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The Development of a Scale to Determine General Competency for Primary School Teachers in Turkey: A Validity and Reliability Study[1]

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ABSTRACT Teachers who are responsible for educating individuals in such an important stage must have the attitudes and behaviours required by the profession. Qualified teachers will lead to better-behaved, trained, and qualified students. The skill of creating a qualified teaching-learning process is directly related to teachers' competencies and knowledge. The aim of this study is to determine at what level teachers working in Turkey have general teacher competencies. The population of this research consists of 450 primary school teachers working in the central district in Ankara during the 2013 - 2014 academic year. During development of this scale, exploratory factor analysis, two half reliability analyses, item-total correlation, Cronbach's alpha, and confirmatory factor analysis were used. Consequently, it is possible to say that this scale, with 60 items and five factors, is a reliable and valid scale to investigate primary school teachers' competencies.

INTRODUCTION

For a society to ensure that its population is well-educated and qualified to meet its future needs, that society's educational system must prepare its citizens in an effective and efficient manner. With today's rapidly changing world, along with the deteriorating global environmental conditions, it is more necessary than ever for all societies to prepare adequate workforces that can meet the world's increasing needs, which requires a proper education. Nowadays, it is a widely accepted fact that the development of a society can be achieved through education and effective training, rapidly increasing the value given to education at all stages and levels. Closely monitoring the developments in science and technology via education is even more important, especially for developing countries to be able to adopt these changes rapidly. Elementary age individuals enter into a planned, scheduled, guided, supported, and mandatory training process for the first time and they continuously learn new information, skills, and behaviours. In this aspect, primary school education is a very important and critical period for individuals to develop their skills and increase their level of education. Teachers who are responsible for educating individuals in such an important stage must have the attitudes and behaviours required by the profession. Teachers, who are constantly interacting with students, are responsible for planning and implementing teaching activities taking place in schools. Qualified teachers will lead to better-behaving, trained, and qualified students. The skill of creating a qualified teaching-learning process is directly related with teachers' competencies and knowledge.

Competency is defined as "the ability to do something well" in the Longman Dictionary of Contemporary English and as "special information that allows the power to do a job" in the dictionary of the Turkish Language Association (www.tdk.gov.tr). According to Deakin Crick (2014: 77), competence is 'a complex combination of knowledge, skills, understanding, values, attitudes and desire which lead to effective, embodied human action in the world, in a particular domain'. In terms of education, competency is defined through two different perspectives: the-

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oretical and operational competencies. The theoretical aspect of competence is a cognitive structure that facilitates the specified behaviour. Operational aspects of competency are skills and behaviours to overcome unexpected and complex situations. Accordingly, competency requires knowledge, skills, attitudes, and strategic thinking (Westera 2001); in other words, teachers' knowledge, skills, and attitudes are directly related to their competencies. According to Falade and Falade (2013), teachers' competence can be described as the application of acquired instructional knowledge, skills, and attitudes for efficient and effective teaching. Teachers' competence depends, to a large extent, on their acquisition of relevant knowledge, attitudes, and skills in their area of specialization. Although the concept of teacher competencies is used in the Turkish language, the term "pedagogical standards" is preferred in the foreign literature (Teacher Development Agency, (TDA) 2007; in this study, the researcher uses 'teacher competencies'.

In order to determine teacher competencies, it is first needed to explain the concept of teacher competency. Teacher competency means "performing the expected roles both in quantity and quality" (Sisman 2006). Teachers need competence to constantly innovate and adapt; this includes having critical, evidence-based attitudes that enable them to respond to students' outcomes, new evidence from inside and outside the classroom, and professional dialogue to adapt their own practices (European Comission 2013). Ozden (1997) argued that training individuals in line with the purpose of the education system requires having well-trained and competent, professional teachers. Thus, primary school teachers should constantly interact with students and should focus on developing students' creativity. In particular, encouraging and developing creativity in primary school education may allow students to develop their capacities and abilities. This is mainly based on teachers showing consistent, patient, tolerant, flexible, and constructive approaches; encouraging students and organizing the teaching-learning process in a flexible manner could allow the development of creativity in primary school education. According to Sezgin (2006), "There is a positive and a high correlation between quality of teachers and the quality of the people as the product of the education system". At this point, neither the definition of a teacher nor the proper performance criteria to evaluate teachers are known.

