Research Article https://doi.org/10.12973/ijem.9.1.215

International Journal of Educational Methodology
Volume 9, Issue 1, 215 - 226.
ISSN: 2469-9632
http://www.ijem.com/

Examination of Pre-school Teachers' Knowledge Levels of the Symptoms of Learning Disability According to Different Variables

Rukiye Konuk Er*
Necmettin Erbakan University, TURKEY

Süleyman Arslantaş
Necmettin Erbakan University, TURKEY

Ahmet Kurnaz
Necmettin Erbakan University, TURKEY

Received: September 22, 2022 ▪ Revised: December 22, 2022 ▪ Accepted: February 7, 2023

Abstract: Considering the fact that learning difficulties are mostly related to academic learning, and students first encounter tasks related with academic learning during the pre-school, it is critical for early intervention that the first symptoms of students with potential learning disability are detected by the pre-school teachers. The aim of this research is to examine knowledge levels of pre-school teachers about the characteristics of learning difficulties that 3–6 years old students, in the pre-school period, may show. With this aim in mind, the development of the "Test for identifying characteristics of learning disabilities in pre-school students (3-6 years)" was completed with 471 pre-school teachers and pre-school teacher candidates of the last grade of pre-school education program. The research has been done in the survey model with a quantitative approach. The sample of the study consists of 291 pre-school teachers. The data have been collected by means of the "Test for identifying characteristics of learning disabilities in pre-school students (3-6 years)" and analyzed using descriptive statistics techniques. At the end of the research, it has been found that there are no statistically significant differences in knowledge levels of pre-school teachers regarding the cognitive, affective, social and motor characteristics of learning disabilities in terms of their gender, the program they have graduated from, having taken courses on special education, having taken courses on learning disabilities, the types of institutions they worked at, and their class sizes. It has been found that there are statistically significant differences in their knowledge levels about cognitive, affective, social and motor characteristics of learning disabilities according to the length of service, teaching students with learning disabilities, having inclusive students in their class, having a relative in need of special education, and teaching students with learning disabilities variables.

Keywords: *Early childhood, early diagnosis, learning disability, pre-school.*

To cite this article: Konuk Er, R. K., Arslantaş, S., & Kurnaz, A. (2022). Examination of pre-school teachers' knowledge levels of the symptoms of learning disability according to different variables. *International Journal of Educational Methodology*, *9*(1), 215-226. https://doi.org/10.12973/ijem.9.1.215

Introduction

Early childhood is a period in which children's development is the fastest. Activities and programs during this time should be planned to support all areas of development. Pre-school education institutions are the first social environment of children, apart from the family environment. For this reason, pre-school teachers should have a good knowledge of children's developmental characteristics and support the development of children's cognitive, affective and motor skills in pre-school education (Doğrul & Kılıç, 2020; Oktay, 2005; Özen Altınkaynak & Yanıklar, 2014; Özer & Özer, 2019; Ramazan & Demir, 2011; Ulutaş et al., 2017). From these development areas the ones acquired through interaction with the environment, the use of the information, interpretation, editing, and all other mental functions such as attention, perception, problem solving, reasoning, creativity and memory can be defined as cognitive development (San Bayhan & Artan, 2004); the ones related with child's being able to express himself/herself, being able to control his/her emotions, being in peace with himself/herself and his/her environment can be defined as the social development (Yavuzer, 1998) ; the ones related with physical development and mobilization with his/her own request, in parallel with the development of the central nervous system, can be defined as motor development (Oktay, 2005; Senemoğlu, 2010; Şahin, 2017; Yavuzer, 1998).

When the areas of development in pre-school period are taken into consideration, it is difficult to recognize learning disability in this period (Cortiella & Horowitz, 2014). Learning disability is a condition that cannot be easily detected,

* **Corresponding author:**
Rukiye Konuk Er, Necmettin Erbakan University, Ahmet Kelesoglu Education Faculty, Konya, Turkey. ✉ rukiyekonuk@gmail.com

because it is not caused by any disability, and it is stated that approximately 23% of children with learning disabilities (LD) are diagnosed during the pre-school (Mustard, 2002; Özçivit Asfuroğlu & Fidan, 2016; Reid, 2005). By the age of 5, these children are at risk of experiencing emotional or behavioral problems, and 30% of young children (0-3 years old) with learning difficulties may have behavioral problems. The concept of LD first emerges in children during the period of learning reading and writing, and 7-8 years is a critical age for its prevention. Thus, the pre-school period is of vital importance in terms of observing the characteristics of learning disability at an early stage and starting the necessary intervention (Cortiella & Horowitz, 2014; Emerson & Einfeld, 2010; Hallahan et al., 2005; Özçivit Asfuroğlu & Fidan, 2016; Reid, 2005). By providing pre-school teachers with sufficient knowledge related to learning disability, it will be likely to meet children with the correct education in an early period.

The studies including the children with learning disabilities in the pre-school period focus on certain characteristics of these children in general (Aslan, 2015; Balıkçı & Melekoğlu, 2020; Cortiella & Horowitz, 2014; Kurnaz, 2020; McGill et al., 2016). Besides, it has been observed that while there are more studies of learning disabilities concerning primary school teachers and teachers teaching different subjects in primary and secondary school levels (Başar & Öncü, 2018; Bekle, 2004; Doğan, 2013; Fırat & Koçak, 2018; Kaçan, 2004; Keskin et al., 2016; Şahin & Gürler, 2018; Yangın et al., 2016), the number of researches oriented to pre-school teachers is limited (Aslan, 2015; Doğan, 2012; Mastropieri et al., 2005) and there are no studies concerning pre-school teachers candidates. For example, in their research, Male and Rayner (2007) emphasized that while primary teachers had knowledge about children with learning disabilities, the findings related to pre-school teachers were limited.

In the literature, it is seen that early preventive intervention programs are effective (Hagan-Burke et al., 2013; Hasiana, 2017; O'Connor et al., 2005). However, in presenting early intervention, it is necessary to put forward pre-school teachers, and their knowledge and skills in accordance with the characteristics that they possess. The studies trying to reveal knowledge and perceptions of both pre-school teachers and pre-school teacher candidates related to children with learning disabilities in the pre-school period are limited. However, pre-school teachers are expected to have knowledge and skills in terms of tracking early literacy skills and other key features of children with learning difficulties who are at risk in early period (Arslantaş & Koçak, 2020; Fırat & Koçak, 2018; Foorman et al., 2016; Konuk Er & Okur, 2020; Namkung & Peng, 2018; Tunçeli & Zembat, 2017).

