Early Childhood Teachers' Self-Efficacy for Supporting Development Scale

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Abstract

Purpose of this study is to develop Early Childhood Teachers Self-Efficacy Beliefs for Supporting Children's Development Scale (ECTSBSCDS). The literature review provided an information base for the creation of scale items. Thus, initially 122 items were created. After experts review for content and discern validity 82 items left in the scale. Twenty-six preschool and kindergarten teachers from four different kindergartens in Erzurum and 156 preservice early childhood education teachers responded to the self-efficacy questionnaire. A series of factor analyses were applied after the data collection to extract factors. After the explanatory factor analysis 38 items were left in the scale. An analysis of the entire scale revealed a reliability score of 0.96. Findings revealed that the ECTSBSCDS is a valid and reliable instrument.

Key Words: Teacher Self-Efficacy, Early Childhood Education, Scale Development

Introduction

Bandura (1986, p. 391) defined self-efficacy as "People's judgments of their capabilities to organize and execute courses of action required to attain designated types of performance." Self-efficacy is a personal belief about the capacity to accomplish a certain task. Bandura suggested that in non-hazardous activities, having optimistic self-appraisals motivated individuals to improve their performance. He stated that, "If self-efficacy beliefs always reflected only what people can do routinely, people would rarely fail, but neither would they mount the extra effort needed to surpass their ordinary performance" (Bandura, 1989, p. 421).

It is important to be realistic about self-efficacy because in performance, self-efficacy beliefs work as initiators of behavior (Bandura, 1989) and increase motivation and persistence (Bouffard-Bouchard, 1990; Multon, Brown & Lent, 1991). Self-efficacy mediates the effects of other self-beliefs and other variables, such as skill, ability and knowledge (Pajares & Miller, 1994; Teti & Gelfand, 1991). Bandura (1989) claimed that people's self-efficacy beliefs determine their level of motivation—that is, the level of effort they will expend on a task and time they will spend preserving that effort. People with higher self-efficacy beliefs persist longer on a task when they face difficulties than people with lower self-efficacy beliefs. The stronger the belief in capabilities, the greater and more persistent are the efforts (Bouffard -Bouchard, 1990; Schunk, 1981; Zimmerman & Ringle, 1981). People with higher self-efficacy attribute failure to insufficient effort or deficient knowledge and skills that are acquirable and quickly recover a sense of efficacy after failures or setbacks (Bandura, 1993).

According to Bandura (1989), there is a difference between possessing skills and being able to use them effectively and consistently under varied circumstances. Even though people have enough knowledge, skills, and abilities to perform a certain task, they may have doubts about those skills and abilities. As a result, they may not even attempt to perform it. In order to perform a certain task, people should believe that their knowledge, skills, and abilities are adequate to perform it so that they may attempt to do so. If people are not fully convinced of their personal efficacy, they rapidly abandon the skills they have been taught. This is especially clear when quick results fail to appear or bothersome effort is significant (Bandura, 1989).

On the other hand, people who doubt their capabilities have a different point-of-view. They usually shy away from difficult tasks, and have low aspirations and weak commitments to the goals that they choose to pursue. In taxing situations, they dwell on

their personal deficiencies, the formidableness of the task, and the adverse consequences of failure (Bandura, 1989).

According to Bandura (1977), self-efficacy is the fundamental mediator among knowledge, other self-beliefs, and execution of behavior because it works as a catalyst. Pajares and Miller (1994) tested for the predictive and mediational role of self-efficacy beliefs on math achievement in a sample of 350 high school students. They used path analyses to analyze correlations among the variables. They found that self-efficacy mediated the effect of gender and prior experiences of mathematics self-concept, perceived usefulness of mathematics, and mathematics problem-solving performance. Also, prior experiences influence mathematics achievement through their effect on self-efficacy beliefs, which can influence performance independent of past behavior (Pajares & Miller, 1994).

Self-efficacy is an important predictor of performance and a primary cause of feelings of self-worth and perceived usefulness. Self-efficacy beliefs are major mediators of behavior and behavior change. Therefore, self-efficacy plays a critical role in the acquisition of a new skill and the performance of it. Accordingly, teachers' self-efficacy beliefs affect their and their students' performances.

