

Validity and Reliability Study of the Scale for Determining the Civic-mindedness Levels of Teaching Staff¹

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Abstract

The purpose of this study was to develop a valid and reliable scale that can be used in determining the civic-mindedness levels of teaching staff working at universities. The study group of the research consisted of 758 students, 256 of whom were male and 524 were female. The item list, which was based on the literature and expert opinions, was prepared for use after also being checked by linguists. The validity analysis of the scale for the data collected was performed with exploratory factor analysis and item-total correlation tests, while the property of reliability was determined using the Cronbach's alpha internal consistency coefficient and the stability test was carried out by determining the relationship between two applications conducted at an interval of the five weeks. The scale, which is called the "Scale for Determining the Civic-Mindedness Levels of Individuals" is a five-step Likert-type scale and consists of 27 items that can be collected under three factors. The factor names are "Openness to Criticism/Development", "Participation/Activeness" and "Lack of Prejudice/Flexibility". The KMO value of the scale was 0.956; and the Bartlett Test values were $\chi^2=11001.719$; $sd=351$; $p<0.000$. Items in the scale accounted for 56.619% of the total variance. As a result of the confirmatory factor analysis, the χ^2 value was 808.07 and the degree of freedom was 321. X^2/df is 2.51. The fit indices of the scale were determined as $RMSEA=0.067$; $S-RMR=0.049$; $NFI=0.97$. The item-total corrected correlation coefficients of the items in the scale varied between 0.40 and 0.703 ($p<.01$). The reliability coefficient of the scale was Cronbach's alpha at 0.954 and the stability coefficients of the items were between 0.496 and 0.674 ($p<.01$).

Keywords: civilizing, democratization, scale, validity and reliability

1. Introduction

The concept of "civic-mindedness" is among those that have recently been placed at the top of the agenda again as democracy has become more widespread around the world, despite its having been used in earlier periods of the history (Iğci, 2008; Aytakin, 2013; Jonaski, 1998; Young, 1999) Considering the definitions of the term 'civic-mindedness' (TDK, 2015; Karakus, 2006) and the effects of non-governmental organizations on social life, that process of becoming civic-minded is closely related to concepts such as civil society, civilization, respect, pluralism, democracy, flexibility, productivity, not holding fixed views and prejudices, free will and legality, which all demand attention (Uluc, 2012; Cohen, Jean and Arato, 1992; Erkan, 2012; Jonaski, 1998).

Becoming civilized and civic-minded has a particular importance in terms of the countries that aim at democratization (Karakus, 2006; Tutar, Tutar and Erkan, 2012). It can be said that becoming civic-minded and democratization are a precondition of each other. It can be expected that a civil individual with the aforementioned properties will contribute significantly to the society in which he/she lives in political, social and economic terms (Uluc, 2012; Aytakin, 2013).

The civilizing of an individual or society is an educational issue from beginning to end as it is achieved throughout the course of life (Eraslan and Bertlek, 2011). Those who are responsible for the civilizing of an individual or society are educational institutions, and the people who teach there (Kondu and Sakar, 2013; Erkan, 2012). Accordingly, it can be said that one of the most important functions of educational institutions is to make individuals more civilized and civic-minded (Kondu and Sakar, 2013; Tutar, Tutar and Erkan, 2012).

Higher education institutions are productive environments as a result of legislation and their structures, which aim to create the culture of a 'civil society', as well as in preparing the next generation to enter society (Aksit, Sedar and

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Tabakoglu, 2003; URL, 2016). The fact that civil society plays a dominant role in educational faculties in higher education and teacher training institutions is important. It is closely related to the civility of the communication and interaction between the teaching staff working there and their students (pre-service teachers), because education faculties are responsible for educating teachers responsible for passing on the idea of 'civil society' to the next generation.

It is important that the reforms aimed at promoting civil society is supported with teacher training which functions in terms of strengthening democracy and democratization. In other words, it can be said that teaching staff working as teachers at teacher training institutions are role models for their students and that they contribute significantly to civic-mindedness within a society. However, the transformation of this situation into a culture which goes beyond just being a discourse about the process of becoming civic-minded and democratization should be ensured in a scientific and rational way. This requires determining the civic-mindedness levels of teaching staff working at education faculties in scientific ways and taking the necessary measures. In other words, determining the levels of knowledge and how much a 'civil culture' is adopted by teaching staff, and making them reflecting on their behaviors can be considered an obligation.