Identifying students with LD in early childhood depends on pre-school teachers' knowledge of the early characteristics of LD. However, only 20% of students experiencing learning difficulties can be identified in Turkey. This rate shows that most of the children with LD cannot be identified in early period, and one of the possible reasons of this situation is that teachers do not know the symptoms of LD in early childhood period. Discussing the needs of children with LD at the minimum level in the general educational literature also shows that teachers require support in meeting the needs of the mentioned students (Başar & Öncü, 2018; Mastropieri et al., 2005; Şahin & Gürler, 2018). Factors such as professional seniority of teachers and their working with children having special needs will become effective in determining their awareness (Armağan Yıldız, 2004; Howard et al., 2011; Özçivit Asfuroğlu & Fidan, 2016; Tunçeli & Zembat, 2017). However, pre-school teachers' not having the necessary knowledge level related to the general characteristics of children with LD in early childhood period has become a considerable factor in planning this research (Doğan, 2012; Gore et al., 2014; Therrien et al., 2011).

In Turkey, the problems experienced in the comprehensive evaluation of academic skills in early childhood period delay identification of certain learning difficulties in children in pre-school period. Pre-school teachers must foresee which children are at risk of experiencing certain learning difficulties in order to determine early and to provide an intervention. Qualified education provided at Bachelor's degree level is effective on future life. Apart from courses of "Special Education and Mainstreaming", the factors which are thought to affect the attitudes and knowledge levels of teacher candidates related to these children have been discussed. In this research, the purpose is to investigate knowledge levels of pre-school teachers related to the symptoms of learning disabilities of children aged 2-6 years considering different variables. Not getting detailed literature information in terms of different variables and whether these determined factors affecting knowledge (experience, professional seniority, the ability to behave empathetically) undergo change in knowledge levels of pre-school teachers will be determined. In the direction of this purpose, knowledge levels of pre-school teachers will be investigated by considering the variables including; gender**,** the undergraduate program they graduated from**,** whether they have an inclusive student**,** whether they work with a student with LD**,** whether they have a relative who needs special education and professional experience.

Methodology

Research Design

This research is a quantitative study in the survey model. The survey is a research approach in social sciences used to describe attitudes, ideas, beliefs, perceptions, behaviors or characteristics of a sample (Creswell & Creswell, 2017). In this approach, quantitative data is collected using scales or questionnaires, and the data are analyzed to explain trends in answers to questions and test research questions or hypotheses (Fowler, 2013). In this research, the survey was done in a cross-sectional way and in the form of instant data collection.

Sample and Data Collection

There are two different samples for two different purposes in the research.

1. The researchers followed two stages to determine the knowledge levels of pre-school teachers about the characteristics of learning disabilities in the early childhood. In the first stage, 471 pre-school teachers from different cities in Turkey and the final year teacher candidates studying pre-school education at Konya Necmettin Erbakan University were included to develop "The Test for Identifying Characteristics of Learning Disabilities in Pre-school Students (3-6 years)

2. The second sampling of the research included 291 nursery school teachers working in Konya province. Both proportional and convenience sampling techniques were adopted to determine the sample. Additionally, teachers who volunteered to participate were included in the research. The demographic information of the participants is shown in Table 1.

Table 1. Distribution of Participants According to Some Variables

	Variable	**N**	**%**
Gender	Female	280	96,22
	Male	11	3,78
	Total	**291**	**100**
Graduation Program	Pre-school Teaching	208	71,48
	Child Development	83	28,52
	Total	**291**	**100**
Taught Students with LD	Yes	209	28,18
	No	82	71,82
	Total	**291**	**100**
Type of Institution	State	240	82,47
	Private	51	7,53
	Total	**291**	**100**

Development of the Data Collection Tool

The research data was collected through the "Test for identifying characteristics of learning disabilities in pre-school students (3-6 years)". During the development of the test, the researchers carried out a thorough literature review and created an item pool. They also consulted three doctoral students studying on learning disabilities and three pre-school education experts regarding the relevance and comprehensiveness of the items in the pool. Depending on the data, using the Kappa statistical technique, the internal consistency coefficient between the raters has been calculated and items with less than α=0.40 have been removed from the item pool. Accordingly, 54 items remained in the form. Kappa inter-rater internal consistency coefficient of learning disability experts was 0.68, and the internal consistency coefficient of the pre-school experts was 0.71.

First, a pilot study was done with 10 pre-school teachers then, 471 pre-school teachers and pre-school teacher candidates, 437 of whom are females and 34 of them males, filled the form consisting of 54 items. The gender distribution of the sample is in parallel with their preferences of the discipline. Filling out the scales, it was examined whether there were differences between the KR20 reliability coefficients, item difficulty, item discrimination, reliability with the equivalent halves method, and the top 27% and the bottom 27%.

During the development of the test, 45 items, out of 54 items, with item discrimination of 0.30 and above remained in the final form. The KR20 reliability coefficient of the final form was 0.94, and the item discrimination values of each of the items were between 0.30 and 0.67. It was found that there were statistically significant differences between the lower and upper 27% groups. Split halves reliability coefficient correlation value was 0.71. Table 2 below gives the reliability (Cronbach's Alpha) values of the scale and its factors.

Table 2. Statistics for The Test for Identifying Characteristics of Learning Disabilities in Pre-school Students (3-6 years)

	Item Statistics				**Test Statistics**		
Factors	**Mean**	**Min.**	**Max.**	**M number**	**Mean**	**Standard Deviation**	**Alpha**
Cognitive Characteristics	0,577	0,433	0,667	24	13,86	6,719	0,912
Motor Characteristics	0,577	0,470	0,654	15	8,654	4,097	0,840
Social/Affective Characteristics	0,530	0,477	0,579	6	3,718	2,018	0,760
Scale as a Whole	0,571	0,433	0,667	45	25,688	11,571	0,939

According to the results, it can be concluded that the scale is reliable and distinctive for determining the level of knowledge of pre-school teachers about the characteristics of learning disabilities in the early period. In determining the criteria to be used when making success or failure decisions, the Z score was used as a relative norm determination tool depending on the arithmetic mean and standard deviations. Low, medium and high success criteria for all factors and for the whole of the test were determined using mean and standard scores. Table 3 below shows the standard score intervals.

