

Early childhood pre-service teachers' self-efficacy in inclusive education: A mixed methods investigation

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This study examines early childhood pre-service teachers' self-efficacy perception in inclusive education, based on a mixed methods research design using a convergent parallel model. Data were collected from 248 pre-service teachers enrolled in early childhood teaching at a state university in Turkey, using the *Teacher Efficacy for the Inclusion of Young Children with Disabilities-TEIYD* scale and interviews. Findings from the quantitative data indicated that pre-service teachers rated themselves competent in inclusive education. There was a significant gender difference in perceptions of the ability to use and adapt knowledge and effective teaching methods for children with special needs. No significant difference was found in the self-efficacy levels of pre-service teachers according to the variables of class level, type of teaching, and presence of students with special needs in the practice class and the immediate environment. Inductive analyses of interview data showed that pre-service teachers were insufficient in inclusive education and that they had deficiencies in this field. Findings are discussed in line with the relevant literature, and suggestions are made concerning implications and further research.

Introduction

The person who is effective in facilitating children to achieve the desired gains in an early childhood education environment is a teacher. With inclusive education, the competence of teachers has come to the forefront and their self-efficacy has been emphasised to create an effective and successful learning environment. Bandura (2001) stated that self-efficacy affects an individual's thinking, goals, lifestyle, efforts, and products obtained as a result of efforts. Tschannen-Moran and Woolfolk Hoy (2001) defined a teacher's self-efficacy belief as "a teacher's belief in his/her own ability to have students achieve expected results." Bangs and Frost (2012) explained that the stronger the self-efficacy belief of a teacher, the more he/she can overcome the difficulties and provide solutions to problems encountered. Pendergast, Garvis and Keogh (2011) stated that teachers with a high level of self-efficacy are more willing to teach and undertake efforts to help students reach their full potential.

In literature, it is revealed that there is an important relationship between inclusion practice and self-efficacy toward inclusion, and self-efficacy is an important factor that directly affects the success of inclusion practices (Jordan, Swartz & McGhie-Richmond, 2009; Kuitinnen, 2017; Sharma, Loreman & Forlin, 2012). Especially the pre-service period, in other words, pre-service teachers' experience plays a significant role in the formation of a positive teacher attitude (Campbell, Gilmore & Cuskelly, 2003; Rakap, Cig & Parlak-Rakap, 2015; Sharma, Forlin & Loreman, 2008). Research shows that pre-service education has a direct effect on teachers' sense of inclusion competence, and therefore, teacher competence should be strengthened (Buell et al., 1999). Many studies conducted

with pre-service teachers reveal that pre-service teachers generally have a positive attitude toward inclusion (Beacham & Rouse, 2012; Loreman, Forlin & Sharma, 2007; Rakap, Parlak-Rakap & Aydin, 2016; Sharma et al., 2006), type of disability, gender (Avramidis, Bayliss & Burden, 2000; Hastings & Oakford, 2003; Rakap, Parlak-Rakap & Aydin, 2016; Romi & Leyser, 2006), previous experience with a disabled person (Bradshaw & Mundia, 2005) and lessons learned (Campbell, Gilmore & Cuskelly, 2003; Rakap, Cig & Parlak-Rakap, 2015), which were identified as important factors in determining attitudes.

Teacher training in early childhood education programs in Turkey

University departments of preschool education in Turkey provide a four-year undergraduate program covering three areas: general culture, field education and vocational courses (Institution of Higher Education [IHE], 2018a). During the four-year undergraduate program, there is only one course termed 'special education', a purely theoretical course running for two hours per week for one semester. The content of the course covers the definition of special education, basic principles, importance of preschool special education and information about disability groups. Generally in Turkey pre-service teachers do not take a practical course directly related to children with special needs (CSN) during their education. They take a 12-week teaching practice course in the last two semesters of the program. As part of this course, pre-service teachers prepare daily plans and implement this plan in kindergartens (IHE, 2018b). If there is a student with a diagnosis in the class in which they practice, pre-service teachers will have their first encounter with a child with special needs within the scope of the teaching program. If there are no CSN in the practice class, pre-service teachers gain no experience with inclusion. Therefore, pre-service teachers do not receive any training in CSN and inclusion education outside of the theoretical course.

In Turkey, according to the Ministry of National Education [MoNE] Special Education Services Regulations, children who need special education and have completed 36 months must receive early childhood education (MoNE, 2018). Thus, with the inclusion practice, CSN has become more prevalent in early childhood education settings. In the same regulation, it was explained that CSN should be placed in classes in equal numbers and not exceeding two students in each section. According to MoNE (2015) statistical data, the number of inclusive education students in early childhood education was 304, while this number was 549 according to MoNE (2021) statistical data. This increase in the number of CSN in early childhood educational institutions in the country makes it necessary for teachers and pre-service teachers to be more competent in this field.

