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# Toward making the invisible visible using a scale: prospective teachers' thoughts and affective reactions to feedback

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This paper presents the development and initial validation of a feedback scale which measures the thoughts and affective reactions of prospective teachers concerning feedback on their teaching experiences. To reach this goal, data from 512 prospective teachers were used to test the internal consistency, exploratory and confirmative factor structure. While exploratory factor analysis was conducted on a random split-half sample of the data to examine the factor structure of the feedback scale items, confirmative factor analysis was conducted in the holdout sample. As a result of these analyses, it has been determined that the scale showed good validity and it has a structure composed of two factors; professional development and anxiety. Also, the reliability of these sub-factors of scale scores was found to be highly reliable. Overall, results suggest that this scale is a valid measurement that should reveal the viewpoints of prospective teachers regarding feedback in the form of observable behaviours for future research.

Keywords: feedback; professional development; anxiety; prospective teacher; scale development

#### Introduction

Educational reform has been conducted in developed countries worldwide in an attempt to create a discussion about the international and national professional competence criteria of prospective teachers in order to train them professionally and develop their skills. Various teacher education models, such as craft, applied science and reflective models, have been developed in an attempt to enable prospective teachers to achieve the professional competencies that are required in order to teach effectively (Wallace 1991). All of these models enable prospective teachers to gain teaching experience and put theory into practice. The related literature indicates that practical teaching experiences are effective in the professional development of prospective teachers; furthermore, such experiences enable them to identify their own strengths and weaknesses (Elliot and Sinlarat 1999; Tang 2004; Özmen 2008; Eraslan 2009). However, numerous studies have shown that prospective teachers frequently encounter problems during field experiences regarding how to implement and structure their teaching (Kukanauza de Mazeika 2001; Boz and Boz 2006; Özmen 2008; Shute 2008). It has been observed that prospective teachers who are encountering a real classroom environment for the first time make an effort to establish their own meaning regarding the process of teaching; however, they often experience difficulties

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in the process of reflection and practice (Gilles, Cramer, and Hwang 2001). Bezzina (2006) defines the first teaching experiences of prospective teachers as a period of 'transition shock,' explaining that they often realize at this point that they are unable to transfer the theoretical knowledge they have acquired to their classroom practice. In this sense, it can be argued that teacher education involves the dimensions not only of 'education' but also of 'development'. This development could be supported not only through sufficient theoretical knowledge and practical teaching skills but also through a critical viewpoint of teachers' practice; in this respect, feedback given as a result of evaluations of prospective teachers' classroom performance plays a significant role. Studies have shown that feedback comprises an important informative instrument in the evaluation of teaching experiences during the phase of development where prospective teachers display their performance (Moreno 2004; Hattie and Timperley 2007; Ekşi 2012).

## Role of feedback in prospective teachers' development

A number of definitions of feedback can be found in the relevant literature. For instance, Paccapaniccia (2002) defined feedback as the evaluation of an individual's teaching by him/herself and others. This process, according to Peker (1992), informs teachers about the truth or falsehood of their behaviour, enables them to reflect on how they can improve their teaching performance and assists in correcting their errors. Additionally, some researchers similarly describe feedback as a continuous dialogue that is carried out by means of agents such as teachers, peers, books, family and self-evaluation (Kouritzin and Vizard 1999; Hattie and Timperley 2007). Combining all these definitions in general, it can be said that feedback is a process of providing an individual with information concerning his/her performance through a variety of means.

Feedback provides information that allows a learner to correct errors or to validate correct responses. Feedback plays a directive role in that it is used to promote correct responses and increase desired behaviour; it is also believed to play a motivational role, as letting prospective teachers know how well they are performing may be an incentive that leads to a greater effort (Kulhavy and Wager 1993). According to Bandura (1997), feedback given through verbal persuasion informs prospective teachers about their teaching performance and enables them to prepare for the occupation in a more professional way. Therefore, he argues, a conducive environment should be provided in order to evaluate the teaching experiences of prospective teachers. Daniels and Daniels (2004) likewise consider feedback as an essential factor in creating behavioural change in the teaching of prospective teachers; as effective feedback can enhance, structure and encourage the performance of prospective teachers and increase their self-efficacy regarding their teaching (Schunk 2008).

According to international studies based on the effect of feedback in the context of teacher training, there are different types of feedback that contribute to the teaching skill of prospective teachers (Kukanauza de Mazeika 2001; Kim 2005; Voerman et al. 2012; Hutton 2013). The literature includes studies aimed at determining how written, visual and verbal feedback affect the performance of prospective teachers, as well as qualitative research concerning reflective feedback such as self-evaluation, peer assessment and feedback from experienced teachers and prospective teachers (Topping, Smith, Swanson, and Elliot 2000; Kim 2005; Lee and Wu 2006; Petrarca 2010).

On the other hand, numerous studies have concluded that, while field practice instructors play an important role in training prospective teachers, they are not always sufficient in evaluating their performance or in providing varied and effective feedback (Sevim 2002; Heneman and Milanowski 2003; Darling-Hammond 2006; Crocker and Dibbon 2008; Özmen 2008; Eraslan 2009; Ganesh and Matteson 2010; Pauli 2010). These studies have mainly focused on the fact that teaching practicum is not applied in an effective manner, which limits the ability of prospective teachers to receive explanatory feedback regarding their teaching experiences (Kukanauza de Mazeika 2001; Boz and Boz 2006; Baştürk 2009). While these studies have emphasized the importance of feedback in terms of developing the teacher's performance and its effect on teaching experiences in general, little attention has been given to the thoughts and reactions of prospective teachers towards feedback. However, without determining the degree to which feedback affects the teaching practice of prospective teachers, research that aims to address this issue may not be successful in producing practical solutions.

# Objective and significance of the study

In consideration of these issues, this study was an attempt to develop a scale that would more clearly illustrate the thoughts and affective reactions of prospective teachers concerning feedback on their teaching experiences. By means of this scale, the quality and variety of feedback about their teaching experiences could be evaluated by the implementers of this scale. Also their teaching experiences could be revealed in terms of observable behaviours. It is hoped that through the use of this scale, prospective teachers' positive and negative views and affective reactions toward feedback can be identified. This study is significant in that it involves a previously unimplemented scale concerning the thoughts and reactions of prospective teachers about feedback on their teaching experiences. Accordingly, the present study seeks to determine validity and reliability of a newly developed feedback scale aimed at the teaching experiences of prospective teachers.

#### Methodology

This section presents information about the study participants, the development of the data collection tool and the analysis of the data.

### Study group

This study consisted of a scale development project. The participants were 580 senior-class prospective teachers receiving education in the primary and secondary education departments of the Buca Faculty of Education, Dokuz Eylül University, Turkey, in the 2012–2013 academic year. Because 44 of the prospective teachers left some survey items blank, and an additional 28 selected two options for the same item, the analyses were carried out based on the responses of 512 prospective teachers. Among the prospective teachers who had participated in the research, male students constitute N = 205 (40%) of the sample and female students constitute N = 307 (60%) of the sample. As the study covers the senior year prospective teachers, the age distribution ranged between 22 (N = 80, 15.6%), 23 (N = 321, 62.7%) and 24 (N = 111, 21.7%) years of age. The distribution of study participants according to their departments is given in Figure 1 in terms of both number and percentage.



