Journal of History Culture and Art Research (ISSN: 2147-0626)

Tarih Kültür ve Sanat Araştırmaları Dergisi
Revue des Recherches en Histoire Culture et Art
مجلة البحوث التاريخية والثقافية والفنية

Vol. 7, No. 3, September 2018

http://kutaksam.karabuk.edu.tr

DOI: 10.7596/taksad.v7i3.1497

Citation: Kiraz, A., & Sıddık, H. (2018). An Analysis of Science Activities in Pre-School Education Programmes in Northern Cyprus and Turkey. Journal of History Culture and Art Research, 7(3), 18-34. doi:http://dx.doi.org/10.7596/taksad.v7i3.1497

An Analysis of Science Activities in Pre-School Education Programmes in Northern Cyprus and Turkey

Kuzey Kıbrıs ve Türkiye Okul Öncesi Eğitim Programlarında Yer Alan Fen Etkinliklerinin Analizi

Aşkın Kiraz[1], Hulin Sıddık[2]

Abstract

Pre-school science education is one of the most important educational processes that enables inquiry, problem-solving, exploring and commenting in children. With a qualified science education, children can develop their curiosity and appreciation for nature while becoming science literate. Furthermore, children who learn to transfer their knowledge of daily life also develop scientific process skills and problem-solving abilities. These competencies are acquired through pre-school education when the child actively participates in the process. The child solves and explains the complex activities surrounding him/her with the support of science activities he/she sees as a game in the science education process. Thus, it is recommended to gain an individual who has developed a sense of research and interpretation. In this study, the aim is to examine the Pre-School Education Program of the Ministry of National Education which is being taught in Turkish Republic of North Cyprus and Republic of Turkey with a specific focus on science activities. In the study, the activities in the program are examined in terms of number, subject, scope, achievement and applicability in accordance with qualitative research and document analysis. Additionally, alternative science activities have been proposed in parallel with the topics in the study. As a result, it has been determined that the number of science activities is kept low in both programs, the subjects which are important outcomes of contemporary life such as environment, animal, soil are not included in programs too much, and the activities are not able to respond to all of the determined achievements.

Keywords: Northern Cyprus, Pre-school, Pre-school education program, Science activities, Science education.

[1] Assoc. Prof. Dr., Near East University, Ataturk Faculty of Education, Nicosia, TRNC.
[2] Master Student, Near East University, Ataturk Faculty of Education, Nicosia, TRNC.

Öz

Okul öncesinde fen eğitimi; çocukta sorgulamayı, araştırmayı, problem çözmeyi, keşfetmeyi ve yorum geliştirmeyi sağlayan önemli eğitim süreçleri arasındadır. Nitelikli bir fen eğitimi ile çocuklar, fen okuryazarı olurken, doğaya karşı duydukları merak ve ilgilerini geliştirirler. Bu sırada bilgilerini günlük hayata transfer etmeyi öğrenenirler, bilimsel süreç becerilerini geliştirirler ve problem çözme davranışlarını artırırlar. Okul öncesi eğitimde bu yetkinliklerin kazandırılması, çocuğun aktif olarak sürece katılması ile olur. Çocuk, fen eğitimi sürecinde oyun olarak gördüğü fen etkinlikleri desteğiyle çevresindeki karmaşık olayları çözümler ve anlamlandırır. Böylece eğitim sürecinde araştırma ve yorumlama duygusu gelişmiş bir birey kazandırmak hedeflenir. Bu çalışmada Kuzey Kıbrıs Türk Cumhuriyeti ve Türkiye Cumhuriyeti'nde okutulmakta olan KKTC MEB Okul Öncesi Eğitim Programının ve TC MEB Okul Öncesi Eğitim Programının fen etkinlikleri kapsamında incelenmesi amaçlanmıştır. Çalışmada, her iki programda yer alan etkinlikler nitel araştırmaya ve doküman analizine uygun olarak sayı, konu, kazanım, uygulanabilirlik gibi alt birimler altında incelenmiştir. Ayrıca çalışmada konular paralelinde alternatif fen etkinlikleri önerilmiştir. Sonuç olarak her iki programda da fen etkinliklerinin sayısının az tutulduğu, güncel hayatın önemli getirisi olan çevre, hayvan, toprak gibi konulara çok fazla yer verilmediği ve etkinliklerin belirlenen kazanımların hepsine cevap veremediği saptanmıştır.

Anahtar Sözcükler: Kuzey Kıbrıs, Okul öncesi, Okul öncesi eğitim programı, Fen etkinlikleri, Fen eğitimi.

1. Introduction

Pre-school education is important for children to be able to be trained as entrepreneurial individuals who are strong in adaptation to research, problem solving and innovation, have a good sense of confidence and can express themselves and make the right decisions. Pre-school education is considered one of the periods when the individual develops most rapidly and is most vulnerable to stimuli. In this period, where children's development and learning are very fast, it is important that the education to be delivered is well planned and designed (İnan, 2017). The pre-school period is the period when curiosity and interrogation are at the highest level. In the pre-school period, science education is the area that supports the curiosity of the child and the researcher spirit and helps answer the questions about the environment (Alisinanoğlu, Özbey and Kahveci, 2017). In order to develop positive attitudes towards science in the future, it is important to educate children according to their interests and abilities that they can learn by living and doing (Aktas Arnas, 2003).

Students who are proficient in science; know, use, and interpret scientific explanations of the natural world; generate and evaluate scientific evidence and explanations; understand the nature and development of scientific knowledge; and participate productively in scientific practices and discourse (Duschl, Schweingruber and Shouse, 2007). Through the science education presented at an early age, it is possible to recognize the events that occur in the environment, to perceive the relationships, to make observations, to interpret the information and to gain scientific process skills (Hamurcu, 2003). It is argued that there are two main reasons for pre-school students to be informed by science teachers: Science is about the real world and science develops reasoning skills. The first statement emphasizes domain-specific or conceptual knowledge: By understanding scientific concepts in specific domains children might better interpret and understand the world in which they live. The second statement emphasizes domain-general or procedural knowledge: "Doing science" as claimed, contributes to the development of general skills needed not only in a specific field, but also in a wide range of fields at the same time (Eshach and Fried, 2005).