There are few studies in the international literature that have been conducted with pre-service teachers on the perception of self-efficacy towards inclusion in early childhood (Böddi et al., 2019; Jin Kim, 2012; Sarı, Çeliköz & Seçer, 2009). This situation is revealed by Methlagl (2022). Within the scope of bibliometric studies in inclusive education, Methlagl (2022) analysed the studies published in the Clarivate *Web of Science* between 1980 and 2019 using the content and network analysis. Keywords, subtopics and themes in the research show that inclusive education research addresses different contexts and

educational levels (e. g. primary education, secondary education, higher education). However, in the study, the study groups were not conducted with preschool and kindergarten levels. A study conducted by Diken (2006) examined preservice teachers' sense of efficacy to work with students with mental retardation. The study group in this research included pre-service teachers in preschool, special education and primary school sectors. Similarly Loreman, Sharma and Forlin (2013) conducted a study involving preservice teachers in different fields, finding that knowledge of law and policy with respect to inclusive education, previous teaching experience and training in working with children with disabilities had statistically significant relationships with teaching self-efficacy scores. In the national literature, there is a study on self-efficacy perceptions and in-service training needs in inclusive education with early childhood teachers (Sönmez, Alptekin, & Bıçak, 2018) and a study on the effect of in-service training program on inclusion self-efficacy (Sönmez, Alptekin & Bıçak, 2019), and a scale adaptation study on the perception of inclusion self-efficacy with early childhood teachers (Keleş, Dikici-Sığırtmaç & Dikici, 2019).

However, a study that directly addresses the perception of self-efficacy related to inclusion through a sample of preschool pre-service teachers could not be found in the international literature. In regards to the success of inclusion, it is critical that pre-service teachers develop positive attitudes towards inclusion during their undergraduate studies and feel competent in this field. Based on its significance, this study is a pioneer in the literature that directly aims to determine the self-efficacy perceptions of early childhood pre-service teachers in inclusive education. The study contributes to the literature by delineating the qualitative and quantitative perspectives of early childhood pre-service teachers. Simultaneously, the measurement tool used in the quantitative dimension of research is important as it is the only scale that covers early childhood inclusive self-efficacy in literature. Therefore, the purpose of this study is to examine early childhood pre-service teachers' perception of self-efficacy in inclusive education. In order to accomplish this, the following questions were posed:

- (a) Is the teacher effectiveness for the inclusion of young children with disabilities scale valid and reliable in the sample of early childhood pre-service teachers?
- (b) Does the self-efficacy perception of early childhood pre-service teachers differ significantly according to their demographic characteristics?
- (c) What are the opinions of early childhood education pre-service teachers about their competences in preschool inclusive education?

Method

Research pattern

This study is a mixed-method research using a convergent design in which the quantitative and qualitative stages of the research are conducted simultaneously (Creswell & Plano Clark, 2011). The intent in using this design is to bring together and compare the differing aspects of the quantitative and the qualitative results (Creswell & Plano Clark, 2011, p. 125).

Study group

The research was conducted with 248 pre-service teachers enrolled in the early childhood teaching department at a state university in Turkey (Table 1). Participants in the study were determined using the convenience sampling method, which allows researchers to choose a situation that is close and easy to access, as it brings speed and practicality (Yıldırım & Şimşek, 2018). In this study, convenience sampling method was preferred as the researcher was responsible for a course conducted with senior students of a preschool teaching department. In the quantitative data of the study, the participants consisted of third and final year pre-service teachers who had completed special education and inclusive early childhood education courses. The average age of pre-service teachers was 22.21 years (range 19 to 27 years).

Table 1: Demographic characteristics of early childhood pre-service teachers (N=248)

Variables		f (%)
Gender	Male	46 (18.5)
	Female	202 (81.5)
	Total	248 (100)
Year of degree	3-year degree	100 (40.3)
	4-year degree	148 (59.7)
	Total	248 (100)
The type of education	Daytime education	107(43.1)
	Evening education	141 (56.9)
	Total	248(100)
A diagnosed child in the practice class	Yes	41 (16.5)
	No	207 (83.5)
	Total	248(100)
An individual with special needs in the immediate environment	Yes	60 (24.2)
	No	188 (75.8)
	Total	248(100)

The criterion sampling method was used to select the study group from which the qualitative data for the research was collected. The following criteria were determined for the interviewed pre-service teachers: (a) successful completion of teaching practice, school experience, special education and inclusive early childhood education courses; (b) presence of CSN in the classroom within the scope of teaching practice course; and (c) volunteering to participate in the research. Interviews were conducted with 14 pre-service teachers, 12 women and two men, who met these criteria. Eight pre-service teachers stated that they took part in practice classes with children diagnosed with autism, three encountered children with physical disabilities, two encountered children with intellectual disabilities and one pre-service teacher took part in lessons with children suffering from the attention deficit hyperactivity disorder.