In addition to this, no measurement tool was found that could be used to measure the civic-mindedness levels of teaching staff at education faculties. This study aimed to develop a valid and reliable scale that can be used in determining the civic-mindedness levels of the individuals working as the teaching staff in higher education institutions in general, and private institutions educating teachers.

2. Method

2.1 Study Group

The study group of this study consisted of 758 students studying in the third and fourth years of different departments in the Faculty of Education of Ahi Evran University, in the fall semester of 2015-2016. 256 of the students were male and 502 were female. Working with this study group resulted from the thought that teachers have the most important responsibility in expanding a 'civil culture' within a society. Students studying at the Faculty of Education were first grouped by their department and then data were collected in order to be able to perform the exploratory and confirmatory factor analysis studies on different groups.

2.2 Scale Development Process

In the process of developing the scale, a literature review and interviews with the students were first performed and a list of the qualities that a 'civil individual' must have was formed. The list formed was turned into expressions regarding behaviors with which teaching staff could be assessed by students, and the options (1) "Never", (2) "Rarely", (3) "Sometimes", (4) "Most of the time" and (5) "Always" were added to them. It was accepted that the level of civic-mindedness increases with the increase in the frequency of related behavior.

A linguist and two pedagogical experts examined the draft scale in terms of expression, wording, spelling and punctuation errors. A draft scale consisting of 35 items was created after making the necessary corrections. The validity and reliability analysis of the scale was performed on the data collected with the help of SPSS 15.00.

The (1) construct validity and (2) item discrimination power analyses were performed on the data collected using the scale. The exploratory and confirmatory factor analysis techniques were used for the construct validity. The item-total correlation examination was performed for the item discrimination analysis. The reliability level of the scale was examined with the (1) internal consistency and (2) stability measurement tests.

Findings obtained from the validity and reliability analyses performed on the data are as follows.

3. Findings

3.1 Findings on the Validity of the Scale

The (1) exploratory factor analysis, (2) confirmatory factor analysis and (3) item discrimination (item-total correlation) examinations were performed for the construct validity in the framework of the validity analyses of the Scale for Determining Civic-Mindedness Levels of Individuals (SDCLI).

3.2 Construct Validity

Findings on the exploratory factor analysis: As a result of the KMO and Bartlett test analyses performed for the purpose of testing the construct validity of the scale; the KMO was found to be 0.958, the Bartlett test value was found to be $\chi^2 = 14394.389$, and sd was found to be 595 ($p=0.000$), and it was decided to perform the factor analysis on the scale consisting of 35 items (Buyukozturk, 2012). The "Main Components Analysis" and "Varimax Vertical Rotation Technique" were applied as the factorization technique. 8 items with factor loads below 0.30 or with less than 0.100

between the loads in different factors were removed from the scale and the analyses were repeated (Buyukozturk, 2012; Eroglu, 2008).

27 items in total remaining in the scale were gathered under three factors. The KMO value of the scale with 27 items was 0.956; the Bartlett Test values were $\chi^2=11001.000$. The factor loads remaining in the scale varied between 0.491 and 0.783. The items included in the scope of the scale explain 56.619% of the total variance. It is sufficient that the amount of variance explained in terms of behavioral sciences is 40% (Buyukozturk, 2012; Eroglu, 2008).

The content of the items in the factors was then examined, and names were given to the factors. 14 items were gathered under the factor named “Being Open to Criticism/Development (O-CD)”, 8 items under the factor named “Participation/Activeness (P-A)”, and 5 items under the factor named “(U-F)”. This is seen in Figure 1 for the eigenvalues.

