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Development of the Democratic Education Environment Scale

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ABSTRACT

Today, the aim of raising individuals equipped with democratic values and behaviors in democratic countries, as well as the definition of an education environment sensitive to human rights and democracy as a human right under international conventions, has increased the importance of democratic education and research in this area. This study aims at developing a scale for the evaluation of the democratic education environment at classroom level, including all in-class processes and structures, based on teacher perceptions. A mixed-method design was employed in this study. This scale was applied to two different samples of 417 and 1091 teachers working in primary, middle and high schools. Exploratory and confirmatory factor analyses were carried out to determine the construct validity of the scale, convergent validity was evaluated, while test-retest, Cronbach Alpha, and split half methods were used to evaluate its reliability. The results of these analyses indicate that the 3-factor, 75-item Democratic Education Environment Scale is valid and reliable.

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Keywords:
Democratic education, democratic education environment, Delphi technique, scale development

Introduction

One of the most important responsibilities of the state in a democratic country is to raise new generations of citizen to internalize universal democratic principles and apply them in all walks of life. Raising individuals with democratic awareness is also a priority for education systems for a number of other reasons: the changing definition of citizenship in line with social, political, cultural and economic developments; the importance of human rights following the United Nations' Declaration on Human Rights and the legal obligations it enforces on signatory states; and recognition of the basic human right to an education that is sensitive to human rights (United Nations, 1948; Gülmez, 2001; Osler & Starkey, 2006). Given this context, the extent to which the educational activities of schools in general, and within classrooms in particular, are in accordance with democratic criteria has become an important field of research.

This study aims to develop a scale to evaluate the level of realization of democratic education environment criteria at classroom level. To this end, this study first investigates what democratic education is and what a democratic class should be like, as well as which categories can be used to evaluate a democratic education environment at classroom level.

Democratic Education

There are a variety of definitions of democratic education. The Alternative Education Resource Organization (n.d.) defines democratic education as an educational context where young people have the

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freedom to organize their daily lives, where there exists equality between young people and adults, and where democratic decision-making processes are adopted.

Regarding the characteristics of democratic education, Balme and Bennis (2008) argue that it should promote the participation of students in the construction of the school's structure and vision, and allow students to regulate their own ways of learning and living, with adults acting as guides and consultants instead of directing student activities.

Whereas Hecht (n.d.a) describes democratic education as an effort towards making school a democratic microcosmos, realized by making democratic principles an integral part of school life, i.e. by creating a democratic community that applies democratic procedures such as elections or school councils; it requires recognition of the multi-dimensionality of learners, taking inner motivation as the starting point of learning and the recognition of the self-management and responsibility of the learner; it supports the learner to develop self-learning strategies and self-assessment, recognizes the ability of the learner to plan his/her learning; its curriculum includes content on democracy, it makes such democratic principles ordinary aspects of school life, and establishes dialogue based relations in all those practices.

Democratic education may be embodied in various forms from the micro level of within class democracy to the macro level of whole school democracy (Morrison, 2008). This study takes democratic education at micro level by focusing on the classroom.

Democratic Education Environment at Classroom Level

The classroom environment is where students spend most of their school lives, and where students and teachers interact. It is a space where a sense of community is mostly experienced. So it has a great impact on students' attitudes and behaviors. Students find opportunities to practice democratic skills and express democratic values in class, where they learn what it means to be an active member of a democratic society (Cappa, 1956; Gimbert, 2002; Print, Ørnstrøm & Nielsen, 2002). For that reason the classroom is the primary location for creating a democratic culture (Duman, 2004).

The democratic classroom is a place where all necessary conditions for a democratic climate co-exist (Angell, 1991). The democratic education environment at classroom level should be created by taking all structures and processes into consideration as a whole in their relation to democracy. Both Dewey's studies (1916/1996, 1938/2007, 1970/2010a, 1900/2010b) and the literature on democratic schools (Apple & Beane, 2011; Greenberg, 1995; Hecht, 2008; Readhead, 2008; Sadofsky, 2008) identify four basic categories of the democratic education environment at classroom level. The first is decision-making/participation, which refers to how decisions are made in class; the second is curriculum-instruction, which refers to objectives, content, instructional methods and materials, and evaluation elements; the third is relations, which refers to inter-personal relations and relations with students' families; the fourth is the teacher, which refers to the characteristics, roles and responsibilities of the teacher. These categories will now be considered in turn.

Decision-making/participation. One of the basic conditions of democratic education is the participation of individuals forming a community in decisions related to themselves (Dewey, 1970/2010a; Guerney & Merriam, 1972; Gutmann, 1999; Kubow & Kiney, 2000; Print et al., 2002; Rainer & Guyton, 1999; Riley, 2011).

In a democratic education environment, students should have the right to participate in decisions about class rules, values and principles, and sanctions to be applied in case of breaches of those rules, values and principles. They should also have the right to participate in decisions on educational objectives, content, methods and evaluation (Arabacı, 2005; Girgin & Gürşimşek, 2004; Guerney & Merriam, 1972; Morrison 2009; Print et al., 2002; Tomlison, 1999, as cited in Riley, 2011).

