

The Views of the Teachers Related to the Teaching Methods and Techniques Used in Preschool Science Teaching

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Abstract

In this study, it was aimed to determine the methods and techniques used in preschool science teaching and the problems the preschool teachers encounter while using teaching methods and techniques. This study is in descriptive survey model. The study group of the research consists of 64 preschool teachers working in Ağrı city center. Personal information form to determine demographic characteristics of the preschool teachers, questionnaire form to determine the methods and techniques that the teachers use in science teaching were used as data collection tools in the study. As a result of the study, it was determined that the most used technique that the preschool teachers use in science teaching is game technique, however it was also determined that the teachers often use drama, cooperative learning and experiment method. It was determined that while teaching science, the preschool teachers consider the convenience of the method and technique first, and only then they consider their skills to use the method and the application time of the method and technique. As a result of the evidence related to the problems the preschool teachers encounter while teaching science, among the problems that the teachers complain the most is the negativity of the environment.

Keywords: Science teaching, Teaching methods and techniques, Teachers' views.

Introduction

Preschool period is known to be the period when the children make fastest progress in several fields. These can be identified as cognitive, physical, language, emotional and social fields (Şahin, 2000). Children display a curious, recipient and researcher personality trait -open to learning- about the things happening around them (Başal, 1998; Aral, Kandır & Can, 2001; Aktaş-Arnas, 2007; Dursun, 2009). It is a necessity to increase questioning and wondering skills of the children for a better development of these fields (Aktaş-Arnas, 2002).

Preschool period is a period full of experiences through which the children learn the basic concepts. The cognitive tools, that is, the concepts which provide the individual to understand the worlds who lives in and to establish meaningful relations can be gained through the children's active interaction with the environment. As the children analyze the world they live in, they actively construct their own knowledge and every gained knowledge underlies the new knowledge to be constructed (Kalley & Psillos, 2001; Tuğrul, 2005; Aktaş-Arnas, 2009; Kandır & Orçan, 2010; Balat & Önkol, 2010). In this direction, it can be said that these characteristics can be gained by the children through science teaching in preschool. Moreover, it is possible with science teaching to make children consider the world in a more quizzical and exiting way. Science teaching in preschool is education which not only is based on the children's curiosity and interest and an enjoyable, interesting education transferring abstract information into concrete information (Küçükturan, 2003) but also an education which contribute to psychomotor, emotional, social and cognitive development of the children (Ayvaci, Devecioğlu & Yiğit, 2002; Akgül, 2004). Especially science activities conducted with young children should be inquiry-based, informed by the children's existing mental models or ideas regarding the targeted phenomena (Saçkes, 2015). As the benefits of science teaching are more functional, preschool teachers have more responsibilities. First of all, the teachers should prepare environment where the children can examine, analyze, discover and develop their observation skills and they should use different teaching methods and techniques to make science teaching a more active, effective and enjoyable course (Alisinanoğlu & Ulutaş, 2003). Another duty of a teacher in science teaching is making the science concepts appropriate presentations within activities and trying different ways for this purpose. To do so, the teachers should improve their adaptive skills (Temel, 1993).

While implementing science activities, the teachers should chose methods which can support and make it easier for children's learning (Senemoğlu, 2000). Children in preschool period are capable of understanding the science concepts, however, as their attention span is short they always need new stimulants during the activities. It is of higher importance that the teachers should instruct science teaching with the different teaching methods and techniques in the curriculum to make sure that each

child benefits from the opportunities in the teaching environment (Zembat, 2012). Thus, the teacher should make an effort to make the children active by using different teaching methods and techniques (Şahin, 2000). In preschool period, it is the duty of the teacher to encourage the children for science teaching, arouse curiosity, encourage them to ask and answer questions and thus provide the children to create schemas about science concepts and events.

Preschool science teaching includes abstract or abstruse concepts, and thus using appropriate methods and techniques instead of didactic method will make it easy for the children to learn science subjects in early period (Demiriz & Ulutaş, 2001; Balat & Önkol, 2010). It is important to conduct the learning process in the curriculums which consider the individual differences of the children through different methods and techniques. Method is used in the meaning of an organized way which is chosen and followed to solve a problem, conclude an experiment, learn or teach a subject. And techniques is used in the meaning of a process, skill or way which should be applied for any art, production or teaching activity (Turkish Language Society, 2014). The teacher can make science teaching more enjoyable and understandable by using mind maps, experiments, study trip, observation, drama, computer assisted instruction, analogy, cooperative learning, drawing, information exchange, project and various methods. However, for a teacher to use these methods, they should be well aware of these mentioned methods-techniques and applications.