Figure 1. Study participants.

#### Development process of the data collection tool

Behaviours are influenced by a complex range of variables; teacher educators need to be aware of, understand and measure these variables (Tavşancıl 2005). Feedback that affects the behaviours of prospective teachers in terms of their teaching practice is one of these variables. With this in mind, this study focused on developing a scale aimed at generating data relating to the 'feedback' dimension of teaching practice.

The preliminary step in developing the scale was to determine the appropriate scale type; the researchers decided to use a 5-point Likert scale. The Likert scale is a practical and useful tool, as it considers the relevant points and calculates both the direction and extent of measurable dimensions of behaviours (Tavşancıl 2005; Dedrick, Marfo, and Harris 2007). The participation levels of prospective teachers regarding the scale items relating to feedback were examined according to five categories: 'Strongly agree', 'Agree', 'Moderately agree', 'Disagree' and 'Strongly disagree'. While the positive items were graded, respectively, as 5, 4, 3, 2 and 1, starting from the category of 'Strongly agree', the negative items were graded respectively as 5, 4, 3, 2 and 1, starting from the category of 'Strongly disagree'. The following phases were involved in developing the feedback scale regarding the experiences of prospective teachers in their teaching practice.

#### Forming the scale item pool

In addition to conducting a literature review, written answers of prospective teachers were collected in order to form the scale items. Accordingly, 145 senior-class prospective teachers from various departments were asked seven open-ended questions such as 'What type of feedback (written, verbal, visual, etc.) did you receive at the teaching-practicum site? What are your thoughts about this feedback?, 'What are your views regarding receiving negative or positive feedback on your teaching experience?' that prompted them to explain their emotions, opinions and behaviours concerning feedback on their teaching experiences. The emotion and thoughts of 145 senior-class prospective teachers, in relation to the feedback provided, studying Chemistry (N = 20), Physics (N = 25), Biology (N = 25), Mathematics (N = 25), Science and Technology (N = 30) and Turkish Education (N = 20) were collected. In order to ensure validity of the study 145 senior-class prospective teachers who provided the initial open-ended responses took part in the main study group (N = 512). Content analysis was applied to the data that were collected from the open-ended questions. Coding was conducted. The written statements of prospective teachers were coded and attention paid to the frequency of occurrence

of codes. Arising from this analysis, scale items were written by researchers, and a total of 70 items -44 positive and 26 negative - which were accepted as being related to feedback, were formed. Special attention was paid to using explicit, simple and clear language in forming the scale items.

#### Obtaining expert opinions

The opinions of four field training experts were solicited in order to determine whether the items in the prepared scale were relevant and sufficient for measuring the related behaviours. In addition, the opinions of two Turkish education experts were asked in order to control the coherence and definiteness of the grammar and to ensure that each item had a single, clear meaning. This phase of the study was carried out to establish the content validity of the scale (Christensen 2004). As a result of these interviews, it was determined that six items were not aimed at measuring emotions, opinions and behaviours regarding feedback; therefore, the decision was made to exclude them from the scale. In this manner, the content validity of the scale was ensured, and a final feedback test scale was prepared with a total of 64 items. In addition, the experts also examined the face validity of the assessment instrument in terms of whether it measured the targeted features in terms of its name, explanations and items, and the instrument was determined to be valid in this respect.

#### Pretesting phase

After the changes and corrections were made according to expert opinions and suggestions, the feedback test scale of 64 items was applied with 12 senior-class prospective teachers studying in the Department of Chemistry Education. As a result of this application, it was determined that the scale required 15–20 minutes to complete and was comprehensible.

#### Application process

The final form of the feedback scale of 64 items was applied with the study participants, whose distribution is showed in Figure 1, at the end of the spring term of the school year of 2012–2013, following the completion of their teaching practicum. The prospective teachers had participated in the research voluntarily, and their scale points did not inform or impact their academic credit or course grades. Special attention was paid to keeping the number of respondents high in order to obtain meaningful and reliable results.

#### Data analysis

The structural validity and reliability of the scale scores were examined in the data analysis. An item analysis was conducted for structural validity; the items were examined in terms of whether they were statistically significant with all scale scores. Following the item analysis, an exploratory factor analysis (EFA) was applied to the remaining items to determine the factor numbers of the scale. EFA was conducted on a random split-half sample (N = 256) of the data to examine the factor structure of the feedback scale. A confirmatory factor analysis (CFA) was conducted in the holdout sample (N = 256). CFA was also used in order to evaluate whether the factor model that appeared as a result of the EFA was oriented with the data. Internal consistency coefficients were examined for the reliability of the feedback scale scores, and its structural validity was established

using the Cronbach's  $\alpha$  reliability coefficient. The SPSS 15.00 and LISREL 8.71 software packages were used for the statistical calculations of the data that were obtained during the study.

#### Findings

This section presents the findings concerning the item analysis that was conducted for the structural validity of the feedback scale, as well as its reliability with EFA and CFA.

## Item analysis

The first step in determining the structural validity of the feedback scale was to apply the item analysis process on the scale items in order to determine the discrimination power of the items. An item analysis process determines whether scale items will measure a feature that is intended to be measured by the scale without mixing it with other features. The objective of this determination is to form a consistent scale by selecting such items (Tavşancıl 2005; Büyüköztürk 2007). The item analysis process in this case was determined according to two different methods. First, the total item score correlations of the 64 scale items were examined. This type of analysis explains the relationship between the scores obtained from each item in the scale and the total score. The fact that the total item correlation was positive and high showed that the items sampled similar behaviours and that the test had a high internal consistency. The existing literature has shown that items with a total item correlation of 0.30 and higher distinguish individual items at an acceptable level. Items between 0.20 and 0.30 may be included in a scale when necessary, or they may be amended. Items lower than 0.20 should not be included in the test (Everitt 2002; Field 2005; Büyüköztürk 2007). In this context, as a result of the total item score correlation analysis of the feedback scale, it was determined that the correlation coefficients of 19 of the items were lower than 0.30 (see Table 1).

In addition to this process, the discrimination of the items was calculated by using the upper and lower 27% rule. This item analysis was conducted to select the most distinctive items in the Likert scale, as well as in calculating the discrimination power of the items (Tavsancil 2005). The difference between the correct responses as a percentage of the upper 27% (N = 138) and lower 27% (N = 138) of the total group can tell us whether an item has discriminated the high scores and low scores on the test. The averages of the scores were calculated for each item, and the difference between these scores was determined using an independent t test. Through the analysis, it was observed that six items (items 2, 3, 7, 32, 35 and 41) did not meet the significance value (p < .05); however, items with a correlation coefficient lower than 0.30 did meet the significance value. Even though the significance values of some items with correlation values (items 1, 4, 5, 11, 12, 15, 24, 38, 48, 57 and 61) lower than 0.30 met such a condition (p < .05), it has been suggested that an absolute criterion be selected in large samples due to the possible significance of lower correlations ( $p \le .001$ ) (Büyüköztürk 2007). In light of this view, in this scale, which was applied with 512 prospective teachers, the researchers selected p = .001 as the absolute criterion. When the significance levels of the scale items were rechecked based on this criterion, it was determined that 12 items were nonsignificant and that the discriminants of these items were low in terms of the behaviour being measured. Furthermore, although items 8 and 17 were found to be significant, they were excluded from the scale, as the discriminant index had negative values.