Teachers' competencies directly affect the teaching-learning process. Accordingly, teachers should be aware of how students are motivated, should be able to able to attract students' attention, listen to them, provide for the student's safety, communicate with the student's family, and give students feedback about their learning processes (Darling-Hammond et al. 2000). Even though the competencies expected from teachers look similar in all countries, teacher qualifications models vary due to cultural differences in the countries; for example, in the United States, the scope of teacher competencies was identified by explaining what teachers should know and be able to do. Accordingly, teachers are dedicated to their students' learning and they believe that all students can learn. In addition, teachers know different methods and strategies related to the course they teach, assess student progress via different techniques, teach analytical thinking, and are in cooperation with parents and the school environment to contribute to the development of the school (NBPTS 2002). Teacher qualifications in Austria are divided into "career dimensions" and "professional elements". Career dimensions of teaching competencies include graduation, competence, achievement, and leadership standards. Professional elements of teaching competencies include professional knowledge, practices, values, and relationship standards (TED 2009).

Another model of teacher competencies was developed by the World Bank (2005). Accordingly, teacher qualifications cover competencies related to the professional dimension, training, related work in the classroom, and the school environment. According to this model, teacher qualifications vary according to the stage of professional life. Accordingly, the first level of this model refers to pre-service teacher training, the second level refers to internship period, and the third level refers to the post-internship and continuous development (World Bank 2005). Professional qualifications require acting ethically and responsibly in performing tasks, participating in individual and collective professional development projects, and interpreting knowledge and culture critically and professionally. Teaching competencies require designing learning situations for the subject to be learned, managing learning, assessing development of learning,

planning and supervising classroom activities, considering differences among students, using the benefits of technology when teaching, and establishing a positive relationship. The school qualifications require communicating with all stakeholders of schools and working as partners with colleagues.

In Turkey, the Ministry of National Education (MoNE) established general competencies of the teaching profession, consisting of six core competencies, 31 sub-competencies, and 233 of performance indicators. Core competencies are: Personal and Professional Values; Professional Development; Student Recognition; Learning and Teaching Process; Monitoring and Evaluating Learning and Development; School, Family, and Community Collaboration; and Program and Content Knowledge (otmg.meb.gov.tr). However, classroom teachers are responsible for teaching more than one course. Thus, they need to have interdisciplinary competencies (Kahramanoglu and Ay 2013); in other words, the competencies the teacher possesses should have common ground in all areas.

Primary school teachers' specific areas of competencies areas are studied under the eight categories by the MoNE. These categories include learning and teaching environment and development, monitoring and evaluation, personal and professional development and relationships with the society, art and aesthetics, developing language skills, scientific and technological development, individual responsibilities and socialization, and physical education and security (otmg.meb.gov.tr). Alnoor and Yu (2011) examined primary school teachers' competencies under four headings: required professional competencies and content knowledge to fulfil the duties, teaching skills, measurement and evaluation, and professional values and behaviours. Comparison of these two studies shows that their areas of competencies are similar and complementary.

A teacher who has the competencies mentioned above organizes the learning environment in a way that develops attitudes and values, solves problems related to interpersonal interaction and collaboration, and continually monitors and evaluates the development of students' attitudes and values. This situation requires teachers to analyse their competencies thoroughly and to spend sustained efforts to develop these competencies. There is a close relationship between teachers' owned competencies and the roles they effectively carry out in classrooms. In other words, the teachers' effectiveness and success depends on their level of competencies.

Examination of the related literature shows that the number of studies investigating teachers' competencies scale in Turkey is limited. In some of these studies, teachers' competencies ere discussed (Seker et al. 2004), existing scales were adapted to the Turkish culture (Diken 2007; Sümbül and Arslan 2006), or they investigated competencies for any other branch (Akbulut 2012; Meral and Bilgic 2012). However, there was no scale for investigating teachers' competencies outside the one developed by the MoNE.