Examples of best practice regarding democratic participation and decision-making mechanisms can be found in democratic schools. Such practices include school councils giving students the right to participate in all decisions related to themselves; direct democracy; equal votes for adults and children; and students being involved in the application of decisions taken (Greenberg, 1995; Hecht, 2008; Readhead, 2008;

Sadofsky, 2008). Decision-making/participation mechanisms such as these can be adopted by conventional schools at classroom level.

Curriculum-instruction. According to Dewey (1900/2010b), the purpose of education is to comprehend and guide the activities of the child. Therefore, education must start with the recognition of each student's interests, instincts, motives, drives and strengths (Dewey, 1938/2007, 1970/2010a, 1900/2010b). Democratic education should understand the inner conditions and experiences of the student, and arrange the necessary conditions for learning, taking the student's own conditions and experiences as the point of departure (Dewey, 1938/2007).

Objectives form one of the elements of curriculum-instruction. Democratic education aims to develop individual and social sense of responsibility in students, cooperation, critical thinking, problem solving, self-control, listening skills, self-expression, social participation, empathy, ability to defend one's own rights and effective decision-making skills. It aims to increase the self-confidence and independence of students, while requiring them to respect others' interests and rights; it aims to guide students to learn and investigate, while promoting equality and freedom of expression among students (Arabacı, 2005; Başaran, 1986; Büyükkaragöz, 1994; Cappa, 1956; Dewey, 1916/1996, 1938/2007; Gimbert, 2002; Guerney & Merriam, 1972; Kubow & Kinney, 2000; MacMath, 2008; Vinterek, 2010). Democratic education also has the power and aim of transmitting, changing and improving the culture (Dewey, 1916/1996; Gutek, 1988/2001). Finally, democratic education also undertakes the duty of constructing and improving the democracy itself (Dewey, 1970/2010a).

Another element of curriculum-instruction is content. It must be offered to the student in relation to ordinary life experiences familiar to him/her, and in accordance with his/her capacity. It must also be able to motivate the student to access knowledge and produce new ideas (Dewey, 1938/2007). In this regard, Apple & Beane (2011) argue that a democratic curriculum should be flexible about what to learn and how to use learning; it should incorporate students' own questions and interests in the educational objectives and content.

In a democratic education environment, instructional methods should support the idea of democracy, meaning that students' needs should be taken into account while determining those methods. In addition, the methods that are directed towards achieving the objectives of democratic education outlined above, such as developing skills of critical thinking, problem solving, discussion, cooperation and self-control should be used. Yeşil (2004) suggests using methods that will give students democratic attitudes and skills, and that will make students active in all activities, while MacMath (2008) recommends methods providing equal participation and sharing opportunities, and Dewey (1916/1996) argues that methods should be determined based on observations of the daily lives of students.

Evaluation in a democratic education environment is not based on results-oriented evaluation, but on process-oriented evaluation (MacMath, 2008; Guerney & Merriam, 1972; Topkaya, 2004). That is, academic scores are not seen as achievement criteria (Arabacı, 2005), and competition based evaluation and rewards are criticized (Dewey, 1970/2010a).

Relations. In a democratic education environment, inter-personal relations should be established based on democratic values, having the following characteristics: tolerance, cooperation, mutual trust, multi-dimensional communication (Arabacı, 2005) and dialogue; conflicts and disputes as part of the educational process (Jenlink & Jenlink, 2008; Lowry, 2002), mutual respect (Print et al., 2002; Riley, 2011), recognition of human dignity (Kubow & Kinney, 2000; Riley, 2011), responsibility (Riley, 2011), respect of other individuals' rights (Cappa, 1956; Riley, 2011), equity and trust among students and teachers, support of social justice (Print et al., 2002), anti-racism and anti-sexism (McAnncih, 1999, as cited in MacMath, 2008), awareness of other people's needs and interests (Cappa, 1956), recognition of every single individual, free expression of thoughts (Guerney & Merriam, 1972), and democratic participation (Lowry, 2002).

In a democratic environment, the most decisive aspect of relations is the relationship between the teacher, having an authoritarian position in conventional education, and the students. Dewey (1938/2007) asserts that teacher-student relations must be horizontal. Another aspect of relations concerns the family

(Dewey, 1900/2010b; Hecht, n.d.b). Relations with students' families should also be democratic, and the teacher must know the family, and make them participate (Gimbert, 2002).

Teacher. The key responsibility for creating a democratic education environment at classroom level certainly belongs to the teacher. Democracy should be an integral part of his/her life style. He/she should act in line with a democratic ideology, and constitute a role model to the students through his/her behavior (Büyükkaragöz & Kesici, 1996; Guerney & Merriam, 1972).

First, the teacher should be aware of the responsibility of designing a democratic education environment, and have the required skills. He/she should know well the conditions of the school's local environment, and know every single student as an individual (Dewey, 1938/2007).

For democratic relationships to flourish in the classroom, the teacher should be able to transform his/her conventional authoritarian role into a facilitating one (Print et al., 2002). He/she, while putting democratic practices into action, must acknowledge and take into account the effects on learning of social and power relations between teacher and student and between students (Gutierrez, Rymes, & Larson, 1995, as cited in Mukhopadhyay, 2009). The teacher should be aware that he/she can only guide learning, so must only control learning in an indirect manner.

