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A Validity and Reliability Study of the Scale for Attitude Towards Classroom as a Learning Environment

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Abstract

This study aims to develop an attitude scale that will reveal preservice teachers' attitudes towards classroom as an educational environment. Two references were applied in the process of writing the items to be included in the draft form of the scale: relevant literature and students' opinions. 50 items were written in line with these two references, but upon the experts' suggestions necessary corrections were taken into consideration and a draft form with 45 items was developed. Draft form of the scale was applied to a total of 473 students consisting of 361 females and 112 males who were studying at different levels of various teaching programs in the fall term of 2018-2019 academic year at Gazi Faculty of Education in Gazi University. Validity and Reliability analyses were done on the set of data obtained through the application of draft form. On the set of obtained data, exploratory data analysis (EDA) was carried out first for construct validity and then confirmatory factor analysis (CFA) was conducted. Exploratory data analysis (n_1=263) and confirmatory factor analysis (n_2=210) were performed in two separate groups. The results of exploratory data analysis (EDA) revealed that the scale consisted of 32 items and 4 sub-dimensions. The results of confirmatory factor analysis which was conducted following exploratory data analysis revealed that adaptive values regarding the model were RMSEA, .066; $\chi 2/df$=2.1; SRMR=.05; IFI=.91; CFI=.91. These values regarding the scale which were obtained as a result of confirmatory analysis show that the structure of the scale was confirmed.

Keywords: Learning, Learning Environment, Classroom, Developing Attitude Scale
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Introduction

Learning can take place anytime, anywhere, so the environments where learning takes place vary to a great extent. Hence, environments which are involved in the learning process and which are formed through the interaction of place, time, infrastructure, equipment and psycho-social factors affecting the learning process can be defined as learning environment (Acat, 2005). Learning environment comprises of all factors affecting learning process. Learning environment refers to schools which are special places constructed for education and which are home to majority of educational and teaching activities whose main purpose is to form and develop behaviours (Bursalıoğlu, 1991). School is an institution which societies identify with the notion of education and educational services. The major feature that distinguishes school from other institutions is that it works for the sake of human beings and has the ability to make them different (Bostancı, 2009). One of the most important components of education is classroom environment where education is conducted. Classroom is a communal life space where educational and teaching activities are carried out in line with pre-established purposes (Aydın, 2012).

Classroom is a system of relations which is second most important thing in a student's life after his / her family. In the classroom, while new behaviours are added to what students already gained in their families, bad behaviours and wrong information are changed. On one hand, students are provided with the opportunity to socialize through enculturation, on the other hand necessary conditions are created for the students to realize and improve their potentials and to individualize (Demirtaş, 2012). Classroom environment consists of the combination of personality traits of the students in the classroom, students' attitudes towards school and class, their habits of studying and resting, their cultural background from the family, the relations between the students, physical conditions of the classroom and student-teacher interaction (Eryaman, 2007; Erden, 1998).

Students' feelings and thoughts as individuals are considered to be of great importance in today's education system. Therefore, students' feelings and thoughts regarding the classroom environment in which they study need to be taken into consideration (Saban, 2004). In today's world, when teachers' and students' roles, teaching strategies and methods, testing and evaluation techniques are questioned, classroom environment as a learning environment is to be examined thoroughly (Tuncer, Bal, Özüt ve Köse, 2012) because students would not feel good in a negative, unpleasant or undesired learning environment, and they would not want to be in such an environment. Moreover, such environments lower students' academic success and increase their tendency to resort to undesired behaviours (Blum, 2005).

Classroom environment is a very comprehensive term that includes all stages from the planning of learning-teaching process to its completion. This term includes a number of components such as rules applied in the classroom; the clarity of these rules and how they are set; communicative

environment in the classroom; teachers' and students' expectations; methods and techniques used in the learning process; innovation, variety and differences of these methods and techniques; whether students are involved in decision-making process; physical features of the classroom; characteristics of students and teachers; classroom atmosphere (social, emotional and psychological interactions in the classroom) (Kurt et al., 2013; Mesa, 2012; Riedler & Eryaman, 2016).

Studies aiming to determine how students' perceptions of classroom environment influence their cognitive and affective qualities reveal that an important part of the variance regarding learning outcomes is explained with perceptions regarding classroom environment (Dorman, 2001).