Teachers' self-efficacy beliefs have been shown to predict student motivation (Midgley, Feldlaufer, & Eccles, 1989) and academic achievement (Goddard, Hoy & Hoy 2000; Muijs & Reynold, 2002). The study by Muijs and Reynold (2002) is especially important in this regard. They found that teacher self-efficacy related to students' achievement even when controlling for prior achievement and background factors. Teachers' self-efficacy beliefs also were related to their professional commitment (Ware & Kitsantas, 2007) and burnout (Skaalvik & Skaalvik, 2007). Skaalvik and Skaalvik (2007) found a positive relationship between perceived collective teacher efficacy and teacher self-efficacy. Collective teacher efficacy has been found to be a predictor of student motivation and achievement (Midgley, Feldlaufer, & Eccles, 1989; Ross, 1992). Therefore, it can be said that teachers' self-efficacy beliefs have a direct impact on students' motivation and achievement and relate directly to teachers' professional commitment and burnout and indirectly affect, through collective teacher efficacy, student achievement and motivation.

These studies reveal the importance of teachers' self-efficacy beliefs on both their and their students' performance. In order to properly measure this importance, self-efficacy scales are needed. The availability of such scales makes it possible to identify deficiencies in teachers' self-efficacy beliefs. With the findings from analyses of scale results,, programs can be developed to support and increase teachers' self-efficacy beliefs. Çapa, Çakıroğlu and Sarıkaya (2005) adapted the Teacher Sense of Efficacy Scale (TSES) created by Tschannen-Moran and Woolfolk (1998) into Turkish. Subscales of Teacher Sense of Efficacy Scale are Efficacy for Instructional Strategies, Efficacy for Classroom Management, Efficacy for Student Engagement. Therefore TSES provides scores for teachers' global sense of efficacy. However, Bandura (1986) emphasized the importance of specifying self-efficacy assessment and correspondence to criterion-based tasks. According to Bandura, self-efficacy must be specifically rather than globally assessed because self-efficacy beliefs are domain- and task-specific. The scales used in assessment must correspond directly to the criterion-based performance of a task. Therefore, special self-efficacy measurement is needed for early childhood teachers.

The purpose of this study was to develop an early childhood teachers' self-efficacy scale for supporting children's development. The study contained validity and reliability analyses of the Early Childhood Teachers Self-Efficacy Beliefs for Supporting Children's Development Scale. No teacher self-efficacy beliefs scales for supporting children's

development have been translated into Turkish, to the researcher's knowledge. Consequently, this study's findings are of great importance because of the study's originality and relevancy.

Method

Item Preparation

The investigator reviewed the literature on different early childhood education systems, including Montessori, Reggio Emilia and High Scope. This literature review provided an information base for the creation of scale items. All of these systems emphasize the holistic development of the child. Early childhood education should aim to develop every aspects of this development, such as cognitive, social, physical, emotional development (Barnes, 1980, 1991; Easton, 1997; Mollet, 1991; Abramson, 2000; Bennet 2001; Weikart, 1988; Schwienhart, 2002; Montessori, 1938). Therefore, items supporting the physical, socio-emotional, and cognitive development of children were developed. Some examples from the scale follow:

1. I can plan activities to support fine motor development of children.
2. I can create and environment that children can freely express themselves.
3. I can support children's creativity.

Although the systems share common values, they have a few different applications. For example, Reggio Emilia stresses parents' participation and role in the educational process. Parents are a natural confluent of educational practice and have a reciprocal relationship with teachers, partnering with them. Parents also join in school administration and work as a consultant (Rinaldi, 1994; Nelson, 1997). Certain children have special rights and share the same classroom with other children. Teachers need to be able to support these children, too (Bennett, 2001; Edmiaston & Fitzgerald, 2000). Examples of some items created with these facts in mind are:

1. I can establish good communication with parents.
2. I can support (cognitive, socio-emotional, physical) development of disable children.

