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DEVELOPMENT OF A SCALE FOR MEASURING STUDENTS' ATTITUDES TOWARDS OUT-OF-SCHOOL LEARNING ACTIVITIES (OoSLA)

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ABSTRACT

The aim of the present study was to develop an attitude scale to measure students' attitudes toward out-of-school learning activities (OoSLA). The study was conducted with two separate study groups consisting of a total of 620 students. Expert opinion was sought on the content validity and face validity of the scale. An Exploratory Factor Analysis (EFA) and a Confirmatory Factor Analysis (CFA) were performed for the construct validity of the scale. The EFA yielded a structure consisting of 22 items and three factors, which accounted for 43.30% of the variance. The factors that were revealed were labeled as follows: "Avoidance of Activities and Deviating from the Learning Goal," "Motivation and Participation," and "Approaching the Learning Goal." The results of the CFA demonstrated that the scale had indices indicating an "acceptable fit" or a "perfect fit." The reliability of the measurements was examined by means of Cronbach Alpha, composite reliability, and the Spearman-Brown Split-Half Test Reliability methods, and it was determined that the calculated reliability coefficients were within acceptable limits. The results of Tukey's Test for Non-Additivity indicated that the scale was not additive. The item-total correlation and the 27% bottom-top group comparisons showed that all of the items on the scale were discriminatory. Ultimately, a valid and reliable measurement scale to reveal students' attitudes towards OoSLA was developed.

Keywords: *Out-of-school learning, Attitude, Scale Development, Informal Learning, Non-Formal Learning*

INTRODUCTION

For success in today's world, students need to be equipped with 21st-century skills such as creativity, critical thinking, problem-solving, communication, and social skills. It is important that students' learning environment is also supportive of these skills (Partnership for 21st Century, 2019). Hence, students' exposure to different learning environments is considered to contribute to their development of different skills. Thus today, learning and teaching are not only restricted to the school environment but also take place in out-of-school learning environments (OoSLE). OoSLE include informal and non-formal learning environments, which provide students with different learning opportunities that are non-existent in traditional learning environments (Ertaş Kılıç, & Şen, 2014). Eshach (2007) defines non-formal OoSLE as zoos and botanical gardens, museums/science centers, planetariums, excursions/nature activities, industrial institutions, national parks, interactive exhibitions, and aquariums, while informal learning environments as streets/play areas, mobile devices, the home environment, free activities at school, web 2.0 applications, and e-learning. Non-formal learning environments support individuals' learning process, they are pre-prepared and structured, and they are under the guidance or leadership of the teacher. In non-formal environments, learning is not sequential and generally not assessed; rather, they

create the opportunity for knowledge to be constructed and developed. On the other hand, informal learning environments emerge spontaneously and randomly, and they are not purposive or planned; in informal learning environments, learning takes place under the leadership of the learner and is not assessed (Eshach, 2007; Fidan, 2012). Out-of-school learning activities (OoSLA) enable the use of non-formal and informal learning environments for formal learning (Salmi, 1993). In the present study, OoSLA are defined as activities that are planned and structured based on the aims of the education program accompanied by a guide or teacher in areas outside of the school building (nature parks, museum, science exhibitions, factory, etc.) and institutions (university, industrial chambers, etc.). Saraç (2017) notes that studies on OoSLA are more frequently conducted in the field of sciences as topics of science can be more closely associated with daily life, and then follows studies conducted in the field of social sciences. These studies have revealed that OoSL environments have positive impacts on academic success and attitude (Sturm & Bogner, 2010; Şentürk & Özdemir, 2014; Yavuz, 2012), enhances the ability to observe and the acquisition of permanent knowledge (Balkan Kıyıcı & Atabek Yiğit, 2010), facilitates the transfer of knowledge to daily life (Ertaş, Şen, & Parmaksızoğlu, 2011), and contributes to the cognitive and affective development of students (Berberoğlu & Uygun, 2013; Güler, 2011).

