Descriptive content analysis of graduate theses in the field of pre-school science education in Turkey

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Abstract. The purpose of this study was to analyze graduate theses carried out in the field of pre-school science education in Turkey to reveal general tendency in this field. For this purpose, the database of Council of Higher Education (CHE) National Thesis Center was used to determine theses. As a result of the screening, a total of 86 graduate theses including 67 master's theses and 19 doctoral dissertations conducted between the years of 1994 and 2018 were included in to the study. The theses were examined through descriptive content analysis by a data collection tool called the theses classification form. The data obtained in the form were transferred to Microsoft Excel and the descriptive statistics were presented as graphs, percentage, and frequency tables. According to the results, it was found that more studies are needed in the field of pre-school science education. Based on findings, recommendations were made.

Keywords: Pre-school, science education, descriptive content analysis

INTRODUCTION

The term science comes from the Latin word "scientia" and means "knowledge" that is processing information rather than misunderstanding or ignoring it (Martin, Sexton, Wagner, & Gerlovich, 1997). Science can be defined as an effort to systematically examine, discover, and understand the observed nature and natural phenomena, and to predict events that have not yet been observed (Çepni, 2012). Pre-school, which is the first period encountered with science, is crucial both in terms of permanence of gained knowledge and as a basis for the knowledge to be gained in the following years (Alisinanoğlu, Özbey, & Kahveci, 2015; Spodek & Saracho, 2007).

Pre-school education, which is defined as a conscious and systematic education process that best directs their development in terms of body, mind, emotion, and social aspects in line with the cultural values and characteristics of the society (Zembat, 2001) provides rich stimulating environment opportunities suitable for the individual characteristics and development levels of 0-6 year old children. In the process of exploring their environment, children can acquire science concepts informally and intuitively through interaction with other entities (Bowman, 1998). Pre-school education institutions are the first step in the systematic support and development of children's experiences through informal means beyond coincidences (Aktaş Arnas, 2002). Pre-school education, which constitutes the first step of education, covers the years from the day the child is born to the beginning of basic education and plays an important role in the life of children. It is a process in which physical, psycho-motor, social-emotional, mind and language development that is largely completed, personality is shaped and the child is constantly changed. Pre-school experiences significantly affect the child's future life perspective. In order to raise healthy, happy, and creative children, it is essential to know this period and evaluate it in the best possible way (Aral, Kandır, & Can, 2002).

Children become aware of the world around them through science and acquire scientific inquiry skills such as curiosity, inquiry, discovery, and research through a variety of scientific experiences introducing basic science concepts (Tu, 2006). Presenting science-related learning opportunities, especially at an early age, can help children change and improve their thought processes. In this way, children gain the ability to think analytically in questioning and understanding their environment (Hamurcu, 2002).

Science education in pre-school is significant in terms of increasing children's closeness to science, positive attitudes towards science, and scientific process skills gained in this period (Davies & Howe, 2003) because they learn basic science concepts and scientific processes. Scientific process skills gained during this period would provide many skills that can be helpful in daily life (Akman, 2003; Lind, 2000).

Children have a natural sense of curiosity and discovery (Uyanık-Balat, 2010). For this reason, pre-school education environments are suitable places for young children to conduct research and make sense of the world around them through daily experiences provided by their teachers (Jones & Courtney, 2002). By using children's curiosity, teachers can increase kids' knowledge of scientific concepts and improve their scientific thinking skills (Aktaş Arnas, 2002). Pre-school science education is organized in accordance with the age, developmental characteristics, and interests of the children in a daily plan (Alisinanoğlu, Özbey, & Kahveci, 2015).

Scientific development characteristics of children should be taken into consideration while determining pre-school science activities. The reasons for that as follows: Children in the 5-6 age group cannot grasp or make inferences that they did not observe or do in person; there is only one perspective on events, they do not accept different perspectives; they can focus on one aspect of an event or object at the same time; and they cannot organize the flow of an event in a logical order (Harlen, 1985). Because pre-school children are in the pre-procedural period, it is difficult for them to understand abstract concepts. Most of the concepts in science are abstract. Therefore, it is important to embody abstract information in the teaching of science concepts (Şahin, 2000; Şahin, 2016).

Science activities are defined as activities that encourage children to pay attention, ask questions, wonder, observe, research, study, and discover in 2013 pre-school education program in Turkey. It is emphasized that teachers' attitudes should be suitable and they should behave appropriately in order to make sure children use scientific process skills, to ensure environmental awareness (MEB, 2013).