Systems such as High Scope and Montessori place greater emphasis on structured educational activities than do other systems. There are key competencies in High Scope, such as creative representation, language and literacy, movement, music, classification, time, space, etc. Teachers should support the development of these key competencies with educational activities and their interactions with the children. Teacher should create an atmosphere in which children can feel safe, and which will enable them freely interact with the environment and each other (Saurino & Saurino, 1996). In the Montessori system teachers prepare structured activities that have definite ends. Children can develop a skill that enables them to engage in activities that require higher skills. Teachers should provide choices, stimuli, and a rich environment in which children can choose an activity (Lillard, 2005; Edwards, 2002). Concurrently, Reggio Emilia promotes a project-based approach in education. The teachers' task is to guide children to realize their projects (Sassalos, 1999). Followings are examples of educational activities:

1. I can help children to dramatize the stories.
2. I can prepare stimulus rich classroom environment.
3. I can help children to find appropriate materials for their projects.

As a result of an extensive literature review on early childhood education systems, the investigator selected and adapted 122 items for measuring teachers' beliefs in their capacity to support the children's achievement of their potential. The 122 items included a response scale ranging from "0: cannot do at all" to "100: highly certain can do."

To assess content and discern validity, a panel of experts reviewed the scale. Two advanced Turkish Ph.D. students from the Pennsylvania State University, experts in both early childhood education and educational psychology and one professor of early childhood education from the Hacettepe University reviewed the scale for content validity. They were asked to evaluate each item's ability to measure self-efficacy in the intended area. They graded each item on a scale from 0-100. For each item the average score of the three experts was calculated; items that had an average score of 80 or higher remained in the scale. Also, experts commented on and made suggestions about items. In response to their suggestions some items were combined and reduced to one item. For example, in the first version of the scale there were redundant items for each age group from three to five years old. For example:

1. I can support cognitive development of three years old child.
2. I can support cognitive development of four years old child.
3. I can support cognitive development of five years old child.

After an expert review, these items were reduced to one item, such as: I can support the cognitive development of children from 3-5 years of age.

After the experts' evaluation, 36 items with an average score of 80 or lower were discarded from the scale. In response to experts' suggestions the first aid subscale was eliminated. Thus, 82 items remained on the scale. After the expert review to establish face validity, a randomly selected group of 30 preservice teacher participants—ten from each class level—provided feedback on each item. Each of the 30 preservice teachers read each item aloud and thought out loud about their understanding of each item. In light of students' feedback the wording of some items was changed. For example, item 57 was: "I can make children respect differences". It became: "I can make children respect individual differences." Item 74 was: "I can tell stories verbally by animating the characters in the story"; it became: "I can tell the stories without reading from the book by verbally animating the characters in the story."

Participants

Twenty-six preschool and kindergarten teachers from four different kindergartens in Erzurum and 156 preservice early childhood education teachers participated in the study and responded to the self-efficacy questionnaire. A total of 182 participants engaged in the pilot study. All teachers were female. The ages of teachers varied from 20 years old to 47 years old and the mean age was 28.4 years old. Seventy-three percent of the teachers had 1 to 5 years teaching experience; 3%, 6 to 11 years; and one teacher, more than 17 years of teaching experience. Among 156 preservice teachers, 62 taught the fourth grade; 49, third grade; and 45, second grade. Of the 156 preservice teachers, 130 (83.3%) were female; 26 (16.7%) were male.

Findings

Validity Analysis

First Phase

Factor analysis is a statistical technique used to "extract as many latent factors as necessary to explain the correlations among the items" (Reise, Waller & Comrey, 2000, p. 294). Therefore, a series of factor analyses were applied after the data collection. An explanatory factor analysis (EFA) was conducted on group variables that were highly correlated and grouped into factors. The purpose was to identify subscales that related to

teachers' self-efficacy for supporting children's development. EFA also revealed the unrepresentative items that should be discarded from the scale to strengthen its validity. In the early steps of the analyses, a correlation matrix revealed that item 65 did not have significant correlation with other items on the scale. Therefore, item 65 was extracted from the scale. Correlations among other variables did not exceed 0.9. Also, item total correlation was calculated to determine the internal consistency of the scale. For all items, item total correlation was significant at the 0.01 level. The lowest correlated item was item 8, with 0.446 correlation; the highest correlated item was item 36, with 0.841 correlation.

Table 1. *KMO and Barlett's Test*

Kaiser-Meyer-Olkin measure of sampling adequacy		.938
Barlett's Test	Approx. Chi-Square	16142,720
	Df	3321
	Sig	,000

The Kayser-Meyer-Olkin measure of sampling adequacy value was 0.94, which falls into the superb range. Therefore, it could be said that the number of participants was adequate to run factor analyses (Tabachnick & Fidell, 2007).