Table 3. Distinctiveness of The Test for Identifying Characteristics of Learning Disabilities in Pre-school Students (3-6 Years)

Factors	Low (<-1 sx)	Medium (-1,+1 sx)	High (+1 sx >)
Cognitive characteristics	0-7	7-21	21-24
Motor characteristics	0-5	5-13	13-15
Social/Affective characteristics	0-2	2-4	4-6
Scale as a Whole	0-14	15-37	38-45

Cohen's calculation method (d), which is the most commonly used method to calculate the effect size, has been used in the research. With the help of the test for identifying characteristics of learning disabilities in pre-school students (3-6 years), the researchers tried to find out the knowledge levels of pre-school teachers about the characteristics that their students in the 3-6 age group might show regarding learning disabilities.

Analyzing of Data

In the analysis of the data such techniques as arithmetic mean, standard deviation, independent samples t-test and one-way analysis of variance (ANOVA) were used. Whether there were statistically significant differences between the data were tested using the t-test for two groups, and using analysis of variance (F) for more than two groups (Guetterman & Fetters, 2018). The normality values for the analyses are given in Table 4. Although the most commonly used one in calculating the effect size is the calculation developed by Cohen (d), some other calculation methods such as Hedge's d and Glass's Δ are also available in the literature. As a general recommendation, Cohen states that if the d value is less than 0.2, the effect size can be defined as weak, if it is 0.5, it can be defined as medium, and if it is greater than 0.8, it can be defined as strong (Kılıç, 2014).

Table 4. The Normality Values for the Analyses

Type of Statistics	Value	Criterion Values
Mod	30,03	Mod, median, arithmetic mean, is close (close)
Median	31,00	
Arithmetic Mean	31,09	
Skewness	-0,19	-1,00 - +1,00
Kurtosis	-0,061	-1,00 - +1,00
Sapiro-Wilk	0,985	P:0,002

All the values given above show that the distribution is parametric.

Findings / Results

The knowledge levels of pre-school teachers about the LD in early childhood have been studied according to gender, department of graduation, teaching a student with a learning disability, whether there is an inclusive student in the classroom, whether there is a relative in need of special education, and length of service variables.

The t-test has been used to determine whether there is a statistically significant difference in the knowledge levels of pre-school teachers regarding the early characteristics of learning disabilities according to the gender (Table 5), department of graduation (Table 6), whether there is an inclusive student in the classroom (Table 7), teaching a student with a LD (Table 8), whether there is a relative in need of special education (Table 9) variable.

Table 5. t-Test Results by Gender

Factors	Gender	N	Mean.	Standard Deviation	t	df	p	d
Motor Characteristics	Female	280	8,66	4,10	2,415	289	**0,016**	**0.81**
	Male	11	5,64	3,38				
Cognitive Characteristics	Female	280	13,89	6,92	1,756	289	0,080	
	Male	11	10,18	5,65				

Table 5. Continued

Factors	Gender	N	Mean	Standard Deviation	t	df	p	d
Social Affective Characteristics	Female	280	3,19	2,05	1,902	289	0,058	
	Male	11	2,00	1,79				
Scale as a Whole	Female	280	25,746	11,73	2,214	289	**0,028**	**0,75**
	Male	11	17,88	9,11				

In Table 5, it is clear that there is a statistically significant difference (p<0.05) in terms of gender in the knowledge levels of pre-school teachers in the motor characteristics factor. The Cohen (d) effect size value showing the size of the difference was 0.81 in the motor characteristics factor, which also indicates that there is a statistically significant difference in the knowledge levels of male and female pre-school teachers. Accordingly, it can be concluded that the knowledge levels of female teachers about the early characteristics of learning disabilities in the motor characteristics factor is much better than that of male pre-school teachers.

In Table 5, it is clear that there is a statistically significant difference (p<0.05) in terms of gender in the total scores of the knowledge levels of pre-school teachers. The Cohen (d) effect size value is 0.75, which indicates that there is a moderate difference in the levels of early characteristics of learning disability between male and female pre-school teachers. Accordingly, it can be concluded that the knowledge level of female teachers is better than that of males.

Table 6.t Test Results by Graduation Program

Factors	Program	N	Mean	Standard Deviation	t	df	p	d
Motor Characteristics	Pre-school	208	8,74	4,15	1,277	289	0,203	
	Child Development	83	8,06	3,97				
Cognitive Characteristics	Pre-school	208	14,34	6,83	2,302	289	**0,022**	**0,42**
	Child Development	83	12,29	6,90				
Social Affective Characteristics	Pre-school	208	3,30	2,04	1,990	289	**0,048**	**0,71**
	Child Development	83	2,77	2,04				
Scale as a Whole	Pre-school	208	26,38	11,82	2,151	289	**0,032**	**0,41**
	Child Development	83	23,12	11,24				

Table 6 shows that there are statistically significant differences in the cognitive and social-affective characteristics factors and in the total knowledge levels of pre-school teachers in terms of the program they graduated from (p<0.05; Cohen d; 0.42; 0.71; 0.41). Accordingly, it can be concluded that pre-school teachers who graduated from pre-school education have a better level of knowledge about the early characteristics of learning disability than the ones who graduated from the department of child development.

Table 7. t-Test Results by Having an Inclusive Student in Class

Factors	Have an Inclusive Student in Class	N	Mean	Standard Deviation	t	df	p	d
Motor Characteristics	Yes	188	8,57	4,01	0,157	289	0,875	
	No	103	8,50	4,30				
Cognitive characteristics	Yes	188	14,46	6,54	2,391	289	**0,017**	**0,29**
	No	103	12,46	7,37				
Social Affective characteristics	Yes	188	3,17	2,08	0,192	289	0,848	
	No	103	3,12	2,01				
Scale as a Whole	Yes	188	26,20	11,29	1,487	289	0,138	
	No	103	24,07	12,42				

There is a statistically significant difference (p<0.05) in the cognitive characteristics factor (Cohen d 0.29). Therefore, it can be concluded that the knowledge level of the pre-school teachers, who have had an inclusive student in class so far is moderately better.

