

The Scale Development Study on Class Teachers' Perceived Self-efficacy in Creating an Effective Classroom Environment

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Abstract

The aim of this study is to develop a five point likert scale called "Class teachers' Perceived Self-efficacy in Creating an Effective Classroom Environment." Following this aim, a draft scale that included 44 items was developed and given to 248 class teachers working in Manisa and Uşak cities of Turkey. The principal components analysis was used in factor analysis of the scale in order to to examine structural validity. As a result of the analysis, 12 items were excluded and remaining 32 items were grouped into 5 factors. The explained variance is 65,157% of the total variance. The Cronbach's Alpha value that indicates the internal consistency of the scale is 0,85. The scale is accepted to be valid and reliable according to these findings. Besides, item-total and item-remaining correlations that were analyzed through Pearson are significant ($p < .001$) and item discrimination that was tested for each item by applying t-test to the bottom and top 27% is also significant. After exploratory factor analysis, confirmatory factor analysis was carried out and goodness of fit indexes were seen to be acceptable (RMSEA=0,075; AGFI=0,75; SRMR=0,69; RMR=0,68; CFI=0,92; NFI=0,92).

Keywords: class teachers, class environment, self-efficacy

1. Introduction

The class is a social environment. Like all the other people in other social environments, the individuals in the classes are affected by the variables such as rules, human relations, communication patterns, norms, physical conditions and leadership styles. Every class has its own specific environmental features and climate (Açıköz, 2003). The term "classroom climate" that can be used as a synonym of learning environment, classroom atmosphere or setting is accepted as a main factor that determines in-class behaviors and learning (Adelman & Taylor, 1997). The physical arrangements that form the classroom, psychologic situations and the interaction between social and cultural elements that affect students' feelings and evaluations constitute the classroom climate (Özden, 2005, p. 39).

While Brophy (cited by Baloğlu, 2002, p. 48) defines creating an efficient classroom climate as teachers' arranging the physical environment in the classroom, setting and applying the classroom rules, taking students' attention to the lesson, forming good relations with the students and formulating students' in-class activities, Akinoğlu (2002, p.113) explains that a positive classroom climate should be organized in a way teacher-student and student-student multiple interaction is provided.

The teacher's efficacy in classroom climate is described in many ways such as teacher-student relations, teachers' expectations, academic competency and communication skills (Rowe et al., 2010). Students are affected by their teachers especially in primary education. The teacher should try to create an environment in which students feel safe and there is not threat, fear or anxiety in order to form and keep a classroom climate that is appropriate for learning. The teacher should increase his/her students' self-confidence by showing that s/he trusts them and expects success from them (Dönmez, 2004, p. 51). Teachers' communication features stand out while doing all these. In order to create an efficient classroom climate, communication and interaction processes should be organized and applied effectively. Teachers' communication features in classroom management directly affect the level of teaching and learning activities (Şimşek and Altinkurt, 2006, p. 228). Negative behaviors in the class would be terminated by setting the class rules together with the effective communication. The rules regulate students' in school and class behaviors and provide similar and terminal behaviors (Erden, 1998, p. 74). Besides, the teacher should organize the physical elements of the class such as class' aesthetic appearance, the number of students, seating plan, cleanness, noise level, temperature and lighting appropriate to the students' physiological needs and teaching activities in order to realize effective and efficient teaching-learning activities (Erden, 1998, p. 67). Becher (1993, p. 374) indicates that every variable related to the physical environment is a support or obstacle for the education. Not only what exists in the environment but also how they are organized and look (aesthetic) are also effective in terms of education (cited by Başar, p. 92). Another element that the teacher should take into consideration while creating effective classroom climate is the timing. Effective teaching depends on muchness and effective use of the time that is used for learning. Spending the in-class time for different activities, preventing boredom, providing students' spend most of their time in class or at school and precluding dropout depend on the effective use of the time. Using the time effectively can

only be provided through a well planning. The arrangements related to provide student participation include planning, determining and distributing the sources, ruling the work and operation processes, equipping the tools, choosing methods, determining students' characteristics, observing and assessing their development (Başar, 2005, p. 17). When all the factors explained until here come together, the class teacher will definitely create an effective classroom climate.