In the factor analysis, high correlation among variables is required. This is calculated with a Barlett Test of Sphericity. A Barlett's value under 0.05 indicates high correlation among variables on the scale and that the data have a mutiple normal distribution. As a result, the scale is eligible for factor analysis. As can be seen in Table 1, the Barlett's test revealed high significance ($p<0.001$), and therefore a factor analysis was appropriate (Tabachnick & Fidell, 2007).

Anti-image correlations are other criteria that help us to test the appropriateness of the scale for factor analysis. Anti-image correlations are expected to be over 0.50. In this study anti-image correlations ranged between 0,863 and 0,969. Just like the KMO and Barlett values, anti-image values also provide evidence that the scale is appropriate for factor analysis. Therefore, factor analysis was conducted for the remaining 81 items on the scale (Tabachnick & Fidell, 2007).

After the extraction and varimax rotation, thirteen factors with eigenvalues of 1 or higher emerged from the first factor analysis. Varimax rotation revealed that factor 1 with eigenvalue of 8.2 explained 10.1% of the variance. A total of thirteen factors explained 75.9% of the variance. Items with loadings of less than 0.40 were suppressed. Therefore, items 17, 37, 42, 74 and 76 were discarded from the scale. Factors ten, eleven, twelve and thirteen were excluded from the scale because they contained less than three items. Thus items 9, 10, 12, 14, 41, 58 and 72 were discarded from the scale. Also, items 4, 15, 16, 22, 24, 38, 47 and 68 were discarded because they were represented on more than one factor. Factor three, which contained items 2, 19, 20, 21 35, 36, and 46, was terminated because items were not related to each other.

Items 55, 57, and 59 from factor six and item 54 from factor one were combined with factor nine because they contained items about story reading, which is an educational activity in early childhood education. Only item 56 was left in factor six, so it was removed from the scale. Seven factors remained in the scale. These factors contained the following items:

1. Factor One: 39, 48, 49, 50, 51, 52, 53, 54, 75
2. Factor Two: 11, 13, 23, 26, 27, 28, 29, 30, 31, 32, 33, 43, 44, 60
3. Factor Four: 25, 66, 67, 79, 80, 81, 82

4. Factor Five: 3, 5, 6, 7, 8
5. Factor Five: 21, 40, 69, 70, 71, 73, 77, 78
6. Factor Six: 1, 18, 34, 45
7. Factor Seven: 54, 55, 57, 59, 61, 62, 63, 64

Several items did not relate with the factors with which they were clustered. Therefore, items 39, 54, and 75 from factor one; 11, 13, 33, 44, and 60 from factor two; 25, 66, and 67 from factor three; 40, 77, and 78 from factor five were removed from the scale. Among the remaining 81 items, 40 were excluded from the scale. Second factor analysis was conducted with the remaining 41 items.

Second Phase

After the second factor analysis, seven factors with eigenvalues of 1 or higher emerged. These seven factors explained 72.4% of the variance. Again, items with loadings less than 0.40 were suppressed. Second factor analysis revealed that items 71 and 73 had loadings less than 0.40; therefore, these items were terminated. Third factor analysis was conducted after the extraction of items 71 and 73.

As with the second analysis, the third analysis revealed seven factors that explained 72.4% of the variance. There were no items with loadings less than 0.40. Seven factors and 39 items were left in the scale with the third factor analysis; these factors contained the following items:

1. Factor 1: 48, 49, 50, 51, 52, 53, 54, 69
2. Factor 2: 21, 23, 26, 27, 28, 29, 30, 31, 32, 43
3. Factor 3: 3, 5, 6, 7, 8
4. Factor 4: 1, 18, 34, 45
5. Factor 5: 79, 80, 81, 82
6. Factor 6: 61, 62, 63, 64, 70
7. Factor 7: 55, 57, 59

Factor six contained items about educational activities in the classroom except for item 61. Therefore, item 61 discarded from the scale. Therefore, the fourth and final factor analysis was conducted with the remaining 38 items.