In recent years, content analysis studies are carried out to reveal current trends in science education in national literature (Bacanak, Değirmenci, Karamustafaoğlu, & Karamustafaoğlu, 2011; Çalık, Ünal, Coştu, & Karataş, 2008; Doğru, Gençosman, Ataalkın, & Şeker, 2012; Güven, 2014; Sozbilir & Kutu, 2008; Wassink & Sadi, 2016) and international literature (Lee, Wu, & Tsai, 2009; Lin, Lin, Potvin, & Tsai, 2019; Tsai & Wen, 2005). In Sozbilir & Kutu's (2008) study, which was the one of the first studies for determining the trends of science education in Turkey, 413 published studies in the field of science education were examined. As a result, although the science education research was starting in 1990s in Turkey, it took great attention; the number of papers reached a peak around 2005 but then showed a decline in 2006 and 2007 and there were big similarities with the international trends. In Doğru, Gençosman, Ataalkın, & Şeker's (2012) study, 591 graduate theses completed in the fields of science/science and technology, physics, chemistry, and biology education in the period of 1990-2009 were analyzed. As a result, a significant increase had been observed in the number of theses published since 2005.

It is noteworthy that in the literature, the number of content analysis studies related to pre-school science education is quite low. Erturk Kara and Sengul (2016) examined 30 articles and 25 graduate theses published in the field of pre-school science education between 2000 and 2014 in Turkey by using content analysis method. The results of the study showed that more studies in the field of pre-school science education were needed. In another similar study by Güneş (2018), 40 articles published in the field of pre-school science education between the years 2013-2017 in Turkey were examined. In this study, it was determined that although there were more studies carried out with children, teachers and prospective teachers; there was limited number of studies carried out with parents.

This paper intends to investigate the general tendency in the field of pre-school science education. For this purpose, graduated theses completed between the years of 1994 and 2018 were analyzed with descriptive content analysis. Therefore, information on the historical development and current status of the studies carried out at the graduate level in the field of pre-school science education can be assessed with this study. This study is important because

the literature lacks of comprehensive studies examining graduate theses in the field of pre-school science education. Thus, the following questions were sought in this study:

1. What is the distribution of the universities the completed theses were in?
2. What is the distribution of the analyzed theses across years?
3. What subject matters are investigated in the analyzed theses?
4. Which teaching approaches/methods/techniques are used in the analyzed theses?
5. Which research approaches/designs/methods are used in the analyzed theses?
6. What is the distribution of the research approaches used across years in the analyzed theses?
7. Which data collection tools are used in the analyzed theses?
8. What are the samples/working groups and sizes studied in the analyzed theses?
9. Which data analysis methods and techniques are used in the analyzed theses?

METHODS

This study was carried out on the basis of descriptive content analysis. Descriptive content analysis is a systematic study in which qualitative and quantitative studies on a particular subject are examined and trends are evaluated. The results obtained in these studies are handled in a descriptive manner (Cohen, Manion, & Morrison, 2007; Çalık & Sözbilir, 2014; Selçuk, Palancı, Kandemir, & Dündar, 2014).

Samples

Higher Education Council National Thesis Center Database was used to determine Graduate theses to be examined within the scope of the study. To do this, first of all, a general screening was made by the keywords pre-school/early childhood/5-age/6-age, science education/teaching, nutrition, and health. Each keyword was searched separately. Later, theses which were published in Pre-school Education Department, Department of Early Childhood Education, Child Development, Child Development and Education and Child Development and Home Management Education Department were examined in detail in the same database and theses which were related to the science education were included in to the study. The years of the studies were not restricted in this phase of the study. It was observed that the first graduate thesis in the field was carried out in 1972. The graduate theses restricted to be found on the database by the author were not included in the study. As a result of the screening phase, a total of 86 graduate theses including 67 master's theses and 19 doctoral dissertations with access permission were included in the study for content analysis. In Table 1, information about descriptive statistics of the theses included in the study is presented.

Table 1. *Descriptive statistics of the graduate theses in the pre-school science education field*

Type of thesis	f	%	Language of thesis	f	%
Master's	67	77.91	Turkish	81	94.19
Doctoral	19	22.09	English	5	5.81
Total	**89**		**Total**	**89**	

Data Collection Tools

In order to classify theses, adapted version of article classification form developed by Sozbilir, Kutu and Yasar (2012) was used. The article classification form consists of six parts: the identity of article, subject, method, data collection tool, sample/study group, and data analysis methods.

The identity of the theses was adapted because the identity subject section of the theses was rearranged in the field of pre-school science education in line with expert opinions by the researchers. The revised form was named as the thesis classification form by the researchers.

Data Analysis

For each thesis included in the study, content analysis was done by filling out the thesis classification form. In order to make a reliable classification, several randomly selected theses were classified by both authors using the thesis classification form separately and the results were found to be fully compatible with each other. Therefore, the rest of the theses were classified by the first author.

In content analysis, which is the most used analysis method among the qualitative data analysis, the relevant categories of research were developed first, and then the words, sentences or pictures that fall into these categories were counted in the data set examined (Silverman, 2001). The data in the thesis classification forms were transferred to Microsoft Excel and the results were analyzed. The results were presented in a descriptive manner as frequency and percentage tables and charts.