About four hours of time spent at school are spent in classrooms defined as shared living space (Demirtaş, 2005). A number of variables regarding classroom need to be taken into consideration in order for the time spent in the classroom to be quality and as desired, and in order for the teaching and learning process to reach the aimed success. In general, positive attitude towards classroom atmosphere and classroom as a learning environment plays an important role in the shaping of perceptions of quality in school life (Gillen, Wright and Spink, 2011). Positive attitudes towards classroom are also closely related with student success. Safe classrooms, warm, supportive and non-hostile atmosphere provide better opportunities for learning and encourage participation and success (Fraser and Fisher, 1982; Goh and Fraser, 1998; Adelman and Taylor, 2005). In this regard, students' attitudes towards classrooms as a learning environment should be examined systematically and sufficiently. One of the best ways to determine students' opinions about this issue is to use assessment tools which can determine their feelings. It is highly important to develop assessment tools that have the necessary psychometric qualities defined to this end. Thus, determining preservice teachers' attitudes towards classroom as a learning environment will help preservice teachers to understand their students better when they start teaching and to take a more active role in their students' developing positive attitude towards classroom. In this regard, this study aims to develop an assessment tool which has necessary psychometric qualities in order to determine preservice teachers' attitudes towards classroom as a learning environment.

Method

Data of the research were collected in line with survey model. In general, survey models aim to research and explain an existing situation or reality as it is. Survey model is a research approach based on the idea of examination of all the data from present or past regarding an object, a phenomenon, a case or an individual (Balcı, 2015). The main concern of this study was to describe preservice teachers' attitudes towards classroom as a learning atmosphere as they were.

Population and Sample

Population of the study consists of 5418 students studying different teaching programs at different grades at Gazi Faculty of Education in Gazi University in the fall term of 2018-2019 academic year. As for the difficulty of reaching the whole population, sample was taken. Draft form of the scale was applied on a volunteer basis to a total of 473 students consisting of 361 females and 112 males studying in various teaching programs that were randomly selected.

Reference values in literature were taken into consideration while deciding how many students the draft form of the scale had to be applied to. Cattell (1978) suggests that in factor analysis, the number of participants should be three to six times more than the number of items while Gorsuch (1974) maintains that the number of participants should be at least five times more than the number of items. As for the sample size, Kline (2005) suggests that the number of participants should be at least 100, according to Hutcheson and Sofroniou (1999) this number should be at least 150 to 300, while Cattell (1978) suggests that the number of participants should be at least 250. Regarding the size of sample, it is suggested that 100 participants would be weak, 200 would be average, 300 would be good, 500 would be very good, and 1000 participants would be excellent (Comrey and Lee, 1992; Tabachnick and Fidell, 2007; Field, 2013). In the light of all this literature review, it can be maintained that the size of sample is in the suggested range.

Scale Development Process

In the development of the scale, the steps suggested in literature were followed (DeVellis, 2014; Cohen and Swerdlik, 2013). In this process, literature review was carried out first and students' opinions about this issue were taken via short compositions. Opinions from a group of four experts on the items in the item pool which was formed through this method were taken in order to provide content validity. In line with experts' suggestions, a draft form with 45 items was created. The draft form, which was created to collect proof regarding validity and reliability in the scale development process, was applied to a group of 263 students and analyses were conducted based on the set of collected data. Both exploratory data analysis and reliability analysis were carried out via SPSS 22.0. On the other hand, Lisrel 8.5 (Linear Structural Relation Statistics Package Program) was used for confirmatory factor analysis. In order to obtain proof for construct validity on the data processed via SPSS 22.0 and Lisrel 8.5, and to determine whether applying factor analysis to the set of data is suitable, Kaiser–Meyer–Olkin (KMO) test and Bartlett Sphericity test were conducted first. Varimax rotation was applied in the analysis. 13 items whose factor load values were below .45 and which took values close to each other in multiple factors were omitted from the scale (DeVellis, 2014; Field, 2013).