Table 2. *Total Variance Explained*

	Initial Eigenvalues			**Rotation Sum of Square Loadings**		
Components	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	19,139	47,848	47,848	6,270	15,674	15,674
2	2,528	6,320	54,168	5,983	14,957	30,631
3	2,176	5,441	59,609	4,336	10,840	41,471
4	1,681	4,203	63,812	3,634	9,084	50,555
5	1,551	3,877	67,689	3,408	8,520	59,075
6	1,296	3,240	70,929	3,295	8,238	67,313
7	1,057	2,641	73,571	2,503	6,257	73,571
KMO=0,935 Barlett's test:= x^2=6375,861; p<0,01						

From the fourth analysis, seven factors with eigenvalues of 1 or more than 1 explained 73.6% of the total variance. Table 2 shows that after the varimax rotation, factor one explained % 15,674; factor two explained %14,957; factor three explained %10,840; factor four explained %9,084; factor five explained %8,520; factor six explained %8,238; and factor seven explained %6,257 of total variance. No items had loadings under 0.40 or represented more than one factor. However, item 54 from factor one and factor seven were combined with factor six because these items are about storybook reading, which is an educational activity in early childhood education. Thus, the final six factors were as

follows: Factor one, Physical Development, contained items 48, 49, 50, 51, 52, 53, 69; Factor two, Socio-Emotional Development, contained items 21, 23, 26, 27, 28, 29, 30, 31, 32, 43; Factor three, Cognitive Development, contained 3, 5, 6, 7, 8; Factor four, Special Children, contained 1, 18, 34, and 45; Factor five, Cooperation with Parents, contained items 79, 80, 81, 82; and Factor six, Educational Activities in Classroom, contained 54, 55, 57, 59, 62, 63, 64 and 70.

After the pilot study the remaining items were renumbered and rearranged as follows: Factor one 48 (1), 49 (6), 50 (8), 51 (35), 52 (29), 53 (19), 69 (7); factor two 21 (11), 23 (2), 26 (10), 27 (14), 28 (36), 29 (32), 30 (13), 31 (20), 32 (4), 43 (24); factor three, 3 (5), 5 (34), 6 (25), 7 (12), 8 (17); factor four, 1 (9), 18 (18), 34 (30), 45 (23); factor five 79 (3), 80 (28), 81 (37), 82 (33); and factor six 54 (26), 55 (27), 57 (31), 59 (38), 61 (15), 62 (16), 63 (21), 70 (22). Finally, the last form of the scale contained six factors and 38 items.

1. Factor one, Physical Development, contained the following items: 1, 6, 7, 8, 19, 29, 35.
2. Factor two, Socio-Emotional Development, contained the following items: 2, 4, 10, 11, 13, 14, 20, 24, 32, 36.
3. Factor three, Cognitive Development, contained the following items: 5, 12, 17, 25, 34.
4. Factor four, Special Children, contained the following items: 9, 18, 23, 30.
5. Factor five, Cooperation with Parents, contained the following items: 3, 28, 33, 37.
6. Factor six, Educational Activities in Classroom, contained the following items: 15, 16, 21, 22, 26, 27, 31, 38.

Third Phase

After the explanatory factor analysis 38 items were left in the scale. A validity correlation between the Turkish version of the Teacher Sense of Efficacy Scale (TTSES) and the Early Childhood Teachers Self-Efficacy Beliefs for Supporting Children's Development Scale was investigated. Çapa, Çakıroğlu and Sarıkaya (2005) conducted a study to adapt the scale into Turkish. From six different universities, 628 preservice teachers participated in their study. They found coefficient alpha values of 0.82 for SE, 0.86 for IS, and 0.84 for CM. For the entire scale, they found 0.93 to be the reliability for the efficacy scores, indicating high reliability scores. Investigators conducted confirmatory factor analysis to determine the validity of the scale. Their findings yielded 0.99 TLI and CFI, which indicated perfect fit of the oblique three-factor model to the efficacy data. Also, an RMSEA of about 0.5 indicated a close fit of the model. These findings revealed that the TTSES with its three subscales is a reliable and valid instrument that measures the general sense of teacher efficacy via 24 items (Çapa, Çakıroğlu, & Sarıkaya, 2005). Therefore, it was expected that the TTSES would provide strong evidence for the concurrent validity of the Early Childhood Teachers Self-efficacy for Supporting Children's Development Scale.