RESULTS

In this section, the results obtained by analyzing the data are presented as a table or graph using the frequency (f) and percent (%) units in line with the research questions respectively.

Distribution of Theses in Terms of University

The distribution of graduate theses in the field of pre-school science education in terms of the universities where they were completed was presented in Table 2.

Table 2. *Distribution of graduate theses on pre-school science education in terms of universities*

University	Master's		Doctoral		Total	
	f	%	F	%	f	%
Abant İzzet Baysal University	4	5.97	1	5.26	5	5.81
Anadolu University	5	7.46	0	0.00	5	5.81
Ankara University	1	1.49	1	5.26	2	2.33
Bahçeşehir University	1	1.49	0	0.00	1	1.16
Başkent University	1	1.49	0	0.00	1	1.16
Boğaziçi University	1	1.49	0	0.00	1	1.16
Çanakkale Onsekiz Mart University	1	1.49	0	0.00	1	1.16
Çukurova University	4	5.97	1	5.26	5	5.81
Dokuz Eylül University	3	4.48	0	0.00	3	3.49
Dumlupınar University	1	1.49	0	0.00	1	1.16
Ege University	2	2.99	0	0.00	2	2.33
Gazi University	8	11.94	1	5.26	9	10.47
Hacettepe University	0	0.00	5	26.32	5	5.81
İnönü University	1	1.49	0	0.00	1	1.16
Kafkas University	1	1.49	0	0.00	1	1.16
Karadeniz Teknik University	0	0.00	1	5.26	1	1.16
Kastamonu University	2	2.99	0	0.00	2	2.33
Marmara University	2	2.99	2	10.53	4	4.65
Mersin University	1	1.49	0	0.00	1	1.16
Mustafa Kemal University	1	1.49	0	0.00	1	1.16
Necmettin Erbakan University	3	4.48	0	0.00	3	3.49
Middle East Technical University	2	2.99	2	10.53	4	4.65
Okan University	2	2.99	0	0.00	2	2.33
Ondokuz Mayıs University	0	0.00	1	5.26	1	1.16
Pamukkale University	1	1.49	0	0.00	1	1.16
Recep Tayyip Erdoğan University	2	2.99	0	0.00	2	2.33
Selçuk University	11	16.42	3	15.79	14	16.28
Trakya University	1	1.49	0	0.00	1	1.16
Uludağ University	1	1.49	1	5.26	2	2.33
Yeditepe University	2	2.99	0	0.00	2	2.33
Yıldız Teknik University	2	2.99	0	0.00	2	2.33
Total	67	100	19	100	86	100

In Table 2, it is seen that most of the theses examined were carried out at Selçuk University. 14 theses were carried out at Selçuk University in the field of pre-school science education, including 11 master's (16.42% of all master's theses), 3 doctoral dissertations (15.79% of all doctoral dissertations). Then, it is seen that nine theses were carried out at Gazi University, including 8 master's theses (11.94% of all master's theses), 1 doctoral dissertation (5.26% of all doctoral dissertations).

In addition, Table 2 shows that most of the master's theses examined were carried out at Selçuk University and most of the doctoral dissertations examined were carried out at Hacettepe University (26.32% of all doctoral dissertations).
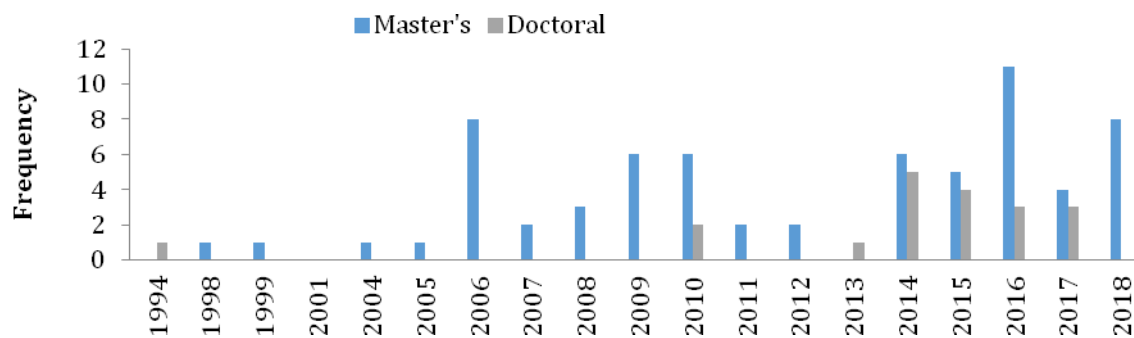
Distribution of Theses across Years

FIGURE 1. *Distribution of graduate theses in the field of pre-school science education across years*

Figure 1 shows the distribution of the theses examined within the scope of the study according to year they were completed. It is seen that there were few studies between 1994-2005 years, and after 2005 there was a big increase in the number of theses. The year in which most thesis studies related to pre-school science education were carried out was 2016 with 14 theses including 11 master's theses and 3 doctoral dissertations. It is also noteworthy to mention that no thesis on pre-school science education was conducted between 1995-1997 years and between 2000-2003 years.