From the brief descriptions of the four categories and their characteristics it is clear that creating and maintaining a democratic education environment at classroom level requires a comprehensive perspective that takes into account all the structures and processes in the classroom.

Previous research on democratic education environments at classroom level has focused on primary, secondary and higher education, the democratic behavior, attitudes and beliefs of teachers according to teacher and student perception. A number of data collection tools have also been developed to assist in such research (Akbaşlı, Yelken, & Sünbül, 2010; Bay, Kaya, & Gündoğdu, 2010; Çakmur, 2007; Demir, 2003; Demirtaş, 2004, as cited in Yalçın, 2007; Genç, 2006; Gömleksiz, 1988; Gözütok, 1995; Selvi, 2006; Shechtman, 2002; Toper, 2007). However, these studies have certain limitations in terms of the categories outlined in this study in that the democratic education environment and democratic teacher attitudes, behaviors and beliefs have mainly been explained in terms of two categories, relations, based on democratic principles and values, and decision-making/participation, while curriculum-instruction has only been included superficially through a few items in the data collection tools (Akbaşlı et al., 2010; Çakmur, 2007; Demirtaş, 2004, as cited in Yalçın, 2007; Gözütok, 1995; Toper, 2007). Moreover, in some studies this category is not considered at all (Demir, 2003), while other studies lack any analysis of the construct validity and reliability of their data collection tools (Çakmur, 2007; Gömleksiz, 1988).

In short, research to date has not yet provided any valid and reliable data collection tool that encompasses all the structural and procedural elements of a democratic education environment as a whole, and that can assess teacher behaviors based on their perceptions about the realization of all the criteria of a democratic education environment at primary and secondary level. Therefore, this study aims to develop a valid and reliable scale to be used to evaluate the level of realization of democratic education environment criteria at classroom based on teacher perceptions.

Method

Research Design

This study employed a mixed-method design (Creswell, 2008). Delphi Technique was used to generate an item pool for the scale. During the Delphi study content analysis and descriptive statistical analysis were used. A survey method was also used to collect data to test the reliability and the validity of the scale.

Sample

The scale was administered to two different samples in spring term of 2011-2012 academic year and fall term of 2012-2013 academic year. A pilot validity and reliability analysis and Exploratory Factor Analysis

(EFA) was carried out using data from the first sample, while Confirmatory Factor Analysis (CFA) and post-construct validity reliability analyses were performed using data from the second sample. The first sample consisted of 417 teachers working at Büyükçekmece District of İstanbul. Of these teachers, 73.4% (*n*=306) worked in elementary schools (1-8 grade), 26.4% (*n*=110) in high schools. The second sample consisted of 1091 teachers working at Arnavutköy, Ataşehir, Avcılar, Bağcılar, Bahçelievler, Başakşehir, Bayrampaşa, Beykoz, Beyoğlu, Çatalca, Esenler, Eyüp, Fatih, Gaziosmanpaşa, Güngören, Kadıköy, Kağıthane, Kartal, Küçükçekmece, Maltepe, Pendik, Sancaktepe, Sarıyer, Silivri, Sultangazi, Şişli, Tuzla, Ümraniye, Üsküdar districts of İstanbul. Of these teachers, 36.6% (*n*=399) worked in primary schools (1-4 grade); 34.3% (*n*=374) at middle school (5-8 grade), and 29% (*n*=318) in high schools.[*]

Data Collection Tools

The data collection tools used are Democratic Education Environment Scale, which was developed for this study, and the survey by Gömleksiz (1988), originally developed to determine the participation levels of instructors and university students in democracy principles, and their in-class behavior in line with those principles. In this study, this survey was used to measure the convergent validity.

Developing the Democratic Education Environment Scale

To develop the Democratic Education Environment Scale (DEES), first a pool of items was created using Delphi technique with the aim of reaching a consensus among a group of experts (Dalkey & Helmer, 1962). The following steps were used, consisting of three rounds.

Delphi panelists. Panelists were selected from three different areas, i.e. practitioners, academicians and NGO (Non-governmental organization) members, in order to obtain a diversity of ideas and various perspectives. Panelist candidates were selected according to the following criteria: academicians with a Ph.D. degree in educational sciences and studying in democratic education field; practitioners who were either a democratic school founder or employee; NGO members who were employed in an NGO working on democratic education/democratic schools. Panelist candidates were determined using the opinions of one American and two German experts working in the field of democratic education. Nine panelists from United States of America, 4 from Germany, 2 each from England, Netherlands and Turkey, and 1 each from Puerto Rico, Spain, Canada, Australia, Austria and Israel were involved in the first round of the Delphi study, making 25 panelists in total, whereas 17 panelists were involved in the third round.

First round Delphi. In the first round, panelists were asked, "What actions should be taken in order to design a democratic education environment in a conventional school classroom?" The concept of "conventional school" in this question was defined by considering current conditions in Turkey, the country where the research findings would be applied. In order to guide the panelists in answering questions and to collect detailed data, the categories that would be adopted while investigating a class in a conventional school were pre-determined as decision-making mechanism, curriculum, teacher, student, relations and physical aspects (Aydın, 1998; Başar, 2001; Erden, 1998; Erden, 2003; Fer, 2009; Ornstein & Hunkins, 1988; Sönmez, 1985). Panelists were requested to answer the question for every category.