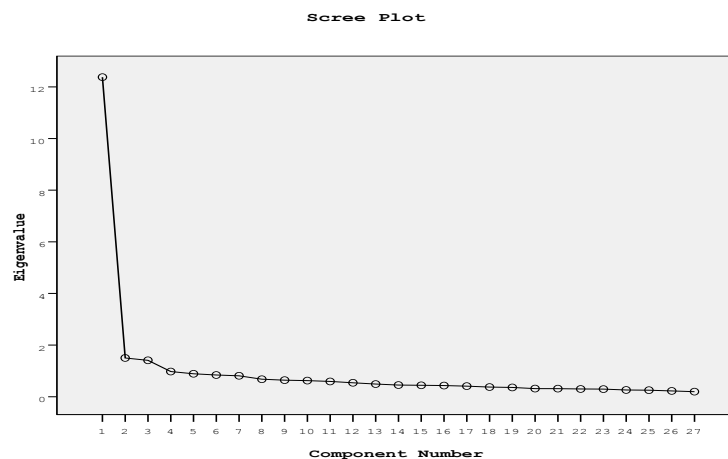


Figure 1. Eigenvalue factor graph of the scale for determining civic-mindedness levels of individuals

Table 1. Factor analysis results of the scale

Factor	Items	F1	F2	F3
O-CD	Is open to criticism.	.774		
	Sometimes creates environments to enable criticism and accepts criticism.	.731		
	Makes other people feel that they are valued.	.690		
	Avoids judgmental expressions; prefers flexible sentence structures.	.682		
	Does not refrain from self-criticism.	.663		
	Asks others to monitor and advise him/her.	.629		
	Puts his/her hierarchical position/status into the background, and attaches importance to thoughts.	.628		
	Is open to innovation.	.611		
	Does not treat people in a humiliating, judgmental or punitive way as a result of what they think.	.609		
	Avoids inflexible and strongly rigid thinking.	.603		
	Acts transparently and openly in his/her emotions, thoughts and behaviors.	.596		
	Tries to avoid from stereotypical expressions and behaviors.	.592		
	Is reconciliatory; tries to avoid disputes and fights with others.	.575		
	Takes initiative in decision-making and implementation when necessary.	.491		
Amount of contribution to variance: 45.840% Eigenvalue: 12.377				
P-A	Thinks positively about any non-governmental organization working with democratic methods, and tries to participate in their meetings.		.741	
	Thinks positively about projects with social content carried out at the local or international level, and supports them.		.715	
	Reads books about different viewpoints or listens to lectures/speeches.		.681	
	Has an enthusiastic personality.		.676	
	Asks questions and is inquisitive.		.672	
	Has a relationship with different segments of the society in economic, political and social terms?		.561	
	Researches the validity of news about a subject from different sources.		.553	
Exhibits sensitive behaviors towards social and political events. Amount of contribution to variance: 5.558% Eigenvalue: 1.501				
U-F	Does not classify people positively or negatively in terms of their religion, belief, ethnic origin, etc.			.783
	Does not have prejudices against political or social symbols.			.706
	Does not use ideological stereotypes, and does not make assessments based on stereotypes.			.614
	Does not treat people that he/she has recently met with prejudice, either positively or negatively.			.575
	Does not speak solely based on his/her status, legal power or other power sources (economic, physical, political, social, etc.).			.540
Amount of contribution to variance: 5.221% Eigenvalue: 1.410				

The factor loads of 27 items in total remaining in the scale and the findings expressing the eigenvalue and variance of the factors are found in Table 1.

As seen in Table 1, the O-CD factor of the scale contained 14 items with loads between 0.491 and 0.774. The eigenvalue of the factor was 12.377, and its contribution to the general variance was 45.84%. The P-A factor contained 8 items with loads between 0.549 and 0.741. The eigenvalue of the factor was 1.501 and its contribution to the general variance was 5.558%. The third factor, the U-F factor, contained 5 items with loads between 0.540 and 0.783. The eigenvalue of this factor was 1.410, and its contribution to the general variance was 5.221%.

Findings on the confirmatory factor analysis: The first and second level confirmatory factor analysis was used in order to test the correctness of the 3-dimensional structure determined according to the results of the exploratory factor analysis. The confirmatory factor analysis was performed on the data collected from 454 students outside the sample where the data used for the exploratory factor analysis were used. While the covert variables represent a theoretical structure in the confirmatory factor analysis, the measurements observed are designed as the indicators of this structure (Joreskog and Sorbom, 1993). Starting from this, an equation modeling where the structure with 3 factors and 27 observed variables can be correctly estimated with the exploratory factor analysis was established, as is seen in Figure 2.