Data collection tool

In the quantitative phase of the study, a measurement tool and a participant information

form were used. The 'participant information form' was created by researchers to obtain demographic information of participants. The measurement tool used in the study was the scale developed by Walls (2007) and adapted into Turkish by Sönmez & Bıçak (2017), originally named as *Teacher Efficacy for the Inclusion of Young Children with Disabilities (TEIYD)*. This scale covers the early childhood period. TEIYD consists of four sub-dimensions: knowledge about laws and processes related to special education, knowledge about CSN, confidence in providing education to CSN, and the perception towards the utilisation of effective teaching methods and adaptation skill. The minimum and maximum scores that can be obtained from the overall scale range between 19 and 95 (Sönmez & Bıçak, 2017; Sönmez, Alptekin & Bıçak, 2018).

As part of the qualitative phase, the researcher prepared interview questions to acquire opinions of early childhood pre-service teachers about their competencies for inclusive education. The pre-service teachers were asked four open-ended interview questions to determine their views: (1) What competencies should a preschool teacher have in order to make effective inclusion? (2) As a pre-service teacher, what are your requirements to feel competent in inclusive education? (3) Do you think you have the necessary theoretical knowledge for inclusion to become a preschool teacher? Why? (4) Do you think you have the necessary practical knowledge for inclusion to become a preschool teacher? Why?

The questions were formulated by first considering a theoretical dimension created from a scanning of the literature. The questions were presented to two independent field experts for their opinion on suitability, content and comprehensibility. Necessary corrections were made according to expert opinions. Later, in an attempt to test whether the order of the interview questions was easily understood and clearly expressed, the interview questions were administered to three preschool teachers. Only one question was corrected and the remaining were finalised.

Data collection process

Permission to use the scale was obtained from Sönmez and Bıçak (2017) via email, and permission for its administration was obtained from the relevant units. Data for this study were gathered during the spring semester of the 2018-2019 academic year. The research was conducted on a voluntary basis, depending on the availability of pre-service teachers, for both the scale administration and the interview questions. The qualitative data were obtained by conducting face-to-face interviews with pre-service teachers. Primarily, the researcher mentioned the confidentiality of the information in the interview and explained that participants could leave the study at any time. The researcher also stated that there is no right or wrong answer to the interview questions, and it is important for participants to share their experiences. All such information was communicated both verbally and in writing by the researcher prior to interviews, along with the participant approval certificate. Interviews were recorded with a digital audio recorder, after obtaining permission from the participants. At the start of each interview, the researcher collected demographic information from the pre-service teachers. Participants were given the opportunity to withdraw from the study at any time.

Data analysis

In the quantitative data, the missing values were analysed first and the average was assigned to the lost values. Later, extreme values were examined and participants with subject numbers 13, 98, 112, 240 and 245 were not included in the analysis. A second-level confirmatory factor analysis was conducted to determine the construct validity of the scale used. Cronbach alpha coefficients and total item correlations were calculated to determine its reliability. The normality of the distributions in sub-groups was examined for gap analyses of the total scores from the scale and the scores from the sub-dimensions of the scale according to the variables. For this, the Kolmogorov-Smirnov and Mann-Whitney U tests were used.

The information obtained through the interview recordings was transcribed. One expert listened to three randomly selected recordings and compared their coherence with the written recordings to check upon reliability in the transcription process. The analysis of interview questions was conducted by assigning codes to each participant. Codes and themes were then created by two independent researchers. Extracted meanings, interpretations and differences in opinions were discussed and sections were reorganised accordingly. Later, the author conducted content analysis on the qualitative data obtained (Yıldırım & Şimşek, 2018). The Miles and Huberman model (1994) was used to determine the reliability of the qualitative data. According to the coding control which gives internal consistency, the consensus among coders is expected to be at least 80% (Patton, 2002). Through this process, 98% reliability was achieved.

Results

Quantitative findings

The Cronbach alpha internal consistency coefficients of the scores obtained from the scale were calculated as 0.928 for all items, 0.706 for the knowledge dimension of laws and processes, 0.936 for the knowledge dimension for children, 0.849 for the confidence in providing teaching and 0.866 for the ability to use and adapt teaching methods. It was determined that the scores obtained were highly reliable (Özdamar, 2004). Item-total correlations are presented in Table 2.

Table 2: Item-total correlations

	F1	F2	F3	F4
s1	.396	s5 .617	s10 .617	s16 .671
s2	.516	s6 .677	s11 .523	s17 .694
s3	.506	s7 .694	s12 .618	s18 .707
s4	.572	s8 .680	s13 .559	s19 .629
		s9 .627	s14 .663	
			s15 .654	

The item-total correlations ranged between 0.396 and 0.572 for the first factor, 0.617 and 0.694 for the second factor, 0.523 and 0.663 for the third factor and 0.629 and 0.707 for the fourth factor. The path diagram (t values) obtained with the second-level confirmatory factor analysis performed to determine the construct validity of the scale is presented in Figure 1.