Aim

The aim of this study is to develop a valid and reliable "General Teacher Competencies" scale for primary school teachers working in Turkey and to determine at what level they have these general teacher competencies. For this purpose, primary school teachers' competencies and general competencies for the teaching profession are combined in line with the related literature and these competencies were examined under five titles: professional and personal attitudes, teaching methods, program development and evaluation, content knowledge, and classroom management.

METHODOLOGY

Population and Sample

The population of this research consisted of primary school teachers working in the central district in Ankara during the 2013 - 2014 academic year. Because of the population size, a sample was used to reach the aim of this study. The scale was applied to 465 teachers via simple random sampling. 352 of the participants were female (78%) and 98 were male (22%).

Data Analysis

In order to develop the Primary School Teacher Competency Scale (PSTCS), outlier analysis was carried out to check whether the data were normally distributed or not. Accordingly, 15 ex-

treme values were determined and subtracted from the data set; the distribution was then normal. Analysis of data continued with 450 data points. For data analysis, exploratory factor analysis (EFA), two half reliability analyses, item-total correlation, Cronbach's alpha, and confirmatory factor analysis (CFA) were used. The data set was randomly divided into two; EFA was made with 225 data points and CFA was made with 225 data points.

FINDINGS AND DISCUSSION

Analysis regarding the validity and reliability of the scale is given below.

Exploratory Factor Analysis (EFA)

A 5-point Likert scale that consisted of two parts was applied to teachers as the data collection tool. In the first section, personal information was obtained and statements regarding teachers' competencies were given in the second section.

To determine primary school teachers' competencies, the researcher reviewed related literature and created the "Primary School Teacher Competency Scale" (PSTCS) with eleven subcategories: child development, effective communication in classroom, teaching methods, teaching reading, teaching writing, teaching mathematics, classroom management, assessment of student achievement, school-family collaboration, program development and evaluation, and professional and personal attitudes. In the process of developing the scale, after literature review, the Delphi technique was used to detect and identify competencies related to the eleven sub-categories. Eleven core competency areas with open-ended questions were sent to 142 faculty members working at the Elementary Education Departments of Educational Faculties in Turkey. The researcher reorganized the items based on the results obtained from the instructors and the items were re-sent to the same group. Accordingly, a total of 136 competency items were determined by the trained experts; those 136 items were sent to the nine experts and the content validity of each item was calculated. As a result of content validity, the number of items was 80. The scale was developed as a 5-point Likert-type scale.

To test the validity of the scale, EFA was conducted over 212 data points. For this purpose, the results of KMO and the Bartlett test of sphericity were analysed: KMO = .924 and Barlett test of sphericity [χ^2 = 8868,003; P <.01], and a p-value of .000 was obtained. Based on these results, the group size was big enough and the data were suitable for factor analysis (Karasar 2005). Then EFA was continued. Analysis of the scale has shown that the scale exhibited a five-factor structure; the scale with five factors was re-analysed via varimax rotation with the assumption of there was not any relationships among the factors (Brown 2006: 31). In the analysis items, with load factors over .45 were preferred. Accordingly, items with load factors less than .45 were removed from the scale and the scale was finalized.

Based on the result of EFA with 60 items, the item load factor varied between .75 and .47 for professional and personal attitudes; between .68 and .49 for teaching methods; between .73 and .54 for program development and evaluation; between .70 and .47 for content knowledge, and between .62 and .72 for classroom management. The variance explained by each factor was 17.29 percent for the first factor, 11.43 percent for the second factor, 9.83 percent for the third factor, 8.46 percent for the fourth factor, and 6.47 percent for the fifth factor. The total variance was 53.98 percent. Factor analysis and item-total correlations of PSTCS are given in Table 1.

Confirmatory Factor Analysis (CFA)

EFA identified that the scale consisted of 60 items and five factors. In order to verify the structure of factors, CFA (Brown 2006: 1) was applied; the fit indices were χ^2= 3241.91; p= 0.00, sd=1642, χ^2/sd = 1.97, IFI= .95, RFI = .91, RMR = .059, GFI = .62, AGFI = .59, CFI = .95, NNFI = .95, NFI = .92, and RMSEA = .074. The standardized values of the scale are presented in Figure 1.