Scale items	r	р	Scale items	r	р
Item 1	0.182 <sup>a</sup>	0.005	Item 33	0.430	0.000
Item 2	$-0.033^{a}$	0.845	Item 34	0.554	0.000
Item 3	0.027 <sup>a</sup>	0.727	Item 35	$0.056^{a}$	0.595
Item 4	0.281 <sup>b</sup>	0.000	Item 36	0.584	0.000
Item 5	0.247 <sup>b</sup>	0.000	Item 37	0.492	0.000
Item 6	0.352	0.000	Item 38	0.217 <sup>b</sup>	0.000
Item 7	0.059 <sup>a</sup>	0.696	Item 39	0.528	0.000
Item 8	$-0.120^{a}$	0.022	Item 40	0.654	0.000
Item 9	0.331	0.000	Item 41	$0.065^{a}$	0.378
Item 10	0.391	0.000	Item 42	0.642	0.000
Item 11	0.186 <sup>a</sup>	0.002	Item 43	0.587	0.000
Item 12	$0.100^{a}$	0.024	Item 44	0.465	0.000
Item 13	0.578	0.000	Item 45	0.383	0.000
Item 14	0.555	0.000	Item 46	0.522	0.000
Item 15	0.242 <sup>b</sup>	0.000	Item 47	0.551	0.000
Item 16	0.492	0.000	Item 48	0.156 <sup>a</sup>	0.007
Item 17	$-0.237^{a}$	0.000	Item 49	0.548	0.000
Item 18	0.442	0.000	Item 50	0.601	0.000
Item 19	0.395	0.000	Item 51	0.512	0.000
Item 20	0.500	0.000	Item 52	0.308	0.000
Item 21	0.592	0.000	Item 53	0.556	0.000
Item 22	0.472	0.000	Item 54	0.589	0.000
Item 23	0.566	0.000	Item 55	0.597	0.000
Item 24	0.280 <sup>b</sup>	0.000	Item 56	0.605	0.000
Item 25	0.483	0.000	Item 57	0.192 <sup>a</sup>	0.006
Item 26	0.442	0.000	Item 58	0.504	0.000
Item 27	0.624	0.000	Item 59	0.611	0.000
Item 28	0.599	0.000	Item 60	0.459	0.000
Item 29	0.327	0.000	Item 61	0.263 <sup>b</sup>	0.000
Item 30	0.515	0.000	Item 62	0.543	0.000
Item 31	0.614	0.000	Item 63	0.427	0.000
Item 32	0.092 <sup>a</sup>	0.149	Item 64	0.468	0.000

Table 1. Item-total correlation scores and significance values of 64 items of the feedback scale.

<sup>a</sup>Items with item-total correlation scores lower than 0.20.

<sup>b</sup>Items with item-total correlation scores between 0.20 and 0.30.

On the other hand, the researchers decided not to include items that met the significance value and had correlation values between 0.20 and 0.30 (items 4, 5, 15, 24, 38 and 61) in the scale, as they had a lower discrimination and a great number of items. As a result of all item analyses, 19 items were excluded from the scale, and it was observed that the remaining 45 items had a total item correlation of 0.308 and 0.654.

#### Factor analysis

Factor analysis is used in testing structural validity in scale development studies. Factor analysis is separated into two parts: EFA and CFA.

*Exploratory factor analysis.* EFA is an analysis that is designed to reveal the connection between the unknown latent variables and the observed variables. EFA explains the relation between the items and related factors. The objective in EFA is to collect vast numbers of items under a limited numbers of factors and reveal whether the generated

factors are similar within the structures of the theory, which enables the comprehension of the behaviour (Floyd and Widaman 1995; Field 2005; Şimşek 2007; Çokluk, Şekercioğlu, and Büyüköztürk 2010). Thus, the study used maximum likelihood (ML) analysis, which is one of the various factorization techniques.

The ML technique is appropriate for theoretical-model-correlation (Backaus et al. 1994). ML permits statistical significance testing of factor loadings and correlations among factors and the computation of confidence intervals if data are relatively normally distributed (Fabrigar et al. 1999). From this point of view, EFA was conducted with the remaining 45 items following the item analysis. Before starting the EFA application process, the assumptions that were required for the validity of the scale were tested. Accordingly, it was determined that the scale involved no multiple and singular outliers, and missing and extreme values were not found (Tabachnick and Fidell 2001; Çokluk et al. 2010).

Sample size and normality assumptions were also two important assumptions for the EFA and ML extraction method. Even though the researchers gave a limited sample size for the factor analysis (N > 100), an important criterion aimed at testing the coherence of the data structure was the results of the Kaiser–Meyer–Olkin (KMO) test (Kline 2005; Çokluk et al. 2010). Accordingly, as a result of the first analysis of the scale, the KMO coefficient was determined as 0.913. The KMO value is considered 'poor' between 0.50 and 0.60, 'weak' between 0.60 and 0.70, 'moderate' between 0.70 and 0.80, 'good' between 0.80 and 0.90 and 'excellent' above 0.90 (Leech, Barrett, and Morgan 2005; Şencan 2005, as cited in Çokluk et al. 2010). Accordingly, the KMO value (0.913) obtained from the test demonstrates that the data have excellent coherence for the factor analysis. Furthermore, the normality assumption determining that the data originated from multivariate normal distribution was revealed through the Bartlett sphericity test and found to be significant ( $\chi^2 = 5129.035$ ; df = 990; p < .05). This result shows that a factor could be obtained from the correlation matrix of the data in the scale and that the data are coherent for the factor analysis.

At the beginning of the analysis, a rotation technique was not used to determine the number of all factors in the first factor analysis application of the scale. Accordingly, 11 factors with an eigenvalue greater than 1 were found in the scale involving 45 items. Factors with an eigenvalue of 1 and greater than 1 are accepted as determinant factors in the determination of the number of factors (Köklü 2002; Pedhazur and Pedhazur-Schmelkin 1991, as cited in Cokluk et al. 2010). The contribution of the 11 obtained factors to the variance is 62.426%. However, an important point to be taken into consideration while deciding on the number of factors is the importance of the contribution of each factor to the total variance. The contribution of each factor with an eigenvalue greater than 1 to the total variance is 29.670%, 7.490%, 3.659%, 3.312%, 3.070%, 2.946%, 2.746%, 2.551%, 2.422%, 2.312% and 2.246%, respectively. According to this result, it can be observed that the first two factors make an important contribution to the variance; however, this contribution decreases after the third factor. In addition, the scree plot graphic was examined in order to reveal and decide on the number of factors more explicitly. An examination of Figure 2 demonstrates that the incline comes to a plateau after the third point; and the contribution of components that are posterior to that point in the variance is both minor and approximately the same. Based on this information, the number of factors was established as two.