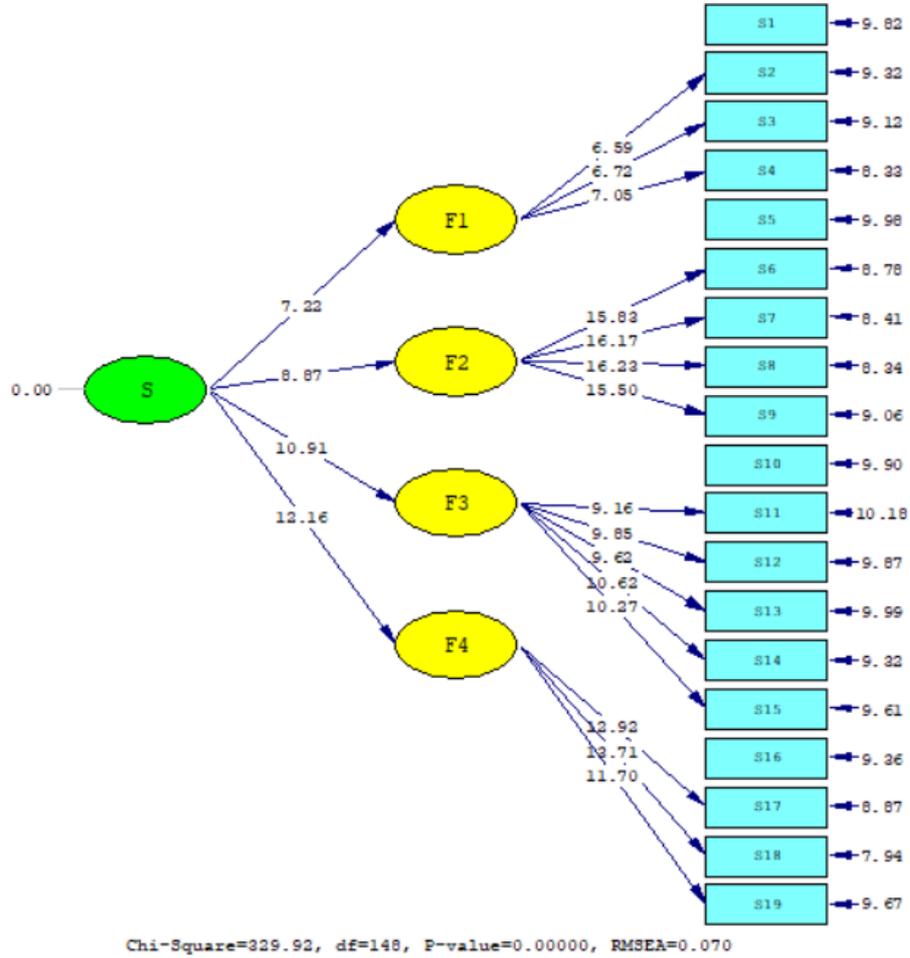


Figure 1: Confirmatory factor analysis path diagram (t values)
 (use web or PDF reader 'zoom in' function in to view)