When the error variances of the variables were examined in Figure 1, it was seen that the error variance of the first item was high (.82). However, in the model, a significant t value was obtained for this item. Cokluk et al. (2012: 324) explained that in such a case the item can remain in the model. Therefore, the first item was not removed from the model.

Reliability Analysis

Cronbach's alpha and split-half reliability analyses were performed to calculate the reliabil-

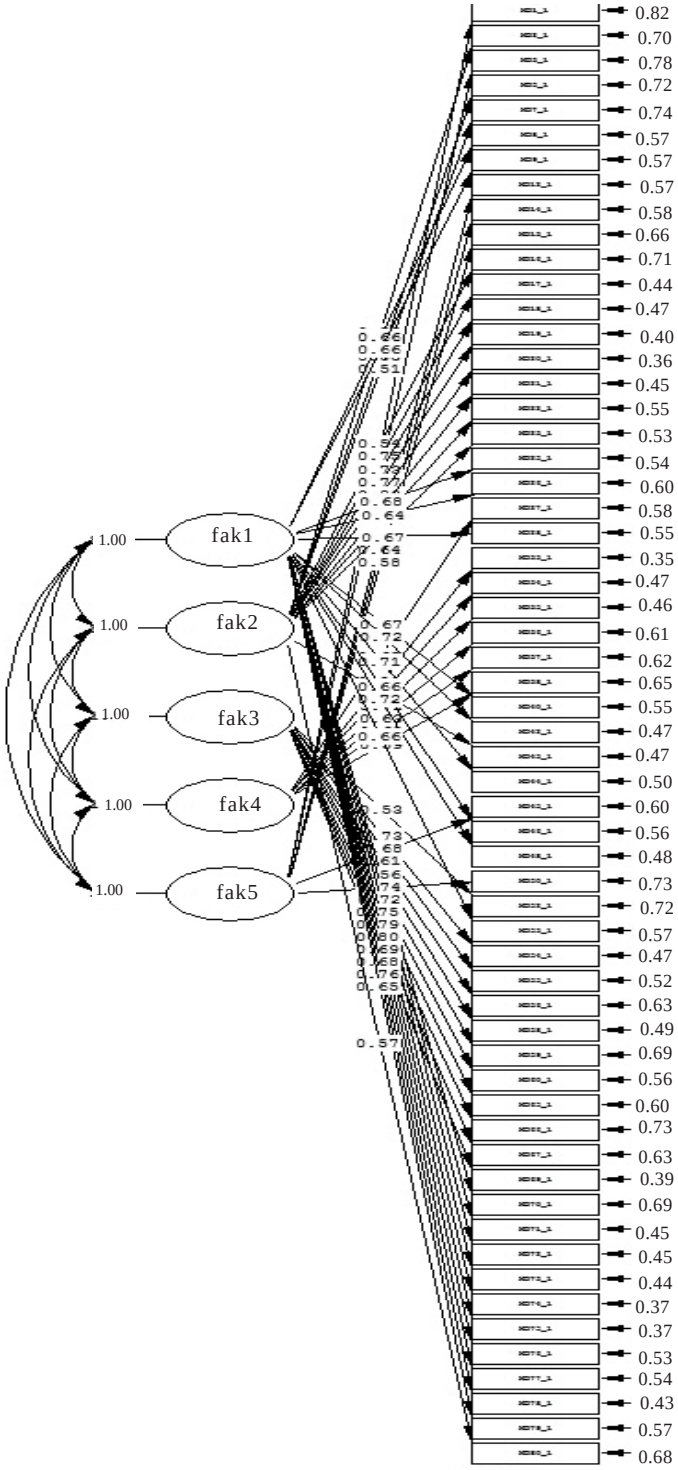
Table 1: Load factor values and item analysis results of primary school teacher competency scale