Since the analysis involved more than one factor, a rotation process was applied. The study used the varimax orthogonal rotation technique, which clearly reveals the factors in



Figure 2. Scree plot graphic.

which the items are involved and enables maximization of the factor variances. Through this process, the loading values of the factor or factors in which the scale items were involved were examined. While the literature supports a common view that the factor loading value of an item should be a minimum of 0.32, there are also theorists who assert that this magnitude should be 0.40 or higher (Büyüköztürk 2007; Tabachnick and Fidell 2001). In the process of scale development, an item is expected to have a high factor loading value. This condition enables the item to have a strong relation to the factor and allows the variance being explained by the factor to be high. Furthermore, the magnitude of factor loading indicates that the scores obtained from the sample are homogeneous (Tabachnick and Fidell 2001). From this point of view, taking the literature into consideration, as well as the fact that the feedback scale was the first relevant study in developing the scale, the acceptance level of factor loadings in this case was taken as 0.40. Accordingly, five items (items 6, 9, 10, 29 and 52) that failed to provide this acceptance level were excluded from the scale, and the factor analysis was performed again with 40 items. Table 1 shows that the five items that were excluded have lower correlation coefficients in determining the item discrimination compared to the remaining 40 items. As a result of the factor analysis that was performed once again with the remaining 40 items using the varimax orthogonal rotation technique, neither overlapping items nor items with a factor loading value lower than 0.40 were identified and it was observed that while 30 items were collected within the first factor, 10 items were collected within the second factor.

Furthermore, we investigated the correlation between factors to determine the relationship between the factors of the scale. The correlation coefficients between factors (factor 1 and factor 2) and between the factors and the total point were found to be positive and significant. These correlations were observed, respectively, to be 0.502 (between factor 1 and factor 2) and 0.942 (between factor 1 and the total point) and 0. 763 (between factor 2 and the total point). These correlations provide support for the multidimensionality of the scale. The findings regarding the factor analysis that was performed for the items of the feedback scale involving 40 items are provided in Table 2, together with the total item

				Factor loadings (λ)		
Scale factors		Scale items	Total item test correlations ( <i>r</i> )	1	2	
	I13	The more feedback I receive, the more I will realize my deficiencies	0.578	0.625		
	I14	Every objective evaluation is important for me.	0.555	0.582		
	I20	Receiving positive feedback motivates me for the profession of teaching.	0.500	0.566		
	I21	Feedback enables me to determine the methods and strategies in my next lecturing.	0.592	0.632		
	I23	When I receive positive feedback, I believe that I will succeed in my teaching experiences.	0.566	0.645		
	I27	I consider each feedback a suggestion.	0.624	0.560		
sut	I28	I try to evaluate each feedback I receive.	0.599	0.624		
me	I30	I am open to every convenient feedback.	0.515	0.633		
lop	I31	Receiving feedback expands my viewpoint.	0.614	0.726		
deve	133	I would like to see my deficiencies by watching my teaching in videos.	0.430	0.574		
Factor 1 (professional	I34	I think feedback that is constantly received is the process of 'learning how to teach'.	0.554	0.681		
	136	Feedback increases my responsibility in my teaching experience.	0.584	0.633		
	137	I would like to receive negative feedback unless it is offensive.	0.492	0.559		
	I39	I would like to receive feedback from the lecturer who teaches the course of teaching practice.	0.528	0.582		
	I40	Feedback I receive makes me think 'how could I be better'.	0.654	0.690		
	I42	I would like to receive feedback so as not to make the same mistakes.	0.642	0.718		
	I43	I need feedback to see how I put the theoretical training courses into practice.	0.587	0.649		
	I46	Monitoring the teaching experience of my classmates will provide benefit for me	0.522	0.616		
	I47	Receiving feedback will accelerate my decision- making process	0.551	0.613		
	I49	I would like to receive feedback from different people regarding my teaching experience	0.548	0.628		
	150	Feedback enables the organization of teaching activities in the classroom	0.601	0.681		
	151	Feedback enables me to think critically about my teaching experience	0.512	0.596		
	153	I think feedback will help me solve problems in the classroom	0.556	0.610		
	154	Feedback enables me to recognize my strengths in my teaching experience	0.589	0.642		
	155	Feedback enables me to recognize my weaknesses in my teaching experience.	0.597	0.708		

Table 2. Scale items, total item test correlations and common factor variances of the feedback scale.

			Factor loadings (λ)		
Scale factors		Scale items	Total item test correlations $(r)$	1	2
(y)	156	Feedback creates an awareness about my teaching experience.	0.605	0.672	
	158	At the end of my teaching experiences, I ask myself about my deficiencies.	0.504	0.471	
	159	Feedback from my practice teacher is constructive.	0.611	0.660	
	I60	The number of practice courses that enable us to receive feedback should be increased.	0.459	0.444	
	I62	Receiving feedback will enable me to make a better plan about my next lecture.	0.543	0.684	
	I16	I lose self-confidence when I receive negative feedback.	0.492		0.660
xie	I18	Receiving negative feedback will disturb me.	0.442		0.610
Factor 2 (an	I19	I get stressed when I am evaluated by an expert teacher.	0.395		0.620
	I22	I would not like to receive feedback regarding my teaching experience.	0.472		0.486
	I25	Receiving negative feedback will create anxiety about being a gualified teacher.	0.483		0.657
	I26	Receiving criticisms about my teaching experience from my peers will disturb me.	0.442		0.647
	I44	I do not need to receive feedback regarding how to teach according to the levels of students.	0.465		0.492
	I45	It will disturb me when my teaching experience is verbally evaluated in front of my friends.	0.383		0.566
	I63	Negative feedback decreases my motivation in my lecturing	0.427		0.659
	I64	When I receive feedback, I would not like to confront my mistakes	0.468		0.566
	Expl	30.195	10.363		
	Expl	ained total variance (%)		40.559	

correlation coefficients. According to the information in Table 2, the statements in the first factors are related to the thoughts of prospective teachers regarding the contribution of the feedback provided to them toward their professional development. Thus, the first factor was called 'professional development' in accordance with the literature. The professional development factor involves 30 items. The variance that is explained by this factor, which has a factor loading value consisting of items varying between 0.444 and 0.726, is 30.195%.