There are three broad questions to answer in science education process: (1) How is science learned, and are there critical stages in children's development of scientific concepts? (2) How should science be taught in classrooms? (3) What research is needed to increase understanding about how students learn science?

(National Research Council, 2007). It is important to think about how teachers are prepared before the beginning of teaching and what they are doing to improve science education as teaching continues. For effective participation in scientific practices, teachers and students need support with the practices as well as with the scientific ideas addressed by the practice (Duschl et al., 2007). With an effective science teaching, students are given the scientific process skills and they are brought into behavior (Karamustafaoğlu, Üstün and Kandaz, 2006). Gaining this behavior and skills is as important as the school environment and the teacher, as well as the pre-school curriculum. How science is taught ultimately depends on the teachers and the programme.

With a solid theoretical focus and child-centered approach, early childhood curriculum stresses the importance of students understanding the foundations of their field before they develop and use quality teaching and instruction programs (Wortham, 2002). Pre-school education programs should be prepared considering the developmental characteristics of the child. While preparing the programs, care should be taken to teach basic science concepts. In addition, basic science concepts should be easily applicable in daily life and activities should be prepared with this logic (Güler and Bıkmaz, 2002). Basic science concepts have begun to be formed in pre-school children. Science concepts are tried to be gained by science and nature activities in pre-school curriculum (Kalley and Psillos, 2001).

The Ministry of National Education (MNE) Preschool Curriculums, which are being taught in Turkish Republic of North Cyprus (TRNC) and Republic of Turkey (RT), are curriculums designed to support all development areas and to take into consideration the children's individual differences. The activities presented in these programs are organized as integrated large group activities, small group activities and individual activities for children aged 36-72 months (3-6 years) who are attending preschool education institutions. Furthermore, activities in the educational programs are aimed at preparing children for primary education (TRNC MNE, 2017).

Science activities in educational programs are not only organized in the form of providing information to the children but also in the way that children learn by playing, doing, living, researching, using their senses and interacting with each other. Children are directed to conduct research through the activities and by experiencing things nature, using various materials and technology. Additionally, children are encouraged to protect the environment and nature, and to respect responsibility for living with these programs (Kıvanç and Çiner, 2018; Yeşilyurt, 2003).

The science activities in the educational programs are designed to give teachers guidelines for development. Teachers need to develop new activities and enrich this pool of activities (RT MNE, 2013) that are aimed at supporting children's development and targeted at learning outcomes, indicators and concepts. Science activities have an important place in the scope of educating literate individuals. Selective activities take into account the learning outcomes according to the subjects and concepts in the program. With the activities, children can make choices, use sensory organs, and make direct contact with nature. It is necessary for raising qualifications and acquiring knowledge in preschool education. In this context, to the aim is to present the activities implemented in pre-school education programs in TRNC and RT in parallel with learning outcomes and targeted behaviours.

Identification of the areas of influence of science activities in the context of pre-school education in which scientific concepts and basic science concepts that are necessary for the child's life are beginning to develop, the appropriateness to the achievements in the curriculum and the determination of the subject-activity balance are very important in terms of increasing the quality of pre-school science education. The alignment of TRNC with the RT in social and cultural terms is also parallel to the educational field. The TRNC education system is a system structured on the basis of the RT education system. Until a few years ago, there had been completely RT MNE curricula and books in force. Within the TRNC education system

renovation studies, new books originating from the TRNC have begun to be developed. Currently, the programs are in a common frame, but some textbooks are newly written by TRNC MNE. In this study the pre-school program of TRNC MNE, which is in line with the pre-school program of RT MNE as in other programs, has been examined in detail within science activities. The TRNC pre-school program has been compared to the RT pre-school program, and alternative activities that support children's development and appeal to achievements have been proposed for educators. The literature on science activities in preschool is insufficient both in the RT and in the TRNC. The in-depth studies of science activities will undoubtedly make significant contributions to the development of pre-school science education in both countries. It is thought that this study done in this context will provide support to the field and the trainers.

1.1. Sub-objectives

1) Which activities have been identified according to the purposes of the pre-school educational programs in TRNC and RT?

2) How are the activities of the pre-school educational programs in TRNC and RT distributed according to their scope?

3) How are the activities of the pre-school educational programs in TRNC and RT distributed according to achievements / learning outcomes?

4) What other activities could be applied based on the learning outcomes and the scope of the programs?

2. Method

This research was based on the examination of the pre-school education books being taught in Northern Cyprus and Turkey. Therefore, this research was conducted by using the qualitative research method. Qualitative research is the process of questioning and giving meaning to the problems related to mankind and social life with unique ways and methods (Creswell, 2014). Document analysis was used in the study for the purpose of examining the science activities in the pre-school curriculum. The document examination involves the analysis of written materials containing information on the facts or phenomena to be investigated (Yıldırım and Şimşek, 2011).

2.1. Research material

In this study, pre-school education books which are currently taught in pre-school institutions in TRNC and RT and prepared by MNE of both countries are examined as a set. The materials were selected according to the purposive sampling approach, from non-random sampling methods. The purpose of the purposive sample is to select situations with vast knowledge that will satisfy the inquiries in the study (Patton, 2014). The Pre-School Education Program, which is being taught in Northern Cyprus, was prepared in 2016 and was implemented in 2017. The Pre-School Education Program book, which is being taught in Turkey, was prepared in 2012 - 2013 and was implemented in 2013. In total, there are 96 activities in the books, with 21 identified as science-related activities.