Content analysis (Creswell, 2007) was applied to the answers collected during the first round. A list of items was generated based on the results of the content analysis. The English wording of the items was reviewed by three experts working in English language teaching, while every item's understandability, category compatibility, and the possibility of merging any items were evaluated by three experts working in educational sciences. A questionnaire consisting of 306 items was formed based on these expert views.

Second round Delphi. The item list formed after the first round was sent to the panelists in the form of a Likert scale to rate each item from 1 to 5 (1 strongly disagree, 5 strongly agree), together with the comments made by the panelists in the first round. Descriptive statistical analysis was applied to the

[*] Turkey's Grand National Assembly decided to legislate a new rule about Turkish Education System in 2012. According to this rule elemantary education structure was divided into two stages as primary and middle school in 2012-2013 academic year. Therefore the names of the level of the schools for first and second samples are different.

answers collected after the end of this second round to calculate mean, median and percentage of agreement levels for the items.

Third round Delphi. Each panelist was sent a new questionnaire form, prepared specifically for them, that included his/her own degree of agreement for each item in the second round, along with the descriptive statistical results for each item calculated from all the panelists' degrees of agreement, and the comments of all the panelists regarding the categories in the second round. The panelists were then asked to review the descriptive statistical results and comments for each item in order to re-evaluate their degree of agreement in the previous round. If they wanted to change their degree of agreement, they wrote down the new degree in the related field.

There are two important criteria in Delphi studies: stability and agreement. Stability is the consistency between the given answers in each Delphi round. Consistency arises when answers do not change in any statistically significant way after two successive rounds. Stability does not necessarily imply a complete level of agreement, but agreement level analysis begins once stability has been obtained (Dajani, Sincoff, & Talley, 1979). In the literature, different criteria, such as the coefficient of variation, F test on two variances, χ^2 test, and the percentage of the panelists that changed their answers to move closer to the mode are all used (Dajani et al., 1979). In this study, the number of panelists who changed their answers to move closer to the mode was used as the stability criteria, with stability being defined as reached when the change was less than 15%. Because 17 panelists were involved in the third round of the study, the researchers therefore defined the stability criterion as fewer than three panelists moving their responses closer to the mode response from the previous round for each item. Although this criterion could not be met for two items, it was decided not to repeat the third round just for these as there were already a large total number of agreed items. Consequently, the Delphi was completed after the third round.

According to the literature, the following criteria are used to determine the agreed items: only interquartile deviation (IQD) (Elfeddali, Mesters, Wiers, & De Vries, 2010; Herring, 2004; Peng, 2009; Waterlander, Steenhuis, Vet, Schuit, & Seidell, 2009); only percentage of agreement (Ager, Stark, Akesson & Boothby, 2010); IQD and percentage of agreement (Rayens & Hahn, 2000); IQD and median (Brouwer et al., 2008); and mean, median and percentage of agreement (Terrell, 2009). In this study, the mean, median and percentage of agreement were used together as agreement criteria. That is, in order for an item to be taken as a characteristic to design a democratic education environment, its mean should be at least 3.5, its median should be at least 4, and the ratio of the number of panelists choosing "I strongly agree" or "I agree" choices to the overall number of panelists should be at least 4/5. At the end of the third round, the item list was assessed based on these criteria, with 119 items out of 306 being identified as characteristics of a democratic education environment. The items list derived from the Delphi study were translated into Turkish by three experts working as a team to decide the best translation, after which an independent translator copy-edited the translation. As these items constituted the items of a scale to be applied in Turkey at classroom level, they were re-checked by three experts working in the field of educational sciences regarding their compatibility with the Turkish education system, with the classroom level, and whether each item could be combined with others or not, or whether one item could be divided or not. Following the revisions based on these expert opinions, the list was finalized with 124 items, which were converted to the Likert scale form.

Other experts were consulted to assess the face and content validity of the 124-item form. Scale items were evaluated by 21 instructors working in the field of education and two assessment and evaluation experts. The form was revised according to those experts' opinions to result in a form with 111 items. Experts found seven item pairs close to each other regarding meaning, so it was decided to select the best of each pair after item analysis. Finally, the scale was reviewed by a Turkish language expert.

Two separate pilot studies were used to test the scale's item readability/intelligibility, which led to further revisions. In its final form, the scale was administered to teachers to collect data for reliability and validity analyses. Derived data were used in item analysis to test the reliability and validity of each item; some items were eliminated based on item remainder correlation values and significance level of each item. The remaining 101 items were subjected to EFA which revealed a three-factor structure. In the EFA items with no significant factor loading on any factor; those with significant factor loading on more than one factor and with differences less than .10 were eliminated from the scale and 83 items remained. CFA was then

performed using data from the second sample to test the validity and reliability of this structure. Items with R^2 values less than .10 were eliminated from the CFA. This reduced the number of the items to 75. In addition to construct validity, convergent validity was tested in comparison to a former scale with similar characteristics. Following these validity analysis, the reliability of the scale was tested, subjected to test-retest, Cronbach Alpha and split half methods. Finally, item-total correlations, item remainder correlations and item discrimination values were calculated for each dimension as well as for the overall scale. Scale was designed as 5 point Likert scale format ranging from everytime (5) to never (1).