In preschool period when the children's concept development is at its peak besides their scientific and basic skills, determining which methods and techniques the teachers use in science teaching, how they get the information about the methods and techniques and what problems they encounter while applying the methods and techniques is important for the quality of science teaching to be improved. In this direction, answers to the questions below have been sought,

1. What are the methods and techniques that preschool teachers use in science teaching?
2. What are the situations in which preschool teachers identify the methods and techniques they use in science teaching?
3. What are the ways of learning about the methods and techniques that preschool teachers use in science teaching
4. Do preschool teachers see themselves adequately in science subjects without deciding on methods and techniques?
5. What are the problems faced by preschool teachers in applying methods and techniques?

METHOD

Research Model

This research is a descriptive study based on the survey model. According to Karasar (2011), “a survey model aims to describe a situation-past or present- as it is and making survey on the population on or a group, example or sample from a multi-element population to reach a general idea.” In this study, it was aimed to determine the methods and techniques the preschool teachers use and the problems they encounter while applying these methods and techniques.

Participants

The study group of the research consists of 64 preschool teachers working in Ağrı city center selected with availability sampling.

Data Collecting Tools

In this study, personal information form and questionnaire form to determine the methods and techniques the preschool teachers use in science teaching were used as data collecting tools. The questionnaire consists of open-ended questions which can determine which methods and techniques the preschool teacher use in science teaching, the source of their knowledge about the methods and techniques, whether their efficiency about the science subjects is effective in deciding the methods and techniques to be used in the courses or not, the aspects they pay attention while choosing the methods and the techniques, and the problems they encounter in the use of these methods and techniques. The opinions of 3 experts on the field have been asked to determine if the questions in the questionnaire serve to the aim of the study and if they are in sufficient number and quality for the situations to be analyzed.

Data Analysis

The data obtained from personal information form and the data the questionnaire were analyzed separately. The data from the personal information form and the questionnaire were tabulated and frequency (f) and percentage (%) values were calculated.

FINDINGS

Table 1 indicates the findings obtained from Personal Information Form applied on preschool teachers.

Table 1. *Frequency and Percentage Values Related to the Data Obtained from Personal Information Form*

		f	%
Gender	Female	49	77
	Male	15	23
Age	20-24	31	48
	25-29	28	44
	30-34	2	3
	35 and over	3	5
Seniority	0-5	59	92
	6-10	3	5
	11 and over	2	3
Graduation	vocational high school for girls	14	22
	associate degree	2	3
	bachelor's degree	45	70
	postgraduate	3	5
Work	official independent	23	36
	nursery class in primary school	41	64

As it can be seen in Table 1, 77 % of the participant of the study is female and 23 % of them is male. It can be seen in the table that the preschool teachers are mostly at the age of 20-24 (48 %) and 30-34 (3 %) at least. 92 % of the preschool teachers has 0-5 years professional seniority, 5 % of them has 6-10 years, and 3 % of them has 11 years and over. It can be understood that 70 % of the preschool teachers has bachelor's degree, 22 % of them graduated from vocational high school for girls, 5 % of them are postgraduates, and 3 % of them has associate degree. On analyzing the workplace of the teachers, it can be seen that 36 % of them works officially independent and 64 % works in the nursery class under the primary school.

The questionnaire results conducted on the preschool teachers and consisting of the methods and techniques were calculated as frequency and percentage and were indicated in Table 2, Table 3, Table 4, Table 5 and Table 6. Information about the methods and techniques the preschools teachers use in science teaching is indicated in Table 2.