A detailed review of studies on attitudes towards OoSLA reveals that these studies aimed to reveal students' attitudes toward different disciplines such as sciences (Jarvis & Pell, 2005) and social sciences (Filiz, 2010), toward science (Şentürk & Özdemir, 2014; Göloğlu Demir & Yılmaz, 2018), and field excursions (Memişoğlu & Kamçı, 2013; Orion & Hofstein, 1991). Studies on attitude are conducted with the aim of impacting behavior by predicting individuals' behaviors, revealing individuals' attitude towards the situation they are in, and changing or reestablishing attitude (Baysal & Tekarslan, 1996). Thus, identifying students' attitudes towards OoSLA is important so that individual differences in the learning and teaching process can be taken into consideration and that teachers can identify their teaching methods and techniques accordingly. In studies where students' opinions regarding OoSLA are revealed, it is reported that students generally find OoSLA pleasurable, enjoyable, and exciting (Sontay, Tutar, & Karamustafaoğlu, 2016; Demir & Öner Armağan, 2018), their knowledge becomes more permanent and they understand more easily and transfer knowledge to daily life (Sontay et al., 2016; Demir & Öner Armağan, 2018). A limited number of studies have reported negative opinions regarding OoSLA, such as "they are tiring" (Şahin, Kabasakal, & Çelebi, 2019), "they cause anxiety" (Avcı & Gümüş, 2019), "I wouldn't want to do them again" (Dee Shanely, 2006), "I didn't like them," "I got bored," "they are bad," and "I am unhappy" (Göloğlu Demir & Yılmaz, 2018). It is noticeable that in these studies, students' opinions regarding OoSLA are based on both positive and negative feelings. It is unknown whether the feelings expressed were as a result of the activities or students already possessed negative opinions and feelings against OoSLA prior to these activities. Hence, this leads to the need to identify students' attitudes towards OoSLA and to the idea that students may have different attitudes. In addition to this, OoSLA can enable students to learn according to their own learning speed, learning style, and interests (Melber & Abraham, 1999). However, students' negative attitudes towards activities carried out in out-of-school environments may negatively affect their learning. When the relevant literature was examined, it was seen that no study was conducted to determine students' attitudes towards OoSLA. Therefore, the scale to be developed is expected to both contribute to filling this gap in the literature and to helping teachers determine appropriate teaching strategies by considering students' individual differences, such as attitude. In conclusion, the aim of the present study was to develop an attitude scale toward OoSLA.

The Purpose of the Study

In the present study, the aim was to "develop a valid and reliable scale to identify secondary school students' attitudes towards out-of-school learning activities (OoSLA)"

METHODOLOGY

The Study Group

The study was conducted with two separate groups of secondary school students enrolled in two different schools. The first study group consisted of 309 students, while the second group comprised 311 students. These numbers indicate the total number of students that remained and were included in the analysis after certain questionnaires were eliminated based on extreme value analysis. Table 1 presents the distribution of students' gender and grade levels by study groups.

Table 1
Student Distribution by Study Groups

Study Group	Female		Male		Grade 6		Grade 7		Grade 8		Total	
	f	*%*	*f*	*%*	*F*	*%*	*f*	*%*	*f*	*%*	*f*	*%*
First Group	168	54.4	141	45.6	136	44.01	78	25.24	95	30.74	309	100
Second Group	179	54.66	132	42.44	112	36.01	101	32.48	98	31.51	311	100

The data of the first study group was used to run an EFA, the Cronbach Alpha reliability, Spearman-Brown Split-Half Test reliability and item analyses. The data from the second study group were utilized to conduct CFA and to calculate a composite reliability coefficient. The sample size of the study groups was approximately 300; this sample size is considered sufficient for EFA and CFA (Cattell, 1978; Comfrey & Lee, 1992).

Procedures for the Development of the Attitude Scale for OoSLA

Upon the review of the related literature, the required common procedures followed by different researchers in the process of scale development were identified (Croceker & Algina, 1986; DeVellis, 2017; Tezbaşaran, 1997). Accordingly, the steps below were followed:

Defining the Target Behaviors to be Measured: Attitudes have three dimensions, namely cognitive, affective, and behavioral (Freedman, Sears, & Carlsmith, 1989; Bohner & Wänke, 2004). In strong attitudes, all three elements are existent, whereas, in weak attitudes, they may not be existent (İnceoğlu, 2004; Kağıtçıbaşı, 1999). Hence, when preparing the items of the scale, items requiring cognitive, affective, and behavioral reactions in relation to ELC activities were developed.

Establishing the Item Pool: In this step, initially, the related literature was reviewed to examine qualitative studies and measurement tools utilized in studies related to OoSL and attitude. Subsequently, 30 secondary school students in different grade levels were asked to write a composition reflecting their feelings, opinions and experiences related to the topic. As a result, based on both the compositions and the related literature, a 52-item item pool was constructed. For the statements in the scale, a 5-point Likert scale was utilized: 1- Strongly Disagree, 2-Disagree, 3- Partially agree, 4- Agree, 5-Strongly agree.