Findings

Pilot Reliability and Validity Analysis Findings

First, the low item correlation valued items were eliminated from seven item pairs with close meanings. Then, the analysis was repeated and item remainder correlation values were evaluated; two items which lead to increase in Cronbach Alfa when they were removed, were deleted from the scale, and the item analysis was repeated. Pearson correlation coefficient analysis was used to calculate item-total correlations; an independent sample *t* test was applied to determine the discrimination of the items; and item remainder values were evaluated. These analyses revealed that one item did not yield significant results regarding the scale as a whole so it was deleted from the scale. This reduced the number of items in the scale to 101.

Exploratory Factor Analysis (EFA) Findings

The remaining 101 items were next subjected to EFA. The adequacy of the data obtained from the sample was evaluated using the Kaiser-Meyer-Olkin (KMO) test, while the normal distribution of the data was tested using Bartlett's test. The KMO value was .939, while Bartlett's test was statistically significant (25994.919, df=5.050, p=.000). A KMO value greater than .9 indicated adequacy of the data, while a significant result from Barlett' test indicated the data was suitable for factor analysis (Büyüköztürk, 2007).

In the EFA, an unrotated principles component analysis was first carried out to determine the factor construct of the scale. Then the analysis was repeated with Varimax rotation technique to clarify the interpretation of the resulting factors. Since the size of the sample was larger than 300, significant factor loading was defined as .30 (Stevens, 1992). The Rotated Component Matrix was evaluated and 18 items with no significant factor loading on any factor; those with significant factor loading on more than one factor and with differences less than .10 were eliminated from the scale. The analysis was repeated for the scale with the remaining 83 items. Table 1 shows eigenvalues and total variance explained, while Table 2 shows related factors of 83 items, as well as the rotated factor loading of the items.

Table 1. Eigenvalues and variance explained

Factor	Eigenvalues	Variance explained%	Cumulative variance%
1	18.311	22.062	22.062
2	8.759	10.552	32.614
3	6.558	7.901	40.515

As Table 1 shows the first factor with eigenvalue equal to 18.311 explained 22.062% of the variance, the second factor with eigenvalue equal to 8.759 explained 10.552% of the variance, and the third factor with eigenvalue equal to 6.558 explained 7.901% of the variance. These factors together explained 40.515 of the variance.

The items falling onto each factor were scrutinized to identify a name for each factor. Factor 1 was named "curriculum-instruction" because its items related to objectives, content, instructional methods, materials and evaluation; factor 2 was named "teacher-relations" because its items related to teacher qualifications and the structure of relations; factor 3 was named "decision-making" because its items related

to the decision-making process. The scale that was developed in this study was called the "Democratic Education Environment Scale (DEES)" to reflect its aim of measuring democratic practices in classroom.

Table 2. Rotated factor loadings

Factor 1				Factor 2		Factor 3	
Item no	Factor loadings	Item no	Factor loadings	Item no	Factor loadings	Item no	Factor loadings
28	.707	38	.586	75	.313	3	.785
32	.706	18	.580	99	.670	4	.773
33	.700	53	.579	95	.644	2	.735
40	.687	52	.568	97	.633	5	.728
39	.671	48	.560	111	.612	1	.703
35	.671	49	.559	96	.610	6	.647
29	.664	41	.547	90	.589	7	.622
23	.653	55	.547	80	.584	10	.532
36	.649	12	.544	98	.551	9	.484
47	.649	51	.541	109	.543	91	.443
24	.648	13	.527	68	.541	8	.417
30	.646	44	.523	110	.532		
27	.633	45	.520	94	.519		
56	.624	50	.519	107	.509		
54	.623	64	.499	89	.507		
20	.620	60	.486	76	.503		
46	.619	81	.484	88	.497		
19	.618	11	.472	104	.464		
22	.618	62	.461	106	.458		
26	.617	57	.425	100	.451		
37	.615			78	.447		
15	.608			105	.428		
42	.608			77	.379		
21	.604			108	.366		
14	.604			103	.349		
17	.593			85	.327		

Confirmatory Factor Analysis (CFA) Findings

In this study, the LISREL 8.80 was used to perform a CFA to test the structure that emerged from the exploratory factor analysis. According to the Kolmogorov Smirnov test results, curriculum-instruction dimension that came out of EFA (D(1091)=.023 p=.146) and the overall scale (D(1091)=.025 p=.104) displayed a normal distribution, whereas decision-making dimension (D(1091)= .063 p=.000) and teacher-relations dimension (D(1091)= .104 p=.000) did not display a normal distribution. In cases of non-normal distribution of data in CFA, it is recommended to use Weighted Least Squares and Robust Maximum Likelihood methods with an asymptotic covariance matrix or covariance matrix calculated from the normal scores (Şimşek, 2007). In this study, the sample size was not sufficient to compute an asymptotic covariance matrix, so the Maximum Likelihood Method and a covariance matrix computed from the normal scores were used.