As a result of the confirmatory factor analysis, the χ^2 value that varies by the sample size was 808.07 and the degree of freedom was 321. X^2/df is 2.51. It can be said that this value indicates acceptable adaptation (Kline, 2005). In addition to this, RMSEA (Root Mean Square Error of Approximation), SRMR (Standardized Root Mean Square Residual), GFI (Goodness of Fit Index), AGFI (Adjusted Goodness of Fit Index), CFI (Comparative Fit Index) and NFI (Normed Fit Index) values among model fitness criteria were taken into consideration for the fitness of the structure. It was determined that the RMSEA value that must be below 0.05 for the fitness of the model (Browne and Cudeck, 1993) was below 0.067 and the SRMR value that must be below 0.10 (Kline, 2005) was 0.049. That the RMSEA and SRMR values were zero or quite close to zero shows the perfection of the model (Brown, 2006; Byrne, 2010).

Apart from this, it was determined that the GFI value, which must be 0.90 or above when the model is suitable, (Kline, 2005) was 0.85; and the AGFI value, which must be 0.90 or above, was 0.82. The GFI and AGFI values may be between 0 and 1 when the model is fit; they should be closer to 1 and they cannot be negative (Joreskog and Sorbom, 1993; Raykov and Marcoulides, 2006). It was seen that the NFI (Kline, 2005; Raykov and Marcoulides, 2006: 44) value, which must be between 0 and 1 and close to 1 was 0.97; and the CFI value, which must be between 0 and 1 and close to 1 again (Brown, 2006; Raykov and Marcoulides, 2006; Byrne, 2010) was 0.98. From the data obtained, it is seen that the model was confirmed.

As can be seen in figure 2, factor loads ranged between 0.53 and .80 for the sub-dimension O-CD; between 0.66 and 0.83 for the sub-dimension P-A; and between 0.60 and 0.76 for the sub-dimension U-F.