2.2. Data collection and analysis

Documents are a rich source of data in social research (Punch, 2005). Findings obtained by analyzing the science activities included in the research materials appropriately for the purpose of the research analyzed according to the content analysis method. Content analysis is used in the analysis of sub-themes and themes that are not obvious in the theoretical sense (Yıldırım and Şimşek, 2011). In this study, coding was first made according to the criteria of the study and various themes were reached in this context. The

activities were organized by using the structured form created by the researcher. In the form, the themes such as subject, achievement and applicability have been determined in accordance with the sub-objectives. Quotation and coding were made by the researchers and simplified by taking the expert opinion. After this phase, the data are organized, grouped by theme and tabulated. Besides a column containing alternative activities related to the topic has been created. Finally, the findings are interpreted and discussed.

Validity: The data obtained from the materials are written in detail in the direction of sub-objectives. Direct quotations were made from the materials and the results of the study are explained accordingly.

Internal validity: The research findings are consistent and meaningful in themselves. The emerging concepts are likely to form a whole. Data collection, data interpretation and interpretation processes were consistent; it is explained in detail how this consistency is achieved. The two researchers who conduct the study constantly question themselves and their research processes. They have checked whether the findings they have obtained and the results of these findings reflect the truth.

External validity: The results of the research are consistent with the conceptual framework of the research question. In the research, there are necessary explanations for the detection of the findings in other investigations. In order for the results of the research to be generalized to similar environments, the researchers informed the reader in detail about all the steps of the research.

Reliability: In the study, the differences between the data obtained from the materials and the researchers related to their analysis were reduced to the most extreme; every step of the study was decided together for this purpose. In addition, analysis and comparison of data were done together; thus trying to get a perfect fit. The data source materials are clearly defined so that other researchers who have done similar research have been created. The data are stored that can be examined by others (Yıldırım and Şimşek, 2011).

3. Results

3.1. Distribution of activities in pre-school education program in Northern Cyprus

The science activities in the in the pre-school education program of the Ministry of National Education which is being taught in Northern Cyprus are presented below in tabular form (Table 1).

Table 1. Science activities in pre-school education program of the Ministry of National Education in TRNC

Name of activity	Scope	Aim	Learning outcomes
School Building	Environment	Observation Protecting nature and taking responsibility	He/she wonders about the changes in nature and social environment and actively explores them. He/she learns his/her responsibilities towards the environment and nature.
Finding colour in nature	Living/non-living	Investigating the events and assets in nature using materials and technological tools Grouping entities by observable properties Respect the life rights of plants and animals	He/she examines the properties of living and non-living assets. He/she protects the life rights of the living.
Review of newspaper	Technology	Using technological tools	He/she develops awareness about the daily use of technology.

			He/she acquires competences appropriate for his/her age about technology.
Newspaper content	Observation Technology	Doing research using various materials and technology Using basic research techniques (Observation, asking questions and establishing cause-effect relationships, etc.) To express the positive and negative effects of technology on life To use technological tools to learn	He/she produces solutions by using the appropriate materials and technology for the problems encountered. He/she applies basic research techniques such as observation, asking questions and establishing cause-effect relationships. He/she develops awareness about the daily use of technology. He/she acquires competences appropriate for his/her age about technology.
Planting	Living/non-living Plants Environment Nature Technology	Investigating the events and assets in nature using materials and technological tools To explain the needs of living/non-living things in nature Respect the life rights of plants and animals Doing research using various materials and technology. Using technological tools	He/she examines the properties of living and non-living assets. He/she learns his/her responsibilities towards the environment and nature. He/she protects the life rights of living things He/she produces solutions by using the appropriate materials and technology for the problems encountered. He/she develops awareness about the daily use of technology.
Olive picking	Living/non-living Plants Nature Technology	Investigating the events and assets in nature using materials and technological tools. Respect the life rights of plants and animals To be interested in observation, trips and the news about science Using technological tools	He/she examines the properties of living and non-living assets. He/she learns his/her responsibilities towards the environment and nature. He/she protects the life rights of living things. He/she produces solutions by using the appropriate materials and technology for the problems encountered. He/she develops awareness about the daily use of technology.
Visit to Kıbrıs newspaper	Technology	Using technological tools To express the positive and negative effects of technology on life	He/she develops awareness about the daily use of technology.
Observing flowers	Living/non-living Plants	Investigating the events and assets in the nature using materials and technological tools To explain the needs of living-non-/non-living things Respect the life rights of plants and animals	He/she examines the properties of living and non-living assets. He/she protects the life rights of living things
Making wind-bell	Living/non-living Natural event (wind)	Investigating the events and assets in the nature using materials and technological tools Using basic research techniques (Observation, asking questions and establishing cause-effect relationships)	He/she examines the properties of living and non-living assets. He/she applies basic research techniques such as observation, asking questions and establishing cause-effect relationships.

As can be seen in Table 1, there are a total of nine activities under the category of science activities in the Pre-School Education Program of the Ministry of National Education that is currently taught in TRNC. The activities are designed to take into account the child's developmental areas and attract the attention of the child. The subjects were determined as appropriate. The objectives of the activities can be listed as follows: creating solutions by using appropriate tools, materials and technology to solve the problems faced by the children, wondering about the environmental changes in nature, observing and investigating actively, establishing cause-effect relationships, protecting nature and taking responsibility and problem-solving skills. When the science activities in the Pre-School Education Program were examined, it was observed that throughout the activity, children's curiosity continues as they are willing to learn by doing. Children are directed to conducted research by exploiting various activities and assets in nature, various materials and technology. Through its objectives, the children are also encouraged to protect the environment and nature, to take responsibility, and to respect the life rights of plants and animals. It appears that more games are being used in the activities. According to the study of Orion, Hofstein, Tamir and Giddings (1997), it was shown that students who were involved in investigative rather than confirmatory activitiesperceived the outdoor learning environment to be more positive and perceived their teacher tobe more supportive. In addition, the students were more involved in the learning event ascompared to those who were involved in the more confirmatory approach. In another study, Conatser (2000), emphasized that while teaching science in early childhood, it is necessary to allow them to find their own way, rather than telling them what to do. Although the number of activities is low, the situation in which the subjects are taught through games is parallel to the Conatser's statement.