In order to determine the confirmation of construct of the scale which consists of 32 items and four sub-dimensions obtained as a result of exploratory factor analysis, confirmatory factor analysis

was carried out on the set of data obtained from a different group of 210 students. Findings of the analyses were examined and interpreted with regard to fit index values accepted in the literature. In order to obtain proof regarding the reliability of the scale, Cronbach's Alpha reliability co-efficient and total correlation of the items in the scale were calculated.

The items whose total correlation values were below 0.30 and which had negative values were omitted from the scale. In order to determine distinctiveness of each item in the scale regarding identification of preservice teachers' attitudes towards classroom, t-test was applied for independent groups in the comparison of group high-low 27% group scores. In addition, Spearman-Brown co-efficient of internal consistence was calculated for two equal halves of the scale.

Findings

Findings regarding Validity of the Scale

Findings obtained as a result of the exploratory data analysis and confirmatory factor analysis conducted to test the construct validity of the scale are as follows:

Exploratory Data Analysis

As a result of the Kaiser-Meyer-Olkin (KMO) and Barlett Spehericity tests that were conducted to determine suitability of the set of data obtained from the pilot study for factor analysis, the KMO value was calculated to be .95. As a result of Barlett test, Barlett Sphericity value was found as [X^2= 5904,856; p<.001]. In Kaiser Meyer Olkin (KMO) Test, values below 0.50 are regarded as unacceptable, values between 0,51 and 0,70 as average, between 0,71 and 0,80 as good, between 0,81 and 0,90 as very good, and over 0,91 as excellent Çokluk, Şekercioğlu and Büyüköztürk, 2010; Field, 2013; Tabachnick and Fidell, 2007). Varimax upright rotation method was used to determine the sub-factors of the scale. 0.45 value was taken as the reference value for undercut point (Seçer, 2015). As a result of Varimax rotation four factors the eingenvalues of which were higher than 1 were determined. These four factors explained 62.49% of the total variance. The size of variance rate is shown as evidence for the strength of factor structure. In social sciences, if between 40% and 60%, this value is accepted as sufficient (Şencan, 2005; Tavşancıl, 2014). The scree plot graph formed according to eigenvalues of the factors is given in Figure 1 below.

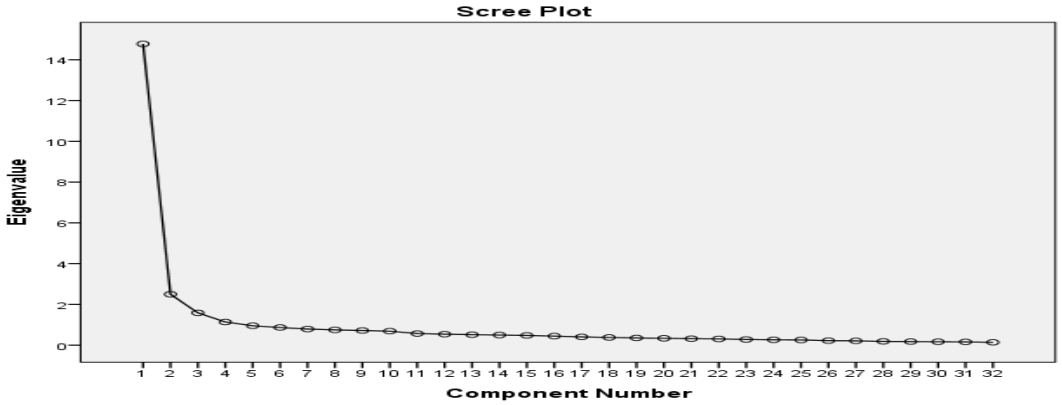

Figure 1. Graph of Eigenvalue Factor of the Scale

The values obtained as a result of exploratory factor analysis (EFA) regarding the scale and scale factors are given in Table 1.