Subject Matters in Theses

The investigated subject matters of the theses at the field of pre-school science education were divided into three categories, called the main subject, subjects, and sub-subjects. The main subject, subjects, sub-subjects, and their distributions of the theses analyzed were given in Table 3. Because more than one subject was studied in analyzed theses the total number of subjects exceeded the number of theses analyzed. For this reason, percentages of the subjects were determined according to the total number of subjects.

As Table 3 shows, the following three main subjects were studied at most: Teaching (72.09%), learning (29.07%), and teacher (22.09%). In addition, it was seen that small numbers of studies have been studied on parents (1.16%), measurement-evaluation (2.33%), educational problems (2.63%), nature of science (01.16%), and socio-cultural aspects (1.16%) as the main subjects.

When studies about teaching were investigated in detail, it was understood that the most studied subject was the effect of teaching on students (60.47%). Also, material supported teaching (6.98%) and method evaluation (4.65%) subjects were placed among studies related to teaching. The effect of teaching on studies about cognitive behaviors (26.74%), it was determined that it was the most studied sub-subjects among the effect of teaching on students' studies. Then, second sub-subject studied among the same subject was the effect of teaching on developing skills; psychomotor, scientific process skills etc. (17.44%).

Table 3. *Subject matters studied in graduate thesis in pre-school science education*

Main subjects (MS)	Subjects (S)	Sub-subjects (S-S)	f_{S-S}	$\%_{S-S}$	f_S	$\%_S$	f_{MS}	$\%_{MS}$
Teaching	The effect of teaching on students	The effect of teaching on cognitive behaviors	23	26.74	52	60.47	62	72.09
		The effect of teaching on developing skills (psychomotor, scientific process skills etc.)	15	17.44				
		The effect of teaching on affective behavior	7	8.14				
		The effect of teaching on language and concept development	1	1.16				
		The effect of teaching on readiness	1	1.16				
		The effect of teaching on cause and effect relationship	1	1.16				
		The effect of teaching on scientific creativity	3	3.49				
		The effect of pre-school education on future science success	1	1.16				
	Method evaluation	Applicability of the teaching method	1	1.16	4	4.65		
		Teachers' views on teaching methods	2	2.33				
		Comparing teaching methods	1	1.16				
	Material supported teaching	Computer assisted teaching	2	2.33	6	6.98		
		Teaching materials	4	4.65				
Learning	Situation detection	Determination of the level of success	5	5.81	25	29.07	25	29.07
		Determination of affective behaviors	15	17.44				
		Determination of psychomotor behavior/scientific process skills	3	3.49				
		Determination of thinking styles	1	1.16				
		Determination of learning approach	1	1.16				
Teacher	Situation detection	Teachers' views on science education	10	11.63	17	19.77	19	22.09
		Teachers' use of methods/activities/application situations	5	5.81				
		Teacher competences	2	2.33				
	Teacher education	In-service education	2	2.33	2	2.33		
Parents	Situation detection	Parents opinion about science education	1	1.16	1	1.16	1	1.16
Measurement-evaluation	Development measuring tool	Scale/test development	2	2.33	2	2.33	2	2.33
Educational problems	Situation detection	Problems in science education	3	3.49	3	3.49	3	3.49
Nature of science	Status detection	Determining students' understanding	1	1.16	1	1.16	1	1.16
Socio-cultural aspects	Situation detection	Science education in the countryside	1	1.16	1	1.16	1	1.16

When studies about teaching were investigated in detail, it was understood that the most studied subject was the effect of teaching on students (60.47%). Also, material supported teaching (6.98%) and method evaluation (4.65%) subjects were placed among studies related to teaching. The effect of teaching on studies about cognitive behaviors (26.74%), it was determined that it was the most studied sub-subjects among the effect of teaching on students' studies. Then, second sub-subject studied among the same subject was the effect of teaching on developing skills; psychomotor, scientific process skills etc. (17.44%).

When studies related to learning were investigated in detail, it was seen that there was only one subject called situation detection (29.07%) and determination of affective behavior (17.44%) studies, the most studied sub-subject among them. In the same subject, there were determination of the level of success (5.81%), determination of psychomotor behavior/scientific process skills (3.49%), determination of thinking styles (1.16%), and determination of learning approach (1.16%) sub-subjects.

As Table 3 shows, the studies about teacher had two sub-subjects: Situation detection studies (19.77%) and teacher education studies (2.33%). When situation detection studies were investigated in detail, it was seen that the most studied sub-subject was teachers' views on science education (11.63%). Also, it was seen that there were two other sub-subjects called teachers' use of methods/activities/application situations studies (5.81%) and teacher competence studies (2.33%). Table 3 also shows that each of the parents, measurement-evaluation, nature of science, and socio-cultural aspects studies among main subjects had only one subject and its sub-subject.