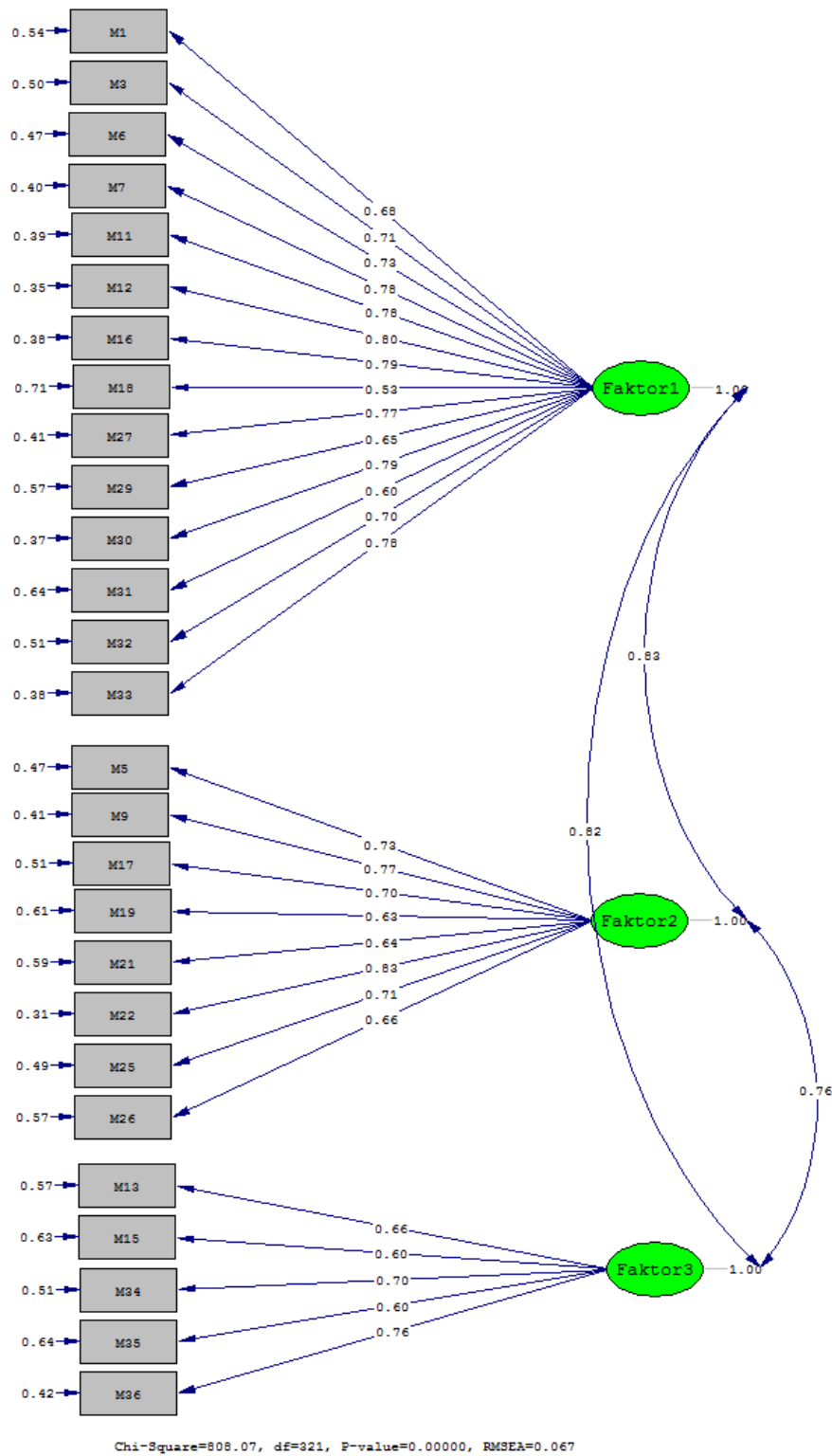


Figure 2. First level confirmatory factor analysis correlation diagram

The three factors that were obtained with first level confirmatory factor analysis represent the properties of civil individuals covert variable defined as the superstructure. The second level confirmatory factor analysis was performed to show this. The second level factor model was tested by adding the second level variable to the first level confirmatory structure tested with three hidden and 27 indicator variables. The connection diagram of the second level confirmatory factor analysis of the scale is shown in Figure 3.