Table 8. t-Test Results by Ever Teaching a Student with Learning Disability

Factors	Ever teaching a student with LD	N	Mean	Standard Deviation	t	df	p	d
Motor characteristics	Yes	209	8,72	4,07	1,168	289	0,244	
	No	82	8,1	4,2				
Cognitive characteristics	Yes	209	15,04	6,7	2,764	289	**0,01**	**0,6**
	No	82	11,99	7,14				
Social	Yes	209	3,29	2,03	1,859	289	0,064	
	No	82	2,79	2,07				
Scale as a Whole	Yes	209	26,46	11,55	2,359	289	**0,02**	**0,3**
…	No	82	22,88	11,86				

There is a statistically significant difference (p<0.05) in the cognitive characteristics factor and in the total knowledge levels of pre-school teachers according to the same variable (Cohen d; 0.60; 0.31). Thus, it can be concluded that the knowledge level of pre-school teachers, who have ever taught a student with a learning disability so far, in the cognitive characteristics factor and in general, is better.

Table 9. t-Test Results by Having Relatives with Special Needs

Factors	Have any relatives with special needs	N	Mean	Standard Deviation	t	df	P	d
Motor Characteristics	Yes	163	8,48	4,05	-0,32	289	0,751	
	No	128	8,63	4,19				
Cognitive Characteristics	Yes	163	12,91	6,93	-2,36	289	**0,02**	**0,28**
	No	128	14,82	6,73				
Social	Yes	163	2,9	2,06	-2,39	289	**0,02**	**0,24**
	No	128	3,47	2				
Scale as a Whole	Yes	163	24,29	11,69	-2,01		**0,04**	**0,26**
	No	128	27,32	11,65		289		

Table 9 shows that there are statistically significant differences (p<0.05) in the cognitive and social-affective characteristics factors and in the total knowledge levels of pre-school teachers according to the same variable (Cohen d; 0.28; 0.24; 0.26). Thus, it can be concluded that the knowledge levels of pre-school teachers, who have relatives with special needs, in the cognitive and social-affective characteristics, is partly better.

The one-way analysis of variance (ANOVA) has been done to find out whether there is a statistically significant difference in the knowledge levels of pre-school teachers regarding the early characteristics of learning disabilities according to the length of service variable. The results of the analysis are shown in Table 10 below.

Table 10. ANOVA Results by Length of Service

Factors	Length of Service (Years)	N	Mean	Standard Deviation	df	F	P	Inference
Motor Characteristics	0-4	110	8,06	3,93	4	2,573	**0,038**	0-4 and 5-9 <10-14
	45174	39	8,56	4,33	286			
	41913	58	9,6	4,32	290			
	15-19	58	7,79	4,06				
	20+	26	8,89	3,61				
Cognitive Characteristics	0-4	110	12,35	6,93	4	2,888	**0,023**	0-4<10-14
	45174	39	14,49	6,53	286			
	41913	58	15,43	7	290			
	15-19	58	13,26	6,81				
	20+	26	13,92	6,29				
Social Affective characteristics	0-4	110	2,79	2,03	4	1,594	0,176	
	45174	39	3,26	2	286			
	41913	58	3,53	2,03	290			
	15-19	58	3,21	2,1				
	20+	26	3,5	2,06				

Table 10. Continued

Factors	Length of Service (Years)	N	Mean	Standard Deviation	df	F	p	Inference
Scale as a Whole	0-4	110	23,21	11,38	4	3,016	**0,018**	0-4<10-14
	45174	39	26,31	10,85	286			
	41913	58	28,57	12,25	290			
	15-19	58	24,26	11,83				
	20+	26	24,31	11,23				

Table 10 shows that there are statistically significant differences ($p<0.05$) in the cognitive and motor factors and in the total knowledge levels of pre-school teachers depending on the same variable. Accordingly, knowledge levels of pre-school teachers about the early characteristics of learning disabilities in the motor field with 10-14 years of length of service is better than the ones with 0-9 years of length of service. Considering the total level of knowledge of pre-school teachers about the characteristics of learning disabilities, those with 10-14 years of length of service have a better level of knowledge than those with 0-9 years of length of service.

Discussion

The indicators of motor skills among LD characteristics are quite meaningful in early childhood. Vuijk et al. (2011) demonstrated that among 137 children with LG, 52,6 % of them showed weakness in manipulative skills, 40,9% of them showed weakness in ball skills and 33,7% of them showed weakness in balance skills. The findings of the conducted research show that these skills come into prominence. In these skills coming into prominence, the rate of noticing motor indicators and general indicators in children is higher in female teachers among pre-school teachers. Thus, it can be thought that female pre-school teachers are more knowledgeable about learning disabilities than male pre-school teachers in the motor field and in general. The most common characteristics of learning disability in the pre-school period are delayed speech, mixing sounds, difficulty in tying shoes, mixing the concepts of left and right, the lack of a certain hand preference and using both hands, mixing the concepts of time and direction (Salman et al., 2016; Scruggs & Mastropieri, 1991). Considering women's responsibilities for child care and education in and out of the home is a cultural trait, it can be thought that awareness of learning disabilities in certain areas is in favor of women. Sağır and Bozgün (2018) also discovered that female teachers were more competent in competence related to children with learning disabilities. Taking the findings of this research, the studies mentioned above, and the literature into account, it can be easily said that female pre-school teachers are more knowledgeable about the early characteristics of learning disabilities than male pre-school teachers.

It has been detected that the program from which pre-school teachers graduate has been considered effective on cognitive, social-emotional and total knowledge levels which are the sub dimensions of early signs of learning disabilities. Accordingly, it can be thought that teachers who graduated from pre-school education have a better level of knowledge about the early characteristics of learning disabilities than the ones who graduated from the department of child development. There are more courses on special education in the department of child development and education during the undergraduate education; however, the obtained outcome may result from both the practices performed in undergraduate period and the practices conducted in the period of transition to occupation of teaching after graduation.