S. No.	*Items*	*Factor I*	*Factor II*	*Factor III*	*Factor V*	*Factor IV*	*Item total correlation*
1	Having a democratic and modern attitude	.76					.70
2	Adopt the profession	.74					.75
3	Being patient, tolerant, well-intentioned, honest, and having a strong personality	.72					.71
4	Having scientific attitudes and behaviours	.72					.71
5	Being an example to both students and others with attitudes and behaviours	.69					.74
6	Guiding students in solving problems	.69					.74
7	Speaking and writing properly in Turkish	.68					.67
8	Being open to suggestions and criticism	.62					.66
9	Loving children	.54					.56
10	Finding creative and constructive solutions to problems that arise in the classroom	.54					.68
11	Closely following scientific and technological innovations and developing him/herself	.54					.61
12	Being patient and understanding during reading activities in the classroom	.53					.66
13	Creating an effective communication environment that ensures the participation of all students in the class	.52					.65
14	Carefully and patiently listening to students and responding appropriately to their questions	.52					.66
15	Considering the principle of individual differences in classroom management	.52					.70
16	Being objective in assessing student achievement	.40					.61
17	Being a model to students via conversational style, listening habits, and gestures	.48					.65
18	Choosing topics and materials to be used in reading activities as appropriate to the student's level	.47					.67
19	Including hands-on activities in teaching mathematics	.47					.69
20	Considering individual differences in reading activities	.47					.63
21	Arranging mathematical operationsin accordance with the level of students	.47					.67
22	Associating mathematics topics with each other by sample solutions and repeating activities during teaching	.46					.68
23	Supporting teaching methods with appropriate tools and materials		.68				.72
24	Selecting appropriate methods and techniques		.63				.72
25	Selecting an appropriate method by establishing a relationship between teaching techniques and teaching objectives		.62				.73
26	Using different teaching methods in the classroom activity		.62				.75
27	Selecting and implementing the most effective methods according to students		.62				.72
28	Using methods that allow students to actively participate in learning processes		.57				.66
29	Knowing teaching methods		.52				.55
30	Supporting in class learning activities with real-life experiences		.51				.52
31	Avoiding giving priority and emphasis to a single method in class activities		.51				.65

Table 1: Contd...

S. No.	*Items*	*Factor I*	*Factor II*	*Factor III*	*Factor V*	*Factor IV*	*Item total correlation*
32	Using computers effectively		.50				.54
33	Keeping the files associated with children and assessing the information in these files		.50				.49
34	Arranging teaching-learning processes according to children's developmental features		.48				.51
35	Enriching mathematics teaching activities with additional materials, samples, and magazines		.46				.67
36	Positively and constructively evaluating the differences among students' achievement			.73			.72
37	Keeping records of students' achievement			.67			.65
38	Taking measures to ensure reaching objectives and changing student behaviour			.66			.74
39	Considering students' developmental level when developing measurement and assessment tools			.64			.71
40	Observing classroom activities of students and assessing the process			.61			.64
41	Working in teams to develop cooperation and coordination with colleagues			.60			.64
42	Identifying issues and finding solutions related to the implementation of the program			.56			.60
43	Reconsidering teaching-learning processes based on evaluation results			.55			.58
44	Knowing measurement and evaluation technics to assess students' achievement			.54			.53
45	Establishing a relationship among purpose, content, methods, and assessment			.54			.56
46	Developing consistent measurement and evaluation tools with the course aims and objectives			.51			.66
47	Teaching reading and writing in line with each other				.69		.65
48	Using writing activities for students to express their feelings and thoughts				.68		.69
49	Arranging writing activities according to students' academic level				.60		.62
50	Selecting topics and texts that may be of interest to students during writing activities				.57		.69
51	Creating an appropriate classroom environment that allows students to perform writing activities				.52		.71
52	Identifying and correcting students' typographical errors				.48		.65
53	Using games during reading activities				.47		.56
54	Considering individual differences during the teaching process					.62	.44
55	Knowing children's developmental features					.57	.53
56	Keeping eye contacts with students					.57	.62
57	Being natural, friendly, and tolerant towards students					.55	.58
58	Creating a democratic teaching-learning environment in the classroom					.52	.52
59	Taking precautions to ensure effective communication and cooperation among students					.52	.54
60	Being tolerant, concerned, patient, and democratic towards students in classrooms					.52	.48

