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Abstract

This article focuses on preschool teachers' views on in-class science activities with Syrian refugee children. Studies concerning science teaching with bilingual children have issues about language and communication. In this study, data were collected by using 9 semi-structured open-ended questions. The case study method was used as research design, and the preschool teachers (N=58) working in Kilis, which is one of the effected cities by Syrian immigration were selected for data collection. Content analysis was used for the data analysis process. The results showed that language and communication is one of the significant issues in class. However, results also showed that Syrian children are more interested in animals and plants and have good observation skills. The teachers stated that they mostly used experimenting in class due to the children's scientific language skills. The study highlighted in-class presentations and discussions while teaching science with Syrian refugee children.

Introduction

“As I see that they do not understand me, I usually do...”. Many brave teachers who have bilingual students in their classroom are only able to finish the teaching session with the activities they invent or come up with while teaching in class. Sometimes they cannot even finish their sentences due to their lack of knowledge about how they can teach in a multilingual classroom in Turkey. After the Syrian civil war, many children and families moved to Turkey, and several companies and public departments were concerned about these children's education and families' integration into host countries. According to the UNICEF (January-June, 2019) report, “nearly 11,500 Turkish and Syrian children benefited from the home-based Early Childhood Education (ECE) programs, while more than 2800 children across the southeast enrolled in ECE summer school classes in June 2019” (p.5). In this context, a 10-week summer school program was held to improve Syrian children's Turkish and support them to have access into Turkish schools. Even if the Syrian children got ready to early childhood education in Turkish schools, in-service teachers did not get enough help about how they could give education to Syrian children without knowing their language. Surprisingly, in addition to the fact that most Turkish teachers do not feel qualified to teach science in early childhood level, teaching science to Syrian children have brought new challenges for preschool teachers. This situation is the “fate of Syrian children and their early childhood teachers”, said one of the principals who directed a pre-k school in a shelter area in Kilis, Turkey. The principal also concluded that “Our young teachers of early childhood feel that they cannot handle these

conditions and some of them are planning to quit work. This is because our school has only Syrian children, who saw and lived through the Syrian war”. She also stated that teachers were tired of seeing the traces of war in children's paintings. In the current study, these drawbacks were explored by the keystones of early childhood education, “teachers”.

Syrian Refugees in Turkey

The Ministry of Interior, Directorate General of Migration Management [DGMM], (2019) shared the data about the number of Syrian immigrants heading to Turkey by years. Nowadays, the latest report showed that there are 3,695,964 Syrian refugees in Turkey (DGMM, 2019) (see Figure 1).

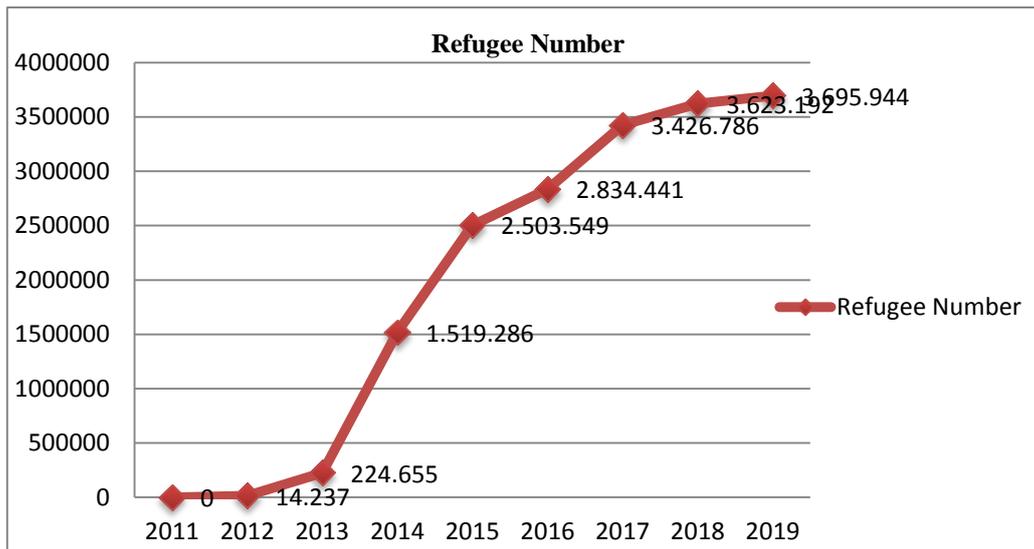


Figure 1. Number of Syrians in Turkey (DGMM, 2019)

In addition, given data (DGMM, 2019) show that most of the Syrian refugees are children. According to the UNICEF Turkey Humanitarian Situation Report, there are 559,839 Syrian children who are under five years of age (January-June, 2019) (see Table 1).

Table 1. UNICEF Turkey Humanitarian Situation Report (January-June, 2019)

	Registered Syrians		Registered non-Syrians		Total
	Male	Female	Male	Female	
Total Affected Population	1.963.465	1.663.355	231.569	136.660	3.995.049
Children Affected (Under 18)	828.550	763.326	63.771	55.895	1.711.542
Children Under Five	273.647	255.571	15.718	14.903	559.839
Children Enrolled in Formal Education	586.867		56.191		643.058
Children Out-of-School (est.)	N/A		N/A		400.000

According to the UNICEF report, there are 643,058 children who enrolled in formal education. These are really important data and according to the PT11: “Nowadays, the number of Syrian children in a class is more than Turkish children in most of the preschools in Kilis, Turkey. We do not know which language we should use in classroom, Arabic, which I do not know or Turkish, which is my mother language!”. This unexpected situation happened in preschool classrooms in Kilis, which has a border gate with Syria. Crépeau (2013) stated that children need more attention and support when they move to other countries. Similarly, other scholars also stated that one of the biggest challenges that families face when they migrate is surviving and educating children in other countries (Boyden, Berry, Feeny, & Hart, 2002). Rossi (2008) highlighted that children have trouble in the education system of a host country due to reasons of poverty, health conditions, and language. In addition, there is not any preparation in teacher education programs about these conditions in universities’ education departments. UNICEF’s office of research (2019) showed that these conditions also affect the Turkish children who are enrolled in the same classroom with their Syrian peers. Migrant children, therefore, have trouble in getting integrated into the education system in the host countries and teachers need to be qualified to teach in a bilingual classroom, especially in early childhood level.