Examining the statements within the context of the second factor, it can be seen that they are all related to the anxieties of prospective teachers concerning feedback. Thus, the second factor was called 'anxiety'. The anxiety factor aimed at feedback involves 10 items, and its factor loading values vary between 0.486 and 0.660. The contribution of the related factor to the total variance is 10.363%. Accordingly, the total contribution of the two factors to the variance is 40.559%. In multi-factor patterns, the explained variance

rate is expected to be between 40% and 60% (Büyüköztürk 2007; Scherer et al. 1988, as cited in Tavşancıl 2005). From this point of view, it can be asserted that the contribution of two factors to the total variance is sufficient. Furthermore, it was observed that the item test correlations of the items gained values between r = 0.383 and r = 0.654 regarding the item validity and homogeneity. Finally, according to the results of EFA that was conducted with 40 items, the KMO value of the scale is 0.922, which signifies an excellent value. In addition, the Bartlett sphericity test revealed that the acquired chi-square value was observed to be significant ( $\chi^2 = 4762.429$ ; df = 780; p < .05). Accordingly, it was accepted that the data had originated from a multivariate normal distribution.

*Confirmative factor analysis.* Following the EFA application that revealed the factor design of the feedback assessment instrument, it was necessary to examine the model with confirmative techniques, as well. CFA is an analysis that tests whether a previously defined and limited structure is confirmed as a model (Floyd and Widaman 1995; Schumacker and Lomax 2004). In this case, a CFA application based on the covariance matrix was performed in order to examine the accuracy of the two-factor structure that emerged as a result of the EFA. CFA investigated the fit indices regarding the two-factor structure and the modification results. In this analysis, which was conducted within the scope of the structural equation model, the t value is required to be significant, the error variances low and the explained variance high for each item to explain their factors (Tabachnick and Fidell 2001). According to the first CFA result, it was primarily determined that the t values of each item were significant. The t values that were calculated for 40 items in the scale were greater than 1.96, which is accepted as the critical value for the significance level of 0.05. This condition demonstrates that all items represent their factors very well, and thus, they could be included in the scale. In addition to this, the error variances of the items were observed to be 0.80 and lower (see Figure 3). When an item has an error variance higher than 0.90 and is close to the value of 1, this affects the inclusion of the item in the model (Cokluk et al. 2010).

The next phase in the CFA process included the examination of the fit indices being produced in order to evaluate the model as a whole (Simsek 2007). The value to be primarily examined in the study was the p value. This value gives information about the significance of the difference  $(\chi^2)$  between the expected covariance matrix and the observed covariance matrix. Thus, it is expected that there will be no significant difference (Cokluk et al. 2010). As a result of the analysis, it was observed that the value p is significant at a level of 0.01. This condition might have been caused by the magnitude of the sample. It is considered a natural outcome when the value p is significant in many CFA applications due to the magnitude of the sample (Hu and Bentler 1999; Tabachnick and Fidell 2001). Thus, since the value of chi-square ( $\chi^2$ ) goodness of fit based on the covariance matrix is sensitive to the sample size and causes misinterpretations in samples greater than 200, the rate of the degrees of freedom (df) to  $\chi^2$  is accepted as a criterion (Tabachnick and Fidell 2001). According to the CFA results, the value  $\chi^2$  is 1495.84, and the degree of freedom is 739. The rate of the calculated chi-square value to the degree of freedom is 1495.84/739 = 2.024. Regarding this criterion, rates of 3 and under are accepted as excellent, and rates up to 5 are accepted as sufficient coherence in large samples (Kline 2005). From this point of view, it could be asserted that this acquired value corresponds to the excellent level of coherence. This



Figure 3. CFA model output of the feedback scale after modification.

condition shows that there is a good coherence between the matrix of the original variable and the suggested matrix.

As a result of the CFA, the goodness of fit indices of Goodness of Fit Index (GFI), Comparative Fit Index (CFI), Normed Fit Index (NFI), Non-Normed Fit Index (NNFI), Parsimony Normed Fit Index (PNFI), Adjusted Goodness-of-Fit Index (AGFI) and Incremental Fit Index (IFI) and the goodness of fit indices of the Root Mean Square Error of Approximation (RMSEA) and the Root Mean square Residual (RMR) were also examined. When the goodness of fit indices of CFI, NFI, NNFI, PNFI and IFI are greater than 0.90, this signifies a good coherence; and when they are greater than 0.95, this signifies an excellent coherence (Tabachnick and Fidell 2001; Thompson 2004). Table 3 shows the goodness of fit indices that are presented as a result of the CFA. Accordingly, it is observed that all goodness of fit indices except for the values of GFI and AGFI are greater than 0.90 and the values of RMSEA and RMR are lower than 0.08. In this study, the values of AGFI and GFI were lower than 0.90, which might have been caused by the magnitude of the sample. Both values are sensitive to the sample size, and it is possible to take lower values in studies with a smaller sample (Tabachnick and Fidell 2001). In addition, regarding these values, the interval of 0.85 and 0.90 is indicated as an acceptable coherence (Shevlin and Miles 1998). While the fact that the values of RMSEA and RMR, which are among other goodness of fit indices in the study, are lower than 0.08 and signify a good coherence, it signifies an excellent coherence for the factor structure

Model	$\chi^2$	df	$\chi^2/df$	RMSEA	RMR	CFI	NFI	NNFI	AGFI	GFI	IFI	PNFI
First CFA model After modification	1495.84 1363.34	739 737	2.024 1.849	0.063 0.058	0.048 0.048	0.97 0.97	0.94 0.94	0.96 0.97	0.75 0.77	0.77 0.79	0.97 0.97	0.90 0.90

Table 3. Goodness of fit indices of the first CFA and after modification.

when they are lower than 0.06 and/or 0.06 in general (Schumacker and Lomax 2004; Thompson 2004; Şimşek 2007; Hooper, Coughlan, and Mullen 2008). In examining the CFA results, the final step was taken to investigate the modification suggestions that would cause an important change in the chi-square value and increase the goodness of fit indices. Accordingly, it was observed that the modifications between the 27th and 28th items and the 30th and 31th items would make an important contribution to the chi-square (see Figure 3). During the modification process, attention was paid to the fact that these items belonged to the same factor and were theoretically interrelated; therefore, a correction would not affect the theoretical framework, and the modifications were performed separately for both corrections. Goodness of fit indices of the first CFA and modification results of the CFA are given in Table 3. According to the CFA results that were observed following the modification, an important decrease occurred in the chi-square value, as it was calculated as 1363.34. The degree of freedom was 737, and the rate of chi-square to the degree of freedom was found to be 1363.34/737 = 1.849.

Based on these explanations, it may be asserted that the items in question have an excellent coherence with the two-factor structure, and the model shows good coherence. Figure 3 shows the CFA model that emerged following the modification. As a result of the CFA application, the study also examined the variance rates where the items (observed variables) explained their factors (latent variable). The positive value and level of the variance rate being explained show the strength of the factor structure of the developed scale (Farrell and Rudd 2009). Accordingly, it was determined that the variances where items explained their factors varied between 0.20 and 0.57.

