

Validity and Reliability Analysis for the Teacher Determination for Democratic Behavior Scale

*Rüştü YEŞİL**

Abstract

The main aim of this study is to develop a scale to assess the extent to which teachers display democratic behaviors they are supposed to display in in-classroom teaching practices and the level of their determination in displaying such behaviors. The study group of this survey is composed of 446 second grade high school students, 243 girls and 203 boys. Survey data had been gathered through the evaluation of branch/guidance teachers by their students within the framework of the scale data that are formed by literature survey and harnessing some means of scaling employed in several research studies. Validity and reliability analysis were made upon such data through SPSS 11.00. For validity, KMO value and Bartlett test values are calculated on the gathered data. Afterwards, factor analysis of the data was made and item-total correlations and power of differentiation (t test) are determined. For the reliability analysis, levels of internal consistency and ability to perform decisive measurements were computed. At the end of analysis, KMO value of scale is measured as 0,936 and Bartlett test value is $p < 0,001$. Items in the scale were collected under a single factor. Item-test correlations and discrimination power of items in the scale are significant. The Cronbach's alpha reliability coefficient of the scale was found to be 0.98. The scale has proven to perform decisive measurements as significant relationships are found for each item when the relationship among evaluations by 139 students is analyzed. In conclusion, it can be concluded that the "Scale for Democratic Teacher' Behavior Determination" is a valid and reliable scale.

Key Words

Democratic Teacher, Class, Validity, Reliability, Scale.

**Correspondence:* Assist. Prof. Rüştü YEŞİL, Ahi Evran University, Faculty of Education, Department of Education Sciences, Merkez Kampüs, 40200, Kırşehir/Turkey.
E-mail: ryesil@ahievran.edu.tr

Kuram ve Uygulamada Eğitim Bilimleri / Educational Sciences: Theory & Practice
10 (4) • Autumn 2010 • 2683-2692

Democracies' need for education is not different from that of other systems aiming to organize life. Like all systems, democracy needs individuals who embrace its values to maintain its existence. It can be asserted that education is the healthiest and the most reliable way to meet this need. As suggested by Barber (1997), "there is only one way for democracy and it is education" (cited in O'Brien, 2006, p. 33). For Dewey (1996), democracy is about coexistence and education is main component.

It is often underlined that schools and classrooms play a crucial role in the democratization of society and social structure. Actually, "according to Getzels and Thelen (1960), schools and classrooms are social systems with their institutions and behavioral norms... It is believed that attitudes and behaviors acquired in democratic classrooms will be carried beyond this academic environment to the social arena" (cited in Perliger, Canetti-Nisim & Pedahzur, 2006, p. 122). Teachers assume significant tasks both in establishing democratic school or classroom environments and in helping education perform its functions. Indeed, it is frequently suggested that democratic education can only be created by democratic teachers (Aydoğan & Kukul, 2003; Karakütük, 2001; Üstün & Demirbağ, 2003; Yeşil, 2002). Kesici (2008) suggests that "performance of these tasks depends on an educator who believes in democratic values. A democratic educator is an individual who believes in the rule of law, equality of all individuals, and the necessity of fundamental rights and freedoms" (p. 63).

Two points can be attached particular importance for teachers to be able to perform the duties they assume in this process. The first is the necessity to take democracy as a whole and reflect all its values and characteristics to the educational environment. The second is that the permanence of this situation (Aly, 2005; Dobozy, 2007). In this framework, teachers should first reflect all the values and characteristics of democracy in their behaviors persistently (in a determined fashion). Therefore, it is important to determine the teachers' levels of performing their fundamental duties in the process of educational democratization in the framework of the "entirety" and "determination" criteria. However, it should be noted that the first requirement for this is the need for valid and reliable assessment instruments to be used for assessing teachers with regard to these qualities. The present study is conducted to develop a scale that can meet this need.

A literature review reveals extensive theoretical research on democracy and democratic education (Armstrong, 2006; Dewey, 1996; Kepenekçi, 2003; Kıncal and Işık, 2003; O'Brien, 2006), as well as descriptive field studies dealing with the democratic level of certain practices or teacher-student-administrator-parent behaviors (Erdem & Sarıtaş, 2006; Gömleksiz, 1988, 1993; Morrison, 2008; Perliger, Canetti-Nisim & Pedahzur, 2006; Rogan, 2006; Sarı, Sarı & Ötünç, 2008; Yeşil, 2002). In these studies especially certain means of data gathering (questionnaires, review forms, rubrics etc.) are used to measure level of democraticness of teachers and students. However, most of these means are not eligible to become scales as their analyses of validity and reliability are not made in a complete manner. Moreover, most of such studies are made not to develop a scale but to describe an existing situation. In other words, it can be argued that there is lack of studies for developing scales to be used in measuring level of determination in teachers' in-classroom democratic behaviors. Nevertheless, it should be noted that the Democratic Attitude Scale which was translated into Turkish and adapted by Gözütok (1995) has been used by other researchers (Dilekmen, 2000; Karahan, Sardoğan, Özkamalı & Dicle, 2006; Taçman, 2006). Apart from these, Zencirci (2003) developed two scales, which are called "the Democratic Attitude Perception Scale" and "the Democratic Values Scale."