The teacher does not only hold the majority of the responsibility of realizing educational objectives but also has a bigger power in effecting the student than the other elements (Murat, Aslantaş and Özgan, 2006). In other words, the teacher who is the architect of the classroom climate has an important place in creating an effective learning process. Teachers' perceived self-efficacy can be said to have an important role in organizing the effective classroom climate.

Self-efficacy is an important term that is prominent in Bandura's Social Learning Theory (Social cognitive Theory). According to Bandura (1986, p. 391), self-efficacy is an individual's judgement on his/her skills for organizing and succeeding a duty assigned to him/her. Albert Bandura defines perceived self-efficacy as "individuals' perceptions on how well they can perform the required actions to deal with possible situations."

Bandura (1986, p. 399-401) explains the four main sources of the self-efficacy beliefs as exact and correct experiences, indirect experiences provided by social models, verbal persuasion and individual's physical and emotional status. He states that the most effective of these is personal experiences. Individuals carry out various actions and assess the results of these. They use the results coming from these assessments in order to develop a self-efficacy belief on carrying out similar actions. The success that an individual gets in his/her previous actions is a success indicator for the similar actions in the future. Hence, the success that has been experienced triggers a reward effect and motivates the individual for similar behaviors. Information coming from the others' experiences (indirect experiences) are not as effective as people's own experiences in developing self-efficacy belief. If the person has limited or no experience in a given field, they might be affected from the others' experiences more. While the success of the model with a close age, similar educational background, same gender etc. might create a feeling of "I can do it too", model's failure may bring an uncertainty in individual's self-succeed skills. Besides, the encouragement by the family, friends, colleagues or supervisors (verbal persuasion) on the success of a behavior can change the self-efficacy (Woolfolk-Hoy, 2000). Individuals tend to maintain the positive effects of persuading suggestions by their environment and situations that they have dealt with successfully in the past. However, the anxiety (emotional status) that the people experience while carrying out a task has a negative effect on self-efficacy belief. High level of anxiety causes a decrease in performance. The individual becomes more successful if s/he is not over anxious or worried. Besides, the person's being both physically and emotionally well just before carrying out a task might increase the possibility of attempting (Bandura, 1986).

Teachers' perceived self-efficacy is one of the elements that effect their performance and success. The teacher cannot be effective in class if s/he lacks self-efficacy perception, no matter how knowledgeable s/he is in the field (Çetin, 2004). This is because the teachers reflect their perceived self-efficacy to the classroom climate and students as a result of their interaction with the students. As class teachers are those who are taken as a model by their students most, teachers' perceived self-efficacy increases their students' motivation in learning and provides the creation of a high level of self-perception (Midgley, Feldlaufer and Eccles, 1989). Therefore, class teachers' perceived self-efficacy are expected to be higher in creating an effective classroom climate than the subject matter teachers (Tschannen-Moran & Woolfolk-Hoy, 2002). In this context, the aim of the study is to develop a scale that will be used to determine class teachers' perceived self-efficacy.

The data coming from self-efficacy beliefs of the teachers in creating an effective classroom climate will allow understanding and foreseeing their behaviors better and provide information about the precautions to be taken in the teaching process in order to increase the success. As Bandura (1997) states, the teacher's self-efficacy belief is important in creating a learning environment that allows cognitive development of the students. In this respect, class teachers' self-efficacy beliefs can be said to be important in creating an effective classroom climate. The number of scales in this field In Turkey is insufficient, so this study that aims to develop a scale on class teachers' perceived self-efficacy is important.

2. Method

This part explains the sample, development of the scale and data analysis.

2.1 Sample

The sample includes 248 class teachers, 156 (63%) of whom are female and 92 (37%) are male and who work in Uşak and Manisa cities in 2016-2017 academic year. In order to develop a scale, the sample should be at least five fold of the variables (Bryman & Cramer, 2001, s.263). On the other hand, Kline (2005) explains that the sample should be at least two and at most tenfold of the items in the scale in order to take out reliable factors. The item-sample ratio in this study is 1:5.

