerinde geleneksel ortamlardan çevrimiçi ortamlara olan değişim, hem öğretmenler hem de öğrenciler için internet teknolojilerinin kullanılmasıyla yeni bir öğrenme-öğretme şekli sunmaktadır. Öğrencilerin internet tabanlı öğrenme ortamlarıyla ilgili algıları nasıldır? Bu soru, yeni teknolojilerin öğrenme-öğretme süreçlerindeki etkililiği üzerinde bir etkisi olması dolayısıyla oldukça önemlidir.

Öğrencilerin teknolojiyle donatılmış öğrenme ortamı algılarını tespit etmeye yönelik olarak geçerli ve güvenilir olan çok sayıda çevrimiçi öğrenme ortamı ölçme aracı yer almaktadır. Ancak Türkiye'de, bu tür ölçme araçlarından elde edilen test sonuçlarının geçerliliği ve güvenirliğini ortaya koyan yeterli sayıda çalışma bulunmamaktadır. Chang and Fisher (2003), lisans seviyesindeki öğrencilerin, çevrimiçi öğrenme ortamlarının psikolojik ve sosyal yönleriyle ilgili algılarını değerlendirmek için karma bir ölçek ortaya

koymuşlardır. Chang ve Fisher'in geliştirdiği Web-Tabanlı Öğrenme Ortamı Ölçeği, öğrencilerin web-tabanlı öğrenme ortamları hakkındaki algı düzeylerini belirlemek için oldukça faydalı bir ölçme aracı olarak ele alınabilir.

Bu bakımdan, bu çalışmanın amacı, Web-tabanlı Öğrenme Ortamı Ölçeğinin Türkçe'ye adapte edilmesi ve ölçeğin geçerliliği, güvenirliği ve ölçekteki maddelerle alt boyutlar arasındaki ilişkiler gibi psikometrik özelliklerin araştırılmasıdır. Web-tabanlı Öğrenme Ortamı Ölçeği dört boyut altında toplanmış olan 32 maddeden oluşmaktadır. Bu alt boyutlar şunlardır: a) Erişim, b) Etkileşim, c) Memnuniyet, d) İçerik yönetimi. Web-tabanlı Öğrenme Ortamı Ölçeğinin alt boyutları şu şekilde açıklanabilir: (1) Erişim (birinci alt boyut), çevrimiçi materyallere erişimi ölçen 8 maddeden oluşmaktadır. (2) Etkileşim (ikinci alt boyut), çevrimiçi öğrenmeye dahil olan herkesin katılımını ve etkileşimini ölçen 8 maddeden oluşmaktadır. (3) Memnuniyet (üçüncü alt boyut), çevrimiçi ortamda öğrenim gören öğrencilerin algılarını ve tepkilerini ölçen 8 maddeden oluşmaktadır. (4) İçerik yönetimi (dördüncü alt boyut), öğrencilerin bu ortamdaki öğrenme ürünlerini ve başarılarını ölçen 8 maddeden oluşmaktadır. Dört alt boyut, 5'li likert tipi ölçekle puanlanmaktadır (Hemen hemen hiç, nadiren, bazen, sık sık, hemen hemen her zaman) (daha fazla bilgi için, Bkz. Chang vd. 2003).

Bu çalışmada, Web-tabanlı Öğrenme Ortamı Ölçeği'nin orjinal hali Türkçe'ye çevrilmiş olup, bu çevirinin geçerliliği uzman görüşleriyle desteklenmiştir. Türkçe'ye adaptasyonu, 5 dil ve alan uzmanının görüşlerine dayalı olarak yapılan Web-tabanlı Öğrenme Ortamı Ölçeği, 4 farklı üniversitede öğrenim gören toplam 772 öğrenciye uygulanmıştır. Uygulama verilerini elde etmek için ölçeğin Türkçe formu öğrencilere verilmiştir. Bu çalışmada, orjinal ölçeğin yapısını, Chang ve Fisher (2003) tarafından maddeler ve alt boyutlar arasında olduğu belirtilen ilişkilere dayalı olarak doğrulayıcı faktör analizi (DFA) yapılmıştır.

Bu çalışmada doğrulayıcı faktör analizi, varsayımsal modelini sıfır hipotezi, tek faktör modeli, ilişkisiz faktörler modeli ve ilişkili faktörler modeli gibi alternatif modelleri değerlendirmek için kullanılmıştır. İlişkili faktörler modeli, madde yapıları arasındaki ilişkilere dayalı ölçme modelinin, veri-model uyum indeksleri ve model parametrelerine göre iyi uyum ve psikometrik özellikler göstermiştir.

Ölçme modeli, test puanlarının iç tutarlılığı sınanarak değerlendirilmiştir. Her dört ölçek için de alfa güvenirlik değerleri uygun düzeydedir (güvenirlik katsayılar ı≥ 0.70). Doğrulayıcı faktör analizinden elde edilen faktör yükleri, bütün maddeler karşılık geldikleri yapılar üzerinde yeterince yüksek yük oluşturdukları için, geçerliliği için yeterli bir kanıt sağlamaktadır.

Bu çalışmanın bulguları, Web-tabanlı Öğrenme Ortamı Ölçeği'nin Türkçe formunun oldukça iyi bir düzeyde geçerlilik ve güvenirlik seviyesine sahip olduğunu ve öğrencilerin web-tabanlı öğrenme ortamlarına yönelik algı düzeylerini değerlendirmek için geçerli ve güvenilir bir ölçme aracı olduğunu ortaya koymaktadır. Öğrencilerin Web-tabanlı Öğrenme Ortamı Ölçeğine verdikleri cevaplar, öğrencilerin web-tabanlı öğrenmenin Türkiye'deki üniversite eğitiminde etkili olup olmadığı konusunda neler düşündüklerini ortaya koymaktadır. Araştırmacıların ve geliştiricilerin bu ölçme aracına sahip olması, onların kendi web-tabanlı öğrenme ortamlarına yönelik belirtilen alt boyutlar ile öğrencilerin psikososyal algılarına uygun değerlendirmelerine olanak sağlayacaktır.

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