Ensuring the Content and Face Validity: To ensure the content validity of the scale, the opinions of six experts were sought: one expert in the field of measurement and assessment, three experts in curriculum and instruction, one social sciences teacher, and one science and technology teacher. When testing content validity, the experts were given an expert opinion form, which was based on a four-point Likert scale: 1- Not appropriate at all, 2- Major revision required, 3- Minor revision required, 4- Completely appropriate. To calculate the "content validity index of each item [I-CVI]," the number of experts marking options 3 and 4 was divided by the total number of experts for each item. The I-CVI average of the remaining items was calculated to determine the scale-level content validity index/averaging [S-VI/Ave] (Polit & Beck, 2006). According to Lynn (1986), when the number of experts

is six and above, the I-CVI needs to be equivalent to .83. Accordingly, seven items that had an I-CVI below .83 were removed from the scale. Ultimately, the S-CVI/Ave of the scale was found to be .94. An S-CVI/Ave value of .90 and above can be claimed to be appropriate for content validity (Waltz et al., 2005). Subsequent to the retrieval of expert opinions, the 45-item form of the scale was submitted to a Turkish language teacher to be evaluated in terms of the appropriateness of the language and layout. Accordingly, the necessary modifications were made.

Pilot Study and Main Implementation: To minimize the potential problems in the main implementation, a pilot study was performed with 10 secondary school students. The necessary modifications were made based on the results of the pilot study. The scale consisting of a total of 45 attitude items —18 negative and 27 positives — was initially administered to the first group. The main implementation was carried out between September and December 2019.

Data Analysis: With negative items scored reversely, the scores were entered into the computer. The extreme value analysis was run; as a result, the data set of eight students from the first group and six students from the second group was excluded from the main data analysis. The missing data analysis revealed that the distribution of missing data was coincidental; hence, the serial average was used in place of the missing data. EFA, reliability analyses and item analyses were conducted by means of the SPSS 22 software, while CFA was performed via Lisrel 8.8.

FINDINGS

Construct Validity

EFA and CFA were performed in order to test the construct validity of the measures obtained from the Attitude Scale for OoSLA.

EFA

To identify the appropriateness of the data for EFA, the Kaiser-Meyer Olkin (KMO) sample sufficiency value was computed and found to be .870, which indicates that the sufficiency of the sample size for factor analysis was at a "great" level (Hutcheson & Sofroniou, 1999, as cited in Field, 2009, p.647). The Barlett sphericity test was found to be statistically significant ($\chi 2=4495.283$, *sd*=990). This value shows that there was a high correlation between the variables; that is, it indicates that the data set was appropriate for principal component analysis (Kalaycı, 2006, p.327). Subsequently, the principal component analysis technique and the varimax rotation technique were performed in EFA. The principal component analysis is a multivariable technique used to convert a series of related variables to a series of unrelated variables by reducing the variation ratios of the original observations. Briefly, it aims to simplify complicated data by reducing the number of variables (Landau & Everitt, 2004). It can be utilized to develop scales or to identify the dimension, under which the items would be grouped (Çokluk, Şekercioğlu, & Büyüköztürk, 2012).

In EFA, when the contribution of each additional factor to the variance explained fell below 5%, the scree plot and the total variance percentage method, which indicate the maximum number of factors to extract, were both considered when making decisions (Dunteman, 1989, as cited in Kalaycı, 2006, p.322).