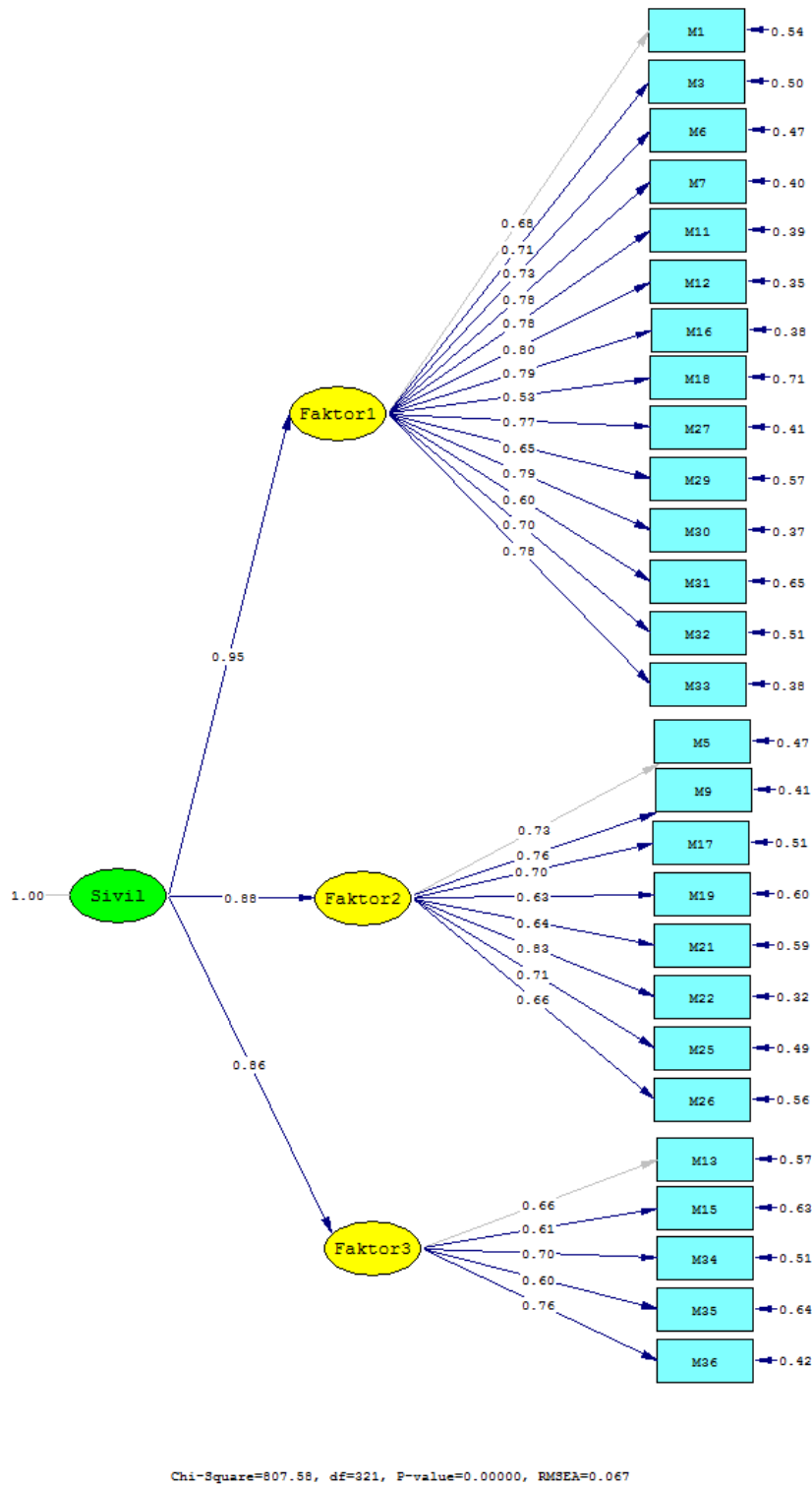


Figure 3. Second level confirmatory factor analysis correlation diagram

The factor loads related to the model obtained from the second level confirmatory factor analysis are seen in Figure 3. Factor loads varied between 0.53 and 0.80 for the sub-dimension O-CD; 0.63 and 0.83 for the sub-dimension P-A, and between 0.61 and 0.76 for the sub-dimension U-F.

The t-values between the factors and items were examined after the standard analyses. In the examination performed, it was determined that there was no red arrow in the t-values. This situation demonstrates that all items are significant at the level of 0.05 (Joreskog and Sorbom, 1993). Findings regarding the fit indices are presented in Table 2.

Table 2. Fit Values and Fit Index Values Obtained from DFA

Fit indices examined	Excellent fit	Acceptable fit	First level fit indices	Second level fit indices
χ^2/sd	$0 \leq \chi^2/sd \leq 2$	$2 \leq \chi^2/d < 5$	2,51	2,51
RMSEA	$0 \leq RMSEA \leq 0.05$	$0.05 \leq RMSEA \leq 0.08$	0.067	0.067
S-RMR	$0 \leq S-RMR \leq 0.05$	$0.05 \leq S-RMR \leq 0.10$	0.049	0.049
NFI	$0.95 \leq NFI \leq 1.00$	$0.90 \leq NFI \leq 0.95$	0.97	0.97
CFI	$0.97 \leq CFI \leq 1.00$	$0.95 \leq CFI \leq 0.97$	0.98	0.98
GFI	$0.95 \leq GFI \leq 1.00$	$0.90 \leq GFI \leq 0.95$	0.85	0.85
AGFI	$0.95 \leq AGFI \leq 1.00$	$0.90 \leq AGFI \leq 0.95$	0.82	0.83

According to the findings in Table 2, it can be seen that the fit indices of the first and second level confirmatory factor analysis were at an acceptable level. This means that the construct validity of SDCLI is confirmed.