#### Reliability study of the feedback scale scores

As the value of an assessment instrument depends on its ability to measure accurately, reliability is a measurement that estimates the consistency between items. To address this issue, the current study examined the internal consistency coefficients for the reliability of the scale scores. In order to do so, the Cronbach's  $\alpha$  reliability coefficients were calculated with respect to the entire scale and its two sub-factors, in line with Sönmez's (2005) argument that it would be more accurate to use the Cronbach's  $\alpha$  coefficient in the calculation of reliability in Likert assessment instruments. The researchers conducted the factor analysis, and the reliability coefficients of the items related to professional development and anxiety factors of the feedback scale were found, respectively, to be 0.947 and 0.835. On the other hand, the Cronbach's  $\alpha$  reliability coefficient of the entire scale was 0.939. It could be asserted that the higher the  $\alpha$  reliability coefficient of a scale, that more items in that scale will be consistent with one another and that the scale will consist of items probing elements of the same feature (Tezbaşaran 2004). From this point of view, since the scale factors and reliability coefficients regarding the entire scale were high, it was established that the scale was very reliable and homogeneous, and the scale

items were congenerical among each other. The minimum score on the scale is 40 and the maximum is 200. The maximum score and minimum score tell us the range of answers given by the participants. Minimum score taken from any factors of the scale would indicate that there were imperfections about the related factor. It is hoped that the scale will support students who have high scores on the scale to develop awareness of their areas of competence and contribute to improvements in their future professional experience.

#### **Discussion and results**

Providing a well-developed foundation in education theory, as well as practical teaching experience and necessary feedback, is essential in the teacher education process. In this study, a scale aiming to reveal the thoughts and affective reactions of prospective teachers concerning feedback on their teaching experiences was developed on the basis of a number of existing studies (Orland-Barak 2002; Tschannen-Moran and Hoy 2007; Calvo and Ellis 2010; Çabakçor et al. 2011) that emphasized the significance of feedback on teaching experience. For this purpose, content validity and construct validity were carried out for scale items. Also, the reliability of the scale scores was found to be highly reliable. When the factor structure was examined, the researchers agreed to call the first factor 'professional development' and the second factor 'anxiety'.

When the items in the first factor were considered, it was concluded that feedback was related to the development process in their teaching. On examining the related literature, it was seen that professional development included individual professional maturity; revealing knowledge and research; examining how teaching experience should be and focusing on feedback in the reflection process to improve experience (Wang 2005; Ekiz 2006). During the feedback process, the prospective teacher has the opportunity to examine and reflect internally on his/her experience, allowing him/her to develop various alternatives to address problem areas. In this way, the prospective teacher creates and explains his/her own meaning and makes conclusions from different points of view about teaching; this contributes to the professional development of the prospective teacher (Ekiz 2006; Hattie and Timperley 2007). As Gunning (2010) points out, feedback can improve prospective teachers' competence and self-confidence professionally, leading to successful teaching. Similarly, Kim (2005) noted that prospective teachers who were given feedback on their performance became more aware of their areas of incompetence, and improvements in their performances were observed. Akkuzu (2012) likewise found that prospective teachers tried to correct their in-class mistakes and implement new strategies based on feedback, thereby improving themselves professionally.

Many researchers have also revealed that prospective teachers developed self-efficacy beliefs by overcoming the difficulties with the help of positive feedback (Bandura 1997, Tschannen-Moran and Hoy 2007). Moreover, Baumeister et al. (2001) expressed that not only positive feedback but also a limited degree of negative feedback, motivated prospective teachers in terms of their deficiencies and directed them to a feeling of success. In this respect, they cited the importance of both positive and negative feedback.

How prospective teachers react to positive or negative feedback is a matter of significance (Keeping and Levy 2000; Kinicki et al. 2004). Yet, no matter how often the importance of feedback is emphasized in terms of professional development, it must also be noted that feedback may serve to increase tension (Brandt 2008). If a prospective teacher does not realize that feedback is useful and realistic, s/he may not react positively

and change his/her teaching accordingly. To illustrate, Edge (1984) explained that prospective teachers may feel anxious about the evaluation process as a response to receiving feedback. Furthermore, Ekşi (2012) concluded that most prospective teachers were unwilling to give or receive oral feedback due to cultural constraints and the potentially offensive nature of criticism. Thus, the researcher pointed out that the process of giving feedback could be modified to avoid hurting others' feelings. Kukanauza de Mazeika (2001) also determined that prospective teachers had negative attitudes toward feedback, perceived feedback as criticism and expressed that receiving feedback caused anxiety. In this case, the researcher emphasized the necessity of creating proper, nurturing and non-threatening environments for teachers to encourage them to express their opinions clearly, discuss their teaching experiences, prevent prejudice and decrease the level of anxiety.

Taking these issues into account, the viewpoints of prospective teachers from various departments with respect to feedback can be revealed clearly via this feedback scale. In addition, this scale will provide the opportunity to reflect on their future professional experiences more clearly. Thus, while prospective teachers evaluate their teaching experiences, they can better understand the role of feedback in this process. Further studies may reveal whether prospective teachers are concerned about feedback and how they regard feedback in terms of their professional development, allowing for a quantitative determination of prospective teachers' affective reactions and opinions regarding feedback in the form of observable behaviours.

The results of this study, which revealed prospective teachers' opinions regarding feedback, may assist lecturers and practicing teachers in identifying the strategies that should be practiced in terms of types, quantity and quality of feedback; furthermore, the usefulness of feedback may be revealed through such processes such as reflective and micro-teaching. In addition, in line with these strategies, the quality of feedback may also be enhanced according to the expectations of students from different departments. Through use of a scale, whether prospective teachers studying in the relevant faculties of various universities receive effective and sufficient feedback during their teaching experience can be measured quantitatively; this scale may be used supportively in qualitative studies. By carrying out studies based on the relationship of feedback to variables such as attitude, self-efficacy, self-confidence and motivation, which are thought to affect prospective teachers' future profession, the professional development and commitment of prospective teachers may be enhanced.