Teaching Approach-Theory/Methods/Techniques Used in Theses

Teaching approaches or theories, methods, and techniques and their distributions in theses were given in Table 4. As Table 4 shows, teaching approaches or theories were used in 11.63%, the teaching methods were used in 22.09%, and the teaching techniques were used in 2.33% in analyzed theses.

Table 4. *Teaching approach-theory/methods/techniques studied in graduate theses in the pre-school science education*

		f	%
Teaching approach or theory	Constructivism	4	4.65
	STEM (Science-Technology-Engineering-Mathematics)	3	3.49
	Montessori	2	2.33
	Multiple intelligence theory	1	1.16
	Sub-total	10	11.63
Teaching method	Inquiry-based teaching	5	5.81
	Argumentation	1	1.16
	Brain-based learning	1	1.16
	Computer assisted teaching	1	1.16
	Experimental Method	1	1.16
	Drama	1	1.16
	Creative drama	1	1.16
	Project based teaching	1	1.16
	Creative problem solving	1	1.16
	Intensive science education	1	1.16
	Activity based science teaching	1	1.16
	Out-of-school learning	1	1.16
	Teaching through physical education activities	1	1.16
	Education from child to child	1	1.16
	Teaching supported by open space activities	1	1.16
	Sub-total	19	22.09
Teaching technique	Analogy	1	1.16
	Predict-Observation-Explain	1	1.16
	Sub-total	2	2.33

When Table 4 was examined, it was seen that the most used approach was constructivist approach (4.65%). Also, STEM (Science-Technology-Engineering-Mathematics) (3.49%), Montessori approach (2.33%) and multiple intelligence theory (1.16%) were used in the theses analyzed respectively. As Table 4 shows inquiry-based teaching method was the most used teaching method (5.81%). It was also seen that student-centered teaching methods such as argumentation, brain-based learning, computer-aided teaching, experiment, drama, creative drama, and activity-based science teaching were used as teaching method in analyzed theses. It was also seen that only analogy and prediction-see-explain techniques were used in the theses.

Research Approaches/Designs/Methods Used in Theses

Table5.*Research approaches/designs/methods used in graduate thesis in pre-school science education*

Research Approaches (RA)	Research Design (RD)	Research Methods (RM)	f_{RM}	$\%_{RM}$	f_{RD}	$\%_{RD}$	f_{RA}	$\%_{RA}$
Quantitative	Experimental	True-experimental	0	0	35	40.70	59	68.60
		Quasi-experimental	34	39.53				
		Pre-experimental	1	1.16				
		Single subject	0	0				
	Non-Experimental	Descriptive	2	2.33	24	27.91		
		Comparative	1	1.16				
		Correlational	0	0				
		Survey	21	24.42				
		Ex-post facto	0	0				
		Secondary data analysis	0	0				
Qualitative	Interactive	Ethnographic study	1	1.16	15	17.44	15	17.44
		Phenomenographic study	3	3.49				
		Case study	8	9.30				
		Grounded theory	0	0				
		Critical studies	0	0				
		Qualitative descriptive	1	1.16				
		Action research	2	2.33				
	Non-Interactive	Historical analysis	0	0	0	0		
		Concept analysis	0	0				
		Review	0	0				
		Metasynthesis	0	0				
		Others	0	0				
Mixed	Mixed	Explanatory	4	4.65	12	13.95	12	13.95
		Exploratory	0	0				
		Triangulation	5	5.81				
		Embedded	3	3.49				
Total			86	100	86	100	86	100

When the findings in Table 5 were analyzed, it was understood that experimental designs (40.70%) were preferred more than non-experimental designs (27.91%) in terms of quantitative research patterns. It was revealed that among the experimental designs, the semi-experimental method (39.53%) was the most preferred, while the semi-experimental method was the most preferred method in all the investigated studies. In addition, it was seen that the weak experimental method (1.16%) was used even though a little less than the experimental designs.

Table 5 shows that among the non-experimental designs, the most scanning method (24.42%) is used, although a little descriptive (2.33%) and comparative (1.16%) research methods are used. Also, in Table 5, it is understood that while interactive designs are preferred among qualitative research patterns (17.44%), non-interactive patterns are not preferred. It is seen that the case study (9.30%) method, which is one of the interactive patterns, is used later,

with case studies (3.49%), action research (2.33%), cultural analysis (1.16%), and qualitative descriptive (1.16%) methods.

According to Table 5, it appears that mixed research approaches were less preferred than other approaches (13.95%), the most diverse method of mixed patterns (5.81%), and then descriptive (4.65%) and embedded (3.49%) research methods, respectively.