Early Childhood Education

Early childhood education is an important period for children to improve their cognitive, social, language, and physical development (Özel, 2017; Yılmaz, 2003). The Turkish Ministry of National Education (MoNE) (2013) reported the fact that children who have had negative experiences in preschool period have low self-esteem and have low success in school. Therefore, the MoNE (2013) stated the aim of Turkish early childhood education as; “I) to ensure that children develop body, mind, and emotions, and gain good habits, II) to create a common upbringing environment for children who come from disadvantaged environments and family background, III) to ensure that children speak Turkish correctly and fluently, and IV) to prepare children to elementary education” (p.10). In line with these aims, all children (Turkish, Syrian, and other minority groups) are taught together in the classrooms where Turkish early childhood teachers are on duty.

Many researchers have stated that children should be taught the skills to be positive and respectful to their friends from different religious and ethnic backgrounds (Gollnick & Chinn, 1990). In the report of the MoNE (2013) there are two acquisitions, which are “respect to differences and explain different cultural characteristics” (p.76). In this point, early childhood teachers should concentrate on these acquisitions in their education in an effort to improving the children’s social development in Turkey. Therefore, preschool teachers use several activities to improve children’s development in a variety of disciplines such as science, language-art, mathematic, drama, and music.

Syrian Children in Early Childhood Education

Wars, migrations, and economic crises leave deep traces on children (Karadağ & Altıntaş, 2010). Language problem is known to be the biggest challenge in the education of refugees in the world (Dreyden-Peterson, 2011; Emin, 2016; Oh & Van der Stouwe, 2008; Oikonomidou, 2010; Özer, Komsuoğlu, & Ateşok, 2016;

Tanrıku, 2017). Moreover, language issues are associated with other problems such as academic achievement (Ceyhan & Kocabas, 2011). Recent research has revealed that children of immigrant families may experience emotional and behavioural problems as well as language problems in the early years of preschool education in Turkey (Kardeş & Akman, 2018; Sarıkaya, 2014, Yalçın, 2017; Yalçın & Simsar, 2020). Yalçın (2017) worked with early childhood teachers and families of Syrian children about the issues in early childhood education in Turkey. The researcher stated that the biggest problem that children experience in the new culture is the language problem and thus, children may easily isolate themselves from their peers (Yalçın, 2017), which reflects on the social skills and self-enhancement of such children.

Similarly, Kardeş and Akman (2018) also touched upon the language problem and emphasized that there may be problems in terms of adaptation to school regarding refugee children in the early childhood classrooms in Turkey. Moreover, the researchers stated that the teachers who have Syrian students in their early childhood classrooms do not make any changes in their teaching techniques or methods and classroom management. In this case, children have difficulty in adapting to the new classroom environment (Kardeş & Akman, 2018). Such children will, therefore, experience hard times in regards to school adjustment in their future education.

Mercan-Uzun and Bütün (2016) worked with Turkish early childhood teachers about the issues appearing in classrooms in which Syrian refugee children are supposed to be integrated. The researchers asserted that one of the biggest issues is school adjustment. They also concluded that children have trouble to contact and communicate with their teachers and peers because of their low language skills (Mercan-Uzun & Bütün, 2016). Likewise, in another study conducted with preschool teachers, 80% of the teachers indicated that they had language issues in their classrooms (Güven, Azkeskin, & Yılmaz, 2018). The researchers also stated that as a result of the language barrier in classes, most of the Syrian children preferred to play and spend time with other refugee children because they were sensitive and vulnerable, and therefore the adaptation process of such children took a long time. In addition, the researchers stated that there are many issues faced by preschool teachers pertaining to Syrian children in early childhood education in Turkey, because of the issues commencing when such children start school without any prior education-related plans (Mercan-Uzun & Bütün, 2016). In another study, Simsar (2020) concluded that most of the pre-service and in-service preschool teachers feel uncomfortable to teach in multicultural classrooms because of their less experiences with these group of children. Apparently, most prejudices were about the sanitation and health conditions under which the refugee children and their families live due to their socio-economic status.

Teaching Science in Early Childhood Education

Children's experiences in the early years have significant impacts on their later learning capacity (Worth, 2010). To improve children's early thinking and learning skills, science activities in early childhood education through richer and more challenging environments for learning have significant roles. It is stated that teaching science in preschool could be possible only by guided, skillful teachers (Worth, 2010). Moreover, it is also emphasized that "science may be a particularly important domain in early childhood, serving not only to build a basis for future scientific understanding but also to build important skills and attitudes for learning" (Worth, 2010, p.1).