In brief, this study differs from others from the aspect of its aim and content in that it aims to develop a scale that can be used to assess teachers' level of determination in their democratic in-classroom behavior.

Problem Statement

This study's main problem is to develop a scale to assess teachers' level of determination in displaying democratic in-classroom behavior.

Method

Sample Group

The sample group of the study consists of 446 students studying in the second elementary level in a Primary School in a Central Anatolian province. The student groups are enrolled in a total of 15 classrooms. 145 of them attend sixth grade, 146 seventh grade, and 135 attend

eighth grade. 243 of the students are females and 203 are males. 139 of the students are subjected to a second application after 4 weeks in order to determine the scale's quality of making determinate measurements. On the other hand, the students assessed a total of 15 teachers who are their own classroom counselors. Of the teachers, 9 are females and 6 are males. Moreover, 4 of the teachers teach Turkish language, 4 teach mathematics, 3 teach science, 2 teach social studies and 2 teach technology-design courses.

Process

The scale development process dealt with the students' observations and assessments about their classroom counselors in classroom teaching practices. Classroom counselors were selected for evaluation for two reasons. First, due to an attempt to ensure that students evaluated the same teacher. The second reason is the belief that students would know their own class counselors better. In the scale development process, a literature review was conducted at the beginning to create a pool of 97 items (Gömleksiz, 1988, 1993; Gözütok, 1995; Heneman, Kimball & Milanowski, 2006; Rogan, 2006; Yeşil, 2002; Zencirci, 2003). Two main points were considered when writing the items. One of them is that the items include all dimensions of democracy reflected in the teachers' in-classroom teaching practices (participation, equality, justice, human rights, freedoms, responsibilities, cooperation, confidence and openness to learning). The second point involved placing a five-point evaluation form including frequency statements for each behavioral item given in the scale in order to determine the teachers' level of determination to display the behavior in question. For this purpose, the following options were introduced at the end of each behavioral item: (1) Never, (2) Rarely, (3) Sometimes, (4) Often and (5) Always. Given its purpose and content, the scale was called the "*The Scale for Democratic Teacher's Behavior Determination (SDTBD)*".

The draft scale had first been had examined by a group of linguistic experts (3 instructors and Turkish language teachers), a group of pedagogues (4 instructors, of which 2 are experts of educational curriculum and teaching, 1 psychological counseling and guidance and 1 educational sociologist) and a group of elementary students in the second level (25 students) and 16 items were excluded in accordance with their

suggestions, as they were either unintelligible or repetition. The final version of the draft scale was an 81-item five-point instrument. The five-point rating included the rating values of (1) Never, (2) Rarely, (3) Sometimes, (4) Often and (5) Always.

A logical and statistical approach was adopted in developing the Scale for Democratic Teacher's Behavior Determination. Within the framework of statistical analysis, (i) factor analysis, (ii) item-total correlations and (iii) item discrimination power are calculated to analyze the validity of scale. In this direction, KMO and Bartlett test analyses, principle component analysis, Pearson's r test and independent groups r tests are used. For reliability analysis of the scale, Cronbach alpha reliability coefficient, correlation value between two equal halves, Sperman-Brown formula and Guttman split half reliability formula are employed. The scale's level of determination is measured by determining the correlation between results of two consecutive applications within two weeks.

The statistical analyses performed in this process and their results are presented below.

Results

Findings about Validity of the Scale

To determine of scale validity, (i) factor analysis, (ii) item-total correlations, and (iii) item discrimination power were calculated.

Structure Validity: The data collected by the SDTBD were first subjected to Kaiser-Meyer-Olkin (KMO) and Bartlett test analyses to test the scale's structure validity, yielding to the results of KMO 0.936 and Bartlett Test values $\chi^2=14184.722$; $sd=2346$; $p<0.01$. On the basis of these values, a factor analysis was performed on the scale and it was determined that factor loadings of the items ranged between 0.506 and 0.779. The factor analysis is performed with the aim to reveal whether the items of a certain scale are grouped into mutually exclusive fewer factors. Items in the same group are assigned a name according to the content of the items (Gorsuch, 1983). Furthermore, factor analysis is used to test whether a particular scale is one-dimensional (Balci, 2009). The analyses revealed the scale's eigenvalue in a single factor as 29.550 and the percentage of explained variance was 42.826. On the other hand, the line chart drawn according to the factors' eigenvalues showed

that the scale items can be collected under a single factor. These operations demonstrated that the remaining 69 items in the scale can be collected under a single factor (Büyüköztürk, 2002; Eroğlu, 2008).