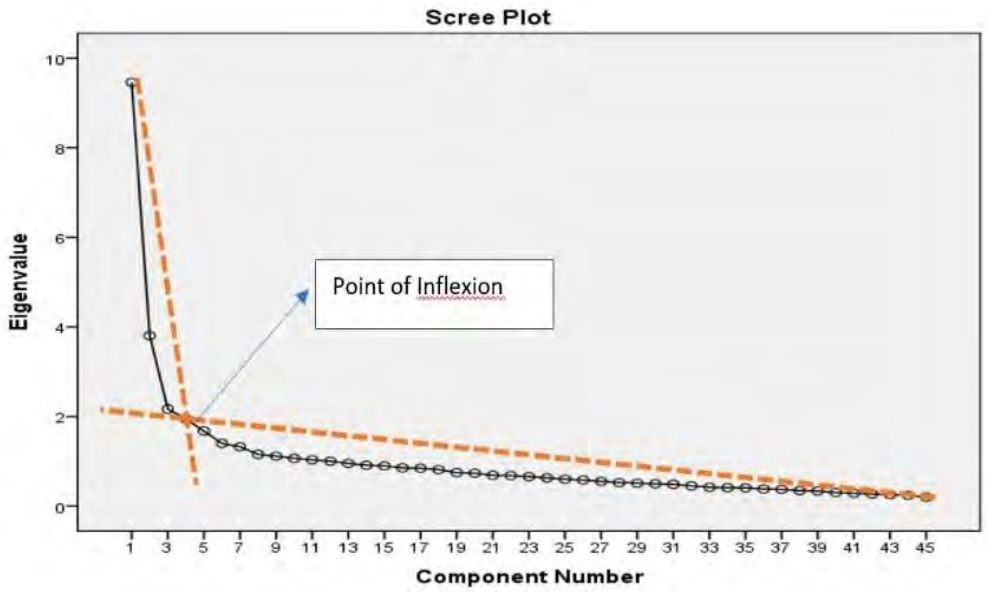

Figure 1. Scree Plot

The point of inflection (4th point) on the scree plot can be observed in Figure 1. The number of points to the left of this point indicates the number of factors (Field, 2009). In Table 2, Eigenvalues above 1 and the total variances explained are presented.

Table 2
Total Variances Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9.45	21.01	21.01	9.45	21.01	21.01
2	3.80	8.45	29.46	3.80	8.45	29.46
3	2.16	4.82	34.28	2.16	4.81	34.28
4	1.94	4.32	38.60	1.94	4.32	38.60
5	1.67	3.72	42.33	1.67	3.72	42.33
6	1.39	3.10	45.44	1.39	3.10	45.44
7	1.32	2.94	48.38	1.32	2.94	48.38
8	1.15	2.56	50.94	1.15	2.56	50.94
9	1.11	2.48	53.42	1.11	2.48	53.42
10	1.06	2.37	55.79	1.06	2.37	55.79
11	1.03	2.29	58.09	1.03	2.29	58.09
12	1.00	2.22	60.31	1.00	2.22	60.31

Extraction Method: Principal Component Analysis.

It can be observed in Table 2 that the contribution of each additional factor after factor 2 to the total variance explained was below 5%. Considering the scree plot and the fact that the total variance explained in the first two factors was low (29.47%), and that the contribution of the third factor to the total variance was 4.82%, which is very close to 5%, a three-factor structure was found to be appropriate.

Three primary criteria were taken into consideration in the elimination of items not measuring the same construct in the factor analysis. The first of these criteria was a factor to which the item was assigned having a factor loading of .30 and above the bottom inflection point (Büyüköztürk, 2019; Pallant, 2005); however, a factor loading value above .45 was determined to be a better criterion (Büyüköztürk, 2019; Tabachnick & Fidel, 2001). In the present study, .45 was taken as the criterion for the bottom inflection point. The second criterion was an item having a high factor loading in a single factor. In the present study, the difference between two high factor loadings was identified to be a minimum of .10 (Büyüköztürk, 2019). The third criterion required taking into consideration common variance values (h^2) of the measured variables, in addition to the factor loadings of the items, for the interpretation of the EFA results. In factor analysis, it is stated in the literature that items with a common variance below .20 should be removed from the measurement tool (Şencan, 2005). The three-factor structure of the attitude scale toward OoSLA obtained after removing the items that did not meet the above-mentioned three criteria, the factor loadings, common variance values, the explained variance and Eigenvalues are presented in Table 3.

Table 3
The Factor Structure and Factor Loadings of the Attitude Scale for OoSLA

Factor	Item No	Statements	Factor1	Factor2	Factor3	h^2
Factor 1 "Avoidance of Activities and Deviating from the Learning Goal"	I8	OoSLA are done not to learn, but only to go on trips. *	.670	-.067	.264	.523
	I9	OoSLA are not related to any course or topic. *	.495	-.055	.024	.249
	I11	I don't think OoSLA have any benefits for me. *	.569	.093	.170	.362
	I13	OoSLA are a waste of time. *	.681	.242	.243	.581
	I24	I get annoyed whenever I hear OoSLA. *	.675	.244	-.101	.525
	I27	I participate in OoSLA under my family's pressure. *	.615	.342	.051	.499
	I29	OoSLA are an opportunity to skip classes. *	.589	.134	.021	.365
	I37	I like displaying exceptional behaviors during OoSLA. *	.674	.085	.016	.462
	I44	If possible, I would prefer to stay at school when there are OoSLA. *	.597	.001	-.143	.377
	I45	In order not to participate in OoSLA, I would prefer not telling my family about them. *	.644	.114	.149	.450