3.2. Distribution of activities in pre-school education program in Turkey by purpose

The science activities in the Pre-School Education Program of the Ministry of National Education being taught in Turkey are presented in based on their purpose (Table 2).

Table 2. Science activities in pre-school education program of the Ministry of National Education in RT

Name of activity	Scope	Aim	Learning outcomes
What's inside the balloons?	Senses Non-living	Predicting Observing	He/she predicts the object/event, explains tips about prediction, observes the real situation, compares the prediction with the actual situation and tells the colour, shape, size, texture of the object / entity.
Ships leaving trail	Water	Observing assets Establishing cause-effect relationship	He/she tells the colour of the object/entity. He/she tells the possible causes of an event and the possible consequences of an event.
Smell and find	Senses Non-living	Predicting Observing Pairing	He/she predicts the object/event, explains tips about prediction, observes the real situation, compares the prediction with the actual situation and tells the colour, shape, size, texture of the object/entity. He/she distinguishes, matches objects/entities according to their odour.
Touching the water and soap	Body Environment	Observing Comparing features Using the tools and equipment necessary for daily living skills	He/she tells the colour, shape, size, texture of the object/entity. He/she distinguishes and compares the purpose of the object/assets. He/she uses tools and equipment related to environmental cleanup.
Heavy and light	Non-living	Sorting by properties	He/she sorts objects/entities according to their weights.

Shadow Length	Vision sense Source of light Shadow measuring	Predicting Observing Comparing features Measuring	He/she predicts the object/event. He/she tells the length of the object/entity distinguishes and compares the length of the object/entities and measures with nonstandard units.
Sketch drawing	Vision sense Non-living Location	To give attention to object/situation/event Applies directions to the location in the room	He/she focuses on the object/situation/event that needs attention. He/she tells the location of the object in the room and uses maps and sketches.
Stories from the Mud	Water Soil	Observing assets	He/she tells the colour, shape, size, texture of the object/entity.
Recycling	Environment	To give attention to object/situation/event	He/she focuses on the object/situation/event that need attention and explains in detail the object/situation/event that attracts attention.
What's in the soil?	Living/non-living	To give attention to object/situation/event Measuring	He/she focuses on the object/situation/event that need attention and explains in detail the object/situation/event that attracts attention and measures with nonstandard units.
Counting balloons	Senses Non-living	Comparing features Sorting by properties	He/she distinguishes and compares the size, the texture and the quantity of the object/entities and sorts objects/entities according to their weights.

As shown in Table 2, a total of twelve activities are implemented under the title of science activities in the Pre-School Education Program being taught in RT. Some of these activities combine science education and mathematics. Field trips are also considered as part of science activities. The activities are designed to take into consideration the developmental characteristics of children from different age groups and attract the attention of the children. While preparing the science activities in the program, various topics are utilized. The purpose of the activities is to help children to observe nature, living creatures and their social environment, to focus on the object, situation or event to be considered and actively investigate, to establish cause-effect relationships, to make assumptions, to protect nature and to take responsibility, to develop problem-solving skills, and to produce solutions by using appropriate tools and materials. In the program, it is observed that exploration activities are usually organized using senses. According to the findings, there is a limited number of activities. There are studies in the literature about the importance of activities in pre-school period. Demiriz (2011) found that science and nature activities in the preschool period are very important in helping children understand the relationship between objects and events. Akbaba and Kaya (2015), argued that in order for children to gain positive attitudes, science activities for the development of thinking skills in the classroom must be included.

3.3. Distribution of the activities in pre-school education program in Northern Cyprus by scope

The effect areas of science activities are examined in the Pre-School Education Program of the Ministry of National Education in North Cyprus and the frequency values related to the scope are shown in Table 3.

Table 3. Distribution of science activities in pre-school education program in TRNC

Scope	Frequency
Living/non-living	5
Technology	5
Plants	3
Environment	2
Nature	2
Natural event	1
Observation	1

In Table 3, it can be seen that the area of living/non-living assets is higher when the scope of science activities in education program is examined. This is followed by technology and plants. It has been determined that the program is in constant interaction with the child but does not adequately address the current and sensitive issue of the environment and nature. This finding is parallel to the literature. Gülay and Ekici stated in their studies in 2010 that "When the preschool education program is examined in general, it seems that the aims, achievements and concepts related to environmental education appear to be at low levels". Ünsal and Güneş (2003) emphasize that children can easily experience misconceptions in their study of science books. In order to avoid this, they emphasized that science events should be chosen to address all issues. Activities should be done with all sense organs so that the child can internalize the knowledge.

3.4. Distribution of the activities in pre-school education program in Turkey by scope

The frequency values for the scope in the Pre-School Education Program of the Ministry of National Education being taught in Turkey are shown in Table 4.