3.3 Item Discrimination

According to the Classical Test Theory (CTT), the discrimination value (R-value) calculated in the form of the correlation coefficient varies between -1 and 1. It is necessary to investigate questions with a low r-value, and remove them from the test if necessary (Crocker and Algona, 1986). The most important criticism made about KTK parameters is that they are easily affected by the sample chosen (Hamilton and Jones, 1993). For this reason, in this study, Corrected Item Total Correlation values (Deville's, 2003; Pall ant, 2007) are presented in Table 3 instead of KTK dependent parameter values:

Table 3. Item-total score corrected correlation analysis

O-CD		P-A		U-F	
I. Num.	r	I. Num.	r	I. Num.	r
1	0.681 (**)	15	0.410 (**)	23	0.638 (**)
2	0.578 (**)	16	0.491 (**)	24	0.486 (**)
3	0.687 (**)	17	0.532 (**)	25	0.506 (**)
4	0.628 (**)	18	0.613 (**)	26	0.628 (**)
5	0.638 (**)	19	0.523 (**)	27	0.523 (**)
6	0.432 (**)	20	0.481 (**)		
7	0.585 (**)	21	0.527 (**)		
8	0.691 (**)	22	0.403 (**)		
9	0.703 (**)				
10	0.606 (**)				
11	0.677 (**)				
12	0.646 (**)				
13	0.580 (**)				
14	0.461 (**)				

As is seen from Table 3, the corrected correlation coefficients of the items range between 0.432 and 0.703 for the O-CD factor; between 0.403 and 0.613 for the P-A factor; and between 0.486 and 0.638 for the U-F factor. That the corrected correlation coefficients are higher than 0.20 means that the item can serve the aim of the relevant factor significantly (Pall ant, 2007). Accordingly, it can be said that each item serves the objective significantly.

3.4 Criterion Validity of the Scale

A relevant literature review was performed in order to determine the criterion reliability of the scale, and similar scales reliability cannot be calculated as there is no similar scale in terms of the content and objective.

3.5 Findings on the Reliability of the Scale

The internal consistency and stability analyses were performed on the data in order to calculate the validity of the scale.

3.6 Internal Consistency Level

The reliability analysis of the scale consisting of 27 items and 3 factors in total was performed using the Cronbach's alpha coefficient formula. The reliability values of the factors and the overall scale are summarized in Table 4.

Table 4. Reliability analysis results concerning the overall scale and its factors

Factors	The amount of item	Cronbach's alpha
O-CD	14	0.938
P-A	8	0.876
U-F	5	0.799
SDCLI	27	0.954

As is seen from Table 4, the Cronbach's alpha reliability coefficients were determined as 0.938 for the O-CD factor, 0.876 for the P-A factor and 0.799 for the U-F factor. The reliability coefficient of SDCLI is 0.954. Accordingly, it can be said that the scale is able to make reliable (consistent) measurements (Buyukozturk, 2012; Balci, 2009).

3.7 The Ability to Make Stable Measurements

The stability level of the scale was calculated using the test-retest method. As is known, a reliable measurement tool should be able to make stable measurements (Balci, 2009). The 27-item form of the scale was applied again to 148 students five weeks later. The relationship between the scores obtained in the two applications was examined. The findings are summarized in Table 5.

Table 5. Test-retest results of the scale items

O-CD		P-A		U-F	
I. Num.	r	I. Num.	r	I. Num.	r
1	0.541(**)	15	0.538(**)	23	0.568(**)
2	0.650(**)	16	0.562(**)	24	0.585(**)
3	0.637(**)	17	0.496(**)	25	0.619(**)
4	0.694(**)	18	0.535(**)	26	0.548(**)
5	0.629(**)	19	0.610(**)	27	0.571(**)
6	0.649(**)	20	0.635(**)		
7	0.618(**)	21	0.710(**)		
8	0.551(**)	22	0.625(**)		
9	0.458(**)				
10	0.513(**)				
11	0.514(**)				
12	0.417(**)				
13	0.518(**)				
14	0.674(**)				

N: 162; **= $p < 0.01$

In Table 5, it is seen that the test-retest correlation coefficients of the items in the scale varied between 0.513 and 0.674 for the O-CD factor, between 0.496 and 0.710 for the P-A factor and between 0.548 and 0.619 for the U-F factor, and each relationship is significant ($p < .01$). Accordingly, it can be said that the scale can make stable measurements (Buyukozturk, 2012; Balci, 2009).