		% Variance Explained	18.370			
		Eigenvalue	5.287			
Factor 2 Motivation and Participation	I12	OoSLA make me very happy.	.135	.618	.285	.481
	I15	OoSLA are fun.	.098	.746	.191	.603
	I16	OoSLA are exciting.	-.063	.741	.204	.595
	I25	I would like to participate in OoSLA by all means.	.063	.569	.089	.335
	I31	I would like more OoSLA to be done.	.252	.635	.126	.483
	I43	I would prefer learning activities to be done outside of school, rather than at school.	.135	.569	-.056	.345
		% Variance Explained	13.342			
		Eigenvalue	2.569			
Factor 3 Approaching the Learning Goal	I3	Even if after a long time, I can remember what I learned during the OoSLA.	.041	.134	.651	.444
	I4	OoSLA enable me to generate different ideas.	.083	.060	.687	.483
	I5	OoSLA enable me to become aware of my interests and abilities.	.015	.019	.666	.444
	I6	I reinforce what I have learned thanks to OoSLA.	.034	.149	.559	.336
	I7	I can use what I learned at school in different areas thanks to OoSLA.	.034	.087	.552	.313
	I10	With OoSLA, I can associate what I learned with daily life.	.154	.235	.463	.294
		% Variance Explained	11.689			
		Eigenvalue	1.692			
		%Total Variance Explained	43.401			

It can be observed in Table 3 that the scale comprised a total of 22 items, with 10 negative and 12 positive items. The scale was found to meet the .20 criterion of the variance explained. As an outcome of EFA and by taking into consideration the contents and the conceptual structure of the items, the first factor consisting of 10 items was labeled "Avoidance of Activities and Deviating from the Learning Goal," the second factor with six items was labeled "Motivation and Participation," and the third factor consisting of six items was labeled "Approaching Learning Goal." The factor loadings of the first factor ranged between .495 and .681 and explained 18-370% of the total variance. The factor loadings of the items in the second factor ranged between .569 and .746 and explained 13.42% of the total variance.

As for the third factor, the factor loadings of the items ranged between .463 and, .687 and explained 11.689% of the total variance. The explained total variance of the scale was found to be 43.401%.

CFA

CFA was performed with the data obtained from the second study group in order to test whether or not they confirmed the structure consisting of the 22 items and the three factors that the EFA yielded. As can be observed in Figure 2, it was revealed that the standardized factor loadings among the 22 items and the three separate factors they tended to measure were 0.40 and above.