Table 4. Distribution of science activities in pre-school education program in RT

Scope	Frequency
Living/non-living	7
Senses	5
Plants	3
Environment	2
Water	2
Soil	1
Animals	1
Body	1
Source of Light	1
Shadow	1
Location	1

When the scope of science activities in the educational program given in Table 4 are examined, living/non-living and senses are the most frequently used. The topics selected for the program are basis and easy to implement. It has been seen that there are no activities related to the use of technology in the program. The lack of this situation is also mentioned in the literature. According to Catron and Allen, program implementations should be able to integrate technology applications and teaching strategies (2003). Again, Black and Hughes (2003), and Polat, Yavuz and Tunc (2017) talked about the importance of adding art and technology to science education in preschool activities in their studies. Bakar, Keles and Koçakoğlu conducted a study in 2009 about science books being taught in Turkey. In the study, they pointed out that the science activities in the books are incompatible with the duration of the curriculum and that the science activities should be more diversified. Raising science literate individuals is possible with science activities being more feasible.

3.5. Distribution of the activities in pre-school education program in Northern Cyprus by learning outcomes

The frequency values related to science-related learning outcomes of the Pre-School Education Program of the Ministry of National Education in Turkish Republic of North Cyprus are shown in Table 5.

Table 5. Distribution of science-related learning outcomes in pre-school education program of the Ministry of National Education in TRNC

Learning outcomes	Frequency
LO 1. He/she thinks about changes in his natural and social environment and actively explores them.	1
LO 2. He/she examines the properties of living and non-living assets.	5
LO 3. He/she takes responsibility for the environment and nature.	2
LO 4. He/she protects the rights of living things.	2
LO 5. He/she produces solutions using the appropriate tools, materials and technology for the problems to be resolved.	3
LO 7. He/she develops awareness of the use of technology in everyday life.	5
LO 8. He/she acquires qualifications suitable for his/her age.	2

As shown in Table 5, when the learning outcomes of the program related to science are examined, it is found that the learning outputs "LO 2. He/she examines the properties of living and non-living assets." and "LO 7. He/she develops awareness of the use of technology in everyday life" are used extensively in the activities. The children learn about nature and curiosity by doing active research. Nevertheless, the learning outcome "LO 1. He/she wonders about changes in his natural and social environment and actively explores them." is not used to a great extent in the program. Appleton (2002), in his research on science activities in the curriculum with teachers responsible for teaching science, found that science activities are interesting and motivating for children, achieving a clear result with activities, and attaining behavior in this way.

3.6. Distribution of the activities in the pre-school education program in Turkey by learning outcomes / achievements

Table 6 shows the frequency values of the learning outcomes (gains) of science activities in the Pre-school Education Program of the Ministry of National Education being taught in RT.

Table 6. Distribution of science-related learning outcomes in pre-school education program of the Ministry of National Education in RT

Learning Outcomes	Frequency
Cognitive	
LO 2. He/she estimates about the object / situation / event.	4
LO 5. He/she observes objects or entities.	5
LO 6. He/she matches objects or entities according to their properties.	1
LO 8. He/she compares the properties of an object or assets.	3
LO 9. He/she sorts objects or assets according to their properties.	2
LO 10. He/she applies directions to the location.	1
LO 11. He/she measures objects.	4
LO 17. He/she establishes cause-effect relationships.	2
Self-care	
LO 3. He/she makes necessary arrangements in living spaces.	1
LO 6. He/she uses the necessary tools and equipment for daily living skills.	1
Motor Development	
LO 4. He/she makes necessary movements that require small muscle usage.	1

After examining the learning outcomes of the science activities in the educational program given in Table 6, “LO 1. He/she gives attention to object / situation / event” and “LO 5. He/she observes objects or entities” were the most frequently used in learning outcomes. It has been observed that the learning outcome “LO 3. He/she makes necessary arrangements in living spaces”, which enables the child to gain environmental

awareness, has not been used. This acquisition, which is an important achievement, has not been widely used in science activities. The lack of activities compared to the achievements is supported by the literature. Ulu and Kiraz (2012) have found that there is no activity towards some of the achievements in the training program. According to Jackman (2005), the most effective way to have a positive attitude is through practice. The behaviors intended to be given to the child should be supported with activities appropriate for the achievements. In their study, Lederman and Abd El Khalick (1998) stated that a concerted effort on the part of science educators and teachers to explicitly guide learners in their attempts to develop proper understandings of the nature of the scientific enterprise is essential. The notion of explicitness is imperative. It is important to aim at teaching nature of science if the desired effect is to be reached on the concepts of the pupils.

3.7. Alternative activities that can be applied according to the scope of the **pre-school education** *programs in Northern Cyprus and Turkey*

The alternative science activities for the pre-school education program of the Ministry of National Education being taught in TRNC and RT are presented in based on their scopes (Table 7).

Table 7. Distribution of alternative science activities for pre-school education programs according to their scopes

Activity	Scope	Application
Hidden colours discovery	Living/non-living	The teacher previously hides colour cards in various locations in the classroom (yellow, blue, red). The teacher then helps the children to find hidden colours by giving verbal directions. After all the colours are found, the children are asked to tell which colour they found.
Let's find the colour of flowers	Living/non-living	Colour cards are prepared in advance and given to the children. In the school garden, flowers are observed. Children are asked to find the colour cards that are the same as the flowers. Then, in the class, the colours that are found are stuck under the same-coloured flower picture.
Touch feel match	Living/non-living	Two one-hand wide holes are opened in the front of a medium-sized cardboard box. The same objects are put into different boxes (For example, two pompoms, two plastic forks, two walnuts, etc.). The teacher asks the children to touch those objects and find the matching objects by inserting their hands through the holes in the box.
Live observation	Living/non-living	Some soil and ants are placed in a glass container. The ants are observed by the children.
Clove experiment	Living/non-living Plants	Two cups are 3/4 filled with water. A small amount of blue ink is poured into one of the cups, and red ink is poured into the other. White cloves are put in the inked water. It is observed that the white leaves of the cloves slowly take on the ink colour from the water in which they are placed.
Plants also have needs	Living/non-living Plants	Three plant pots are taken. One of the pots is put in a dark cupboard; while the other two are put in a sunny place. One of the two pots placed in a sunny place is given water. No water is given to the other, but water is also given to the pot in the dark cupboard. It is observed which plant grows better.
How does it smell?	Living/non-living Senses	The child's eyes are covered before the experiment begins. First, they smell neroli oil and then an onion. They are asked what the objects are and how they smell (good-bad).
Tell me about the bottles	Living/non-living Senses	Different sizes of plastic bottles are brought to the school. First, the bottles are examined in an empty state and then filled with water. It is observed which bottle receives more water. Their weights are compared.
Discover the soil	Living/non-living Soil	Half of a jar is filled with soil. The rest of it is filled with water and the lid is closed. Children are asked to shake the jars for a while. Then, the layer deposition of soil to water is observed.