Fırat and Koçak (2018) also found in their research that there are differences due to the difference in major fields of study regarding the learning disabilities. Kuruyer and Çakıroğlu (2017) stated that the level of knowledge and practices regarding the concept of learning disability vary from teacher to teacher. In a similar vein, Yurdakul and Susar-Kırmızı (2013) concluded that the knowledge of classroom teacher candidates about dyslexia is partially correct.

It is seen that it is very important for teachers to have knowledge about the children with LD whose difficulties and abilities differ greatly (Gore et al., 2014; Melekoğlu, 2017; O'Connor et al., 2005; Schumm et al., 1994; Simmons et al., 1998). Brigham et al. (2011) and Kaçan (2004) found that teachers want to receive in-service training on LD. Başar and Öncü (2018) claim that the knowledge of primary school teachers related to learning disability is deficient or wrong; however, this deficiency might be filled when the training is applied. Soares et al. (2018) emphasize that special education teachers, teachers of different subjects might be quite active in the process of learning disabilities, and they may direct children to success. Because of including a mainstreaming student in their classrooms previously, the level of pre-school teachers' knowledge about early cognitive indicators of learning disability is positively affected.

It was supported by research that the ability of teachers who have different types and levels of students with special needs in their class to use different methods (such as using mnemonic techniques, graphic organizers, and science applications in life) and their willingness to do this affect the success of children with LD (Başar & Öncü, 2018; Mastropieri et al., 2005; Scruggs et al., 2010). The fact that teachers who have ever taught a child in need of special education enabled them to have better knowledge about LD, which is a special subject in special education. As a matter of fact, opinions of teachers on special learning disabilities vary according to their background and experiences (Kuruyer & Çakıroğlu, 2017).

Studying with a student with learning disability is effective on the sub dimension of cognitive indicators related to early signs of learning disabilities and total knowledge levels of pre-school teachers. The fact that typical features of LD, which is a general misconception, are based on early childhood characteristics, seems to have disappeared as a result of teaching children with LD. Since they are not as clear as academic indicators and there are no systematic measurements, the characteristics of LD and the process in the early period are mentioned as the issues that challenge teachers (Hasiana, 2017). However, teaching children with LD has created awareness, and findings in the direction of having knowledge have been obtained on behalf of teachers (Demir, 2005; Foorman et al., 2016; Hagan-Burke et al., 2013).

A statistically significant difference has been found in the knowledge level of pre-school teachers regarding the early characteristics of learning disabilities according to having relatives with special needs variable. This emphasizes the result that having a relative with special needs is effective on behaving empathetically, relations and emotions (Demir, 2005). Cavioni et al. (2017), Hagan-Burke et al. (2013) and Vuijk et al. (2011) emphasize that social and emotional learning and relationship styles of students with learning disabilities should be taken into account by teachers.

It has been observed that working life of pre-school teachers is effective on motor and cognitive sub dimensions of early signs of learning disabilities and total knowledge levels. Therefore, it can be concluded that the knowledge of pre-school teachers about the early characteristics of learning disabilities is in favor of teachers who have 10-14 years of length of service, during which they both gain experiences and do not feel burnout. The students attending the pre-school teacher education undergraduate programs state that the teachers' professional experience is effective in determining learning disabilities (Demir, 2005), and this finding is supported by the studies stating that teachers' professional experience in this process is effective in working with children with LD (Altun & Uzuner, 2016; Gore et al., 2014; Hasiana, 2017; Male & Rayner, 2009; Namkung & Peng, 2018; Sağır & Bozgün, 2018). It is emphasized that children with LD should be academically supported by the teachers who have the experience in implementing different methods in their lessons (Therrien et al., 2011).

Conclusion

Depending on the research results, (a) it can be concluded that "Test for identifying characteristics of learning disabilities in pre-school students (3-6 years)" is reliable and distinctive for determining the knowledge levels of pre-school teachers about the characteristics of early learning disability. (b) The rate of pre-school teachers' noticing the characteristics is between 45-60% for all the factors and the whole scale for all variables. (c) There are statistically significant differences in the cognitive characteristics factor according to the variables of the program graduated from, ever teaching an inclusion student, ever teaching a student with learning disability, having a relative with special needs, and length of service. (d) It has come out that the statistically significant difference found in knowledge levels of teachers in the motor characteristics is found in the variables of gender and length of service. (e) Moreover, the statistically significant difference found in knowledge levels of teachers in the social-affective characteristics is found in the variables of the program graduated from and having a relative with special needs.

Recommendations

At the end of this study, suggestions for further research topics for teachers and researchers were presented. Teacher trainings based on the characteristics of children with early LD could be planned and the effectiveness of these programs can be determined. Needs analysis for LD could be carried out by conducting these training programs separately for teacher candidates and active teachers. The diagnosis rate of 23% during this period may cause many cases to grow and become cases that may put teachers in a difficult situation in the future. To prevent this, standardized and highly reliable assessment tools based on country norms can be developed to facilitate needs analysis and diagnosis in the early stages. Since longitudinal studies will lead to the development of more effective intervention programs, they can be planned and implemented. Moreover, support program activities encompassing various development areas affected by learning disabilities could be planned for implementation and in-class arrangements, and the effectiveness of these activities could be revealed. Research on how these support programs are implemented in classrooms can be suggested. Finally, in terms of raising awareness for learning disabilities, the effectiveness of the special education courses offered during the undergraduate programs can be examined.

Limitations

This study is limited to determining the knowledge levels of pre-school teachers about the symptoms of learning disabilities in children aged 3-6 in early childhood.

Authorship Contribution Statement

Konuk Er: Contributed to the design of the study, interpretation of the results, literature review, and writing of the manuscript. Arslantaş: Contributed to the design of the study as well as data extraction, data analysis and full text review. Kurnaz: Contributed to the interpretation of the results and writing of the manuscript, data acquisition, data analysis and full text review.