Table 2. *Frequency and Percentage Values Related to the Methods and Techniques Preschool Teachers Use in Science Teaching*

Teaching Methods and Techniques used in Science Teaching	f	%
Mind map	10	16
Experiment	26	41
Study trip and observation	2	3
Project	1	2
Analogy	5	8
Drama	35	55
Cooperative learning	30	47
Computer-assisted teaching	-	-
Drawing	20	31
Multi-methoded techniques		
1.Language activities in Turkish	5	8
2. Music activities	3	5
3. Art activities	12	19
4. Game	37	58

Game (58 %) is the main method and technique that the preschool teachers use while teaching science. 55 % of the teachers use drama, 47 % of them use cooperative learning and 41 % of them use experiment. It can be seen that the preschool teachers use project (2 %), study trip and observation (3 %) and analogy (8 %) the least. It can be inferred from Table 2 that the preschool teachers do not use computer-assisted teaching method in science teaching.

Table 3 indicates the variables that the preschool teachers consider while determining the methods and techniques.

Table 3. *Frequency and Percentage Values Related to the Variables the Preschool Teachers Consider While Determining the Methods and Techniques*

Variables	f	%
Objectives of the course	27	42
Readiness level of the students	17	27
The number of the students	23	36
The skills to use the method	52	81
Ease of use	57	89
Time	45	70
The characteristics of the subject	15	23
Classroom and its size	20	31
Cost	37	58

It can be seen in Table 3 that the preschool teachers consider ease of use (89 %) of the method and technique the most, their skills to use the method (81 %) and the application time (70 %) of the method and technique, they ignore the readiness level of the students (27 %) and the characteristics of the subject (23 %). Table 4 indicates the variables that the preschool teachers learn the methods and techniques they use in science teaching.

Table 4. *Frequency and Percentage Values Related to Ways through Which the Preschool Teachers Learn the Methods and Techniques*

Learning Styles	f	%
Other colleagues	23	36
Symposiums	10	16
Library	6	9
Newly graduate teachers working in the school	17	26
Seminars	45	70
Internet	36	56
In-service Training	21	33

As it can be seen in Table 4, 70 % of the preschool teachers learn the methods and techniques from seminars, 56 % of them learn from internet, 36 % of them learn from other colleagues, 33 % of them learn from in-service trainings, 26 % of them learn from the newly graduates working in the school, 16 % of them learn from symposiums, 9 % of them learn from library. Findings related to

whether preschool teachers' efficiency about science topics affects applying the methods and techniques are indicated in Table 5.

Table 5. *Data Related to the Fact That Whether the Preschool Teachers Consider Themselves Adequate in Deciding the Teaching Methods and Techniques*

	f	%
Adequate	23	36
Semi-adequate	37	58
Not adequate	4	6

As it can be seen in Table 5, 36 % of the preschool teachers consider themselves adequate, 58 % consider themselves semi-adequate, and 6 % of them consider themselves inadequate about the science topics. Findings related to the problems the preschool teachers encounter while teaching science are indicated in Table 6.

Table 6. *The Problems That the Preschool Teachers Encounter While Applying Teaching Methods and Techniques*

Problems	f	%
Lack of technology	21	33
Inadequacy in teaching abstract concepts	35	55
Fire danger	7	11
Lack of material	28	44
The experiments' being dangerous	12	19
Negativity of the environment	43	67
Lack of knowledge	38	59
Crowded classrooms	18	28
Having difficulty in stooping to the levels of the children	32	50
Being unable to go excursions	24	38
Children's having problem in transferring abstract concepts into concrete ones.	33	52
Being unable to find appropriate experiment for children's age and readiness levels.	26	41

As it can be seen in Table 6, the preschool teachers report that they encounter problems like negativity of the environment (67 %), lack of knowledge (59 %), they are inadequate in teaching abstract concepts (55 %), children have problem in transferring abstract concepts into concrete ones

(52 %), having difficulty in stooping to the levels of the children (50 %), lack of material (44 %), being unable to find appropriate experiment for children's age and readiness levels (41 %), being unable to go excursions (38 %), lack of technology (33 %), crowded classrooms (28 %), experiments are dangerous (19 %), and fire danger (11 %) related to the methods and techniques they use in science teaching.