4. Discussion and Result

This study aimed to develop a scale that can be used in determining the civic-mindedness levels of the teaching staff working at a Faculty of education. The scale, named "The Scale for Determining Civic-Mindedness Levels of Individuals (SDCLI)" is a five-stage Likert-type scale and consists of 27 items that can be gathered under three factors.

Each of the items in the factors was graded as (1) "Never", (2) "Rarely", (3) "Sometimes", (4) "Most of the time", (5) "All the time" to represent the frequency of behavior. Frequently exhibiting the relevant behaviors was assumed to mean that the characteristic of being civic-minded was ongoing and continuous. As the number of the items in the factors is different, it is possible to turn them into standard scores and structure and give meaning to the raw scores obtained from the scale/factor using the formula below, in such a way that the lowest is 20 and the highest is 100:

$$X_{\text{standardscore}} = \frac{X_{\text{raw score}}}{\text{TheAmountOfItem}} \times 20$$

Range of Scores (Out of 100 points)	Meaning	Arithmetic average range
20-35	Very Low	1.00 – 1.80
36-51	Low	1.81 – 2.60
52-67	Middle	2.61 – 3.40
68-83	High	3.41 – 4.20
84-100	Very High	4.21 – 5.00

The validity of the scale was determined by examining discrimination levels based on (1) the exploratory and confirmatory factor analysis and (2) item-total correlation.

According to the exploratory factor analysis results, the SDCLI consists of 27 items and three factors in total. Among the factors, the factor of "Being Open to Criticism/Development (O-CD)" includes 14 items, the factor of "Participation/Activeness (P-A) factor" consists of 8 items, and "Lack of Prejudice/Flexibility (U-F) factor" consists of 5 items. The factor loads, eigenvalues, the rate of explaining the variance of the items in factors showed that the scale has construct validity.

First and second level confirmatory factor analysis was performed in order to confirm the factor structures of the scale that was found to consist of three factors as a result of the exploratory factor analysis. According to the results of both primary and secondary confirmatory factor analysis as a result of the confirmatory factor analysis, it was found that the observed values of the scale model were confirmed using the data of the model established (Kline, 2005; Joreskog and Sorbom, 1993; Brown, 2006);

The item-total score corrected correlation coefficients were calculated in order to determine the extent to which each of the items in the scale is able to measure the properties that it aims to measure. The corrected correlation values between each item of the scale and total scores varied between 0.403 and 0.703. Accordingly, it can be said that each item in the scale serves the objective of measuring the property that it is required to measure at a significant level with the overall scale, and each item is discriminative at the required level (Pallant, 2007; Balci, 2009).

A relevant literature review was performed in order to determine the criterion validity of the scale, but similar scale validity could not be calculated as there is no similar scale in terms of its content and objective.

The internal consistency levels varied between 0.799 and 0.938 by the factors of the scale calculated as the Cronbach's alpha reliability coefficient. The reliability coefficient for the overall scale was 0.954. Within the framework of these values, it can be said that the scale is able to make reliable measurements (Buyukozturk, 2012; Gorsuch, 1983).

The characteristics of being able to perform stable measurement of the items in the SDCLI were calculated with the test-retest method. The stability factors of the items varied between 0.496 and 0.710. All of these relationships were positive and significant at the level of $p < 0.001$. Accordingly, each item on the scale is able to make stable measurements with their invariance aspect by time (Gorsuch, 1983; Buyukozturk, 2012).

Consequently, it can be said that SDCLI is a valid and reliable scale that can be used in determining the civility levels of individuals. In addition, it can be suggested that this scale could also be used for the measurement of the civic-mindedness levels of individuals working as employees and managers in different occupational groups and in different departments of secondary and higher education institutions. Nevertheless, the validity and reliability analyses of the scale should be performed again if they are applied to different segments of the population.

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