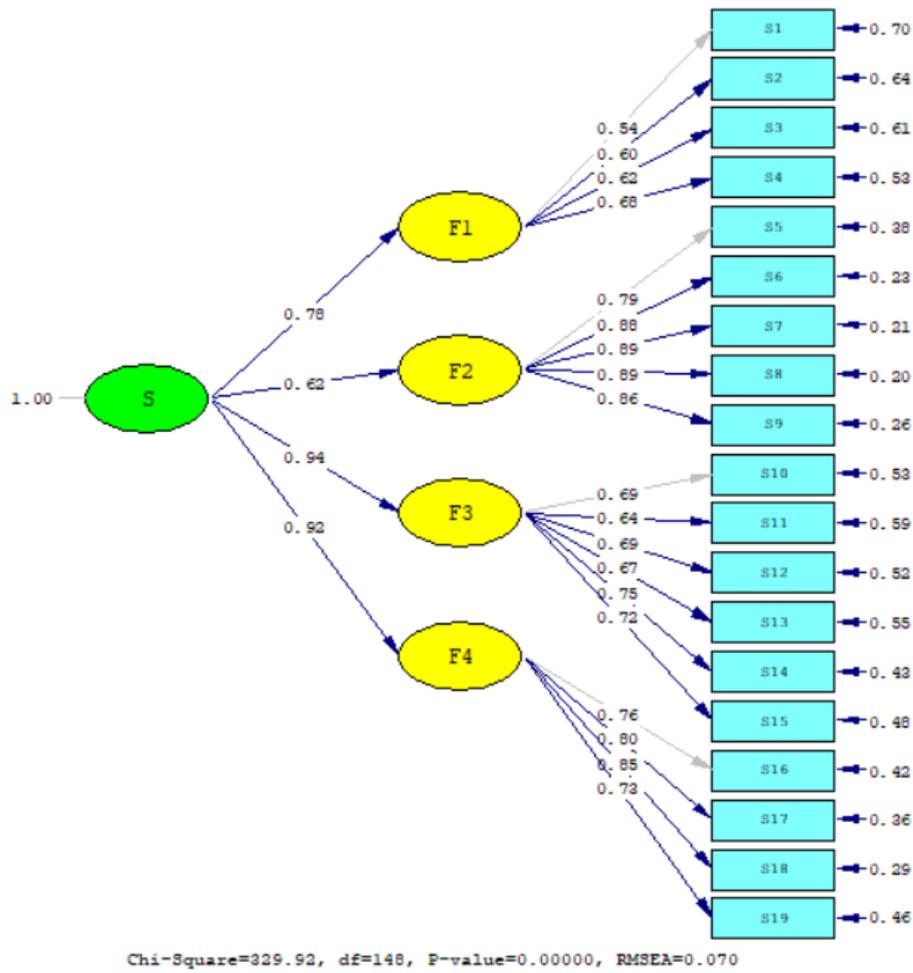


Figure 2: Confirmatory factor analysis path diagram (standardised load values)
(use web or PDF reader 'zoom in' function in to view)

Compliance indices obtained by second-level verification factor analysis are calculated as χ^2/SD ratio (329.92/148) 2.23 (Figure 2). A ratio of ≤ 3 indicates a perfect fit (Kline 2005). In the path scheme, RMSEA = 0.070. The calculated value coincides with the good fit of RMSEA (≤ 0.08) (Sümer, 2000). GFI = 0.88 and values greater than 0.85 for GFI are indicative of an acceptable fit (Yılmaz & Çelik, 2009). The standardised RMR was calculated as RMR = 0.056, and this corresponds to a good fit in the Brown (2006) source (as quoted in Çokluk, Şekercioglu & Büyüköztürk, 2010). Calculation results were CFI = 0.97, NFI = 0.96, NNFI = 0.97 and IFI = 0.97. If these indexes are over 0.95, it corresponds to a perfect fit (Tabachnick & Fidell, 2001).

Table 3: Descriptive statistics, pre-service teachers' total scale scores and scores of scale sub-dimensions

TEIYD scale and sub-dimensions	N	Mean	SD
Information on laws and processes regarding special education	248	14.42	2.44
Knowledge about children with special needs	248	20.18	3.67
Confidence in teaching special needs children	248	20.06	3.82
Utilisation of effective teaching methods and adaption skill	248	14.45	2.80
Self-efficacy level total score	248	69.12	10.45

Table 4: Analysis results, early childhood pre-service teachers (N=248)

Groups			N	Rank average	Rank sum	U	p
Self-efficacy	Gender	Female	202	127.63	25653.0	3693.0	.054
		Male	46	105.07	4728.0		
	Year of degree	3rd class	100	119.85	11985.0	6935.0	.401
		4th class	148	127.64	18891.0		
	The type of education	Daytime	107	124.12	13281.0	7477.0	.981
		Evening	141	123.91	17347.0		
Special education law	Gender	Female	202	125.17	25160.0	4186.0	.432
		Male	46	116.02	5221.0		
	Year of degree	3-year	100	121.57	12157.0	7107.0	.594
		4-year	148	126.48	18719.0		
	The type of education	Daytime	107	122.77	13136.0	7358.0	.811
		Evening	141	124.94	17492.0		
Information about the child with special needs	Gender	Female	202	128.48	25824.0	3522.0	.018
		Male	46	101.27	4557.0		
	Year of degree	3-year	100	118.60	11860.5	6810.5	.277
		4-year	148	128.48	19015.5		
	The type of education	Daytime	107	130.27	13939.0	6819.0	.218
		Evening	141	119.21	16689.0		
Teaching confidence	Gender	Female	202	124.38	25000.0	4346.0	.682
		Male	46	119.58	5381.0		
	Year of degree	3-year	100	123.21	12321.0	7271.0	.815
		4-year	148	125.37	18555.0		
	The type of education	Daytime	107	118.47	12676.0	6898.0	.286
		Evening	141	128.23	17952.0		
Teaching methods and adaptation	Gender	Female	202	129.54	26038.5	3307.5	.004
		Male	46	96.50	4342.5		
	Year of degree	3-year	100	124.23	12422.5	7372.5	.960
		4-year	148	124.69	18453.5		
	The type of education	Daytime	107	124.93	13368.0	7390.0	.856
		Evening	141	123.29	17260.0		

When the sub-dimensions of the scale were examined, it was determined that the highest average is for 'knowledge about CSN' and the lowest average is for 'information about the laws and processes related to special education' (Table 3). The highest score from the

scale received by pre-service teachers was 94, and the lowest score was 35. Considering the points that could be obtained from the scale, it was concluded that pre-service teachers in this study rated themselves adequate for inclusive education.