Results And Discussion

According to the result obtained from this study which was conducted to determine the methods and techniques the preschool teachers use in science teaching and to determine the problems they encounter while applying these methods and techniques, the preschool teachers choose to use play technique the most among the methods and techniques in teaching science. In spite of that, it was determined in the studies about the science concepts teaching of the preschool teachers that a clear majority of the teachers do not use the play technique (Karamustafaoglu & Kandaz, 2006; Güler & Bıkmaz, 2002; Şahin, 1998). It is thought that as the play technique has advantages such as allowing the child to express himself/herself, stimulate his/her creative thinking and imagination, science concepts can be taught better with this technique. Thus, it can be said that teachers should frequently apply play technique in science teaching in preschool period. According to Akman and Özgül (2015), science instruction in the early years can be easily integrated with play.

Another result obtained from the study, the teachers mainly use drama, cooperative learning and experiment methods. The methods that the teachers less prefer are project, study trip, observation and analogy. On analyzing the methods and techniques the teachers often use in science teaching, it can be clearly seen that they never use computer-assisted instruction in science teaching. It is thought that these results which show similarities with the results of the study conducted by Karamustafaoglu and Kandız (2006). As the contribution that the computer make to the education today is clear and it is known that the children in preschool are interested in computers, not using computer-assisted instruction in especially science teaching and not allowing the children to experience a more concrete and visual education is of higher importance. The reason why computer assisted instruction is not used is that the classes are technologically inadequate and the current student numbers are crowded.

In the study, it was determined that the teachers consider the ease of use of the methods and techniques the most, and then their skills to use the method or the technique and the application time of the method or the technique while teaching science; yet they less consider the readiness level of the students and the characteristics of the subject. The lack of adequate method and technical knowledge of pre-school teachers also prevents effective science education from taking place. In order to get rid of this situation, teachers need to increase their method and technical knowledge.

The preschool teachers stated that they learn the methods and techniques from seminars, internet, other colleagues, in-service training and newly graduates working in the school, quite few of the teachers stated that they utilize symposiums and libraries. Particularly emphasis should be given to sharing knowledge and experience with each other, especially in seminars, and emphasis should be placed on methods and techniques. It is inevitable that newly graduated teachers will benefit from the fact that their current knowledge is more. Teachers' graduate degrees increase their participation in the symposium, but teachers who do not graduate and do not have the desire to improve themselves and learn new things about the field are not interested in these subjects.

According to another result obtained from the study, it is quite challenging that more than half of the preschool teachers consider themselves semi-adequate in teaching science topics and very few of them consider themselves inadequate about it. In another study, it is stated that the preschool science teachers consider themselves inadequate in science subjects and they want to take in-service trainings (Karaer & Kösterelioglu, 2005; Kildan & Pektas, 2009). It's a clear evidence that consider in themselves semi-adequate or inadequate will be resulted with failure in science teaching. In this case, the teachers avoid teaching science topics in preschool, spare less time to science activities, and avoid using effective teaching methods and techniques. Thus, for science teaching to be successful, the teachers should be able consider themselves adequate and to do so, both before service and inservice the teachers should be given the necessary education and necessary equipment should be provided.

On analyzing the problems that the preschool teachers encounter while teaching science, negativity of the environmental conditions is the mainly complained problem. Because of the geographip situation of Ağrı where the teachers work, winters last long here and this causes the teachers to be unable to do study trips and provide variety about the works about nature. Yet, for the children, creating a garden in which various animal can shelter and flowers can grow will provide the science activities to go out of the classroom and increase the children's skills such as observing, comparing and analyzing (Martin, 1997). Güven, Ahi, Tan & Karabulut (2013) analyzed the views of the preschool teachers about teaching method and techniques in their study. As a result of the study, it was determined that the preschool teachers think that as the special teaching methods develop different zones of development and skills of the children, arouse children's interest, provide permanent learning, make the education productive, develop creative thinking skill, and provide getting exact information about the children, they are necessary.

That the lack of knowledge of the teachers about the science topics and that they consider inadequate themselves in teaching abstract concepts is the most outstanding problem revealed in the study. Because applying the method or the techniques requires to have knowledge about the subject on which the method or the technique will be applied rather than having knowledge about the

method or the technique. The teachers stated that having problem in children's transferring abstract concepts into concrete ones, being unable to stoop into children's levels and lack of materials are another problems the teachers encounter. According to Johnson (1999), science is generally neglected in early childhood classrooms. As a reason of this, it can be seen that science is considered and presented excessively formal, is abstract and consists of much theoretical information, and therefore children at early ages and their children consider science teaching extremely difficult. Another reason for neglecting science in the classrooms is the fallacy that the constructivist approach is incompatible with science (Wilson, 2002). To increase the quality of the science in preschools, the attitudes of the preschool teachers should at good levels firstly. To do so, the knowledge of the preschool teachers about science should be provided to be adequate levels (Van der Molen, 2013; Akçay, 2014).