Similarly, Aktaş (2002) stated that science teaching in early years does not necessarily mean teaching scientific knowledge, rather, it should be giving opportunities to children to learn by hands-on activities. Additionally, “developing and extending children’s interest is particularly important in the preschool years, when attention and self-regulation are nascent abilities” (Bowman, Donovan, & Burns, 2001, pp. 8- 9). It has been showed that preschool teachers could develop children’s interest and early learning skills by improving their basic science process skills, such as observing, classifying, communicating, measuring, and predicting (Büyükaşkapu, 2014). These process skills are also necessary for Syrian refugee children in classes for improving their learning skills. Hence, it has been stated that early childhood classrooms are appropriate places for children to improve their problem-solving skills, creative thinking skills, and scientific learning skills (Jones & Courtney, 2002).

In addition, some researchers stated that in this period, concrete perception of children is at the forefront and teachers should find the right ways for their teaching activities (Uyanık-Balat & Önkol, 2014). Researchers showed some of the appropriate teaching strategies and techniques which teachers could use while teaching science in class, i.e. concept mapping, experiments, observation and study trip, project, analogy, drama, and direct instruction (Uyanık-Balat & Önkol, 2014). However, preschool teachers should find the appropriate teaching strategies and techniques for their own early childhood classes. Simsar (2018) worked with 44 Turkish children and 6 American teachers about the Turkish students’ attitudes towards science. The study consisted of Turkish children who lived in the United States and for whom English was the second language. The study results showed that Turkish children had positive attitudes towards life science topics in science activities. Teachers using textbooks and hands-on actives had positive relationships with children’s attitudes towards science scores. The study also showed that preschool teachers should know their students’ interest and learning skills before they do in-class science activities (Simsar, 2018). In another study, Ünsal, Jakobson, Molander, and Wickman (2018) worked on bilingual children’s everyday language and science language skills. The authors stated that children’s everyday language repertoire was limited to make sense of science. The researchers also highlighted that making monolingual exams in education limited bilingual children’s achievement in science. They concluded that what “science teachers need to ask themselves is how they can support bilingual students within this process” (Ünsal, et al., 2018, p.338). Teachers are, therefore, the main source for solving problems about teaching science to refugee children in the classroom environment. However, teaching science in early childhood classes is one of the biggest drawback for teachers (Tu, 2006).

The researchers focusing on science education and teaching problems in Turkey generally state that teachers, classroom environment, students, and curriculum are the biggest barriers in teaching science (Balbağ, Leblebici, Karaer, Sarıkahya, & Erkan, 2016). Babaraoğlu and Metwalley (2018) worked with 189 Turkish preschool teachers about teaching science in early childhood education. They concluded that children’s interest, classroom materials, and the number of children in a classroom had an impact on science teaching. The researchers also indicated that due to the time spent on science, teachers would like to have in-service training about science teaching methods and techniques (Babaraoğlu and Metwalley, 2018). It could also be suggested for teaching science with bilingual children.

Within the same framework, Martinez-Alvarez (2019) stated that “there is a need to explore how minorized

children's linguistic and cultural resources can be employed in the science classroom." (p. 799). In Turkey, Turkish preschool teachers are expected to watch children's interests and background knowledge about science topics such as animals, plants, natural events, weather events, and etc. before they incorporate science activities into in-class practices. Martinez-Alvarez (2019) also stated that there is a growing movement about science for all children and need to create curricula for diverse populations. In addition, the researchers stated that "the goal of making science accessible for diverse learners is not new, and continues to grow" (Martinez-Alvarez, 2019, p. 802). Likewise, El Takach and Al Tobi (2021) suggested that teachers could use some materials to diagnose their students' science interest and previous ideas about science such as drawing a pictures about science. Especially at this point, before the Syrian civil war, there was not any work on science teaching for diverse populations in Turkey. In addition, there were not any classes related to teaching science to diverse groups of children in early childhood teacher education programs. Preschool teachers have a single Scientific Methods class about Teaching Science in Early Childhood Classroom. For example, in Kilis 7 Aralık University, Early childhood Teacher education program offers one course for their preservice teachers, which is Teaching Science in Early Childhood Classroom. When the syllabus of the course was analyzed, it is clear that it does not involve any methods to teach science to diverse groups of children in early years. So, early childhood teachers get their diploma from that university without any practical and/or theoretical development about Syrian refugee children, who will probably be attending their classroom.

Some researchers stated that "understanding the cultural backgrounds of students and the potential influence that culture might have in their acquisition of abstract knowledge is an important and laudable concern for teachers, teacher educators, and education researchers, particularly for those focusing on the education of students with backgrounds that differ from their own" (Mcnew-Birren & Gaul-Stout, 2019, p.618). Moreover, Ünal, et al. (2016) stated that lexical meaning of a word in a child's first language could differ from that of in their teacher's own language. Looking at the cultural backgrounds of the children who are bilingual in a classroom is one of the ways that can help preschool teachers while building their science activities. However, this is not the only way for effective teaching. There could be some problems in a classroom such as the lack of a science centre, insufficient materials, Syrian children's poor language skills, and teachers' insufficient skills of teaching science. When the origin of the problems is taken into consideration, relevant solutions will be found to boost early childhood education by teachers, researchers, and policy makers. For example, if the problem is observed to be the language skills of Syrian children, summer language programs can be organized to improve children's language skills, or preschool teachers can be supported by assigning translators to assist during classes. If the problem is related to the lack of sufficient materials in the classroom, or to the insufficient science teaching skills of the teachers, necessary materials can be provided to the classes by the National Education Directorates, and teachers can be given in-service training. At this point, this study aimed to explore the "views of Turkish teachers about the problems they face while they teach science to Syrian refugee children in their classrooms."