When Table 4 is examined, gender in participants' self-efficacy towards the inclusion of CSN ($U = 3693$, $p > 0.05$), their knowledge of laws and processes related to special education and their confidence in providing education to CSN did not show statistically significant difference. However, the participants' knowledge about CSN ($U = 3522$, $p < 0.05$) and their perceptions about the skill of using effective teaching methods and making adaptations ($U = 3307.5$, $p < 0.05$) showed a statistically significant difference according to gender. It was determined that perceptions of knowledge of CSN and the ability to use effective teaching methods and adaptation among women were statistically higher than men. Participants' competencies for the inclusion of CSN ($U = 7477$, $p > 0.05$) and the scores obtained from the sub-dimensions of the scale did not show statistically significant difference according to the type of education. When Table 4 is examined, it is deduced that the participants' self-efficacy ($U = 6935$, $p > 0.05$) for the inclusion of CSN and the scores obtained from the sub-dimensions of the scale did not show statistically significant difference according to year of degree.

The presence of a child with special needs in the practice class did not cause a statistically significant difference; participants' competencies for the inclusion of CSN ($U = 4167.5$, $p > 0.05$), and the scores obtained from the sub-dimensions of the scale. When Table 5 is examined, it is concluded that as per participants' competencies for the inclusion of CSN ($U = 4783.5$, $p > 0.05$) and the scores obtained from the sub-dimensions of the scale, there is no statistically significant difference observed with the presence of an individual with special needs in the close environment.

Table 5: Analysis results according to the variable of there being a diagnosed child in the practice class and an individual with special needs in the immediate environment (N=248)

Groups		N	Rank average	Rank sum	U	p	
Self-efficacy	A diagnosed child in the practice class	Yes	41	124.35	5098.5	4167.5	.933
		No	207	123.33	25282.5		
	An individual with special needs in the immediate environment	Yes	60	138.78	8326.5	4783.5	.076
		No	188	119.94	22549.5		
Special education law	A diagnosed child in the practice class	Yes	41	114.74	4704.5	3843.5	.384
		No	207	125.25	25676.5		
	An individual with special needs in the immediate environment	Yes	60	136.47	8188.0	4922.0	.135
		No	188	120.68	22688.0		
Information about the child with special needs	A diagnosed child in the practice class	Yes	41	138.35	5672.5	3593.5	.135
		No	207	120.53	24708.5		
	An individual with special needs in the immediate environment	Yes	60	138.17	8290.5	4819.5	.083
		No	188	120.14	22585.5		

		environment					
Teaching confidence	A diagnosed child in the practice class	Yes	41	116.10	4760.0	3899.0	.464
		No	207	124.98	25621.0		
	An individual with special needs in the immediate environment	Yes	60	135.86	8151.5	4958.5	.158
		No	188	120.88	22724.5		
Teaching methods and adaptation	A diagnosed child in the practice class	Yes	41	129.27	5300.0	3966.0	.565
		No	207	122.35	25081.0		
	An individual with special needs in the immediate environment	Yes	60	138.22	8293.0	4817.0	.085
		No	188	120.12	22583.0		

Qualitative findings

Table 6: Themes and sub-themes with their associated codes

Themes	Sub-themes	Codes
Competency	Knowledge	Early childhood education
		Inclusion education
		Diagnosis groups
	Instructional adaptation	The adaptation of activities Classroom climate
Teacher characteristics	Teacher characteristics	Experience
		Observation skills
		Patience
		Love of children
Educational needs	Planning	Respect for differences
		Individualised education plan
	Application	Practical experience
		Application examples
Knowledge	Knowledge	Types of disabilities
		Characteristics of disabilities
		Interaction
Adaptation	Adaptation	Activities
		Program planning

The answers to interview questions were grouped under two main themes: competency and educational needs. Table 6 depicts how the collection of codes represents sub-themes and how such sub-themes can be categorised under the two main themes. The theme “competency” consisted of four subthemes, namely, knowledge, instructional adaptation, teacher characteristics and planning. In the pre-service answers regarding knowledge, the emphasis on teachers in the field of early childhood education, inclusion education and acquiring information about diagnosis groups came to the forefront. Participants explained that the level of knowledge should be supported not only by theoretical aspects but also by practice. The pre-service teacher should “know diagnoses that require inclusion and how to recognise them, and have both theoretical and practical knowledge about inclusive education” (P8’s view as an example). The pre-service teachers focused on

the adaptation of activities and classroom climate under the sub-theme of instructional adaptation. P13 stated,

They must have a good knowledge of inclusive education. The teacher should be resourceful about how to modify activities for a child with special needs. They should be able to design the activity according to the characteristics of the child. They should inform their friends. They should draw a road map to guide them on what they could pass on to the child.