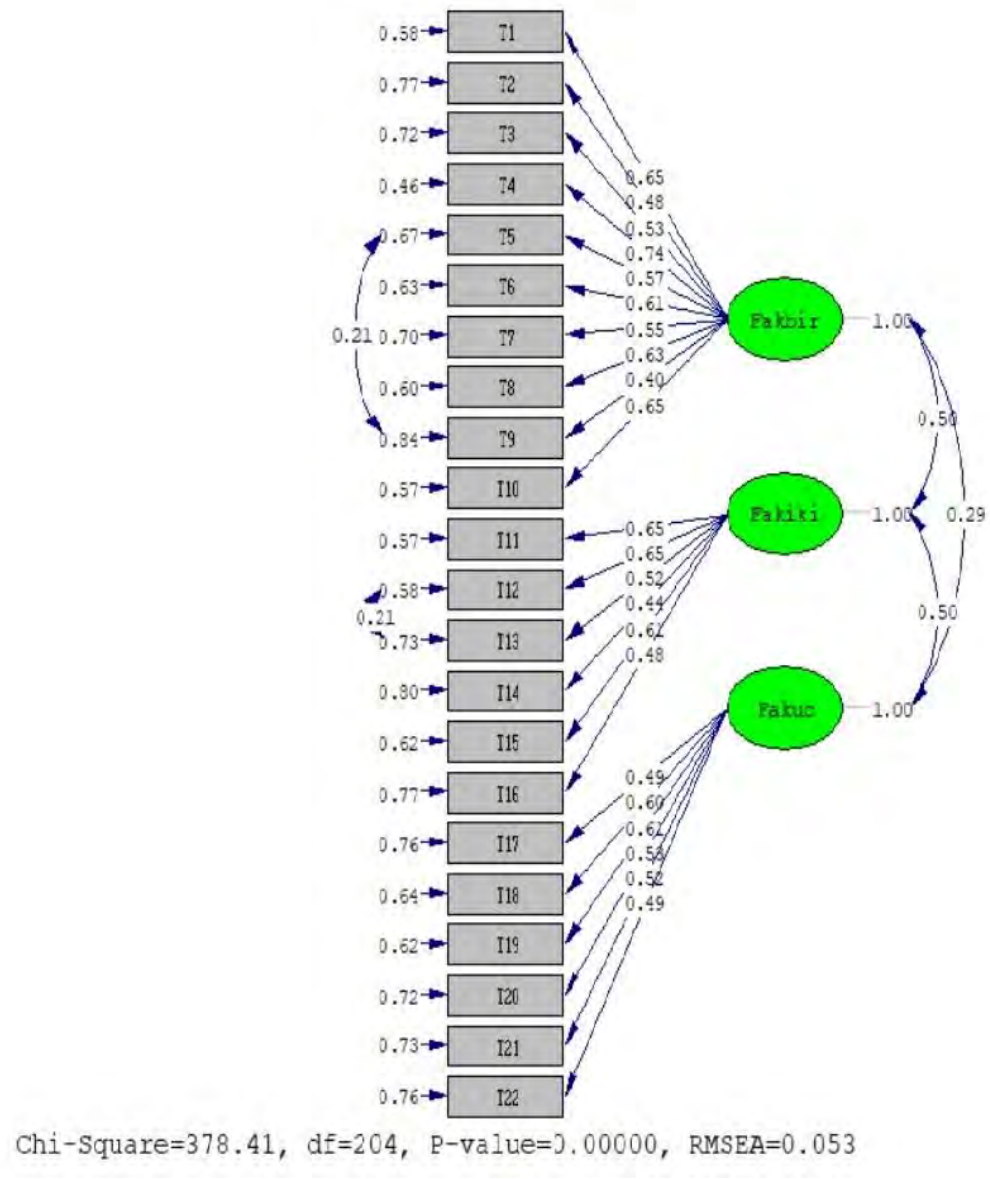

Figure 2. Standardized CFA Analyses

The fit indices obtained from the CFA for the Attitude Scale Toward OoSLA and the criteria for acceptable and perfect fit indices (Hu & Bentler, 1999; Tabachnick & Fidel, 2001; Schermelleh-Engel & Moosbrugger, 2003; Schumacker & Lomax, 2004; Seçer, 2015; Meyers, Gamst, & Guarino, 2006; Meydan & Şeşen, 2011) and the results are displayed in Table 4.

Table 4
References Regarding Model Fit and Model Fit Indices

Fit Indices Examined	Criteria for Perfect Fit (PF)	Criteria for Acceptable Fit (AF)	Fit Indices Obtained	Result
χ2/sd	0 ≤ χ2/sd ≤ 2	2 ≤ χ2/sd ≤ 3	1.85	PF
GFI	.95 ≤ GFI ≤ 1.00	.90 ≤ GFI ≤ 95	.90	AF
AGFI	.90 ≤ AGFI ≤ 1.00	.85 ≤ AGFI ≤ .90	.88	AF
CFI	.95 ≤ CFI ≤ 1.00	.90 ≤ CFI ≤ .95	.95	AF
NFI	.95 ≤ NFI ≤ 1.00	.90 ≤ NFI ≤ .95	.90	AF
NNFI	.95 ≤ NNFI ≤ 1.00	.90 ≤ NNFI ≤ .95	.94	PF
IFI	.95 ≤ IFI ≤ 1.00	.90 ≤ IFI ≤ .95	.95	PF
RFI	.90 ≤ AGFI ≤ 1.00	.85 ≤ AGFI ≤ .90	.89	AF
RMSEA	.00 ≤ RMSEA ≤ .05	.05 ≤ RMSEA ≤ .08	.053	AF
SRMR	.00 ≤ SRMR ≤ .05	.05 ≤ SRMR ≤ .10	.060	AF
PNFI	.95 ≤ PNFI ≤ 1.00	.50 ≤ PNFI ≤ .95	.79	AF
PGFI	.95 ≤ PGFI ≤ 1.00	.50 ≤ PGFI ≤ .95	.73	AF

χ2=378.41, sd=204, 90 Percent Confidence Interval for RMSEA =(.0.044 ; 0.061)

The fit indices of the attitude scale for OoSLA as presented in Table 4 are as follows: While χ2/sd=1.85, NNFI=.94, and IFI=.95 show perfect fit, GFI=.90, AGFI=.88, CFI=.95, NFI=.90, RMSEA=.053, SRMR=.060, PNFI=.79, and PGFI=.73 correspond to an acceptable fit. Hence, the three-factor model obtained from the CFA was found to have a sufficient fit level. The t-test values of the three-factor model obtained from the CFA are presented in Table 5.