Table 1. Exploratory Factor Analysis Results of Attitude Scale regarding Classroom

Factors	Scale Items	Factor Common Variance	Varimax Factor Loads	Factors	Scale Items	Factor Common Variance	Varimax Factor Loads
Factor I	5. If I had a chance I would not stay in the classroom for even a moment.	,773	16,010***	Factor II	14. Classrooms are places where a lot is shared beside knowledge.	, 524	8,361***
	6. I cannot breathe in the classroom.	,597	9,832***		44. Classroom activities increase motivation for learning.	, 591	10,681***
	40. Each and every minute spent in this classroom torments me.	,768	15,257***		10. Classrooms are places where I expand my knowledge	, 714	12,646**
	2. For me, staying in the classroom is nothing but just a routine.	,684	12,248***		30. I have positive feelings towards learning in the classroom.	, 746	14,729***
	23. I hate classroom environment.	,737	12,330***		45. I care about the time spent in the classroom in terms of education.	, 694	12,588***
	3. I am attending classes just because I have to	,750	12,803***		7. Classrooms are places where useful learning takes place.	, 649	12,984***
	1. I never feel like entering the classroom.	, 686	12,033***		22. In the classroom, I do not forget my purpose about education.	, 513	8,348***
	31. For me, classroom means nothing other than the walls.	, 738	13,740***		34. Education given in the classroom contributes to my personal development.	,583	9,760***
	4. There is nothing in the classroom that interests me.	, 671	12,404***		25. Attending classes enhances my self-confidence for my future.	,675	12,877***
	24. I feel imprisoned when I enter the classroom.	, 644	10,139***		38. Classrooms are places that always offer opportunities to learn.	,607	10,414***
	12. Classrooms do not mean anything to me.	, 683	9,720***				
	41. Classrooms are always places where you spend your free time.	, 652	12,251***				

	Eigenvalue=7,756 Factor Explained Variance %=24,238				Eigenvalue=4,703 Factor Explained Variance %=14,696		
Factor III	18. I find peace in classroom.	, 666	14,232***	Factor IV	20. Classrooms mean a lot for an education system.	, 487	6,777***
	19. Classroom gives me confidence.	, 682	15,242***		35. School is meaningful with classrooms	,540	8,814***
	17. I lose track of time in the classroom as a learning environment.	, 637	13,045***		15. I cannot think of education without classrooms.	,530	8,264***
	37. It makes me happy to know that I will listen to the teacher in the classroom.	, 674	13,864***		29. Classrooms are essential learning environments in education	,577	9,918***
	9. I always enter the classroom with motivation.	, 648	14,058***				
	Eigenvalue=4,233 Factor Explained Variance %=13,227				Eigenvalue=3,306 Factor Explained Variance %=10,330		
Scale Total=62,491							

Confirmatory Factor Analysis

After the exploratory data analysis, confirmatory factor analysis (CFA) was carried out to determine whether the structure of the scale was confirmed. Values obtained from the confirmatory factor analysis were evaluated in line with the generally accepted fit indices. There is no absolute consensus among researchers on the criteria to be taken into consideration regarding fit indices (Munro, 2005; Wetson & Gore, 2006). Values examined overall for model fit are X^2 / df, CFI, IFI, SRMR and RMSEA values (Hu and Bentler, 1999; İlhan and Çetin, 2014; Brown, 2015; Kline, 2016).

As a result of the confirmatory factor analysis conducted, adaptive values regarding the model were found as: RMSEA, .066; $\chi 2/df=2.1$; SRMR=.05; IFI=.91; CFI=.91.

Table 2. Reference Values regarding Model Fit

Fit Measure	Good Fit Values	Acceptable Fit Values	Fit Values of the Current Model	Fit
Ki-Kare/sd	$\chi 2/sd \leq 2$	$\chi 2/sd \leq 3$	2.1	Acceptable
RMSEA	0.00<RMSEA<0.05	0.05<RMSA<0.10	0.066	Acceptable
SRMR	0.00<SRMR<0.05	0.05<SRMR<0.10	0.051	Acceptable
IFI	0.95<IFI<1.00	0.90<NFI<0.95	0.91	Acceptable
CFI	0.95<CFI<1.00	0.90<CFI<0.95	0.91	Acceptable

According to Table 2 it can be maintained that values regarding the scale which were obtained as a result of confirmatory factor analysis are within the range of acceptable fit values, and four-dimensional structure of “the scale regarding classroom” was confirmed in line with determined fit indices.