2.2 The Development of the Scale

The scale development process includes the review of the literature, examining related scales, forming the item pool and field experts' control.

First, the literature was reviewed and the studies on class teachers' perceived self-efficacy in creating effective classroom climate were examined. The findings in the literature reveals a positive correlation between teachers' perceived self-efficacy and the classroom climate that they create (Babaođlan, Korkut, 2010; Gibson & Dembo, 1984; Moore, Mary, 1992; Schunk, 1985; Tuckman & Sexton, 1990; Woolfolk & Hoy, 1990). A teacher with a high level of self-efficacy fulfills his/her students' needs and tend to create a warm climate (Ashton & Webb, 1986; Fritz, Miller-Heyl, Kreutzer & MacPhee, 1995; Saklofske et al., 2001; Woolfolk & Hoy, 1990). Effective use of time that is a part of the classroom climate (Lorsbach and Jinks, 1999) and strategies that are used for classroom management related to effective planning are found to have a relation with teachers' self-efficacy beliefs (Gibson & Dembo, 1984; Saklofske, Michayluk & Randhawa, 1988; Sparks, 1983; Woolfolk, Rosoff & Hoy, 1990; Wax & Dutton, 1991). After literature review, categories related to the scale were defined as physical environment, student-teacher communication, planning, setting class rules, teacher effectiveness and class rules.

The class teachers that were the target group of the scale were asked open-ended questions on perceived self-efficacy in creating an effective classroom climate. These questions are as follows: What are point that you consider while communicating with your students in class? How do you control the class to create an effective classroom climate? What are the difficulties you experience while managing the class? What do you do to provide active participation of your students into learning process? In the light of the answers, items were sorted out according to pre-defined categories of perceived self-efficacy in creating effective classroom climate and an item pool with 56 items were created. In the direction of expert opinions and suggestions, every item was based on the literature. Expert opinions were used to provide content validity. The experts were two faculty members and two class teachers that do PhD. This draft of the scale was examined by a faculty member that study in the field of Turkish for language validity. After teacher and expert assessments, the final version of the scale was formed. The scale is a five-point likert scale in which rating is as follows: 5-always, 4-often, 3-sometimes, 2-rarely and 1-never. The scale was administered to 20 class teachers to test its language and understandability and 12 items were excluded in this stage; so the final form of the scale included 44 items. Then, the scale was administered to 248 (92 male and 156 female) class teachers.

In the second stage of the study, explanatory factor analysis (EFA) was carried out by using varimax rotation and principal components methods. The limit for factor loadings was set as ,30 (Büyüköztürk, 2010, p.124).

After factor analysis, item analysis was carried out for the remaining items. Item analysis was carried out separately for the whole scale. Following the item remaining, item total and item discrimination analysis, items with low reliability were excluded. Before Confirmatory Factor Analysis (CFA), Cronbach's Alpha reliability analysis was carried out in order to determine internal consistency of the scale. CFA was used to test the structure provided by EFA.

3. Findings

Factor analysis was carried out in order to determine the structure validity of the scale and factor loadings of the items to organize dimensions. Structure validity shows "the level of measuring an abstract concept correctly in the context of the behavior that is aimed to be assessed" (Büyüköztürk, 2010, s. 168). Factor analysis (principal component analysis) was used in order to determine the structure validity of the scale. Kaiser-Meyer-Olkin (KMO) coefficient that is used to determine if the sample is enough and Barlett Sphericity test that controls if the distribution in the universe is normal were used before starting factor analysis.

Table 1. KMO and Bartlett's test values

Kaiser-Meyer-Olkin Sampling Adequacy		.839
Barlett's Test	Chi-square	5262.144
	Df	528
	Sig.	000

As can be seen in Table 1, KMO value is ,839 and the result of Bartlett test is significant (5262,144, $p = 0,000$). The data is appropriate to the factor analysis when KMO value is higher than ,60 and Bartlett test is significant (Büyüköztürk, 2010; Field, 2005).