Method

Research Design

This study adopts qualitative case study research design as it aims to explore early childhood teachers' views on

their in-class science activities with the existence of Syrian refugee children. Case studies generally aim to explain cases in its real condition (Yıldırım & Şimşek, 2013). Cresswell (2007) suggested that researchers have chances to examine issues in depth by using case study design. By using case study research design in the current study, more data were explored in depth from participants' real conditions about what they do while teaching science in class with their foreign students.

Study Group

This study was conducted with preschool teachers in one of the cities in the Southeastern Anatolia region in Turkey with the highest number of immigrants in their preschool classrooms. The study group was appointed with the purposive sampling model to include the participants based on volunteering. The study group of this study consisted of 58 (53 female and 5 male) preschool teachers who had immigrant children in their classrooms.

Most of the preschool teachers in the study (91.4%) were female and their teaching experience was 1-3 years (24.1%) and 4-6 years (24.1%). The participants mostly have an Early Childhood Teaching degree (79.3%) and some of them had a Child Development degree (10.3%). Most of the preschool teachers already had experience about working with Syrian children (55.2%). The demographic data results showed that most of the classrooms has 16-21 (50.0%) and 22 and more (31.0%) children in the classrooms. In addition, most of the preschool teachers (46.6%) worked with Syrian children and some of them (29.3%) had 6-10 Syrian children in their classroom. Of all the preschool teachers, 24.1% of them had 11 and more Syrian children in their classrooms. Moreover, most of the participants (39.7%) had 1-2 years, some of them (32.8%) less than 1 year, and the rest of the participants had 3 years and more experiences about working Syrian children.

Data Collection Tool

The aim of the study was preschool teachers' views about their science teaching in classroom. Eisenhardt (1989) suggests that in the case study method, there are some different data collection techniques. One of them is the interviewing method. In line with the aim of the study, an interview form with 9 semi-structured open-ended questions was prepared for data collection. While creating interview questions, content validity and language validity were checked by the field experts (in the field of science education, in the field of preschool science education and in the field of language education). A pilot study was conducted by the working five preschool teachers who were not included in the study. Then the interview questions were checked in terms of comprehensibility. In the interview form, there are questions about science activities, science teaching methods, science content knowledge, supporting Syrian children's language skills by science activities, science teaching process and issues on science teaching when implementing in class science activities, etc.

Data Analysis

In the current study all the answers were transcribed into electronic formats and analyzed by the rules of case

study research method. The data about each preschool teacher was transferred to electronic environment. Creswel (2007) stated that data analysis process should be separated into important contents, sentences and examples about preschool teachers' answers for each interview questions. Yıldırım and Şimşek (2013) emphasize that in the analysis of data, certain codes and themes should be created in order to make the obtained data more understandable. To create certain codes and themes, Nvivo 12 program, which is the most common software program in qualitative data analysis was used for organizing the data. Moreover, important and common expressions of preschool teachers were collected under different codes. Frequency and percentage calculations were made for each theme and shown in tables. With these percentage and frequency distributions, it was aimed to explain each theme in more detail and in depth.

Leung (2015) stated that "in quantitative research, reliability refers to exact replicability of the processes and the results" (p. 326). In qualitative study, reliability of the study could be checked by working other coders. McAlister et al. (2017) stated that for calculating the reliability of qualitative study, it is common to have multiple coders code in the same data set. In addition, Miles and Huberman (1994) also created a formula for checking the study's reliability as stated as follows: $\text{reliability} = \left(\frac{\text{number of agreements}}{\text{number of agreements} + \text{disagreements}} \right) * 100$. Based on the results of the formula, Miles and Huberman (1994) suggested that 80% agreement between coders on 95% of the codes is sufficient for a qualitative study. A second coder who is an expert in science education in early childhood assisted to calculate the reliability score of the current study, which was found 86%. Current study results were reliable according to the formula by Miles and Huberman (1994).

Results

The demographic information about the participants showed that vast majority of the preschool teachers stated that their classroom is partially eligible for teaching science (65.5%) and majority of the classrooms have science centers (86.2). Most of the preschool teachers stated that their science centers in the classroom does not have enough materials (67.3%). Interestingly, only one preschool teacher stated that she had enough materials in her science center (1.7%). Moreover, few of the participants believed that their science center was sufficient for teaching science (8.6%). Most of the participants believed that their science center was partially sufficient for teaching science (56.9%). In addition, most of the preschool teachers did not have any lessons during their education or in-service training for teaching science with Syrian children (62.1%).

Preschool teachers' views on how often they teach science in their classroom were analyzed and results are shown in Table 2.

Table 2. Preschool Teachers' Frequency of Teaching Science in Classroom

Theme	Codes	<i>f</i>	%
Frequency of teaching science	Once a week or less	42	72.41
	2-3 times a week	15	25.86
	4 times and more	1	1.72

Table 2 shows that majority of the preschool teachers teach science once a week or less (72.41%). In addition, some of the preschool teachers teach science twice a week (25.86%), and only one preschool teacher stated that she teaches science 4 times and more (1.72%). The data results were not surprising for science teaching in early childhood education. The literature shows that most of the teachers give less time to teaching science in their classroom (Tu, 2006; Yılmaz-Tuzun & Topçu, 2008) due to lack of materials and confidence in teaching, as well as invalid preconceptions on science (Lind, 2000). In addition, the relevant literature also shows that most preschool teachers rather focus on children's social- emotional skills, and physical development (Worth, 2010). Some of the example of preschool teachers answers about related question:

PT30: "As far as the plan is concerned, we do science activities. Sometimes 1-2 times a week, sometimes once in every two or three weeks."

PT25: "Yes I do. We're trying to make once or twice a week. But it changes, depending on the children."