Path diagram and factor load values resulting from confirmatory factor analysis are seen in Figure 2:

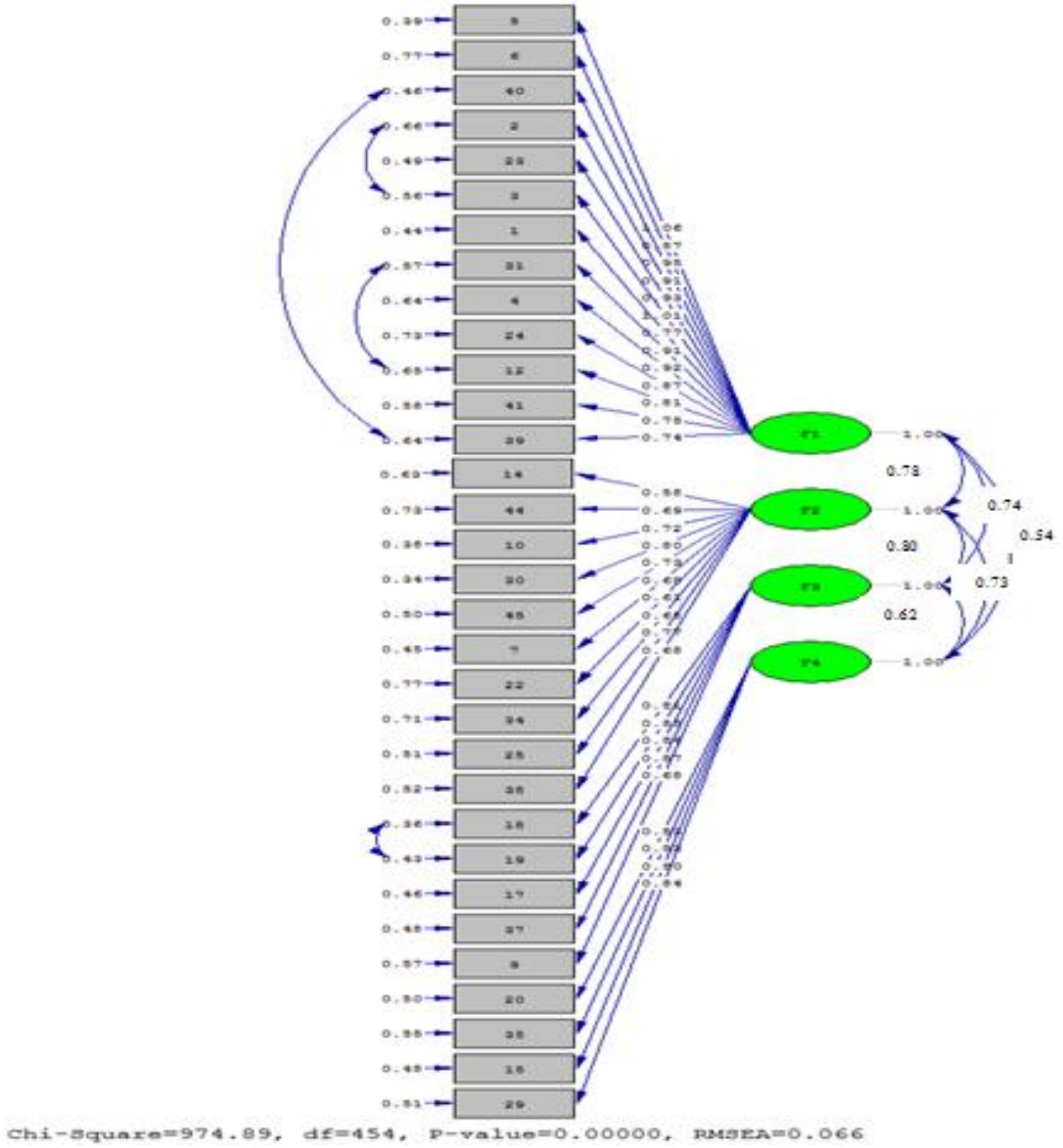

Figure 2. Path diagram on the results of the confirmatory factor analysis

Findings regarding the Reliability of the Scale

Regarding the reliability of the scale, Cronbach's alpha reliability coefficients were obtained for the whole scale and its sub-dimensions, and total item test correlations were calculated for each item in the scale. Then, independent samples t-test was carried out in order to determine significance of the difference between the average scores of groups of the upper 27% and lower 27%. In addition to these analyses, Spearman-Brown coefficient of internal consistence was calculated for the two equal halves of the scale. Moreover, as another indicator of the internal consistence, correlation coefficients of sub-dimensions of the scale were calculated with each other and with the overall scale. Results of the reliability analysis are given in Table 3 and Table 4.