The teachers stated that among the problems they encounter are being unable to find experiments appropriate to the children's age and readiness, crowded classrooms, experiment's being dangerous and fire danger. Ministry of National Education should support the teachers about these subjects, provide them materials, conduct studies to decrease the number of students for per teacher and increase their motivation with in-service trainings. Choosing appropriate teaching methods and techniques in preschool science teaching is of higher importance for the curriculum to be successful. Based on the results of this study, the recommendations below can be made:

1. Practical activities related to the methods and techniques should be done particularly during undergraduate education and the evaluations about the activities should be done.
2. Adequate training about the science topics in the science teaching course in undergraduate education should be given to the preservice teachers and it should be provided that they are active enough during the course.
3. The teachers should be given in-service trainings to resolve the inadequacy of the teachers about sciences, which is considered to be an important problem and revealed in this study.
4. Preservice teachers should be gained knowledge and experience with the practices about science activities that they can give to the preschool students.
5. The Ministry of National Education and the Universities should cooperate and the teaching staff can be relieved of what they need in terms of methods and techniques.
6. The process of teaching methods and techniques in the education faculties can be examined by the researchers.

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Genişletilmiş Özet

Okul Öncesi Fen Öğretiminde Kullanılan Yöntem ve Tekniklere İlişkin Öğretmen Görüşleri

Okul öncesi dönem çocuklar için birçok alanda en hızlı ilerleme kaydettikleri dönem olarak bilinmektedir. Bu alanlar içinde bilişsel, fiziksel, dil, duygusal ve sosyal alanlar gösterilmektedir. Bu alanların daha iyi gelişebilmesi için merak etme ve soru sorma becerilerinin artırılması gerekmektedir. Birlikte eğitim ve öğretim sisteminde de gereken önemin verilmesi şarttır. Fen öğretiminin sağladığı bunca yararların daha işlevsel olması açısından okul öncesi öğretmenlerine büyük görevler düşmektedir. Öncelikle, öğretmenlerin çocuğun inceleme, araştırma, keşfetme ve gözlem becerilerini geliştirmek için uygun ortamlar hazırlaması gerekmektedir. (Alisinanoğlu ve Ulutaş, 2003) birçok yöntem ve tekniği kullanarak fen öğretimini daha aktif, etkili ve zevkli hale getirmeleri gerekmektedir. Fen öğretiminde öğretmenlere düşen bir diğer görev de fen kavramlarını, etkinlikler içinde uygun bir sunum şekline getirebilmek ve bu amaçla farklı yollar denemek ve kendisinin uyum ve uyarlama becerisini geliştirmesi gerekmektedir. Okul öncesi dönemde fen öğretimi soyut ya da anlaşılması güç olan kavramları içermekle birlikte, bu kavramların öğretiminde didaktik yolla öğretmek yerine uygun yöntem ve tekniklerin kullanılması erken dönemde çocukların fen konularını öğrenmelerini kolaylaştıracaktır.

Bilimsel becerilerin ve temel becerilerin yanı sıra kavram gelişimlerinin de en üst düzeyde olduğu okul öncesi döneminde, okul öncesi eğitimi kapsamında gerçekleştirilen fen öğretiminde öğretmenlerin kullandıkları yöntem ve tekniklerin neler olduğu, yöntem ve tekniklere ait bilgilerinin kaynaklarını, yöntem ve teknikleri uygularken karşılaştıkları sorunların belirlenmesi, ülkemiz okul öncesi fen eğitiminin kalitesinin artırılması bakımından çok önemlidir. Bu bağlamda, gerçekleştirilen çalışmada, okul öncesi öğretmenlerinin fen öğretiminde kullandıkları yöntem ve teknikleri belirlemek ve bu uygulamaları yürütürken karşılaştıkları sorunları tespit etmek amaçlanmıştır.