According to the results of the factor analysis, the scale consists of 8 factors whose eigenvalues are higher than one. These 8 factors explain 66,287% of the total variance. The criteria for the items are to have a high factor loading only in one factor; have a difference of at least 0,1 if they take place in two or more factors and have a minimum 0,4 factor loading value (Büyüköztürk, 2010, p. 127). Items with a high factor loading in more than one factor should be excluded from a scale that consists of multiple factors (Bandalos and Finney, 2010). Items 4., 8., 14., 15., 16., 17., 23., 24., 26., 27., 28. and 37. were excluded from further analysis because of

insufficient factor loading or having a smaller difference than ,1 in two or more factors. Factor analysis was repeated with remaining 32 items.

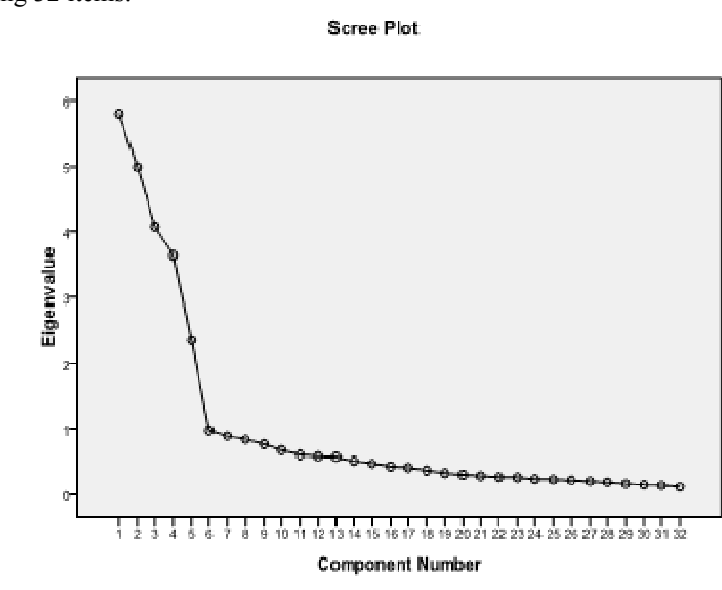


Figure-1. The Scree Plot of Class Teachers’ Perceived Self-efficacy in Creating Effective Classroom Climate Scale

The scree plot was used in determining the number of factors in EFA. The number of factors is set according to the number of points above where the shape forms an elbow (point of separation) (Field, 2005). As seen in Figure-1, the factor loadings take an even form starting from the sixth point where elbow from is shaped. According to this, the scale consists of five factors. The eigenvalues and explained variance percentages of the factors are given in Table 2 below.

Table 2. The Percent of Explained Total Variance

Factors	Initial Eigenvalues			Total Factor Loadings			Rotated Totals of Factor Loadings		
	Total	Variance %	Cumulative %	Total	Variance %	Cumulative %	Total	Variance %	Cumulative %
1	5.800	18.125	18.125	5.800	18.125	18.125	4.980	15.563	15.563
2	4.992	15.600	33.725	4.992	15.600	33.725	4.661	14.567	30.129
3	4.076	12.738	46.464	4.076	12.738	46.464	4.287	13.396	43.526
4	3.638	11.370	57.834	3.638	11.370	57.834	3.625	11.327	54.853
5	2.343	7.323	65.157	2.343	7.323	65.157	3.297	10.304	65.157

The variance explained by factor one is 18,125%; it is 15,600% by factor two, 12,738% by factor three, 11,370% by factor four and 7,323% by factor five. The total variance explained is 65,157% (Table 2). The explained variance in this research can be accepted as sufficient since variance ratios between 40% and 60% are identified as ideal (Scherer, 1988). The factor loadings of the items are given below in Table 3.