Table 5
T-Test Values Obtained from the CFA

Item No/ Factor 1	*t*	Item No/ Factor 2	*t*	Item No/ Factor 3	*t*
T1	11.96	T11	11.16	T17	7.89
T2	8.41	T12	11.01	T18	9.91
T3	9.38	T13	8.38	T19	10.11
T4	14.16	T14	7.19	T20	8.57
T5	10.21	T15	10.34	T21	8.37
T6	10.98	T16	7.79	T22	7.80
T7	9.71				
T8	11.63				
T9	6.80				

T10	12.06

p<.01

It can be observed in Table 5 that the t-test values range between 6.80 and 14.16. All the t values that the CFA yielded were found to be significant at the .01 level. The absence of insignificant t values showed that there was no need for any items to be removed from the model (Çokluk, Şekercioğlu, & Büyüköztürk, 2012). Taking into consideration the t statistics that showed the fit between the items and the factors, it was concluded that all the items under each factor were fit.

Reliability

The reliability of the measures related to the attitude scale for OoSLA was calculated by means of the Cronbach Alpha, composite reliability, and two split-half test reliability methods. The results of the Turkey Non-additivity test, which was performed to examine the additivity property of the scale, were evaluated. The obtained values are presented in Table 6.

Table 6
Reliability Coefficients and Non-Additivity Results

Subscales	Number of Items	Cronbach's Alpha	Spearman-Brown Split-Half Test Reliability	Composite Reliability	Tukey's Test for Non-additivity
Factor 1	10	0.84	.81	.83	F=.000 p=.983>0.05
Factor 2	6	0.76	.71	.73	F=.015 p=.904>0.05
Factor 3	6	0.70	.71	.74	F=.561 p=.454>0.05
Scale	22	0.83	.73	.91	F=7.405. p=.007<0.05

The Cronbach Alpha reliability coefficients measures were found to be .84 for factor 1, .76 for factor 2, .70 for factor 3 and .83 for the overall scale. Based on the association between the two halves of the test, the split-half test reliability of the measures for each factor and the overall scale was calculated by utilizing the Spearman-Brown formula (Büyüköztürk, 2019). The split-half test reliability coefficient was found to be .70 and above. The factor loadings which the CFA yielded, and the composite reliability coefficient calculated based on the error variance values were as follows: .83 for factor 1, .73 for factor 2, .74 for factor 3 and .91 for the overall scale. Thus, considering that measures with a reliability coefficient of .70 and above are accepted as reliable (Field, 2009; Fraenkel, Wallend, & Hyun, 2012), it can be stated that the reliability coefficients were sufficient. The results of the Tukey's Test for Non-additivity showed that the subscales of factor 1 (F=.000, p=.983>0.05), factor 2 (F=.015, p=.904>0.05), and factor 3 (F=.561, p=.454>0.05) were additive, whereas the overall scale was not additive (Tukey Nonadditivity: F= 7.405, p=.007<0.05).

Item Analysis

With the aim of determining the levels of discrimination and predictive power of the total score, the corrected item-total correlation was calculated, and the 27% bottom-top group comparisons were made. The findings of the item analysis are presented in Table 7.

Table 7
Item Analysis Results

Item No	Corrected Item Total Correlation	Cronbach's Alpha if Item Deleted	*T*	*p* and *df*
I8	.58	.82	-9.15	
I9	.38	.84	-8.19	
I11	.51	.83	-8.31	
I13	.66	.81	-11.68	
I24	.61	.82	-11.79	df=164 p=0.00
I27	.58	.82	-11.37	
I29	.47	.83	-12.03	
I37	.57	.82	-10.19	
I44	.46	.83	-10.41	
I45	.57	.82	-11.92	
I12	.53	.72	-13.73	df=164 p=0.00
I15	.61	.70	-14.84	
I16	.57	.71	-16.46	
I25	.41	.75	-12.60	
I31	.52	.72	-18.79	
I43	.402	.75	-11.12	
I3	.483	.64	-13.22	df=164 p=0.00
I4	.511	.63	-11.43	
I5	.475	.64	-10.62	
I6	.397	.67	-12.43	
I7	.380	.67	-12.82	
I10	.350	.68	-10.69	

*p<.001

The findings in Table 7 demonstrate that the t-values for the differences between the item scores of the 27% bottom-top groups ranged between -12.03 and -8.31 for factor 1 (df=164, p<.001), between -18.79 and -12.60 (df=164, p<.001) for factor 2, and between -13.22 and -10.62 (df=164, p<.001) for factor 3. That the t values of the differences between the lower and higher groups were significant is regarded as proof for item discrimination (Erkuş, 2012).