Trends of Research Approaches Used in Theses across Years

Figure 2 shows that trends in research approaches across years to identify if there was any significant shift in used approaches. As seen from Figure 2, quantitative research approaches which were highly common initially started to lose their commonality although they are still dominant. Qualitative research approaches are in a trend that continues to be used even though it decreases occasionally. However mixed research approach is slightly increasing in recent years, except for 2018.
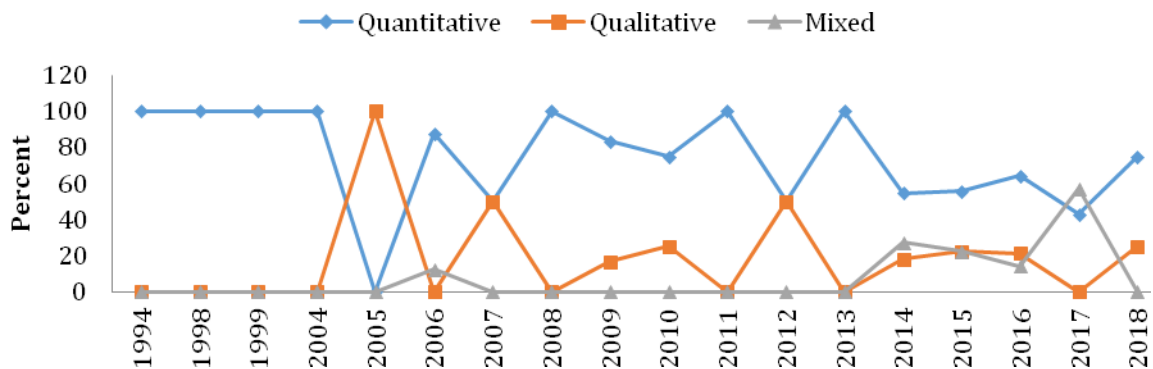

FIGURE 2. *Trends in research approaches across years (1994–2018)*

Data Collection Tools Used in Theses

Data collection tools used in the thesis studies examined are presented in Table 6. The total numbers of data collection tools were not calculated as more than one data collection tool could be used in a single study. The percentages calculated were arranged according to the total number of theses (N=86) subjected to analysis.

Table 6. *Data collection tools used in graduate thesis in pre-school science education*

Type of data collection tools	f	%
Questionnaires	25	29.07
Achievement/Concept tests	33	38.37
Aptitude, attitude, perception, personality etc. tests	38	44.19
Interviews	24	27.91
Observations	19	22.09
Alternative assessment tools	7	8.14
Documents	7	8.14
Information forms	15	17.44

Table 6 indicates that the most data collection tools used was aptitude, attitude, perception, personality, and etc. tests (44.19%). Then, it is seen that achievement/concept tests (38.37%), questionnaires (29.07%), interviews (27.91%), observation (22.09%) and information forms (17.44%) were widely used respectively. It is seen that the least used data collection tools were alternative assessment tools (8.14%), and documents (%8.14).

Samples/Working Groups and Sample/Working Group Sizes Used in Theses

Table 7 and Figure 3 show samples/working groups and sample/working group sizes used in theses analyzed. The total numbers of samples/working groups were not calculated as more than one samples/working group could be used in a single study. The percentages calculated were arranged according to the total number of theses (N=86) subjected to analysis.

Table 7. *Samples/working groups used in graduate thesis in pre-school science education*

	f	%
Pre-school	50	58.14
Primary(1-4)	1	1.16
Primary(5-8)	1	1.16
Undergraduate	8	9.30
Teachers	30	34.88
Master trainers	1	1.16
Parents	8	9.30
Curriculum and instruction	1	1.16
Administrators	2	2.33
Local school leaders	1	1.16

Table 7 indicates that most of data were collected from pre-school (58.14%) and teachers (34.88%). Then it is seen that undergraduate students and parents were used in equal percentage (9.30%) and a small number of data were collected from administrators, local managers, master trainers, primary students (1-4), and primary students (5-8).
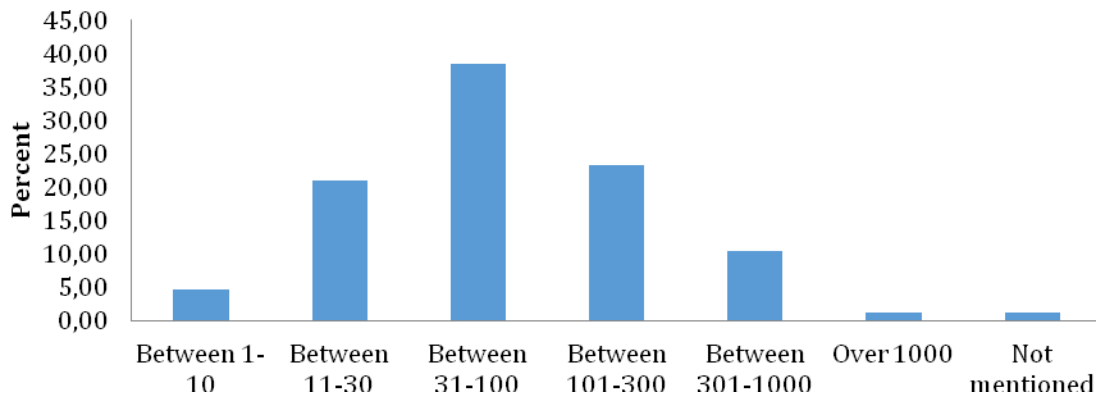