In the first stage of the analysis, fit index values and *t*-values of each observed variable were evaluated. This showed that the *t*-values of each item were significant (p<.01), and fit index values (X^2=15694.67, p=.000, df=3317, X^2/df=4.732; RMSEA=0.068; SRMR=0.059; CFI= 0.93; GFI= 0.70) were at acceptable levels, except for GFI. Hooper, Coughlan, and Mullen (2008) argue that modification indices can be allowed in order to increase fit levels, and after an assessment of the "fit of each construct, and its items individually, to determine whether there are any that are particularly weak", items with low R^2 values can be eliminated. Therefore, the R^2 values of each item were evaluated, and eight items with R^2 values less than .10 were eliminated from the analysis. This reduced the number of the items to 75. Then CFA was repeated. The modification indices were evaluated and error terms correlated between certain items, based on the theoretical structure of this study. The CFA model obtained after these operations is shown in Figure 1, the fit indexes values and acceptable levels of fit indexes values being presented in Table 3.

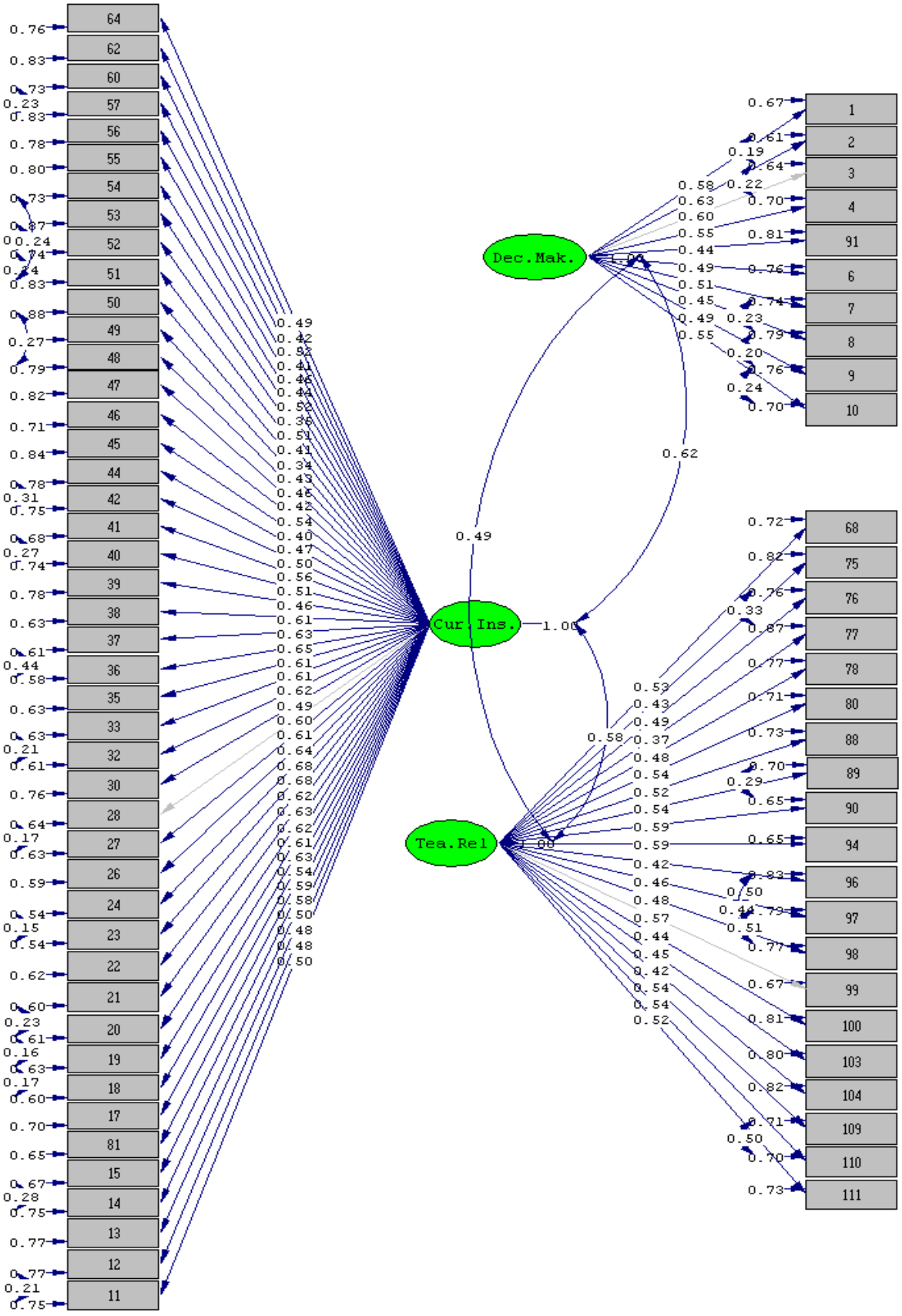


Figure 1. CFA model of DEES

Table 3. DEES fit indexes values and acceptable levels of fit indexes

Fit indexes	Scale results	Acceptable fit	Good fit*
x^2/sd	3.928	≤2	≤5
RMSEA	0.052	≤.08	≤.05
CFI	0.96	≥.90	≥.95
SRMR	0.053	≤.08	≤.05
GFI	0.80	≥.95	≥.85

*Büyüköztürk, Akgün, Özkahveci, & Demirel, 2004; Hooper et al., 2008; Hu & Bentler, 1999; Şimşek, 2007

As Table 3 shows, the x^2/df was 3.928, RMSEA was 0.052, CFI was 0.96, SRMR was 0.053 and GFI was 0.80.