Table 3. Rotated Component Matrix after Factor Analysis

Items	Factors				
	1	2	3	4	5
27	.871				
29	.868				
28	.861				
30	.856				
32	.830				
31	.826				
26	.748				
22		.823			
24		.815			
23		.763			
21		.760			
25		.756			
20		.714			
18		.710			
19		.658			
14			.894		
13			.891		
15			.856		
16			.840		
12			.839		
17			.641		
6				.851	
7				.795	
2				.792	
3				.721	
1				.698	
5				.688	
10					.871
8					.802
11					.798
9					.791
7					.711

Factor loading is a coefficient that explains the relation between items and factors. The factor loadings of the scale items should be above 0,30 or 0,40 limits (Field, 2005). The minimum value was set as 0,40 in this research. When first results of the factor analysis was examined, 12 items whose factor loading was below 0,40 or that have high factor loadings in two or more factors were excluded and factor analysis was carried out again. The final form of the class teachers' perceived self-efficacy in creating an effective classroom climate scale consists of 5 factors and 32 items. There seven items whose factor loadings change between 0,871 and 0,748 in factor one; 8 items with factor loadings between 0,823 and 0,658 in factor two; six items with factor loadings between 0,894 and 0,641 in factor three; six items with factor loadings between 0,851 and 0,688 in factor four and five items with factor loadings between 0,871 and 0,711 in factor five.

By considering the content of the items that they consist of and the related literature, the five factors that summarize class teachers' perceived self-efficacy in creating an effective classroom climate were named as follows: factor one as "classroom rules", factor two as "planning", factor three as "teacher effectiveness", factor four as "physical environment" and factor five as "communication."

3.1 Confirmatory Factor Analysis (CFA)

Different from the factor analysis that is carried out through traditional method, CFA is used to verify a factor structure that is pre-defined by the researcher. It is used as an addition to EFA in scale development studies. In such studies, it is presumed that various latent variables which are structured by the scale items are explained by another latent variable and the appropriateness of this presumption to the data is tested (Şimşek, 2006).

As seen in Figure-2, Chi-square value is 1092,99 and df is 459. The Chi-square and df ratio (X^2/df) is 2,381. In large samples, when this ratio is below three, it is considered as perfect and when it is below five it is considered as good fit (Çokluk, Şekercioğlu, & Büyüköztürk, 2012). Therefore, there is a perfect fit. In table 4 below, it is given chi-square and df ratio, goodness of fit indexes and accepted assessment criteria according to

Schermelleh-Engel, Moosbrugger and Muller (2003).