FIGURE 3. *Samples/working groups sizes used in graduate thesis in pre-school science education*

Figure 3 indicates that most commonly selected sample/working group sizes were 31–100 participants (38.37%) and the least selected sample/working group sizes were 1-100 (4.65%) and over 1000 (1.16%) participants. In addition, it is seen that the size of sample group was not mentioned in a study.

Data Analysis Methods and Techniques Used in Theses

Figure 4 shows data analysis methods and techniques used in the theses analyzed. In studies with more than one analysis method while analyzing the data, the coding process was constructed for each analysis method while collecting the data. Therefore, the percentages in Figure 4 calculated are arranged according to the total number of theses (N=86).
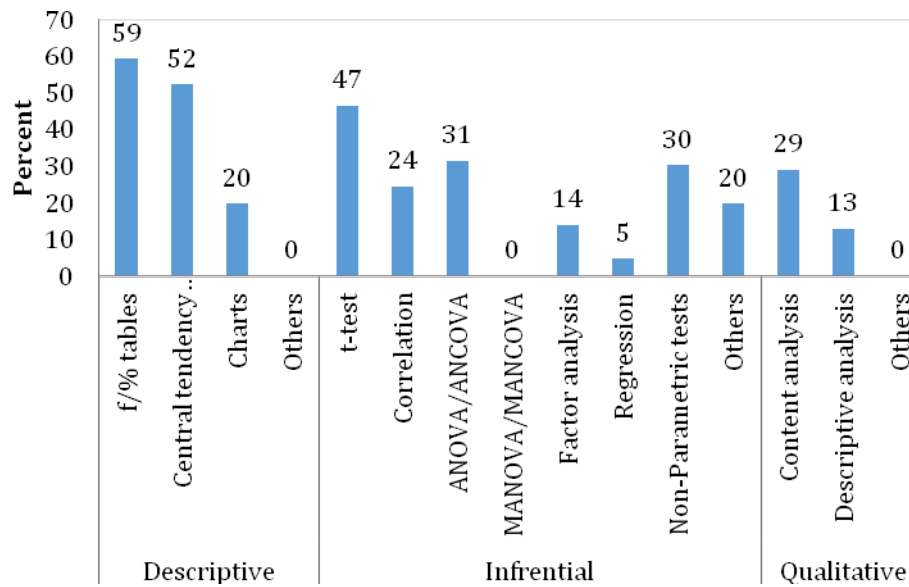
FIGURE 4. *Data analysis methods and techniques used in graduate theses in pre-school science education*

As it can be seen from the Figure 4, the most used data analysis technique among descriptive data analysis methods is calculation of frequencies and percentages (59%). The second one used for descriptive data methods is central tendency measures such as mean, mode, median, standard deviation (52%) and third one is charts (20%) in the analyzed theses. Among inferential data analysis methods, t-test is the most used data analysis technique (47%) and ANOVA/ANCOVA, non-parametric tests and factor analysis are widely used. However, there were few samples of regression, but there is no sample of MANOVA/MANCOVA. Among qualitative data analysis methods, the most used data analysis technique is content analysis (30%) and descriptive analysis is the second order (13%).

DISCUSSION, CONCLUSIONS and SUGGESTIONS

It is needed to determine trends and guide future studies in educational research by examining studies in the field at certain intervals. There are a few studies conducted in the field of pre-school science education in Turkey (Ertürk Kara & Şengül, 2016; Güneş, 2018). For this reason, this descriptive content analysis study was carried out to explore research in the field of pre-school science education completed between the years of 1994 and 2018. This study is important because of the fact that it provides a general sense and a big picture in the field of pre-school science education in Turkey.

According to the findings, there were 67 master's theses and 19 doctoral dissertations in the field of pre-school science education. Based on the findings, it can be suggested that more doctoral dissertations in the field of pre-school science education should be done It was also found that 81 of examined theses were written in Turkish and 5 in English. The English theses were completed at only Middle East Technical University and Boğaziçi University.

It was observed that graduate theses in the field of pre-school science education were mostly carried out at Selçuk University (16.28%) and later at Gazi University (10.47%). It was understood that the master's theses examined were mostly carried out at Selçuk University (16.42%) and then at Gazi University (11.94%), while doctoral dissertations were mostly carried out at Hacettepe University (26.32%) and then at Selçuk University (15.79%). It can be said that related programs such as pre-school/child development and child development and education/pre-school programs has been offered at Hacettepe University, Gazi University, and Selçuk University for a long time.