As see in Figure 1, factor loadings varied between .34-.68. Moreover, the factor-item correlations were found to be statistically significant (p<.01). As a result of the CFA, the scale took on its final form, consisting of overall 75 items, with 10 on the decision-making dimension, 45 on the curriculum-instruction dimension and 20 on the teacher-relations dimension.

Table 4 presents the correlations between the overall scale and dimensions of the scale.

Table 4. Correlations between overall scale and dimensions of DEES

	Overall scale	Decision-making	Curriculum-instruction	Teacher-relations
Overall scale	1	.671***	.950***	.720***
Decision-making		1	.527***	.401***
Curriculum-instruction			1	.512***
Teacher-relations				1

Table 4 shows that there were significant medium positive correlations between dimensions; significant strong positive correlations between overall scale and each dimension (p<.001) (Büyüköztürk, 2007).

Convergent Validity Findings

As part of the validity analysis, the convergent validity of the scale was also evaluated. Convergent validity is the correlation between participant scores using the scale under development and scores from another scale measuring the same or similar behavior (Büyüköztürk, 2007; Balcı, 2010). To measure convergent validity in this case, the survey developed by Gömleksiz (1988) was used to determine the participation levels of instructors and university students in democracy principles, and their in-class behavior in line with those principles, as well as to determine how democratic behaviors were perceived by themselves and by each other. The second part of this survey, which evaluates instructors' in-class democratic behavior, was used for this study's convergent validity analysis. The scale and survey were applied to a group of 38 teachers, and the Pearson product-moment correlation analysis of their responses demonstrated a positive significant correlation between the scores taken from them (r=.546, n=38, p=.000).

Reliability Analysis Findings

In this study, test-retest reliability was assessed to determine the consistency of scores taken at various times. In order to determine this, the scale was applied to a sample consisting of 43 teachers twice over a two-week interval. With derived data, paired samples *t* test and Pearson product-moment correlation analysis were applied to each dimension, as well as to the overall scale. Table 5 presents means, standard deviations, Pearson product-moment correlation coefficients and paired samples *t* test results between scores taken twice, for each dimension and the overall scale.

Table 5. Mean, standard deviation, correlation, and t-values of the overall scale and each dimension derived from the test-retest of the DEES

	Pre-test			Post-test			r	p	t	p
	n	$\bar{x}$	SS	n	$\bar{x}$	SS				
Overall scale	43	311.442	41.003	43	310.465	41.39	.905	.000***	.356	.723
Decision-making dimension	43	40.581	6.288	43	41.07	6.178	.830	.000***	.881	.383
Curriculum-instruction dimension	43	181.372	29.421	43	180.256	29.336	.883	.000***	.516	.609
Teacher-relations dimension	43	89.488	8.741	43	89.14	8.873	.824	.000***	.438	.664

Table 5 shows statistically significant correlations between mean values taken in the two applications of the test-retest to the overall scale, and to each dimension ($p<.001$). The test-retest correlation values varied between .824-.905. Moreover, Paired samples *t* test results showed that there is no statistically significant difference between mean values taken in two applications of the test-retest to the overall scale, and to each dimension ($p>.05$).

In this study, internal consistency was evaluated using two different methods, namely Cronbach Alpha and split half. In addition, in order to determine reliability, the standard error of measurement which explains the standard deviation of the individual's scale scores to real scores was calculated (Büyüköztürk, 2007). Cronbach Alpha, Guttman and Spearman Brown values were calculated for overall scale, and each dimension as presented in Table 6, together with the standard error of measurement.

Table 6. Reliability coefficients and standard error of measurement for the overall scale and each dimension

	Cronbach Alfa	Guttman	Spearman Brown	C. Alfa for the first and second halves	Standard error of measurement
Overall scale	.949	.793	.801	1. Half: .935 2. Half: .898	7.191
Decision-making dimension	.798	.681	.684	1. Half: .743 2. Half: .680	2.523
Curriculum-instruction dimension	.945	.818	.820	1. Half: .931 2. Half: .888	5.171
Teacher-relations dimension	.848	.677	.679	1. Half: .781 2. Half: .788	3.250

The internal consistency coefficients of the overall scale varied between .949 and .793, whereas the internal consistency coefficients of dimensions varied between .945 and .677. Standard error of measurement of the overall scale and each dimension varied between 2.523 and 7.191, as shown in Table 6.

Following the Cronbach Alpha and split half methods, item-total correlations, item remainder correlations and item discrimination values were also calculated for the overall scale and for each dimension. The results of Pearson product-moment correlation analysis for calculating item-total correlations and the item remainder correlations pointed to all factor-item correlations were statistically significant ($p<.001$). The results of independent samples *t* test to determine item discrimination pointed to the difference between the means of the upper and lower 27% for every item was statistically significant ($p<.001$).