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#### References

- Akkuzu, N. 2012. "Kimya öğretmen adaylarının mesleki yeterlilik düzeylerinin belirlenmesi [Determination of Professional Competence Levels of Chemistry Pre-service Teachers]." PhD diss., Dokuz Eylul University.
- Backhaus, K., B. Erichson, W. Plinke, and R. Weiber. 1994. *Multivariate analysemethoden-eine anwendungsorientierte einführung* [Multivariate Analysis Methods an Application-oriented Introduction]. Berlin: Springer-Lechrbuch, 124–135.
- Bandura, A. 1997. Self-efficacy: The Exercise of Control. New York: W. H. Freeman.
- Baştürk, S. 2009. "Öğretmenlik uygulaması dersinin öğretmen adaylarının görüşlerine göre incelenmesi [Investigating Teaching Practice Course According to Student Teachers' Opinions]." İlköğretim Online 2: 439–456.
- Baumeister, R. F., E. Bratslavsky, C. Finkenauer, and K. D. Vohs. 2001. "Bad Is Stronger Than Good." *Review of General Psychology* 5: 323–370. doi:10.1037/1089-2680.5.4.323.
- Bezzina, C. 2006. "Views from the Trenches: Beginning Teachers' Perceptions about Their Professional Development." *Journal of In-Service Education* 32: 411–430. doi:10.1080/136 74580601024515.
- Boz, N., and Y. Boz. 2006. "Do Prospective Teachers Get Enough Experience in School Placements?" *Journal of Education for Teaching* 32: 353–368. doi:10.1080/02607470600981912.
- Brandt, C. 2008. "Integrating Feedback and Reflection in Teacher Preparation." *ELT Journal* 62: 37–46. doi:10.1093/elt/ccm076.
- Büyüköztürk, Ş. 2007. Sosyal bilimler için veri analizi el kitabı. İstatistik, araştrıma deseni SPSS Uygulamaları ve yorum [Data Analysis Handbook for Social Sciences. Statistics, Research Pattern, SPSS Applications and Commentary]. Ankara: Pegem.
- Calvo, R. A., and R. A. Ellis. 2010. "Students' Conceptions of Tutor and Automated Feedback in Professional Writing." *Journal of Engineering Education* 99: 427–438. doi:10.1002/j.2168-9830. 2010.tb01072.x.
- Christensen, L. B. 2004. Experimental Methodology. 9th ed. Boston: Pearson Education.
- Crocker, R. K., and D. C. Dibbon. 2008. *Teacher Education in Canada*. Kelowna, BC: Society for the Advancement of Excellence in Education (SAEE).
- Çabakçor, B. Ö., E. Akşan, T. Öztürk, and S. O. Çimer. 2011. "İlköğretim matematik öğretmen adaylarının matematik derslerinden aldığı ve tercih ettikleri geri bildirim türleri [Types of Feedback That Were Received and Preferred by Prospective Primary Mathematics Teachers]." *Turkish Journal of Computer and Mathematics Education* 2: 46–68.
- Çokluk, Ö., G. Şekercioğlu, and Ş. Büyüköztürk. 2010. Sosyal bilimler için çok değişkenli istatistik: SPSS ve LISREL uygulamaları [Multivariate Statistics for the Social Sciences, SPSS and LISREL Applications]. Ankara: Pegem.
- Daniels, A. C., and J. E. Daniels. 2004. *Performance Management: Changing Behavior That Drives Organizational Effectiveness.* 4th ed. Atlanta, GA: Aubrey Daniels International.
- Darling-Hammond, L. 2006. *Powerful Teacher Education: Lessons from Exemplary Programs*. San Francisco, CA: Jossey-Bass.
- Dedrick, R. F., K. Marfo, and D. M. Harris. 2007. "Experimental Analysis of Question Wording in an Instrument Measuring Teachers' Attitudes Toward Inclusive Education." *Educational and Psychological Measurement* 67: 116–131. doi:10.1177/0013164406292034.
- Edge, J. 1984. "Feedback with Face." ELT Journal 38: 204-206. doi:10.1093/elt/38.3.204.
- Ekiz, D. 2006. "Self-observation and Peer Observation: Reflective Diaries of Primary Student-Teachers." *Elementary Education Online* 5: 45–57.
- Ekşi, G. 2012. "Implementing an Observation and Feedback Form for More Effective Feedback in Microteaching." *Education and Science* 37: 267–282.
- Elliot, B., and P. Sinlarat. 1999. "Social Dilemmas as a Source of Ongoing Teacher Development." Paper presented at the ECER Conference, Lahti, Finland, September 22–25.
- Eraslan, A. 2009. "İlköğretim matematik öğretmen adaylarının 'öğretmenlik uygulaması' üzerine görüşleri [Prospective Mathematics Teachers' Opinions on 'Teaching Practice']." *Necatibey Eğitim Fakültesi Elektronik Fen ve Matematik Eğitimi Dergisi* 1: 207–221.
- Everitt, B. S. 2002. *The Cambridge Dictionary of Statistics*. 2nd ed. Cambridge: Cambridge University Press.

- Fabrigar, L. R., D. T. Wegener, R. C. MacCallum, and E. J. Strahan. 1999. "Evaluating the Use of Exploratory Factor Analysis in Psychological Research." *Psychological Methods* 4: 272–299. doi:10.1037/1082-989X.4.3.272.
- Farrell, A. M., and J. M. Rudd. 2009. "Factor Analysis and Discriminant Validity: A Brief Review of Some Practical Issues." Paper presented at the Australia-New Zealand Marketing Academy Conference (ANZMAC), Melbourne, Australia, November 30–December 2.
- Field, A. 2005. Discovering Statistics Using SPSS. 2nd ed. London: Sage.
- Floyd, F. J., and K. F. Widaman. 1995. "Factor Analysis in the Development and Refinement of Clinical Assessment Instruments." *Psychological Assessment* 7: 286–299. doi:10.1037/1040-3590.7.3.286.
- Ganesh, B., and S. M. Matteson. 2010. "The Benefits of Reteaching Lessons in Preservice Methods Classes." Action in Teacher Education 32: 52–60. doi:10.1080/01626620.2010.549718.
- Gilles, C., M. M. Cramer, and S. K. Hwang. 2001. "Beginning Teacher Perceptions of Concerns: A Longitudinal Look at Teacher Development." *Action in Teacher Education* 23: 89–98. doi:10.1080/01626620.2001.10463079.
- Gunning, A. M. 2010. "Exploring the Development of Science Self-efficacy in Pre-service Elementary School Teachers Participating in a Science Education Methods Course." PhD diss., Columbia University.
- Hattie, J., and H. Timperley. 2007. "The Power of Feedback". *Review of Educational Research* 77: 81–112. doi:10.3102/003465430298487.
- Heneman, H. G. III, and A. T. Milanowski. 2003. "Continuing Assessment of Teacher Reactions to a Standards-based Teacher Evaluation System." *Journal of Personnel Evaluation in Education* 17: 171–195.
- Hooper, D., J. Coughlan, and M. R. Mullen. 2008. "Structural Equation Modelling: Guidelines for Determining Model Fit." *Journal of Business Research Methods* 6: 53–60.
- Hu, L. T., and P. M. Bentler. 1999. "Cutoff Criteria for Fit Indexes in Covariance Structure Analysis: Conventional Criteria versus New Alternatives." *Structural Equation Modeling: A Multidisciplinary Journal* 6: 1–55. doi:10.1080/10705519909540118.
- Hutton, P. R. 2013. "The Effect of Feedback on Self-efficacy and Musical Aptitude Scores." PhD diss., University of Oklahoma.
- Keeping, L. M., and P. E. Levy. 2000. "Performance Appraisal Reactions: Measurement, Modeling, and Method Bias." *Journal of Applied Psychology* 85: 708–723. doi:10.1037/0021-9010.85.5.708.
- Kim, M. 2005. "The Effects of the Assessor and Assessee's Roles on Preservice Teachers' Metacognitive Awareness, Performance, and Attitude in a Technology-related Design Task." PhD diss., Florida State University.
- Kinicki, A. J., G. E. Prussia, B. Wu, and F. M. McKee-Ryan. 2004. "A Covariance Structure Analysis of Employees' Responses to Performance Feedback." *Journal of Applied Psychology* 89: 1057–1069. doi:10.1037/0021-9010.89.6.1057.
- Kline, R. B. 2005. *Principles and Practice of Structural Equation Modeling*. 2nd ed. New York: Guilford Publications.
- Kouritzin, S. G., and C. Vizard. 1999. "Feedback on Feedback: Preservice ESL Teachers Respond to Evaluation Practices." *TESL Canada Journal* 17: 16–39.
- Köklü, N. 2002. *Açıklamalı istatistik terimleri sözlügü* [Dictionary of Annotated Statistical Terms]. Ankara, Turkey: Nobel.
- Kukanauza de Mazeika, J. M. 2001. "Effect of Different Types of Feedback During Microteaching Sessions on Preservice Teachers." PhD diss., New York University.
- Kulhavy, R. W., and W. Wager. 1993. "Feedback in Programmed Instruction: Historical Context and Implications for Practice." In *Interactive Instruction and Feedback*, edited by J. Dempsey and G. Ales, 3–20. Englewood Cliffs, NJ: Educational Technology.
- Lee, G. C., and C.-C. Wu. 2006. "Enhancing the Teaching eEperience of Pre-service Teachers through the Use of Videos in Web-based Computer-mediated Communication (CMC)." *Innovations in Education and Teaching International* 43: 369–380. doi:10.1080/14703290600973836.
- Leech, N. L., K. C. Barrett, and G. A. Morgan. 2005. SPSS for Intermediate Statistics: Use and Interpretation. 2nd ed. Mahwah, NJ: Lawrence Erlbaum.
- Moreno, R. 2004. "Decreasing Cognitive Load for Novice Students: Effects of Explanatory versus Corrective Feedback in Discovery-based Multimedia." *Instructional Science* 32: 99–113. doi:10.1023/B:TRUC.0000021811.66966.1d.