As presented in Table 7, the results regarding the item-total correlation range between .38 and .66 for factor 1, between .40 and .61 for factor 2, and between .35 and .51 for factor 3. As the item-total correlation for all the items is .30 and above, it can be stated that it is sufficient with respect to the discrimination of the feature to be measured (Kalaycı, 2006; Büyüköztürk, 2019).

The Evaluation of the Scores

In the attitude scale for OoSLA, the scores that can be obtained from the dimension of "Avoidance of Activities and Deviating from the Learning Goal" can range between 10 and 50, and those that can be obtained from the dimensions of "Motivation and Participation" and from "Approaching the Learning Goal" can range between 6 and 30. The evaluation of the scores that the attitude scale for OoSLA yielded was based on the scores obtained from the subscales. A total score cannot be obtained from the scale. In this scale, a high score in the dimension of "Avoidance of Activities and Deviating from the Learning Goal," which consists of 10 negative items, does not indicate a high level of avoidance of activities and deviance from the learning goal; conversely, a high score indicates a low level of avoidance and deviance.

DISCUSSION

In the course of equipping students with 21st-century skills, OoSLA are gaining increasing importance. Thus, in recent years, projects based on OoSLA have been supported by The Scientific and Technological Research Council of Turkey through Nature Education and Science Schools (2020). In addition, in accordance with the directives of the Ministry of National Education (MoNE), provincial directorates of national education have been preparing guidelines regarding OoSL environments (MoNE, 2019). A review of the related literature has yielded only a limited number of scales. While two of these are attitude scales to measure teachers' (Tortop, 2012) and students' (Orion & Hofstein, 1991) attitudes towards field excursions, the other is an attitude scale to measure teachers' attitudes towards OoSLE (Balkan Kıyıcı & Yavuz Toplaoğlu, 2016). As the first two are based on field excursions and the third one is related to the science field, their contents are more limited when compared to the present study. The present study includes not only the OoSLE or the excursions made in these environments but also the activities carried out within these environments. Moreover, it is not limited to any field of discipline.

As an outcome of the present study, a 22-item scale, consisting of 10 negative and 12 positives items, was developed with a construct validity of S-CVI/Ave=.94. The scale explains 43.4% of the total variance. The results of the EFA revealed that the scale measured a three-factor structure. The three factors were labeled as follows: Factor 1- "Avoidance of Activities and Deviating from the Learning Goal," Factor 2- "Motivation and Participation" and Factor 3- "Approaching the Learning Goal." The dimensions related to learning show similarity with the "learning tool aspect" and "individualized learning aspect" of the scale developed by Orion and Hofstein (1991). The results of the CFA revealed that the fit indices of the three-factor structure of the scale indicated "acceptable fit" and "perfect fit." The results obtained from the EFA and CFA showed that the construct validity of the attitude scale for OoSLA was ensured.

The reliability of the measures obtained from the attitude scale for OoSLA was analyzed with the Cronbach Alpha, combined reliability, and Spearman-Brown Split-Half Test Reliability methods. It was revealed that the measures of reliability coefficients were above .70 for all three factors and for the overall scale. It is indicated in the related literature that measures of .70 and above are reliable (Field, 2009; Fraenkel, Wallend, & Hyun, 2012; Büyüköztürk, 2019). The results of the Tukey's Test for Non-Additivity indicated that the scale was not additive.

Within the scope of the item analysis of the attitude scale for OoSLA, the corrected item-total correlation was analyzed, and the 27% bottom-top group comparisons were made. The results of the analysis demonstrated that the corrected item-total correlations ranged between .350 and .661, and that the t values regarding the differences between the 27% bottom-top were significant for all the items in the scale. These findings indicate that all the items in the attitude scale for OoSLA are discriminatory. The findings obtained in the present study revealed that the attitude scale for OoSLA is a scale that yields valid and reliable results related to students' attitudes.

CONCLUSION

In the present study, a valid and reliable measurement scale was developed with the aim of identifying secondary students' attitudes towards OoSLA. Providing more than one piece of evidence, rather than a single item of evidence, for the construct validity and reliability of the scale and the discrimination power of the scale items is among the strengths of the study. In addition, various recommendations can be made for further studies. Firstly, the present study was conducted with a study group consisting solely of secondary students. Hence, it can be replicated with high school students. Another recommendation for future studies is that the fit validity, similarities, convergent validity, and discriminant validity of the attitude scale for OoSLA can be analyzed. The reliability of the scale can be supported by studies that utilize different reliability calculation methods such as the method of test-retest reliability.

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