References

Altun, T., & Uzuner, F. G. (2016). Sınıf öğretmenlerinin özel öğrenme güçlüğü olan öğrencilerin eğitimine yönelik görüşleri [Views of classroom teachers on the education of students with special learning disabilities]. *The Journal of Academic Social Science Studies, 44,* 33-49. https://doi.org/10.9761/JASSS3366

Armağan Yıldız, S. (2004). Öğrenme güçlüğü olan çocukların psikososyal özellikleri, sorunları ve eğitimi [Psychosocial characteristics, problems and education of children with learning disabilities]. *Hasan Ali Yücel Eğitim Fakültesi Dergisi, 2,* 169-180. https://bit.ly/3RaCu2s

Arslantaş, S., & Koçak, F. (2020). Öğrenme güçlüğü olan öğrenciler için öğretimde işbirliği ve ekiple öğretim [Collaboration and team teaching in teaching for students with learning disabilities]. In A. Kurnaz & H. Sarı (Eds.), *Öğrenme Güçlüğü Olan Öğrenciler ve Eğitimleri/Students with Learning Disabilities and Their Education* (pp.178-204). Pegem Publishing.

Aslan, K. (2015). Özgül öğrenme güçlüğünün erken dönem belirtileri ve erken müdahale uygulamalarına dair derleme [Review of early symptoms of specific learning disability and early intervention practices]. *Hacettepe University Faculty of Health Sciences Journal/Hacettepe Üniversitesi Sağlık Bilimleri Fakültesi Dergisi*, *1*(Suppl.2), 577-588. https://bit.ly/3IocIpA

Balıkçı, Ö. S., & Melekoğlu, M. A. (2020). Early signs of specific learning disabilities in early childhood. *Internatıonal Journal of Early Childhood Special Education, 12*(1), 84 - 95. https://bit.ly/3JS8TsU

Başar, M., & Öncü, A. (2018). Sınıf öğretmenlerinin öğrenme güçlüğüyle ilgili kavram yanılgılarının giderilmesi ve öğretmen görüşlerinin değerlendirilmesi [Elimination of classroom teachers' misconceptions about learning disability and evaluation of teachers' opinions]. *Hacettepe University Journal of Education/Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 33*(1), 185-206. https://doi.org/10.16986/HUJE.2017027934

Bekle, B. (2004). Knowledge and attitudes about attention-deficit hyperactivity disorder (ADHD): a comparison between practicing teachers and undergraduate education students. *Journal of Attention Disorders*, *7*(3), 151-161. https://doi.org/10.1177/108705470400700303

Brigham, F. J., Scruggs, T. E., & Mastropieri, M. A. (2011). Science education and students with learning disabilities. *Learning Disabilities Research & Practice, 26*(4), 223-232. https://doi.org/10.1111/j.1540-5826.2011.00343.x

Cavioni, V., Grazzani, I., & Ornaghi, V. (2017). Social and emotional learning for children with learning disability: Implications for inclusion. *International Journal of Emotional Education, 9*(2), 100-109.

Cortiella, C., & Horowitz, S. H. (2014). *The state of learning disabilities: facts, trends and emerging issues* (3rd ed.). National Center for Learning Disabilities. https://bit.ly/3XLyp7A

Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.

Demir, B. (2005). *Okulöncesi ve ilköğretim birinci sınıfa devam eden öğrencilerde özel öğrenme güçlüğünün belirlenmesi* [Determination of special learning disability in preschool and primary education first grade students] (Publication No. 188756) [Master's thesis, Marmara University]. Yüksek Öğretim Kulu Başkanlığı Tez Merkezi [Higher Education Council Thesis Center]. https://bit.ly/3XZNYYJ

Doğan, B. (2013). Türkçe ve sınıf öğretmenlerinin okuma güçlüğüne ilişkin bilgileri ve okuma güçlüğü olan öğrencileri belirleyebilme düzeyleri [Turkish and primary school teachers' knowledge about reading difficulties and their ability to identify students with reading difficulties]. *Research in Reading & Writing Instruction/Okuma Yazma Eğitimi Araştırmaları, 1*(1), 20-33. https://bit.ly/3H77tIa

Doğan, H. (2012). Özel öğrenme güçlüğü riski taşıyan 5-6 yaş çocukları için uygulanan erken müdahale eğitim programının etkisinin incelenmesi [Investigation of the effect of the early intervention education program applied for 5-6 year old children at risk of special learning difficulties] (Publication No. 319492) [Doctoral dissertation, Marmara University]. Yüksek Öğretim Kulu Başkanlığı Tez Merkezi [Higher Education Council Thesis Center]. http://bit.ly/3HmD494

Doğrul, H., & Kılıç, F. (2020). Okul öncesi öğretmene adaylarının öğretmenlik mesleğine yönelik tutumlarının farklı değişkenler açısından incelenmesi [Examining preschool teacher candidates' attitudes towards teaching profession

in terms of different variables]. *Journal of University Studies/Üniversite Araştırmaları Dergisi, 3*(2), 49-57. https://doi.org/10.32329/uad.699452

Emerson, E., & Einfeld, S. (2010). Emotional and behavioural difficulties in young children with and without developmental delay: A bi-national perspective. *Journal of Child Psychology and Psychiatry, 51*(5), 583-593. https://doi.org/10.1111/j.1469-7610.2009.02179.x

Fırat, T., & Koçak, D. (2018). Sınıf öğretmenlerinin öğrenme güçlüğünün tanımına ilişkin görüşleri [Opinions of classroom teachers on the definition of learning disability]. *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi, 18*(2), 915-931. https://doi.org/10.17240/aibuefd.2018..-431461

Foorman, B., Dombek, J., & Smith, K. (2016). Seven elements important to successful imple-mentation of early literacy intervention. *New Directions for Child and Adolescent Development,154*, 49-65. https://doi.org/10.1002/cad.20178

Fowler, F. J. (2013). *Survey research methods*. SAGE.

Gore, N., Hastings, R. P., & Brady, S. (2014). Early intervention for children with learning disabilities: Making use of what we know. *Tizard Learning Disability Review, 19*(4), 181-189. https://doi.org/10.1108/TLDR-08-2013-0037

Guetterman, T. C., & Fetters, M. D. (2018). Two methodological approaches to the integration of mixed methods and case study designs: A systematic review. *American Behavioral Scientist, 62*(7), 900-918. https://doi.org/10.1177/0002764218772641

Hagan-Burke, S., Coyne, M. D., Kwok, O., Simmons, D. C., Kim, M., Simmons, L. E., & McSparran, R. M. (2013). The effects and interactions of student, teacher, and settingvariables on reading outcomes for kindergarteners receiving supplemental reading intervention. *Journal of Learning Disabilities, 46*(3), 260–277. https://doi.org/10.1177/0022219411420571

Hallahan, D. P., Llyod, J. W., Kauffman, J. M., Weiss, M. P., & Martinez, E. A. (2005). *Learning disabilities: Foundations, characteristics, and effective teaching* (3rd ed.). Pearson.