- Orland-Barak, L. 2002. "The Impact of the Assessment of Practice Teaching: Learning to Ask Different Questions." *Teacher Education Quarterly* 29: 99–122.
- Özmen, H. 2008. "Okul deneyimi-I ve okul deneyimi-II derslerine ilişkin öğretmen adaylarının görüşleri [Student Teachers' Views on School Experience I and II Courses]." *Ondokuz Mayıs Üniversitesi Eğitim Fakültesi Dergisi* 25: 25–37.
- Paccapaniccia, D. 2002. "Making the Most of Assessment Feedback." *Health Executive* 17: 60–61. Pauli, C. 2010. "Fostering Understanding and Thinking in Discursive Cultures of Learning." Paper
- presented at the meeting of EARLI SIG 10 and 21, Utrecht, The Netherlands, September 2–3.
- Peker, R. 1992. "Geribildirimin üniversite öğrencilerinin ölçme ve değerlendirme dersindeki başarıya etkisi [The Effect of Feedback on the Academic Success of Measurement and Evaluation Lesson of College Students]." *Uludağ Üniversitesi Eğitim Fakültesi Dergisi* 7: 31–39.
- Petrarca, D. M. 2010. "Associate Teacher Learning Tool: An Exploration of Associate Teachers' Use and Responses." PhD diss., University of Calgary.
- Schumacker, R. E., and R. G. Lomax. 2004. *A Beginner's Guide to Structural Equation Modelling*. 2nd ed. Mahwah, NJ: Lawrence Erlbaum.
- Schunk, D. 2008. "Attributions as Motivators of Self-regulated Learning." In *Motivation and Self-regulated Learning: Theory, Research, and Applications*, edited by D. H. Schunk and B. J. Zimmerman, 245–266. New York: Lawrence Erlbaum.
- Sevim, S. 2002. "Eğitim fakültesi-uygulama okulu işbirliği kapsamında yürütülen öğretmenlik uygulaması ve uygulamada karşılaşılan güçlükler [The Implementation of Faculty-school Partnership Program and the Difficulties Encountered in Practice]." MA diss., Karadeniz Technical University.
- Shevlin, M. E., and J. N. V. Miles. 1998. "Effects of Sample Size, Model Specification and Factor Loadings on the GFI in Confirmatory Factor Analysis." *Personality and Individual Differences* 25: 85–90. doi:10.1016/S0191-8869(98)00055-5.
- Shute, V. J. 2008. "Focus on Formative Feedback." *Review of Educational Research* 78: 153–189. doi:10.3102/0034654307313795.
- Şimşek, Ö. F. 2007. Yapısal eşitlik modellemesine giriş (Temel ilkeler ve LISREL uygulamaları) [Introduction to Structural Equation Modeling: Basic Principles and LISREL Applications]. Ankara, Turkey: Ekinoks.
- Sönmez, V. 2005. "Bilimsel araştırmalarda yapılan yanlışlıklar [Mistakes Made in Scientific Tesearches]." Eğitim Araştırmaları Dergisi 18: 150–170.
- Tabachnick, B. G., and L. S. Fidell. 2001. Using Multivariate Statistics. 4th ed. Boston, MA: Allyn & Bacon.
- Tang, S. Y. F. 2004. "The Dynamics of School-based Learning in Initial Teacher Education." *Research Papers in Education* 19: 185–204. doi:10.1080/02671520410001695425.
- Tavşancıl, E. 2005. *Tutumların ölçülmesi ve SPSS ile veri analizi* [Measuring Attitudes and Data Analysis Using SPSS]. 2nd ed. Ankara, Turkey: Nobel.
- Tezbaşaran A. A. 2004. "Likert tipi ölçeklere madde seçmede geleneksel madde analizi tekniklerinin karşılaştırılması [A Comparison of Conventional Item Analysis Techniques to Construct Likert Type Scales]." *Turkish Journal of Psychology* 19: 77–90.
- Thompson, B. 2004. *Exploratory and Confirmatory Factor Analysis: Understanding Concepts and Applications*. Washington, DC: American Psychological Association.
- Topping, K. J., E. F. Smith, I. Swanson, and A. Elliot. 2000. "Formative Peer Assessment of Academic Writing between Postgraduate Students." Assessment & Evaluation in Higher Education 25: 149–169. doi:10.1080/713611428.
- Tschannen-Moran, M., and A. W. Hoy. 2007. "The Differential Antecedents of Self-efficacy Beliefs of Novice and Experienced Teachers." *Teaching and Teacher Education* 23: 944–956. doi:10.1016/j.tate.2006.05.003.
- Voerman, L., P. C. Meijer, F. A. J. Korthagen, and R. J. Simons. 2012. "Types and Frequencies of Feedback Interventions in Classroom Interaction in Secondary Education." *Teaching and Teacher Education* 28: 1107–1115. doi:10.1016/j.tate.2012.06.006.
- Wallace, M. 1991. Training Foreign Language Teachers: A Reflective Approach. Cambridge: Cambridge University Press.
- Wang, H. L. 2005. "Early Childhood Educators' Perceptions of Professional Competence in Preschool Settings." PhD diss., Pennsylvania State University.