Table 3. Results of Reliability Analysis

Factors	Item Number	Total Item Correlation	Upper 27%-Lower 27% t	Factors	Item Number	Total Item Correlation	Upper 27%-Lower 27% t
I.Classroom as a boring learning environment	Item 5	,773	16,010***	II.Classroom as a Positive Learning Environment	Item 14	, 524	8,361***
	Item 6	,597	9,832***		Item 44	, 591	10,681***
	Item 40	,768	15,257***		Item 10	, 714	12,646**
	Item 2	,684	12,248***		Item 30	, 746	14,729***
	Item 23	,737	12,330***		Item 45	, 694	12,588***
	Item 3	,750	12,803***		Item 7	, 649	12,984***
	Item 1	, 686	12,033***		Item 22	, 513	8,348***
	Item 31	, 738	13,740***		Item 34	,583	9,760***
	Item 4	, 671	12,404***		Item 25	,675	12,877***
	Item 24	, 644	10,139***		Item 38	,607	10,414***
	Item 12	, 683	9,720***				
	Item 41	, 652	12,251***				
	Item 39	, 666	12,618***				
	Cronbach's Alpha=,95				Cronbach's Alpha=,90		
III.Classroom as a Peaceful Place	Item 18	, 666	14,232***	IV.Classroom as a necessary learning environment	Item 20	, 487	6,777***
	Item 19	, 682	15,242***		Item 35	,540	8,814***
	Item 17	, 637	13,045***		Item 15	,530	8,264***
	Item 37	, 674	13,864***		Item 29	,577	9,918***
	Item 9	, 648	14,058***				
	Cronbach's Alpha=,88				Cronbach's Alpha=,84		
Scale Total Cronbach's Alpha=,96							

***P<.001,

Table 3 shows that Cronbach's alpha reliability coefficient of the whole scale is .96 and reliability coefficients of its sub-dimensions are .95, .90, .88' and .84 respectively. According to Özdamar (1999), if Cronbach's alpha internal consistence coefficient of the scale is within the range of $0.80 \leq \alpha < 1.00$, the scale is highly reliable. Therefore, the feature measured by the current scale is homogeneous and all items in the scale measure the same feature (Tavşancıl, 2014). In the Table, total item correlation coefficients calculated for each item in the scale vary between 0.48 – 0.77.

The result that total item correlations are positive and high (0,30 and higher values) reveals that items exemplify similar behaviours and internal consistence of the test is high (Büyüköztürk, 2006). Besides, results of the t-test which was carried out for all items between the scores of upper 27% and lower 27% vary within the significance level of P<.001. On the other hand, Spearman-Brown internal consistence coefficient, calculated for the two equal halves of the scale, was observed at a very high value: "0.95". The findings regarding correlation values for the whole scale and between sub-dimensions are given in Table 4.

Table 4. Correlation Values for the Whole Scale and between Sub-dimensions

	Scale Total	Factor I	Factor II	Factor III	Factor IV
Factor I	,919**	----------			
Factor II	,904**	,713**	----------		
Factor III	,832**	,660**	,765**	----------	
Factor IV	,687**	,485**	,628**	,524**	----------

**P<.01

It is seen that correlation values in Table 4 reveal average and high-level positive relation for the whole scale and between its sub-dimensions at α=0.01 significance level, ranging between 0,49 and 0,92.

Results of the validity and reliability analyses regarding the scale reveal that there are a total of 32 items in the scale; 13 of them are negative and 19 are positive. The maximum score that can be received from "Scale for Attitude towards Classroom", which is a five-point Likert scale, is 160, and the minimum score that can be received is 32.

Conclusion, Discussion and Suggestions

This study aims to develop an assessment tool in order to determine preservice teachers' attitudes towards classroom. For this purpose, first of all, a pool of items consisting of 50 sentences of attitude based on the literature and student opinions was formed. Then a draft form consisting of 45 items was developed following the necessary editing done in line with the opinions of a group of four experts.