Hasiana, I. (2017). Identification of learning difficulties in children at early childhood education, advances in social science. *Education and Humanities Research, 58*, 250-253. https://doi.org/10.2991/icece-16.2017.44

Howard, V. F., Williams, B., & Lepper, C. E. (2011). *Özel gereksinimi olan küçük çocuklar* [Very young children with special needs] (G. Akçemete, Trans. Ed.). Nobel. (Original work published 2009)

Kaçan, G. (2004). Sınıf öğretmenlerinin mesleki gelişime ilişkin isteklilik düzeyleri [Level of willingness of classroom teachers for professional development]. *Osmangazi Üniversitesi Sosyal Bilimler Dergisi, 5*(1), 57-66. https://bit.ly/3jbyJNC

Keskin, İ., Korkut, A., & Can, S. (2016). Öğrenme güçlüğü yaşayan öğrencilere yönelik öğretmen yeterlilikleri ölçeğinin geliştirilmesi [Developing a teacher competency scale for students with learning difficulties]. *Amasya Education Journal/ Amasya Üniversitesi Eğitim Fakültesi Dergisi, 5*(1), 133-155. https://dergipark.org.tr/tr/download/article-file/224086

Kılıç, R. (2014). İlköğretim I. kademe öğretmenlerinin otantik ölçme ve değerlendirme yöntemleri ile ilgili bilgi, tutum ve görüşlerinin değerlendirilmesi [Evaluation of primary school teachers' knowledge, attitudes and opinions about authentic measurement and evaluation methods] (Publication No. 372293) [Doctoral dissertation, Marmara University]. Yüksek Öğretim Kulu Başkanlığı Tez Merkezi [Higher Education Council Thesis Center] http://bit.ly/3wAblMO

Konuk Er, R., & Okur, M. (2020). Öğrenme güçlüğünün erken belirtileri (3-6 Yaş) [Early symptoms of learning disabilities (3-6 years)]. In A. Kurnaz & H. Sarı (Eds.), *Öğrenme güçlüğü olan öğrenciler ve eğitimleri* [Students with learning disabilities and their education] (pp.77-104). Pegem Publishing

Kurnaz, A. (2020). Öğrenmenin oluşumu ve öğrenme güçlüğü ve türleri [Formation of learning and learning disability and its types]. In A. Kurnaz & H. Sarı (Eds.), *Öğrenme güçlüğü olan öğrenciler ve eğitimleri* [Students with learning disabilities and their education] (pp. 2-25). Pegem Publishing

Kuruyer, H. G., & Çakıroğlu, A. (2017). Sınıf öğretmenlerinin özel öğrenme güçlüğü olan öğrencilerin eğitsel değerlendirme ve eğitimsel müdahale sürecinde görüş ve uygulamaları [Opinions and applications of classroom teachers in the process of educational evaluation and educational intervention of students with special learning disabilities]. *Turkish Studies*, *12*(28), 539-555. https://doi.org/10.7827/TurkishStudies.12494

Male, D. B., & Rayner, M. (2007). Who goes to SLD schools in England? A follow-up study. *Educational & Child Psychology, 22*(3), 145-152. https://doi.org/10.1111/j.1467-9604.2007.00462.x

Mastropieri, M. A., Scruggs, T. E., & Graetz, J. (2005). Cognition and learning in inclusive high school chemistry classes. In T. E. Scruggs & M. A. Mastropieri (Eds.), *Cognition and learning in diverse settings: Advances in learning and*

behavioral disabilities (pp. 99-110). Emerald Group Publishing Limited. https://doi.org/10.1016/S0735-004X(05)18005-7

McGill, R. J., Styck, K. M., Palomares, R. S., & Hass, M. R. (2016). Critical issues in specific learning disability identification: What we need to know about the PWW model. *Learning Disability Quarterly, 39*(3), 159–170. https://doi.org/10.1177/0731948715618504

Melekoğlu, M. A. (2017). Özel öğrenme güçlüğünün nedenleri ve özellikleri [Causes and characteristics of a specific learning disability]. In M. A. Melekoğlu & U. Sak (Eds.), *Öğrenme güçlüğü ve özel yetenek* [Learning disability and special ability] (pp. 23-52). Pegem Publishing.

Mustard, J. F. (2002). Early child development and the brain-the base for health, learning, and behavior throughout life. In M. E. Young (Ed.), *From early child development to human development: Investing in our children's* future (pp. 23-61). World Bank.

Namkung, J., & Peng, P. (2018). Learning disabilities. In B. B. Frey (Ed.), *The SAGE encyclopedia of educational research, measurement, and evaluation* (pp. 243-278). SAGE Publications. https://doi.org/10.4135/9781506326139.n385

O'Connor, R. E., Fulmer, D., Harty, K., & Bell, K. (2005). Layers of reading intervention in kindergarten through third grade: Changes in teaching and child outcomes. *Journal of Learning Disabilities, 38*(5), 440-455. https://doi.org/10.1177/00222194050380050701

Oktay, A. (2005). *Current issues in pre-school education*. Morpa Publications.

Özçivit Asfuroğlu, B., & Fidan, S. T. (2016). Özgül öğrenme güçlüğü [Spesific learning disorders]. *Osmangazi Medical Journal/Osman Gazi Tıp Dergisi, 38*(Special Issue 1) 49-54. https://bit.ly/3XLEot4

Özen Altınkaynak, Ş., & Yanıklar, C. (2014). Anne ve babaların okul öncesi eğitimden çocuklarının gelişimine yönelik beklentileri [Expectations of parents for the development of their children from pre-school education]. *Mehmet Akif Ersoy University Journal of the Faculty of Education/ Mehmet Akif Ersoy Üniversitesi Eğitim Fakültesi Dergisi, 1*(30), 56-72. https://bit.ly/3R9WyBY

Özer, D. S., & Özer, K. (2019). Motor development in children (10th ed.). Nobel Publishing.