Under sub-theme teacher characteristics, participants highlighted experience, observation skills, patience, love of children and respect for differences. For example, P6 said, "First of all, they must have complete theoretical knowledge of the field. Then applications to practice are necessary. Teachers should be patient, observant and should love children". The sub-theme planning was emphasised by two pre-service teachers (P11 and P4). Participants focused on the competence of preparing an individualised training plan with the following expressions; P4 stated, "First of all, they must accept their students unconditionally. They should be able to prepare an individualised education plan (IEP) and make necessary adjustments in plans".

Another theme stated by preservice teachers is educational needs. Most of the pre-service teachers (f:13) stated that they found themselves insufficient in inclusion practice. All of the pre-service teachers stated that they have educational needs for inclusive education. Application, knowledge and adaptation were chosen as sub-themes for which participants expressed needs. Application has been identified as a sub-theme expressed by all participants, saying that they are most interested in gaining practical experience and seeing application examples for inclusive education in action. As an example of this notion P3 stated,

I believe practice, that is, application, is a more permanent and efficient way of learning than theory. Therefore, I would like to learn one-on-one with special needs children, by practising with such cases. I would like to see many different examples.

The pre-service teachers emphasised that the education they received during their university studies was insufficient in terms of both theory and practice. The following statement from P2 supports this situation: "I studied inclusion, but it is more theoretical. I have no application experience; I think I am very inadequate" (P2). Another sub-theme was knowledge. The pre-service teachers mentioned that they should have more detailed information about the types and characteristics of disabilities, for example in P7's statement, "I definitely need training on this subject. Namely, there are many diagnoses and I would like to have more detailed information about them, I would like to encounter more examples." Four of the pre-service teachers stated that they want to be trained with regard to interacting with a special child. P5's statement is another example, "I don't know how to communicate with them. Understanding them is very important for us and them as well. We can get training in regards to how we interact with them". Under the sub-theme of adaptation, the pre-service teachers explained that they can get support in adapting activities and preparing program plans. An example of this is from P8,

Especially seeing the symptoms of the student's inadequacies and how can I organise the program and the appropriate activity for the student, what should I do? Should I simplify the activities? I would like to get support in this regard (P8).

Discussion

The research tried to obtain in-depth and consistent findings by collecting data in two different ways using quantitative and qualitative research methods. In this study, self-efficacy perceptions of pre-service teachers in inclusive education were examined. First, the measurement tool used in the study was modified based on prospective teachers. As the fit statistics obtained from the confirmatory factor analysis were at an acceptable level, it was observed that the scale had construct validity. The reliability of the scale was determined to be high with 0.92. Based on these results, the Turkish version of the scale was accepted as a valid and reliable measurement tool for early childhood pre-service.

The scores that pre-service teachers received from the scale conclude that the pre-service teachers find themselves competent enough for inclusive education. Diken (2006), in his research with pre-service teachers studying in different fields, found that pre-service teachers felt competent to work with students with intellectual disabilities. At the same time, a moderate positive relationship was found between the pre-service teachers' perceptions of efficacy and their views on inclusion. In another study involving preschool pre-service teachers, a significant relationship was found between pre-service teachers' self-efficacy perceptions and inclusive education competencies (Dolapçı & Yıldız Demirtaş, 2016). It was stated that as the self-efficacy perceptions of the pre-service teachers increased, their competency in inclusive education increased. However, in these studies, the study group was not conducted only with preschool preservice teachers. Unlike our results, Sarı, Çeliköz & Seçer (2009) found that the self-efficacy of early childhood in-service teachers was higher than early childhood pre-service teachers in a study conducted with both teachers and pre-service teachers. However, in the current study, pre-service teachers were found to have low scores in lower dimensions.

Qualitative data support these findings and provide a more detailed information in this study, which uses a mixed-methods approach to avoid the limitations of a single research method. Pre-service teachers obtained the highest average in 'knowledge about CSN' and the lowest average in 'knowledge about the laws and processes regarding special education' sub-dimensions. The sub-dimension 'perception toward the skill of using effective teaching methods and making adaptations' obtained the lowest average. In qualitative findings, pre-service teachers emphasised that knowledge about laws and processes related to special education is an important competence in inclusion; however, they feel insufficient in practice and planning. When the sub-dimension of 'knowledge about laws and processes related to special education', which recorded the lowest average is examined, there arise competencies regarding regulation and an individualised education plan (IEP). This finding is consistent with the qualitative data. Similar to this study, Böddi et al. (2019) found that preschool pre-service teachers are aware of the fundamental knowledge connected to CSN and inclusion, but they find themselves inadequate in practical knowledge. In his study examining pre-service teachers' mainstreaming self-

efficacy, Walls (2007) found a meaningful difference in the sub-dimensions of the measurement tool in 'knowledge about the laws and processes about special education'. Early childhood education pre-service teachers received lower scores than pre-service teachers in an early childhood special education program.