The draft form of the scale was applied to a total of 473 students consisting of 361 females and 112 males who were studying at different levels of various undergraduate programs in the fall term of 2019-2020 academic year at Gazi Faculty of Education of Gazi University. Exploratory data analysis (EDA) and reliability analyses regarding the scale were carried out on the set of data obtained from 263 students. Confirmatory factor analysis (CFA) was conducted on the second set of data obtained from 210 students to determine whether the structure of the scale was confirmed.

Regarding the reliability of the scale, Cronbach's Alpha reliability coefficients were calculated both for the whole scale and for its sub-dimensions. In line with the results of the exploratory data analysis, 13 items were omitted from the scale since they did not comply with the criteria determined in the literature. Sub-dimensions in the scale which consisted of four sub-dimensions and 32 items were named "Classroom as a boring learning environment," "Classroom as positive learning environment," "Classroom as peaceful environment," and "Classroom as necessary learning environment," respectively.

It can be observed that this four-factor structure explained 62,49% of the total variance. According to the results of the reliability analysis, Cronbach's alpha reliability coefficient was .96 for the whole scale, and .95, .90, .88, and .84 for the sub-factors of the scale, respectively. The confirmatory factor analysis revealed that the adaptive values regarding the model were RMSEA, .066; $\chi 2/df$=2.1; SRMR=.05; IFI=.91; CFI=.91.

It can be maintained from the validity and reliability values that the current assessment tool has the necessary psychometric features and it can be used to determine attitudes towards classroom. Studies for scale development are usually carried out with limited groups of participants. Applying the

scale on various groups with higher number of participants will enable collecting more sound evidence with regard to validity-reliability of the scale.

Attitudes are regarded as one of the most important psychological characteristics determining individuals' behaviours and their social perceptions (Kağıtçıbaşı, 2008). Determining students' attitude levels towards specific psychological objects (teachers, classes, school, teaching materials etc.) within the education system is desirable because students' feelings and thoughts about the learning environment may have positive or negative influences on their development and academic life (Tatar, 2006; Sarı and Cenkseven, 2008).

Classroom environment is one of the most important factors that affect students' learning. Students learn better when they think that the learning environment is positive and supportive (Dorman, Aldridge and Fraser, 2006). Such an environment will provide opportunities to develop relevant contents, clear learning aims and feedback, and social skills as well as strategies which will help students to be successful (Weimer, 2009). Therefore, the behaviours which students will show under particular circumstances can be predicted through measuring their attitudes (Vogel & Wanke, 2016). The way to do it is using the assessment tools with the necessary psychometric qualities.

The literature review reveals that relevant studies are mostly based on attitudes towards school (Thornburg, 1985; Marks, 1998; Tonya and Callahan, 1999; McCoach and Siegel, 2003; Cheng and Chan, 2003; Holve-Sabel and Gustafsson, 2006; Erkman et al., 2010; Şekerci,2011; Alıcı, 2013; Yıldız and Kızıltaş, 2017; Özdemir,2017; Yıldırım and Akan, 2018; Atmaca,2019; Koçak and Yıldız, 2019; Küsmez and Yeşilkayalı, 2020), and there are a limited number of studies on attitudes towards classroom as a learning environment (Afari et al., 2013; Sarıtaş and Çelik, 2013; Yıldırım, 2018).

Determining learner attitudes towards the classroom will enable preservice teachers to consider all the factors related to the classroom atmosphere when they start teaching and help them show more empathetic behaviours towards their students. Developing assessment tools to that end will contribute to revealing the current situation and enriching the related literature.

In line with the findings of the research, recommendations for further studies and for researchers studying on this subject are as follows:

1. In different studies, analyses regarding criteria validity of the scale can be carried out.

2. In studies about the reliability of the scale, using different reliability methods such as test – retest method can be recommended.

3. Confirmatory factor analysis regarding the scale can be reapplied on the sets of data obtained from different samples, and new evidence regarding whether the current, obtained structure is confirmed can be acquired with the purpose of support or arrangement.

4. The scale which was developed can be used in different studies by taking different variables into consideration. In this way, literature can be enriched even further.

5. The assessment tool that was developed serves to the purpose of determining preservice teachers' attitudes towards the issue. Similar scales can be developed in order to contribute to determination of students' attitudes towards classroom as a learning environment at different educational levels.

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