When the distribution of theses by years was analyzed, it was seen that there were few studies between 1994-2005 years and there has been a big increase since 2006. Pre-school education, which was previously carried out at the two-year associate degree level, started to be offered at the undergraduate level in 1998-1999 academic year and the first four-year degree students were graduated in 2002 (Dağlıoğlu, 2012). This situation is thought to be effective in the rapid increase of graduate studies in pre-school science education after 2005. Similar results were obtained in studies done by Sozbilir & Kutu (2008) and Doğru, Gençosman, Ataalkın, & Şeker (2012).

When we look at the main subjects studied in graduate thesis in the field of pre-school science education, it is understood that studies on the subject of teaching are the most, then learning and to a lesser extent on the subject of teachers. Among the studies on the main subject of education, the effect of teaching on students was examined the most; it was understood from the studies on the subject of learning that the most affective situation is determined and the studies on the subject of teachers are determined mostly from the studies on the subject of teachers. Particularly, parents, measurement-evaluation, problems experienced, the nature of science and the scarcity of socio-cultural aspects studies draw attention. For this reason, it is recommended to conduct studies on these issues primarily for researchers who would work in this field in the future. In the study, it is noteworthy to mention that studies on teaching methods, assessment, and material supported teaching, psychomotor behavior/scientific process skills determination, teacher competency determination and scale-test development are scarce. Therefore, it can be said that there is an important need to carry out studies on these issues.

When the theses within the scope of the study were examined in terms of teaching approaches/methods/techniques, it was seen that the most constructivist approach from the approaches and theories, the most inquiry-based teaching from the methods, and only the analogy and predict-observation-explain techniques were used. Although there are some studies that used some teaching approaches or theories such as STEM, Montessori approach, and multiple intelligence theory, and some teaching methods such as argumentation, brain-based learning, computer-assisted teaching, experimentation, drama, creative drama, activity-based science, they are very few in number and it can be said that more studies on methods, techniques, and techniques are needed.

It was determined in the study that quantitative research methods were used most, then qualitative research methods and mixed research patterns were used. The reason why more quantitative researches were preferred in the studies is the fact that the data could be collected faster and easier than qualitative methods and the analysis could be carried out more effortlessly (De Jong, 2007). It was also seen that among the quantitative research designs, experimental designs were preferred more than non-experimental designs, and semi-experimental designs were among the experimental designs and the method of scanning was among the non-experimental designs. This result is similar to the results obtained in the studies of Doğru, Gençosman, Ataalkın, & Şeker (2012), where graduate theses in the field of science education other than pre-school period were examined. It was understood that while interactive patterns were preferred from qualitative research patterns, non-interactive patterns were not preferred and the most case study method was used from interactive patterns. While mixed research designs were much less preferred than other designs, it was understood that the diverse methods were used among mixed designs. Based on this finding, the need to increase the number of studies using mixed and qualitative research patterns is remarkable.

According to the data obtained from the study, it was seen that in majority of theses in the field of pre-school science education, the data were collected with a single data collection tool and scale/inventory was preferred mostly as the data collection tool. In particular, there is a need for studies where alternative (complementary) measurement tools such as rubrics, concept maps, portfolios, performance tests, and documents such as scientific publications (articles, theses, books, etc.), textbooks and curricula to use as data collection tools.

It was seen that the pre-school children (3-6 years old) and then the teachers were the most common sampling/working group types in the theses examined. However, the number of

studies especially with parents was remarkable. This result is similar to the results of Güneş (2018). Because parents are also teachers of children outside of school (Hollingsworth & Hoover, 1999), it is thought that especially parents' work will be beneficial in order to better understand the impact or contribution of children to science education.

The findings of the study showed that while sample size between 31-100 participants was the most preferred, 1-10 sample size was not chosen. This could be mostly due to the use of quantitative research patterns in the studies examined. With the increasing number of studies where qualitative research patterns are preferred in the field of pre-school science education, more detailed and explanatory information can be obtained from smaller sample groups at a local level, which is not generalized.

In most recently studied theses, it was seen that quantitative predictive analysis methods, then quantitative descriptive analysis and at least qualitative data analysis methods were preferred. It was determined that the most t-test from quantitative predictive analysis methods, the most frequency/percentage tables from quantitative descriptive analysis methods, and the most content analysis method from qualitative data analysis methods. This result is a natural indicator of using the quantitative research approach in the theses examined.

The purpose of this research was to explore general tendency in pre-school science education research in Turkey. For this purpose, the national graduate theses between the years of 1994-2018 were analyzed. Based on the findings, it is recommended that national journal articles in the same field should be examined. It is also recommended that journal articles and theses in international context should be examined. By doing this, there is an opportunity to compare national and international research tendencies in pre-school science. Finally, more in-depth meta-synthesis studies can be conducted on differences between national and international setting.

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