PT15: "I do. Three times a week. I integrate it with some activities such as, science and language art, science and music, science and drama... etc."

Safaaf, Muslim, and Liliawati (2017) stated that "science process skills are a set of skills used in scientific activities. Students with science process skills are actively involved in learning" (p. 1). In this way, science process skills are useful for children to improve their language, social and cognitive skills. These skills are also necessary for refugee children in classrooms. Table 3 demonstrates the results of the content analyses on preschool teachers' views about what they do for improving the scientific process skills of refugee children.

Table 3. Improving Refugee Children's Science Process Skills

Themes	Codes	<i>f</i>	%
Science Skills	Hand on activities	18	23.38
	Experiments	13	16.88
	Motivate children to arouse curiosity	12	15.58
	Ask open-ended questions	9	11.69
	Observation	7	9.09
	Giving responsibility to children	5	6.49
	Demonstration and taking	3	3.90
	Analyzing	3	3.90
	Playing	3	3.90
	No response	4	5.19

According to the data given in Table 3, most of the preschool teachers use *hands-on activities* (23.38%) for improving their children's science process skills during science activities. Moreover, some of them also do *experiments* (16.88%) and motivate children to arouse their curiosity (15.58). Among many different views, three of the preschool teachers use *analyzing* (3.90%), three of them use *demonstration* (3.90%), and three of them use *playing* (3.90%) in order to improve their students' science process skills. Finally, few of the preschool teachers give no response to the related questions (5.19%). The examples of some preschool teachers' views about improving their students' science process skills during science activities are as follows:

PT29: “By considering individual differences, we are trying to create a suitable environment for observation skills.”

PT11: “I encourage children to actively participate in experiments to gain scientific process skills. The child finds himself/herself in the activity and gains the desired skill more quickly.”

PT22: “I give children the opportunity to learn by hands-on activities. So, when children are in the process, their learning becomes more permanent.”

PT18: “I think that scientific process skills are very effective in understanding, interpreting, establishing a cause and effect relationship, understanding the effectiveness of science. I use games to improve basic scientific process skills of children. I think that they are more open to learning, which increases their curiosity.”

Table 4 shows the content analysis about preschool teachers’ opinions on refugee children’s success in in-class scientific process skills.

Table 4. Preschool Teachers’ Opinions about Their Syrian Children’s Success in Science Process Skills

Themes	Codes	<i>f</i>	%
Children’ Success in Science Process Skills	Observation	22	31.88
	Measuring	14	20.29
	Inferring	14	20.29
	Classification	8	11.59
	Collecting data	2	3.45
	Communication	1	1.72
	No response	8	11.59

Within the context of teaching science to second language learners, the literature shows that “through hands-on inquiry instruction, students benefit from science activities as they develop context-based content knowledge along with language development” (Carrier, 2013, p.409). It means that if teachers use the right teaching method, language should not be the problem when improving science knowledge and science process skills. According to data in Table 4, most of the preschool teachers stated that their Syrian students are successful in the *observation* skills (31.88%). Moreover, some of the preschool teachers also stated that their Syrian students are successful in measuring (20.29%) and inferring (20.29%) process skills. However, a few preschool teachers stated that their Syrian students show success on communication (1.72%) skills of science process skills. The examples of some preschool teachers’ views about their Syrian students’ success on science process skills are as follows:

PT21: “Since science activities are a scientific process in its own right, they should be supported by translators until the end of the activity so that the language will not be a barrier against the achievement of the activities. In this way, the main subject to be taught is taught without a problem. Observation skills contribute to problem solving, focusing on events, and hands-on learning. Refugee students are more successful in focusing and observing”

PT51: “Since they do not understand our language very well, science activities offer them the

opportunity to learn by doing, and to understand the events and their causes and consequences.”

PT7: *“They can establish a cause and effect relationship with our experimental activities. Therefore, I think they are more successful in inferring skills.”*

There are different teaching methods and techniques while teaching science in classrooms. The preschool teachers were asked about the science teaching methods and techniques that they use in classroom. They were given nine activities to rank from 1 to 9 on the forms. In the ranking system, 1 is the most used method, while 9 is the least preferred one that they used. The preschool teachers’ opinions about methods and techniques that they used during science teaching are given in Table 5.

Table 5. Preschool Teachers’ the most and least Used Teaching Methods and Techniques in Their Science Activities

Methods and Techniques	Most Used						Least Used		
	1	2	3	4	5	6	7	8	9
Analogy	1(1.72)**	1(1.72)	3(5.17)**	2(3.45)**	5(8.62)	7(12.07)	12(20.69)*	19(32.76)*	2(3.45)
Experiment	25(43.1)*	11(18.97)*	6(10.34)	3(5.17)	3(5.17)**	1(1.72)**	1(1.72)**	2(3.45)	2(3.45)
Drama	4(6.90)	11(18.97)*	12(20.69)*	10(17.24)*	6(10.34)	6(10.34)	3(5.17)	1(1.72)**	0(0.0)
Play	14(24.14)	10(17.24)	9(15.52)	8(13.79)	4(6.90)	6(10.34)	1(1.72)**	1(1.72)**	1(1.72)**
Study Trip and Observation	1(1.72)**	7(12.07)	4(6.90)	7(12.07)	4(6.90)	5(8.62)	10(17.24)	8(13.79)	6(10.34)
Concept Map	5(8.62)	4(6.90)	5(8.62)	5(8.62)	9(15.52)	6(10.34)	11(18.97)	4(6.90)	2(3.45)
Problem Solving	4(6.90)	3(5.17)	3(5.17)**	8(13.79)	15(25.86)*	10(17.24)*	4(6.90)	6(10.34)	0(0.0)
Project Studies	1(1.72)**	6(10.34)	10(17.24)	9(15.52)	6(10.34)	8(13.79)	7(12.07)	6(10.34)	0(0.0)
Others (No Responses)	3(5.17)	5(8.62)	6(10.34)	6(10.34)	6(10.34)	9(15.52)	9(15.52)	11(18.97)	45(77.59)*