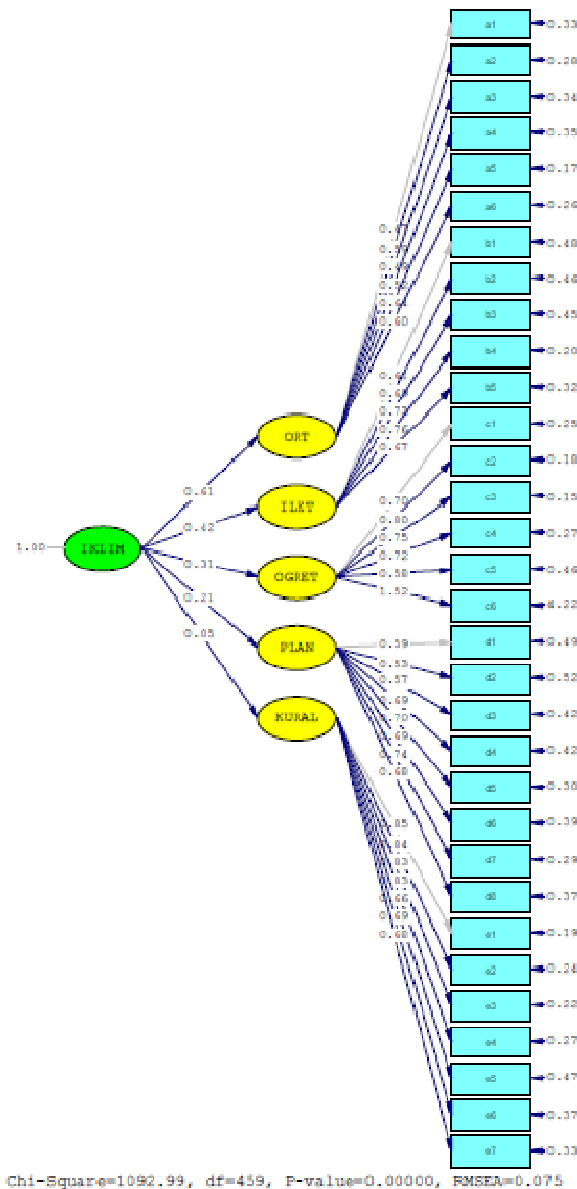


Figure 2. Results of CFA

(*1=Climate, 2=Classroom Rules, 3=Planning, 4=Teacher Effectiveness, 5=Communication, 6=Physical Environment)

Table 4. CFA Goodness of Fit Results of Class Teachers' Perceived self-efficacy in Creating an Effective Classroom

Fitness Indexes	Criteria	Acceptable Criteria	Proposed Fitness Values
X^2/df	$0,00 < X^2/df < 3$	$3 < X^2/df < 5$	2,381
RMSEA	$0,00 < RMSEA < 0,05$	$0,05 < RMSEA < 0,10$,075
RMR	$0,00 < SRMR < 0,05$	$0,05 < SRMR < 0,10$,069
GFI	$0,95 < GFI < 1,00$	$0,90 < GFI < 0,95$,78
AGFI	$0,90 < AGFI < 1,00$	$0,85 < AGFI < 0,90$,75
NNFI	$0,95 < NFI < 1,00$	$0,90 < NFI < 0,95$,92
CFI	$0,95 < CFI < 1,00$	$0,90 < CFI < 0,95$,92

The results of CFA is given in Table-4. Root Mean Square Error of Approximation (RMSEA) is ,75; Root Mean Square Residual (RMR) is ,69; Goodness of Fit Index (GFI) is ,78; Adjusted Goodness of Fit Index (AGFI) is ,75; Normed Fit Index (NFI) is 0,92 and Comparative Fit Index is 0,92. Even though the results do not indicate a perfect fit, they are in the acceptable limits. These findings verify the factor structure of “Class Teachers’

Perceived self-efficacy in Creating an Effective Classroom Climate Scale.”

3.2 Item Analysis

Item analysis was carried out in order to determine how effectively the scale measures intended behaviors and aptitudes. In order to find out item discrimination, raw scores were sorted from highest to lowest and t-values for the mean scores of the bottom and top 27% were calculated. Item-total and item-remaining correlations and item discrimination t-values are given in Table-5 below.

Table 5. Item Total Correlations and Independent Samples T-test Results of the Bottom and Top 27% Groups of Class Teachers' Perceived self-efficacy in Creating an Effective Classroom Climate Scale

Item	Item-total Correlation	Item-remaining Correlation	T-test for Items (Bottom and top 27%)
27	.297	.303	6.055
29	.297	.286	5.415
28	.271	.243	6.448
30	.349	.338	5.166
32	.283	.254	5.425
31	.313	.303	5.436
26	.295	.286	8.146
22	.277	.256	6.434
24	.264	.243	5.878
23	.385	.359	7.004
21	.263	.239	7.057
25	.329	.248	5.072
20	.395	.384	7.446
18	.415	.403	6.479
19	.374	.364	7.856
14	.284	.275	7.705
13	.270	.262	8.120
15	.390	.396	6.027
16	.348	.339	6.347
12	.359	.365	6.170
17	.412	.403	4.599
6	.447	.451	4.456
7	.384	.376	5.708
2	.470	.473	6.317
3	.443	.417	7.112
1	.401	.405	5.227
5	.397	.401	4.601
10	.404	.408	6.293
8	.427	.430	5.042
11	.242	.249	4.470
9	.305	.309	6.296
7	.327	.316	6.674

As seen in Table 5, item-remaining correlation coefficients are between 0,24 and 0,47 while item-total correlation coefficients are between 0,29 and 0,47. These values are above the generally accepted limit that is 0,20 (Büyüköztürk, 2010, p. 171). Besides, correlations of all items are significant in the level of $p < ,001$ in item-total and item-remaining analysis. All these results indicate that all items are within the same structure.