At the end of the analysis the reliable and valid 3-dimension, 75-item scale was obtained. Total scores for each dimension and overall scale can be calculated.

Discussion and Conclusion

This study aimed to develop a scale to evaluate the level of realization of a democratic education environment at classroom level based on teachers' perceptions. To this end, Delphi Technique was used to generate an item pool for the scale. Experts from different countries participated in the Delphi study. Face and content validity of the items were then assessed. Pilot studies were used to test the scale's item readability/intelligibility. Provisional scale was administered to teachers to collect data for reliability and validity analyses, and the construct validity, convergent validity and reliability of the scale were evaluated.

The EFA performed to determine the factor structure of the scale revealed a three-factor construct. A CFA was applied to test the construct revealed out after the exploratory factor analysis. Every observed variable of the CFA needed to be statistically significant regarding the related latent variable, and goodness of fit statistics needed to be at the acceptable level (Şimşek, 2007). The CFA showed that the factor loadings of the items varied between .34 and .68, and all factor-item correlations were found to be statistically significant ($p<.01$).

According to the literature, χ^2/df should be equal or less than 2 for a good fit, or equal or less than 5 for an acceptable fit; RMSEA should be equal or less than .05 for a good fit, or equal or less than .08 for an acceptable fit; CFI should be equal or more than .95 for a good fit, or equal or more than .90 for an acceptable fit; SRMR should be equal or less than .05 for a good fit, or equal or less than .08 for an acceptable fit; GFI should be equal or more than .95 for a good fit, or equal or more than .85 for an acceptable fit (Büyüköztürk, Akgün, Özkahveci, & Demirel, 2004; Hooper et al., 2008; Hu & Bentler, 1998; Şimşek, 2007). In this study, χ^2 /df was 3.928; RMSEA was 0.052; CFI was 0.96; SRMR was 0.053; and GFI was .80. That is, all values, except for the GFI were acceptable. GFI value is known to be affected by sample size, and has a tendency to decrease when the degrees of freedom is higher than the sample size (Sharma, Mukherjee, Kumar, & Dillon, 2005). Since the sample size was 1091, and degrees of freedom was 2670 in this study, a low GFI value was an expected result. Therefore, it can be said that the fit index values of the DEES point to good fit.

One of the indicators of internal validity of a scale is statistically significant strong positive correlations between overall scale and each dimension of scale. Also there must be statistically significant medium correlations between dimensions for a strong construct validity of a scale. In this study correlation between dimensions varied between .401-.527; correlation between overall scale and each dimension varied between .671-.950. Correlation values between .70-1.00 indicate strong correlation, .70-.30 indicate medium correlation, .30-.00 indicate weak correlation (Büyüköztürk, 2007). In this study, significant medium positive correlations ($p<.001$) were found between the dimensions of the scale and significant strong positive correlations were found between overall scale and each dimension ($p<.001$). In conclusion, it can be stated that the three-factor DEES is a valid scale. A convergent validity analysis was also carried out to determine scale's relationship to an existing scale measuring a similar structure developed by Gömleksiz (1988). This showed that the DEES's convergent validity was high ($r=.546$, $p<.001$).

Test-retest reliability analysis was carried out in order to determine the consistency between the scores taken at different times. Statistically significant correlations ($p<.001$) were found out between the overall scale and dimensions from two consecutive applications in a two-week period. This indicates that the DEES gives reliable results over time.

Cronbach Alpha values for the scale varied between .798 and .949 for all dimensions, and for the overall scale. Tezbaşaran (1997) states that Cronbach Alpha coefficient should be close to 1, while Büyüköztürk (2007) states that it should be .70 or higher, for test score reliability to be considered statistically acceptable. Gutmann and Spearman coefficients were found to vary between .677 and .820 for the overall scale, and for all dimensions. Based on these results, it can be concluded that the internal consistency of the DEES is high.

The item-total correlations, item remainder correlations and item discrimination values calculated for the overall scale and for all dimensions revealed statistically significant correlations between all items and total scores of scale ($p<.001$), and to a statistically significant difference between the means of the upper and lower 27% for every item ($p<.001$). This indicates that all items were valid and reliable.

All the results obtained from the validity and reliability analyses indicate that the DEES is a valid and reliable scale that can be used in the evaluation of democratic education environment measures at classroom level. The DEES is expected to make a valuable contribution to studies in democratic education because it considers decision-making, curriculum-instruction and teacher-relations dimensions, as well as the democratic education environment at classroom level in detail. In particular, the DEES can be said to be original in its inclusion of a curriculum-instruction dimension, in comparison with other data collection tools developed to evaluate the democratic education environment, and teachers' democratic attitudes, behaviors and beliefs, which generally include items regarding democratic relations and decision-making (Akbaşlı et al., 2010; Çakmur, 2007; Demir, 2003; Demirtaş, 2004, as cited in Yalçın, 2007; Gözütok, 1995). In this sense, the DEES makes a new contribution to the field of democratic education. At the same time, a student form of the scale needs to be developed, and analysis of teacher-student perceptions of each other needs to be carried out.

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