Similarly, in Turkey, the 'special education' lesson is compulsory in early childhood teacher training degree programs. The content of the course does not include strategies that can be used in determining the student with special needs, developing IEP and practising inclusivity. Therefore, it can be stated that the pre-service teachers in the study group have limited knowledge about inclusion. In addition, when the findings from the interview were evaluated, most of the pre-service teachers found themselves to be inadequate. They stated that implementation, adaptation and planning are important competencies in inclusion and they find themselves inadequate in these areas. Qualitative findings provided results that supported the status of pre-service teachers in sub-dimensions. In the literature, there are mentions of insufficiencies in the knowledge and application dimensions in the education that teachers receive at university regarding CSN (Lancaster & Bain, 2010; Purdue et al., 2009). The pre-service teachers' limited knowledge of inclusive education is associated with their participation only in compulsory courses in teacher training programs (Lancaster & Bain, 2010; Purdue et al., 2009). These compulsory courses contain more theoretical knowledge than practical knowledge for pre-service teachers who teach CSN (Boe, Sujie & Cook, 2007; Woolfolk Hoy & Spero, 2005). This situation coincides with the qualitative findings of the research. The prospective teachers deduced that the courses they undertook were insufficient in terms of knowledge and application. Moreover, they needed to learn how to teach and interact with CSN. Teacher training programs may therefore need to consider ways to more coherently integrate preparation for inclusion, through both theoretical knowledge and field experiences. Similar to this study, Stites et al. (2018) found that preservice teachers in both early childhood and special education programs need experience in rich, inclusive environments and more instruction and practice. This perception aligns with previous research on pre-service teachers (Catalona et al., 2020; Colson et al., 2017) and indicates this as an important area that teacher training programs need to address.

One of the most important findings obtained from this study was that, according to the gender variable, a significant difference was observed in the perception levels of the ability to use and adapt information and effective teaching methods for CSN. It was also determined that women's perceptions of their knowledge of CSN and the skill of using effective teaching methods and making adaptations were higher than men. Studies reveal that female pre-service teachers have higher self-efficacy in inclusive education than men (Avramidis, Bayliss & Burden, 2000; Romi & Leyser, 2006; Tait & Mundia, 2014).

In this study, no significant difference was found in the self-efficacy levels of pre-service teachers according to the variable of class level, type of teaching and presence of CSN in the practice class and the immediate environment. Considering that education faculties should aim to provide similar proficiencies to all pre-service teachers, regardless of gender, education type and department, it can be concluded that this finding is in line with research expectations. It can also be described as a positive situation in terms of teacher

training. A study conducted by Romi and Leyser (2006) found that the self-efficacy of third and fourth-year pre-service teachers was higher than those in the first and second year. When the application class or immediate environment were taken into consideration, the quality of the experience with an individual with special needs was more important than the presence of the individual with special needs. Alghazo et al. (2003) and Bradshaw and Mundia (2005) did not find a relationship between having experience with an individual with special needs and the attitude toward inclusion among pre-service teachers. Similar to this study, Özokcu (2018) found that the preschool teachers' level of interaction with disabled individuals did not make a significant difference in the teachers' self-efficacy scores. In their study, which examined the effect of the special education lesson on pre-service teachers' attitude, desire and comfort level toward inclusion, Rakap, Cig and Parlak-Rakap (2015) examined the variable of the presence of an individual with special needs in the family and immediate environment. They determined that in regards to attitude, desire and comfort levels, the average scores of pre-service teachers with previous experience were higher than those with no experience. However, in most of the comparison analyses, the average scores of the inexperienced pre-service teachers were found to be higher than those who had experience.

Limitations and recommendations for future research and practice

Due to the mixed-method approach used in this study, the research contributes to the literature in terms of data diversity and providing versatile information about inclusion in early childhood education. However, there are some limitations as well. The first being the variable of there being a student with special needs in the practice class and there being a person with special needs in the immediate environment. These items are dichotomous (Yes/No). Therefore, it was impossible to examine the communication and quality of interactions between pre-service teachers and individuals with special needs. Second, although a good dataset was obtained with qualitative and quantitative findings in the study, the samples were drawn using convenience sampling. Finally, studies could be conducted with both the teacher and the pre-service teacher group, using the observation technique, to expand on the studies on inclusive early childhood education and acquire more information on this subject.

Important findings in the study are that pre-service teachers consider themselves inadequate, especially in the areas of teaching, adaptation and individualised education plans. A number of recommendations can be given to teacher education programs regarding increasing the competence of pre-service teachers in this field. Special education and inclusion courses with application content can be added to the teaching program. In the preschool teacher education program, there can be a discussion on how to make educational adaptations for a student with special needs in all field courses. It can also be ensured that pre-service teachers practise teaching in inclusive environments. However, at this point, effective guidance by practice teachers is considered important.

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