Item-Total Correlations: A calculation was made to determine the extent to which the scale items fit their purpose and it demonstrated that item-test correlation coefficients ranged between 0.508 and 0.775 and both relationships were significant.

Discrimination Power: Item analysis was carried out to identify the discrimination power of each of the 69 items in the scale and it was found that each item could make a significant discrimination between the students in the lower and upper groups (groups of 27%).

Validity of Harmony: A literature review was made to determine the current validity of the scale. The validity of similar scales could not be performed since the review revealed no similar scales used to determine the democratic quality of teachers' behaviors in classroom teaching process and their level of determination in displaying such behaviors.

Findings about the Reliability of the Scale

Internal Consistency Level: To identify the internal consistency level of the scale in the context of its reliability analysis, Cronbach's alpha reliability coefficient was found to be 0.98; the correlation coefficient between two equally split halves was 0.88; Spearman-Brown internal consistency coefficient was 0.94; and the Guttman split-half value was found to be 0.94.

Time Invariance Level: The scale's stability level was determined by using the test-retest method. The 69-item scale was re-applied to the same 139 students four weeks after the original application. It was observed that the item relationships between the two applications ranged between 0.335 and 0.716 and the relationship was found to be 0.801 for the overall scale. Each relationship was significant at the level of $p < .001$.

Conclusion

This study's main aim is to develop a scale to assess the extent to which teachers display the democratic behaviors they are supposed to display in in-classroom teaching practices and their level of determination in

displaying such behaviors. The Scale for Democratic Teacher Behavior Determination is a five-point Likert-type scale consisting of 69 items that can be collected under a single factor. Each item was rated by the following scores: *never* (0), *rarely* (1), *sometimes* (2), *often* (3), *always* (4). The scores obtained by the student responses to the 69-item five-point Likert-type scale range between 0.00 (zero) and 276.00. These are raw scores and their counterparts in the percentage system can be calculated by using the following formula:

$$X_{\text{standard.score}} = \frac{X_{\text{rawscore}}}{\text{NumberofScaleItems}} \times 25$$

Thus, with regard to the level of determination in the teachers' democratic behaviors according to the raw score intervals, a level between 0.00 – 55.20 is “very low”; 55.21 – 110.40 is “low”; 110.41 – 165.60 is “moderate”; 165.61 – 220.80 is “high”; and the interval between 220.81 – 276.00 is “very high”.

The scale's validity was examined by using three different methods, including (1) factor analysis, (2) item-total correlations and (3) item discriminator power. The scale consists of 69 items that can be collected under a single factor. Item factor loadings range between 0.506 and 0.779. Furthermore, the scale has an eigenvalue of 29.550 and an explained variance of 42.826%. Factor loadings over 0.30 and a variance of 30% are considered as sufficient in behavioral sciences. On the other hand, for the items, it was also determined that item-test correlations assumed values between 0.510 and 0.782 and they have the power to discriminate between the lower and upper groups (groups of 27%).

Therefore, the Scale for Democratic Teacher's Behavior Determination is arguably a valid scale in terms of item loadings, rates of explaining variance, item-test correlations, and discriminatory power (Balci, 2009; Büyükoztürk, 2002; Eroğlu, 2008; Gorsuch, 1983; Karadağ, 2007).

As a result of the tests performed to identify the internal consistency level of the scale, Cronbach's alpha reliability coefficient was found to be 0.98; the correlation coefficient between two equally-split halves was 0.88; Spearman-Brown internal consistency coefficient was 0.94; and the Guttman split-half value was found to be 0.93. A reliability coefficient equal to or above 0.70 is considered to indicate a reliable scale (Balci, 2009; Eroğlu, 2008; Gorsuch, 1983). In the test-retest method applied to determine the time invariability level of the scale items, total

score correlation coefficients ranged between 0.335 and 0.716 and all these relationships were found to be significant at a level of $p < .001$. As a result, it could be suggested that the scale performed reliable measurements with regard to internal consistency and time invariability.

In conclusion, it can be argued that the “The Scale for Democratic *Teacher’s Behavior Determination*” is a valid and reliable scale that can be used to determine the level of democraticness of teachers’ in-classroom behaviors and their level of determination in displaying such behaviors. Moreover, it can be suggested that SDTBD can be used in measuring the level of determination of teachers’ displaying democratic behaviors in primary, secondary or higher education.

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