Of 407 participants, the top 27% (n=110) and bottom 27% (n=110) according to their total scores were compared for each item and total score by using independent samples t-test. When Table 5 is examined, it is seen that item-total correlations are between ,470 and ,263 and t values are significant ($p < ,001$) in all 32 items . As seen in the table, the top 27% group's mean score is significantly higher than the bottom 27% group's mean score ($p < ,001$) in all items. Items with ,30 and higher item-total correlation values can be stated to discriminate individuals with a high degree (Büyüköztürk, 2005).

The difference in item score means of the bottom group (27%) and top group (27%) that are formed according to the total scores was compared b using independent samples t-test and it is seen that the item discrimination index of each item is statistically significant in the level of 0,0,1. The item mean score of the top 27% group is higher than the bottom groups' and the difference is statistically significant ($p < ,001$) (Büyüköztürk, 2010, p. 171). According to these findings, the items in the scale have a high validity and they intend to measure the same behavior.

3.3 Findings related to Reliability

Cronbach's Alpha value was calculated for each factor and the scale in order to determine the reliability of the scale that indicates the internal consistency. The results of the reliability analysis for each factor and the scale that took its final form with 32 items are given in Table 6 below.

Table 6. Reliability Analysis of Class Teachers' Perceived self-efficacy in Creating an Effective Classroom Climate Scale and its Factors

Factor	Cronbach's Alpha
Factor-1	.93
Factor-2	.893
Factor-3	.914
Factor-4	.868
Factor-5	.863
Total	.85

According to the reliability analysis results (Table 6), the reliability coefficient of factor one is ,93; it is ,893 for factor two; ,914 for factor three; ,868 for factor four ; ,863 for factor five and ,85 for the whole scale. If the Cronbach' Alpha inter-consistency coefficient value is between ,80 and 1,00, the scale is highly reliable (Özdamar,1999). Therefore, "Class Teachers' Perceived self-efficacy in Creating an Effective Classroom Climate Scale" is a reliable measurement tool.

4. Results and Discussion

This study has been carried out in order to develop a scale that measures the perceived self-efficacy levels of the class teachers in creating an effective classroom climate. The validation of the scale was done through factor extraction (EFA, first and second sorted CFA). The extraction has given five factors. According to it, factor one (classroom rules-CR) consists of seven items and explains 18,125 of the total variance. Factor two (planning-P) consists of eight items and explains 15,600% of the total variance. Factor three (teacher effectiveness-TE) consists of six items and explains 12,738% of the total variance. Factor four (physical environment-PE) consists of six items and explains 11,370% of the total variance. Factor five (communication-C) consists of five items and explains 7,323% of the total variance. The total variance explained by 32 items in five factors is 65,157%.

The internal consistency of the scale that gives the reliability has been tested by using Cronbach's Alpha reliability coefficient. The coefficient of the whole scale is 0,85 while it is as follows for each factor in order: 0,93 for CR; 0,893 for P; 0,914 for TE; 0,868 for PE and 0,863 for C. The given Cronbach's Alpha values are sufficient. Item-total, item-remaining and item discrimination indexes have been examined separately for each item. In item discrimination analysis, the difference in item means of the bottom and top 27% groups that have been formed according to total scores has been compared by using independent samples t-test and item discrimination index of each item is statistically significant in the level of 0,01. In the light of these findings, the validity of the items in the scale is high and they intend to measure the same behavior.

CFA has been carried out in order to verify the factor structure provided by EFA and the results of CFA verifies the factor structure. The scale that has been developed can be used in order to measure class teachers' perceived self-efficacy in creating an effective classroom climate. The factor structure provided by EFA has been verified by the results of CFA (RMSEA=0,075; GFI=,78; AGFI=0,75; SRMR=0.69; NNFI=0,92; CFI=0.92). This result also indicates that the factors formed according to the literature have been verified statistically.

The scale has been developed by studying on and collecting data from class teachers. It can be suggested to study with teachers in the other fields in order to use the scale with them.

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