Visiting other classes	Environment	The other classes are visited. The class details are taken. Names of their classes are told. The colour or picture that is the symbol of the class is given (for example: Yellow card for yellow class, or bee picture for bee class).
Residual material chest	Environment	Children are asked to bring material from their home (information about what is the residual material is given beforehand to the children). The residual materials are collected in the middle of the class. With children, residual materials are grouped according to their properties (paper-cardboard, plastic, fabric, etc.) and put into large cardboard boxes that were designed with the children.
Let's make paper dough	Environment	Children tear newspapers into a large basin. Then, the newspapers are wetted with warm water. Flour and glue are added to the wet and soft papers. Then, those papers are kneaded and paper dough is made.
Reviewing books and magazines	Technology	Children are asked to bring a book and magazine from their homes. Differences and similarities between the books and magazines are discussed after each of them is reviewed.
Visit to press	Technology	A visit to a media organization is arranged. There, they observe the process of preparing a newspaper (cut, printed, etc.).
I am publishing my own news	Observation Technology	Children are required to draw a picture and describe an event in the drawing section of the Microsoft Paint program. Children are asked to write about the picture in the writing section of the drawing (children only use letters because they do not know how to write whole words and if the class is not too large, the teacher can write what they say). Printouts are taken of the work.
Class newspaper	Observation Technology	Children stick the news that they have prepared on a blank A3 page and create a newspaper. Then, they give a name to the newspaper.
They can also grow without soil	Living/non-living Plants Environment Soil Nature Technology	Three toothpicks are placed in a potato. Then the potatoes are placed inside a glass of water. The glass is placed in a sunny spot and children observe the green leaves emerging from the top of the potato.
Lawn man	Living/non-living Plants Environment Nature	First, grass seeds are put in a ladies' sock. Then it is covered with sawdust and sewn up. The children give the surface of the face a human face (by sticking residual materials such as buttons). Within two weeks, grass will have grown on the lawn man's head.
What's in the grocery store?	Living/non-living Plants Nature	A trip to a grocery store is organized. The benches in the grocery sections are observed. The names of vegetables and fruits are explained. Children buy various vegetables and fruit they want.
Watching the wind	Living/non-living Natural event	A piece of paper is put on the table and a ping-pong ball painted with water paint is placed on the edge of the table. Children are asked to blow the ball. The ball will leave a mark on the paper as it moves. Each time, the ball is cleaned and another colour is painted on it. At the end of the activity, the teacher asks why the ball has moved different distance every time and discusses wind power.
Windmill	Living/non-living Natural event	Square-shaped papers are cut from the corners to the centre. One end is joined in the middle with the other end. It is fastened to a wooden bar with a fastener. The windmill is put against the wind.
Feeling bag	Senses	Objects with different characteristics are put in a cloth bag (wool knot, wooden block, plastic toy plate, etc.). Children put their hands into the bag and describe the properties of the object (without looking into the bag) that they hold (soft, hard, etc.).
Ice cubes	Water	Children are given a glass of cold water, a glass of hot water and 2 ice cubes. The children put the ice cubes into the glasses and observe which of them melts faster.

States of matter	Water	Water is placed into a container in a freezer. After 1-2 hours, the water turns into ice. An ice cube is placed into a container on the table and the children watch the transition to ice water. A cup of water is put on a cooker. The transition from water to vapour (gas) is observed.
How does the mud occur?	Water	Children are divided into small groups and each child is given two plastic plates and spoons. The inside of the dishes is filled with some sand. The kids mix the sand with the spoon and they are asked to observe the sand closely. Children will be asked questions about what will happen when the water is added. Some water is put on each child's plate. The children mix the water and the sand with the spoon in order to turn it into mud.
Soil	Soil	Children are taken out to the school garden. They are asked to examine the soil and play with it for a while. They make footprints. The soil, sand and clay taken from the garden are examined in the science corner with the help of a magnifying glass.
Tooth cleaning experiment	Body Environment	Two white Lego pieces are put into two separate plastic jars (see-through) filled with water. The Lego piece in the first jar is brushed with a toothbrush for a week and the piece in the second jar is not brushed and food is placed in the jar every day instead. The jars are observed every day.
Can oily hands only be cleaned with water?	Body Environment	One drop of olive oil is placed on one of the children's hands. The child is asked to wash his/her oily hand only with water. Then, the child is asked to squeeze liquid soap and wash his/her hand again. The child is asked which method cleans the oil better.
Which one is heavy?	Source of Light Shadow	On a field trip, the teacher asks children to collect stones. The stones are then placed in the science corner and examined with a magnifying glass. The stones are classified as large and small. Then, with the help of scales in the science corner, the stones are weighed and sorted from heavy to light.
Shadow games	Source of Light Shadow	Puppets are attached to small bars. The torch light is turned on and the shadow of the puppets is projected onto a white curtain.
Shadows of toys	Source of Light Shadow	Children are taken out to the school garden. They are asked to draw the shadows falling on the paper by giving them various toys.
Sketch of my bedroom	Location	Children are given pictures such as beds, cupboards and work tables cut from magazines in advance. They are then asked to draw a sketch of their own bedrooms using these pictures.