Seventy-four new graduate preschool teachers from two major universities in Ankara and 218 preschool teachers from 18 different schools in four large cities (Istanbul, Ankara, Bursa and Trabzon) in Turkey responded to the Early Childhood Teachers Self-Efficacy Beliefs for Supporting Children's Development Scale and the Turkish version of the Teachers' Sense of Efficacy Scale (TTSES). A total of 292 participants engaged in the study. Of the 74 prospective teachers, two were male (3%) and 72 were female (97%). Ages of the prospective teachers ranged from 20 to 26, with a mean age of 22.8 (SD= 1.2). All teachers were female. The ages of teachers ranged from 19 to 55, with a mean age of 30.5 (SD= 7.4).

Calculation of the Pearson correlation between TTSES and ECTSSCDS revealed 0,601 correlation, which was significant at the 0.01 level. This correlation provided strong criterion-related evidence for the concurrent validity of the scale.

Table 3. *Correlations Among Factors*

	Total Scale	Phys. Dev.	Socio-Emo. Dev.	Special Child.	Cognitive Dev.	Cooperation with Parents	Educational Activities in Classroom
Total Scale	-	.862*	.920	.898	.485	.844	.914
Physcial Dev.		-	,841*	,844*	,161*	,789*	,791*
Socio-Emotional Dev.			-	,901*	,219*	,791*	,859*
Special Children				-	,196*	,767*	,854*
Cognitive Dev.					-	,189*	,241*
Cooperation with Parents						-	,827*
Educational Activities in Classroom							-

*p<0,01

This second application of the scale also enabled the calculation of subscale correlations with each other and subscale correlations with the total scale. Thus, the internal consistency of the scale had been determined. This process provides evidence of the structural validity of the scale. Table 3 exhibits the correlation scores, and reveals that all factors are significantly correlated with each other and with the entire scale. These findings show that the scale has internal consistency and structural validity.

Reliability Analyses

Cronbach Alpha coefficients for each factor and for the whole were calculated with data from the first and second cohorts. Through these analyses, the reliability of the scale was determined. Analyses of the data from the first cohort for each factor revealed coefficients scores of 0.94, 0.94, 0.88, 0.91, 0.87 and 0.9, respectively. An analysis of the entire scale revealed a reliability score of 0.98. The same analyses were conducted with data from the second cohort. Cronbach's coefficients for the second cohort were 0.91, 0.91, 0.94, 0.94, 0.87 and 0.87, respectively. An analysis of the entire scale revealed a reliability score of 0.96. Two analyses provided consistent Cronbach's coefficients, indicating sound reliability (Isaac & Michael, 1995).

Discussion

Findings revealed that the Early Childhood Teachers Self-Efficacy Beliefs for Supporting Children's Development Scale (ECTSBSCDS) is a valid and reliable instrument with its physical, socio-emotional, cognitive development, special children, cooperation with parents, and educational activities subscales. Çapa, Çakıroğlu and Sarıkaya (2005) adapted the Teacher Sense of Efficacy Scale (TSES) developed by

Tschannen-Moran and Woolfolk (1998) into Turkish; that scale provides general information about teacher efficacy. However, according to Bandura (1986), self-efficacy is a domain- and task-specific concept. Therefore, it should be measured to determine whether it is domain- and task-specific. The Early Childhood Teachers Self-Efficacy Beliefs for Supporting Children's Development Scale is in the early childhood domain and its subscales measure task-specific components of early childhood education. Therefore, it can provide domain- and task-specific information about early childhood teachers' self-efficacy for supporting children's development, which is congruent with the nature of self-efficacy measurement.

Many studies have revealed the importance of teachers' teaching efficacy for students' motivation and achievement (Muijs & Reynold, 2002; Midgley, Feldlaufer, & Eccles, 1989; Ross, 1992); teachers' professional commitment (Ware & Kitsantas, 2007); and teacher burn-out (Skaalvik & Skaalvik, 2007). Therefore, the ability to determine teachers' teaching efficacy provides us with the opportunity to intervene if teachers or prospective teachers have a low sense of teaching efficacy. Further, ECTSBSCDS enables us to determine deficiencies in early childhood teachers' teaching efficacy and intervene to eliminate them.

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