Yöntem

Bu araştırma, tarama modeline dayalı betimsel bir çalışma niteliğindedir. Araştırmanın çalışma grubunu, Ağrı il merkezinde görev yapan 64 okul öncesi öğretmeni oluşturmaktadır. Bu çalışmada veri toplama aracı olarak; okul öncesi öğretmenlerinin demografik özelliklerini belirleyebilmek amacıyla kişisel bilgiler formu, öğretmenlerin fen eğitiminde kullandıkları yöntem ve teknikleri belirleyebilmek amacıyla anket formu kullanılmıştır. Veri toplama aracı olarak kullanılan kişisel bilgiler formu ve anket formundan elde edilen verilerin analizi ayrı ayrı yapılmıştır. Kişisel

bilgiler formundan ve anket formundan elde edilen veriler tablolaştırılarak frekans (f) ve yüzde (%) değerleri hesaplanmıştır.

Bulgular

Okul öncesi öğretmenlerinin fen öğretiminde kullandıkları yöntem ve teknikleri belirlemek ve bu uygulamaları yürütürken karşılaştıkları sorunları tespit edebilmek amacıyla yapılan bu çalışmada elde edilen sonuçlar şu şekildedir. Okul öncesi öğretmenlerinin feni öğretirken kullandıkları yöntem ve teknikler arasında en fazla oyun tekniğine yer verdikleri görülmektedir.

Okul öncesi öğretmenleri fen öğretirken en çok yöntem ve tekniğin kullanım kolaylığını göz önünde bulundurdukları, daha sonra ise yöntemi kullanma becerileri ile yöntem ve tekniğin uygulanma süresini göz önünde bulundurdukları; öğrencilerin hazırbulunuşluk düzeyleri ile konunun özelliğini pek az öğretmenin göz önünde bulundurduğu tespit edilmiştir.

Okul öncesi öğretmenlerinin fen öğretiminde kullandıkları yöntem ve teknikleri seminerlerden, internetten, diğer öğretmen arkadaşlarından, hizmetiçi eğitimden, yeni mezun olan ve kurumda görev yapan öğretmenlerden elde ettiklerini belirtirken, öğretmenlerin az bir kısmı sempozyumlardan ve kütüphaneden öğrendiklerini belirtmektedirler. Okul öncesi öğretmenlerinin yarısından fazlasının kendilerini fen konularını öğretmede biraz yeterli görmeleri oldukça düşündürücü olmakla birlikte az bir kısmının ise kendilerini hiç yeterli görmedikleri oldukça manidardır.

Okul öncesi öğretmenlerinin fen öğretirken yöntem ve teknikler ile ilgili karşılaştıkları sorunlara ait bulgulardan, öğretmenlerin şikâyet ettikleri sorunların başında çevrenin olumsuzluğu gelmektedir. Öğretmenlerin fen konuları ile ilgili bilgi eksikliği ve özellikle soyut kavramları anlatmada kendilerini yetersiz hisstemelerini dile getirmeleri ortaya konan sorunların en büyüğü olduğu söylenebilir. Öğretmenler aynı zamanda yaş ve hazırbulunuşluk seviyelerine uygun deney bulamamak, teknoloji eksikliği, sınıfın kalabalık olması, deneylerin tehlikeli olması ve yangın gibi sorunları dile getirmektedirler.

Sonuç

Okul öncesinde fen öğretiminde uygun olan yöntem ve tekniklerin seçilmesi Eğitim-öğretim programının başarıya ulaşması için çok önemlidir. Bu doğrultuda özellikle lisans öğreniminde yöntem ve teknikler ile ilgili uygulamalı etkinlikler öğretmen adaylarına yaptırılmalı ve birçok etkinlik üzerinde değerlendirmeler gerçekleştirilmelidir. Bununla birlikte bu çalışmada ortaya koyulan bir diğer önemli problem olan fen konularındaki yetersizliğin ortadan kalkması için hizmetiçi Eğitim

yapılmalı ve bu eksiklikler en kısa zamanda giderilmeye çalışılmalıdır. Aynı zamanda lisans programında yer alan fen öğretimi dersinde fen konuları ile ilgili yeterli öğretim verilmeli ve öğretmen adaylarının bu derste yeterince aktif olmaları sağlanmalıdır.