Diversification of activities in line with objectives and increasing the number of activities will be effective in raising the efficiency of science education. The child with a wide range of imagination can internalize the activity by participating in five sensory organs. The child who participates in science activities accepts knowledge as his own property, learns by doing by living, and can transfer his knowledge to daily life. He understands nature, explores and acts sensitive to his environment. According to Kefi, it is necessary for children to participate in science experiments and to have real experiences in order to sustain their interest and curiosity towards science during the preschool period and to create positive attitudes towards science (Kefi, 2013). The importance of increasing the number of creative science events has been frequently mentioned in studies conducted (Aikenhead, 2005; Inan, Trundle and Kantor, 2010; Kiraz and Firat, 2016; Roberts, 2007; Sackes, Trundle, Bell and O'Connell, 2011). In addition; Tsai, Lin, and Yuan (2002) considered that such initiatives could broaden the scope of similar studies and shed more light on the improvement of science education in his study to improve activities with science teacher candidates, in order to highlight the lack of activities in science education.

4. Conclusion and recommendations

There are a total of nine activities under the heading of science activities in the Preschool Education Program of the Ministry of National Education which is being taught in Turkish Republic of North Cyprus. Furthermore, there are twelve activities under the Ministry of Education's pre-school education program, which is being taught in Republic of Turkey. The activities are designed to take into account the children's developmental areas and attract their attention. Some of the activities in the program have combined science education with mathematics education. It seems that the activities are arranged in such a way that the children are willing to learn and learns things by doing by taking into consideration the development characteristics and age groups of the children.

The objectives of the activities can be ordered as children's curiosity about nature and changes in nature, protection and to take responsibility for nature, observation and active research, to establish cause-effect relationship, to develop tools, to predict and develop problem solving skills, and to produce solutions by using suitable materials or technology for the problems faced by the children. When the scope of the educational program is examined, it is seen that there is a limited number of activities related to the environment.

When examining the learning outcomes of the education program being taught in Northern Cyprus, it is seen that "LO 2. He/she examines the properties of living and non-living assets." and "LO 7. He/she develops awareness of the use of technology in everyday life" seems to be used extensively in the activities. Two of the learning outcomes in Turkey's education programs "LO 1. He/she gives attention to object / situation / event" and "LO 5. He/she observes objects or entities." seem to be the most frequently used. It is seen that the educational game method is the most preferred method in the learning process of science activities in the educational programs.

Resultantly, there is a limited number of activities under the heading of activities in Pre-school Education Programs. In the programs, science activities that are basic and simple to apply are generally selected. It is observed that the current problems such as the environment, animals and soil are not included to a great extent. Also, there are not many experiments included in the science activities. Pre-school education programs should include more science activities so that the child can participate in the activities and acquire his/her own knowledge. It is important that activities predominantly occur in the environment, where children have the freedom to perform things themselves. Children who are already curious about the complex aspects of nature and who try to solve problems will be able to implement their exploration and research skills in this way. In addition to the activity and scope, it is necessary to include activities that include the environment, animals, global warming, and soil loss, which are relevant topics in modern society.

Kaynakça / References

Aikenhead, G. (2005). *Science for everyday life: Evidence-based practice.* NewYork: Teachers College Press.

Akbaba, A. & Kaya, B. (2015). Okul oncesi ogrencilerinin dusunme becerilerinin gelismesine yonelik ogretmen gorusleri. *Elektronic Sosyal Bilimler Dergisi, 14(*55), 148-160.

Akman, B.; Balat Uyanik, G. & Guler, T. (2013). *Okul oncesi donemde fen egitimi*. Ankara. Tarcan Matbaacilik.

Aktaş Arnas, Y. (2003). Küçük bir bilim adami yetiştirmenin ilk adimlari. *Çocuk ve Aile,* Ekim (42-46).

Alisinanoğlu, F.; Özbey, S. & Kahveci, G. (2017). Okul öncesinde fen eğitimi. *Pegem Atıf İndeksi*, 1-200.

Appleton, K. (2002). Science activities that work: Perceptions of primary school teachers. *Research in Science Education*, *32*(3), 393-410.

Bakar, E.; Keleş, Ö. & Koçakoğlu, M. (2009). Öğretmenlerin MEB 6. sınıf fen ve teknoloji dersi kitap setleriyle ilgili görüşlerinin değerlendirilmesi. *Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi*, *10*(1).

Black, P. & Hughes, S. (2003). *Teaching science and design and technology in the early years*. London: David Fulton Publishers.

Catron E. C. & Allen, J. (2003). *Early childhood curriculum: A creative play model*. Merril Prentice Hall. New Jersey.

Conatser, R. M. (2000). *How to prepare your preschooler to Harvard?* New Orleans: Streetcar Publishing.

Creswell, J. W. (2014). *Research design: Qualitative, quantitative and mixed methods approaches* (4th ed.). Sage, Thousand Oaks, CA.

Demiriz, S. (2001). Okuloncesi egitim kurumlarindaki fen ve doga etkinlikleri ile ilgili uygulamalarin belirlenmesi. *IV. Fen Bilimleri Egitimi Kongresi, Bildiriler,* Ankara.

Duschl, R. A.; Schweingruber, H. A. & Shouse, A. W. (2007). Taking science to school: Learning and teaching science in grades K-8. Washington, DC: National Academies Press.

Eshach, H. & Fried, M. N. (2005). Should science be taught in early childhood? *Journal of science education and technology*, *14*(3), 315-336.