Full Scale Explained total variance : 53.98% Alpha : .97



Chi-square =2241.91, df = 1642, P-value = 0.00000, RMSEA=0.074

Fig. 1. Confirmatory factor analysis model of primary school teachers' competency scale (Standardized Values)

ity of the scale consisting of 60 items. The evaluation alpha coefficients for each factor showed that it was .95 for the first factor, .91 for the second factor, .90 for the third factor, .87 for the fourth factor, and .80 for the fifth factor. The alpha co-efficiency of the total scale was .97. The reliability of the scale can be examined with the consistency between the two equally-divided parts of the data (Secer 2013:174); this scale was tested using the two halves reliability as well. By Spearman Brown co-efficiency, the first factor was.90, the second factor was .88, the third factor was .92, the fourth factor was .87, and the fifth factor was .77. Spearman Brown co-efficiency for the whole scale was .75.

DISCUSSION

In this study, the PSTCS was developed to determine teachers' competencies. During the scale development process, first an item pool consisting of 136 items was created via the Delphi technique. Then, these items' scope of validity was examined and, as a result, the scale was arranged with 80 items. EFA was applied to the scale with 80 items. Items with less than .45 load factors were removed from the scale. At the end, the scale was finalized with 60 items and five factors. The total variance explained by the five-factor scale was calculated as 53.98 percent. The lowest value of the total correlation for the remaining 60 items was .48. In this case, it is possible to say that each item in the scale effectively distinguishes between factors.

CFA and acceptable levels of fit indices showed that the NFI, NNFI, IFI, and RFI values were bigger than .90, the CFI value was bigger than .95, and the RMR and RMSEA values were between .05 and .08; these are acceptable values. The value of fit indices for NFI, NNFI, IFI, and RFI were .95 and higher, the CFI value was .97 and higher, the AGFI and GFI values were .90 and higher, and the RMR and RMSEA values were smaller than .05, showing a perfect fit (Brown 2006: 87). Similarly, χ^2/sd value should be less than about 4 (Harrington 2009: 54); in this case, the model fit indices are within acceptable limits.

For the reliability of the scale, Cronbach's alpha co-efficiency and two halves reliability for the each factor were calculated. According to Cokluk et al. (2012), a calculated reliability co-efficiency higher than .70 is generally accepted as sufficient. The results showed that all the reliability co-efficiencies were higher than .70; consequently it was observed that the scale was reliable.

CONCLUSION

The aim of this paper is to determine at what level teachers working in Turkey have general teacher competencies. During the development of this scale, EFA, two half reliability analyses, item-total correlation, Cronbach's alpha, and CFA were used. The data set was randomly divided into two, and EFA and CFA were conducted with 225 data points each. Based on the EFA, the scale exhibited a five-factor structure. CFA showed that the fit indices were χ^2= 3241.91; p= 0.00, sd=1642, χ^2/sd = 1.97, IFI= .95, RFI = .91, RMR = .059, GFI = .62, AGFI = .59, CFI = .95, NNFI = .95, NFI = .92, and RMSEA = .074. Cronbach's alpha and split-half reliability analyses were performed to calculate the reliability of the scale and the value was more than .70. The PSTCS is a valid and reliable instrument that can be used to investigate primary school teachers' competencies. The scale had 60 items under five dimensions.

RECOMMENDATIONS

In this study, the "Primary School Teachers Competency Scale" was developed based on the views of teachers working at primary schools. It is argued in the literature that general competencies do not change much, but some variations can still be observed among teacher competencies according to the goals and the aims of different countries. The items of the scale can be used in different cultures to determine whether primary school teachers have these competencies or not; additionally, some variables (gender, seniority, age, reason for choosing this profession, etc.) can be used to investigate their impact on the PSTCS.

NOTE

[1] The summary of this study was presented at 1st Eurasian Educational Research Congress Congress, held on in Istanbul, Turkey, between 24 – 26 April, 2014

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