* Most mentioned method and technique in the column

** The least mentioned method and technique in the column

According to the data in Table 5, the most adopted method by the preschool teachers was experimenting, which was ranked first (43.10%) and second (18.97%) among all the other methods. The table shows that drama was another most used technique, which was ranked second (18.97%) and third (20.69%). In addition, the preschool teachers also stated other techniques and methods ranked in the first place such as concept maps (8.62%), as well as games ranked in the second place (17.24), and project studies ranked in the third place (17.24). Interestingly, some of the least used teaching methods and techniques include analogy, which was ranked in the first place (1.72%) and second place (1.72%) from the bottom, as well as study trips and observation (1.72%).

Table 5 also shows the least used methods and techniques. The preschool teachers mostly ranked analogy in the seventh place (20.69%) and eight place (32.76%). In addition, concept maps (18.97%), and study trips and

observation (17.24%) techniques were ranked by the participants as the least used methods and techniques while teaching science to children in class. Moreover, drama (1.72%), games (1.72%), and experiments (1.72%) are the least stated techniques in this section by teachers.

The participants further stated that they have several concerns while teaching science. Likewise, researchers stated that one of the big issues about teaching science is the lack of materials. Table 6 shows the results of the analysis on the preschool teachers' views about issues and possible solutions about teaching science in the classroom.

Table 6. Preschool Teachers' Views about issues and Solutions on Teaching Science with Syrian Children

Themes	Category	Codes	<i>f</i>	%
The Issues and Possible Solutions in Science	Issues	Communications	42	75.00
		Lack of attention	3	5.36
		Materials	3	5.36
		Lack of Knowledge	3	5.36
		Have no problem	5	8.92
	Solutions	Showing and doing (Using visual materials)	19	35.85
		Actively Participation	11	20.75
		Translator	10	18.87
		Repeating	9	16.98
		Educational games	4	7.55
		No responses	2	3.45

According to the data in Table 6, the majority of the preschool teachers stated that they had communications issues (75.00%) while teaching science with Syrian children in the classroom. Interestingly, some of the teachers emphasized the lack of attention (5.36%) lack of science teaching materials (5.36%), and lack of knowledge (5.36%) in science teaching. The participants were asked about how they handle such issues in the classroom. Table 6 shows that they mostly use activities through the showing and doing method (35.85%) by using visual materials about the related science topic. Moreover, some of the teachers also encourage their Syrian students to actively participate (20.75%) in their science activities. Some of the teachers stated that they asked for the help of a translator (18.87%) in the classroom while teaching science with Syrian children. Most of the preschool teachers are observed to try to handle the communication problems. In her study, Ünsal et al., (2018) stated that teachers try translating unfamiliar words into minority language as a solution of language limitations in the classroom. Similarly, in the current study it was found that teachers used translators and repeating due to the language and communication issues. Moreover, a study by Lee (2005) has shown that most of the bilingual children's science learning is directly related to their teachers' language of instructions. If there is a problem at this point, teachers are the best person who can solve the issues about it. The examples of some preschool teachers' views about their issues and solutions on science teaching with Syrian children in the classroom are as follows:

PT17: *“Our main problem is the language. When the language problem is eliminated, there is no problem. We receive support from translators in order to explain the science activities to the children easily.”*

PT29: *“Language is our biggest problem. So, the showing and doing method works more.”*

PT45: *“Our biggest problem is the language. For this reason, I repeat words a lot, and in the meantime, I try to introduce the materials to the children.”*

The preschool teachers stated several issues about teaching science with Syrian children in the classroom. They stated how they cope with these issues and use different strategies for teaching science. Moreover, the participants expressed their opinions about how their Syrian students can be integrated into their science activities. The results of the content analysis are shown in Table 7.

Table 7. Preschool Teachers' Views about Their Syrian Children' Attitudes towards Science Activities

Themes	Codes	f	%
Attitudes of Syrian Children	Interest	22	25.29
	Love science activities	21	24.14
	Actively participate	17	19.54
	Curious about science	10	11.49
	Give more attentions	7	8.05
	Excited	3	3.45
	Unwilling	3	3.45
	Quietly watching (Passive participation)	2	2.30
	No responses	2	2.30

Table 7 shows the content analysis of the preschool teachers' views about their Syrian children' attitudes towards their science activities in class. The results showed that most of the preschool teachers stated that Syrian children are interested in (25.29%) and love (24.14%) science activities. Few of the preschool teachers stated that their Syrian students are nervous (3.45%), unwilling (3.45%), and quietly watching (passive participation) (2.30%) the science activities. Even though the teachers mention communication problems in their classrooms, science activities draw the Syrian children's attention, and science activities could be used for improving children's social-emotional, cognitive, and language skills by developing teachers' skills with in-service training about science teaching. The examples of some preschool teachers' views about their Syrian students' attitudes towards their science activities are as follows:

PT29: *“Children actually want to participate in such science activities. When I do science activities, children are active and learning becomes more fun. That's why, Syrian children love science more than others.”*

PT11: *“They attend with curiosity and enthusiasm. They want to touch the materials. They especially like experimenting and educational games.”*

PT43: *“If we do the science activities with the help of a translator, my Syrian students get more curious and interested in the activity.”*

PT38: *“My Syrian students in the classroom are very active in science activities. They follow these activities very carefully and try to learn. Their favorite activities are activities that do not require much conversation such as science activities, garden games, sightseeing-observation and so on.”*

There are several science concepts that preschool teachers may use while creating their science activities. They may teach concepts about earth and space science, life science, physical science and technology. The content analysis results about preschool teachers’ views on their Syrian students’ interest in science concepts are shown in Table 8.