Fen ve Doga Etkinlikleri (2008). http://www.egitimciyim.net/forum/digerler-etkinlikler/ynt-fen-ve-doga-etkinlikleri-t5653.0.html

Gulay, H. & Ekici, G. (2010). MEB okul oncesi egitim programinin çevre egitimi açisindan analizi. *Turk Fen Egitimi Dergisi*, 7 (1), 74-84.

Hamurcu, H. (2003). Okul öncesi eğitimde fen bilgisi öğretimi "proje yaklaşımı". *Eğitim Araştırmaları, 4*, 13, 66-72.

Harris, S. E. (2008). *Save the earth science experiments: Science fair projects for eco-kids*. New York: Lark Books Pub.

İnan, H. Z. (2017). Okul öncesi eğitim ve okul öncesi eğitim programı. *Pegem Atıf İndeksi*, 1-24.

İnan, H. Z.; Trundle K. C. & Kantor, R. (2010). Understanding natural sciences education in a Regio Emilia-inspired school. *Journal of Research in Science Teaching*, 47: 1186–208.

Jackman, H. L. (2005). *Early education curriculum a child's connection to the world*. Third edition. Thomson Delmar Learning, USA.

Kalley, M. & Psillos D. (2001). Pre-school teachers' content knowledge in science: Their understanding of elementary science concepts and of issues raised by children's questions. *International Journal of Early Years Education, 9(*3), 165-179.

Karamustafaoğlu, S. & Kandaz, U. (2014). Okul öncesi eğitimde fen etkinliklerinde kullanılan öğretim yöntemleri ve karşılaşılan güçlükler. *Gazi Üniversitesi Gazi Eğitim Fakültesi Dergisi, 26(*1), 65-81.

Karamustafaoğlu, S.; Üstün, A. & Kandaz, U. (2006). Okul öncesi öğretmen adaylarinin fen ve doğa etkinliklerini uygulayabilme düzeylerinin belirlenmesi. *XIII. Ulusal Eğitim Bilimleri Kurultayı*, Malatya.

Kefi, S. (2013). Okul oncesi egitim ogretmenlerinin temel bilimsel sureç becerilerini kullanim duzeyleri. *Egitim ve Ogretim Arastirmalari Dergisi, 2,* 300-319.

Kıvanç Öztuğ, E. & Çiner, M. (2018). Okulöncesi dönemi çocukları için yaratıcı drama yöntemi ile kurgulanan sosyal beceri eğitiminin değerlendirilmesi. *Journal of History Culture and Art Research, 7(*1), 414- 428. doi:http://dx.doi.org/10.7596/taksad.v7i1.1296

Kiraz, A. & Firat, A. (2016). Analyzing the environmental awareness of students according to their educational stage. *Researchers World - Journal of Arts, Science & Commerce, 7*(2): 15-25.

KKTC Milli Egitim Bakanligi (2017). *Okul oncesi egitim programi.* Lefkosa: Okman Printing LTD.

Lederman, N. & Abd-El-Khalick, F. (1998). Avoiding de-natured science: Activities that promote understandings of the nature of science. In *The nature of science in science education* (pp. 83-126). Springer, Dordrecht.

National Research Council (2007). *Taking science to school: Learning and teaching science in grades K-8*. National Academies Press.

NSTA (2007). *A head start on science: Encouraging a sense of wonder*. The U.S: National Science Teacher Association Press.

Orion, N.; Hofstein, A.; Tamir, P. & Giddings, G. J. (1997). Development and validation of an instrument for assessing the learning environment of outdoor science activities. *Science Education*, *81*(2), 161-171.

Patton, Q. M. (2014). Qualitative research and evaluation method. Sage, Thousand Oaks, CA.

Punch, K. F. (2005). *Sosyal araştırmalara giriş: Nitel ve nicel yaklaşımlar* (çev. D. Bayrak, H. Bader Arslan, Z. Akyüz). Ankara: Siyasal Kitabevi.

Polat, O.; Yavuz, E. A. & Tunc, A. B. O. (2017). The effect of using mind maps on the development of maths and science skills. *Cypriot Journal of Educational Sciences 12*: 32-45.

Roberts, D. A. (2007). *Scientific literacy/science literacy*. In: S.K. Abell ve N.G. Lederman (Eds.), Handbook of research on science education (pp. 729–780). New York: Routledge.

Sackes, M.; Trundle, K. C.; Bell, R. L. & O'Connell, A. A. (2011). The influence of early science experience in kindergarten on children's immediate and later science achievement: Evidence from the early childhood longitudinal study. *Journal of Research in Science Teaching*, 48: 217–35.

TC Milli Egitim Bakanligi (2013). *Okul oncesi egitim programi.* Ankara: Milli Egitim Basimevi.

Tsai, C. C.; Lin, S. S. & Yuan, S. M. (2002). Developing science activities through a networked peer assessment system. *Computers & Education*, *38*(1-3), 241-252.

Ulu, E. & Kiraz, A. (2014). Science education and cognitive development in updated 2012 pre-school curriculum. *Procedia - Social and Behavioural Sciences*, 136: 438-451.

Ünsal, Y. & Güneş, B. (2003). İlköğretim 6. sınıf fen bilgisi ders kitabının fizik konuları yönünden incelenmesi. *Gazi Üniversitesi Gazi Eğitim Fakültesi Dergisi*, *23*(3).

Wortham, S. C. (2002). *Early childhood curriculum: Developmental bases for learning and teaching*. Merrill/Prentice Hall.

Yesilyurt, S. (2003). Ana sinifi ogrencileri ve ilkogretim birinci sinif ogrencilerinin canli ve cansiz kavramlarini anlama duzeyleri uzerine bir arastirma. *Erzincan Egitim Fakultesi Dergisi, 5* (2), 83-95.

Yıldırım, A. & Şimşek, H. (2011). *Sosyal bilimlerde nitel araştırma yöntemleri.* Ankara: Seçkin.