Ramazan, O., & Demir, S. (2011). Okul öncesi eğitim kurumuna devam eden 36–48 aylık çocukların bilişsel gelişim düzeyleri [Cognitive development levels of 36-48 month old children attending pre-school education institution]. *Journal of Educational Sciences Research/Eğitim Bilimleri Araştırmaları Degisi*, *1*(2), 83-98. https://bit.ly/3Y1vya5

Reid, G. (2005). *Dyslexia and inclusion: Classroom approaches for assessment teaching and learning.* David Fulton Publisher.

Sağır, Ş. U., & Bozgün, K. (2018). Sınıf öğretmenlerinin öğrenme güçlüğü olan öğrencilere yönelik yeterliklerinin farklı değişkenler açısından değerlendirilmesi [Evaluation of classroom teachers' competencies for students with learning disabilities in terms of different variables]. *SETSCI Conference Indexing System, 3,* 1116-1119. https://bit.ly/3XZiyBV

Salman, U., Özdemir, S., Salman, A. B., & Özdemir, F. (2016). Özel öğrenme güçlüğü "Disleksi" [Specific learning disability "Dyslexia"]. *FNG & Science Medical Journal/ FNG & Bilim Tıp Dergisi, 2*(2), 170-176. https://bit.ly/3WG4fBi

San Bayhan, P., & Artan, İ. (2004). *Çocuk gelişimi ve eğitimi* [Child development and education]. Morpa.

Scruggs, T. E., & Mastropieri, M. A. (1991). Classroom applications of mnemonic instruction: Acquisition, maintenance, and generalization. *Exceptional Children*, *58*(3), 219– 229. https://doi.org/10.1177/001440299105800305

Scruggs, T. E., Mastropieri, M. A., Berkeley, S., & Graetz, J. E. (2010). Do special education interventions improve learning of secondary content? A meta-analysis. *Remedial and Special Education*, *31,* 437– 449. https://doi.org/10.1177/0741932508327465

Schumm, J. S., Vaughn, S., Gordon, J., & Rothlein, L. (1994). General education teachers' beliefs, skills, and practices in planning for mainstreamed students with learning disabilities. *Teacher Education and Special Education, 17*(1), 22-37. https://doi.org/10.1177/088840649401700104

Senemoğlu, N. (2010). *Gelişim, öğrenme ve öğretim: Kuramdan uygulamaya* [Development, learning and instruction: From theory to practice]. Pegem Academy.

Simmons, D. C., Kameenui, E. J., & Chard, D. J. (1998). General education teachers' assumptions about learning and students with learning disabilities: DeSign-of-inStiriction analysis. *Learning Disability Quarterly, 21*(1), 6-21. https://www.jstor.org/stable/1511369

Soares, N., Evans, T., & Patel, D. R. (2018). Specific learning disability in mathematics: A comprehensive review. *Translational Pediatrics*, *7*(1), 48–62. https://doi.org/10.21037/tp.2017.08.03

Şahin, S. (2017). Bilişsel gelişim [Cognitive development]. In N. Baysal Metin (Ed.). *Doğum öncesinden ergenliğe çocuk gelişimi* [Child development from prenatal to adolescence] (pp. 83-122). Pegem Academy.

Şahin, A., & Gürler, B. (2018). Destek eğitim odasında ve kaynaştırma ortamlarında çalışan öğretmenlerin bireyselleştirilmiş eğitim programı hazırlama sürecinde yaşadıkları güçlüklerin belirlenmesi [Determining the difficulties experienced by teachers working in the support education room and in inclusive environments during the process of preparing an individualized education program]. *Adıyaman University Journal of Social Sciences/Adıyaman Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 10*(29), 594-625. https://doi.org/10.14520/adyusbd.437206

Therrien, W. J., Hughes, C., & Hand, B. (2011). Introduction to special ıssue on science education and students with learning disabilities. *Learning Disabilities Research & Practice, 26*(4), 186–187. https://doi.org/10.1111/j.1540-5826.2011.00339.x

Tunçeli, H. İ., & Zembat, R. (2017). Erken çocukluk döneminde gelişimin değerlendirilmesi ve önemi [Evaluation and importance of development in early childhood]. *Journal of Educational Theory and Practical Research/ Eğitim Kuram ve Uygulama Araştırmaları Dergisi, 3*(3), 1-12. https://bit.ly/3RcrPUT

Ulutaş, A., Demir, E., & Yayan, E. H. (2017). Motor gelişim eğitim programının 5-6 yaş çocukların kaba ve ince motor becerilerine etkisinin incelenmesi [Investigation of the effect of motor development training program on gross and fine motor skills of 5-6 years old children]. *Abant İzzet Baysal University Journal of the Faculty of Education/Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi, 17*(3), 1523-1538. https://doi.org/10.17240/aibuefd.2017.17.31178-338846

Vuijk, P. J., Hartman, E., Mombarg, R., Scherder, E., & Visscher, C. (2011). Associations between academic and motor performance in a heterogeneous sample of children with learning disabilities. *Journal of Learning Disabilities, 44*(3), 276–282. https://doi.org/10.1177/0022219410378446

Yangın, S., Yangın, N., Önder, V., & Şavlığ, A. (2016). Sınıf öğretmeni adaylarının ve öğretim elemanlarının çeşitli öğrenme güçlüklerine yönelik farkındalıkları [Awareness of classroom teacher candidates and instructors about various learning disabilities]. *Education Sciences*, *11*(4), 243-266. https://doi.org/10.12739/NWSA.2016.11.4.1C0664

Yavuzer, H. (1998). *Çocuk eğitimi el kitabı* [Child education handbook] (6th ed.). Remzi Bookstore.

Yurdakul, İ. H., & Susar-Kırmızı, F. (2013). Views and insights of elementary teacher candidates on sound-based sentence method *(Case of Pamukkale University). Procedia-Social and Behavioral Sciences, 106,* 3303-3311. https://doi.org/10.1016/j.sbspro.2013.12.382