Table 8. Preschool Teachers’ Views about Their Syrian Children’ Interest in Science Concepts

Themes	Codes	f	%
Interest in Science Concepts	Animals	43	74.14
	Plants	32	55.17
	Space	23	39.66
	Balance	7	12.07
	Force and Motion	4	6.90
	Natural Events	4	6.90
	Human Body	3	5.17
	States of Matter	3	5.17
	Weather Events	1	1.72
	Simple Machines and Magnets	1	1.72

Teachers should know the background, interest and attitudes of Syrian children towards science. Babaraoğlu and Metwalley (2018) stated that children’s interest is one of the factors that impact teacher’s in-class science teaching. The participants were asked about their thoughts related with the Syrian children’s interest in science concepts/topics. Martinez-Alvarez, (2019) stated that science must be accessible to all children and teachers should find the best topic for catching the Syrian children’s attention to science education. Moreover, Simsar’s (2018) study about Turkish children found that life science topics such as animals, plants, and human body are the topics that draw Turkish children’s interest in science activities. Similarly, according to the Table 8, the majority of preschool teachers stated that their Syrian students are mostly interested in animals (74.14%). Most of the participants also stated that plants (55.17%) and space (39.66%) activities caught the Syrian children’s interest in science activities. Interestingly, a few of the preschool teachers stated that science activities about weather conditions (1.72%) and simple machines and magnets (1.72%) were least interesting science concepts for the Syrian students. The examples of some preschool teachers’ views about their Syrian students’ interest in science concepts are as follows:

PT12: *“I imitate animals. They like animal toys. I also bring cats, and birds into the classroom. They really like them.”*

PT23: *“We grow plants, animals, flowers in the science center. One of the students takes care of the flowers every week.”*

PT15: *“The most attention-taking activities are about plants, animals and natural phenomena. I do*

experiments, observations, and get them to play educational games.”

PT18: *“Space, plants, weather conditions. I do experiment and concept maps during science activities.”*

The preschool teachers' views about Syrian children's language development by using science activities were analyzed, and content analysis and the results are shown in Table 9.

Table 9. Preschool Teachers' Views about Language Development of Their Syrian Children by the Using Science Activities

Themes	Codes	<i>f</i>	%
Language Development by Science Activities	Repeating	15	25.86
	Asking Open Ended Questions	12	20.69
	Stories and Nursery Rhymes	12	20.69
	Visual Materials	10	17.24
	Educational Games	8	13.79
	Experiments	6	10.34
	I can't do anything	5	8.62
	Translator-Family Support	4	6.90
	Concepts Maps	4	6.90
	Forming Groups for Social Learning	4	6.90
Active Listening	3	5.17	
No responses	10	17.24	

Language issues are shown in many studies as the key problem when teachers work with refugee children in early childhood education (Balbağ, et al., 2016; Kardeş & Akman, 2018; Mercan-Uzun & Bütün, 2016; Martinez-Alvarez, 2019; Sarıkaya, 2014, Yalçın, 2017). The preschool teachers were asked about how they help develop language skills of their Syrian students by giving in-class science activities. According to Table 9, most of the preschool teachers stated that they use repetition (25.86%) in science activities for improving their Syrian students' language skills which they mostly stated as one of the most important issues in the classroom. Some of the teachers stated that they use open-ended questions (20.69%), and stories and nursery rhymes (20.69%) about related science concepts for language development. Active listening (5.17%), group-work for social learning (6.90%), and concept maps (6.90%) are other strategies used by preschool teachers. The examples of some preschool teachers' views about improving their Syrian students' language skills by teaching science is as follows:

PT27: *“I try to combine stories and nursery rhymes with concepts taught in science activities.”*

PT32: *“I am preparing concept maps for the concept that I will discuss in the science event.”*

PT48: *“I am preparing science activities especially on the concepts they know. In this way, I give them the opportunity to reinforce their previous concepts and learn new concepts.”*

The preschool teachers' views about education and/or in-service training support related to science teaching with the Syrian children in class were analyzed with content analysis and the results are shown in Table 10.

Table 10. Preschool Teachers' Views about Education And / Or Inservice Training Support for Teaching Science with Their Syrian Children in Classroom

Themes	Codes	<i>f</i>	%
Education and/or In-service training	Communication	10	12.82
	Drama	9	11.54
	Science education	9	11.54
	Language education	8	10.26
	Classroom management	5	6.41
	Child Behavior / Psychology	5	6.41
	Play	5	6.41
	Others	18	23.08
	No responses	9	11.54

According to the Table 10, preschool teachers need different types of supports for teaching science with their Syrian students in the classroom. Depending on teachers' conditions, some teachers would like to have education or in-service training about communication (12.82%), and some of them needs drama (11.54%) and science education (11.54%). Predictably, some of the preschool teachers thought that if they improve their language teaching skills, they may teach science to the Syrian children more (10.26%). Moreover, classroom management (6.41%), Child Behavior/Psychology (6.41%), and games (6.41%) are other factors that they deemed necessary for teaching science. Classroom management could be selected because of the large number of children in classrooms. Additionally, knowledge of Child Behavior /Psychology is needed if you are working with culturally different groups in your classroom. Mercan-Uzun and Bütün (2016) suggested that teachers and children need to take psychological support due to the hard times during children's' education. The researchers also suggested that educational plans are necessary in order to ensure that children do not encounter negative attitudes in schools.

Discussion

Expectably, language and communication skills were seen one of the biggest problems expressed by preschool teachers when they teach science in classroom with the Syrian refugee children. Wellington and Osborne (2001) stated that language issues in science are not a problem only for bilingual children. It could be the issue for all children to cope with. Frequency of teaching science shows that teachers give less time in teaching science in their classroom, resulting in parallel attributes with previous studies by Tu (2006) and Yılmaz-Tuzun and Topçu (2008). There could be some reasons for not giving more time to teaching science. In the future, the effects of teachers of refugee children on spending time in science should be explored. Science process skills could be improved by giving science activities to Syrian children. These skills are also helpful for improving their learning skills. Teachers stated that more hands-on activities should be performed with the Syrian students because they think that it is one of the science process skills. However, there could be some misconceptions about it. It is one of the learning ways for children (Büyüktaskapu, 2014). However, it guides other teachers

with respect to new supporting ways through introducing ideas on how they can do activities for refugee children at school. Likewise, Kalogiannakis, Ampartzaki, Papadakis, and Skaraki (2018) worked with young children to improve their natural science concepts. The researchers stated that children improved their existing knowledge of the planets through hands-on activities about planets. Hands-on activities are also the best way of learning in early childhood education for other children.

Most Syrian refugee children show observation skills more than other skills. Observation is the basic level of science process skills and most of the preschool teachers improve their children's observation skills in Turkey (Dogan & Simsar, 2018). Even if children have not understood the higher level of science process such as inferring, this level could give some information about the skills of Syrian children while teaching science. Moreover, teachers may improve their Syrian children's science concepts and skills by the giving more hands-on activities in classroom (Dogan & Simsar, 2018). Teachers could use it when they prepare their science projects. For example, one of the teachers stated that *"They can establish a cause and effect relationship through our experimental activities. Therefore, I think they are more successful in inferring skills"*. Consequently, teachers who do not share the same minority language with their Syrian students may still do science activities by becoming aware of their students' skills.

Using techniques is important for a teacher to establish in-class science activities. However, the results show that teachers use experiment, but they give less time on the analogy technique. This could make sense because during analogy, teachers need to make more verbal connection between what they show and what Syrian children understand. There are really hard times to get permission to make a study trip and observation out of school, though it is not about Syrian refugee children. Yet, those children could cause a harder procedure than the others due to strict rules about their safety in Turkey. Teachers stated mostly about issues on communications and language. These results are parallel with the results of previous studies (Emin, 2016; Lee, 2005; Özel, 2017; Rossi, 2008; Tanrikulu, 2017; Ünsal et al., 2018). Teachers stated that they mostly used the showing and doing technique many times for teaching concepts of science in class. A researcher asserted that what *"...teachers need to ask themselves is how they can support bilingual students..."* (Ünsal et al. 2018, p.338). Teachers stated that Syrian children love science activities and are really interested in them. They also stated that animals and plants are really interesting concepts for them. In this point, Howe (2002) suggested that teachers could bring fish, animals in cages, and plants into the classroom for making it more attractive for children. Moreover, teachers stated that they need some training support for solving communication issues. They also would like to learn how they can understand child behavior or psychology. This is also important for classroom management. If a child shows unexpected behavior in the classroom such as attacks, isolation, and crying, teachers should work on it.

Conclusions

In this study, preschool teachers pointed out some views about what they see in class while doing science activities. They also showed some solutions about teaching science with Syrian children. Teachers stated some of the concepts that Syrian children are interested in and teachers of these children could use them when they are

looking for the best way to integrate the Syrian refugee children into the classroom environment. Hence, it might constitute a starting point for further research to examine different ways of involving Syrian children into early childhood education in Turkey and other countries where Syrian refugees have migrated.

Recommendations

Moreover, some of the preschool teachers stated that the process was less exhausting when children came to school to learn Turkish in summer. It means it will become a more achievable process when refugee children learn some Turkish and can understand teachers' directions in the education process. Policy makers may pay an attention to this point and could open some summer schools for improving Syrian refugee children's language of host countries. Likewise, it could also be suggested that due to the language barriers of children, Ministry of National Education could create new early childhood education programs for teachers who work in schools where there are many Syrian refugee children. Although each topic (mathematics, science, language-arts, music...etc) is important in early childhood education, teachers should spend more time on language-art topics for preparing Syrian refugee children to elementary education and social life.

The participants also concluded that one of the solutions for teaching science to Syrian children is having a translator in the classroom. Policy makers and school principals could work on this solution and make a plan for giving one translator to each preschool classroom. However, they should be careful while opening this position. PT29 stated that "Translators do not understand science concepts. That is why, they have difficulty explaining some of the scientific concepts to Syrian children in the classroom while I teach." In this case, policymakers and school principals could look for translators who know the language of minority children and have some pedagogical background in early childhood education.

Some of the teachers stated that while teaching science, hands-on activities were more crucial in integrating Syrian children into learning process. Likewise, Badger and Harker (2016) used field trips to make a real connection with school curriculum of rural students. Field trips could be a really good way of practicing with refugee children while teaching science. Visiting the zoo, traveling to a museum, and building blocks with natural materials in the forest or backyard of the schools will help refugee children to get integrated into school life as they will find the opportunity to show their skills to learn without feeling too much language burden.

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