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THE EFFECT OF DRAMA BASED MATHEMATIC ACTIVITIES ON SCIENTIFIC PROCESS SKILLS OF 5 YEAR OLD CHILDREN

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ABSTRACT

The purpose of this research is to examine the effect of drama based mathematics activities on the basic scientific process skills of children in the 5-year-old. An experimental research model with pretest posttest control grouped experimental model was used. 8-week experimental study designed to examine the effects of the program on the basic scientific process skills to classification and measurement skills, 20 children chosen from two branches of a special school attached to the National Education in Kadıköy district of Istanbul in 2016. 10 of these children are in the experimental, 10 of them are in the control group. 5 of the children are girls and 5 are boys. Experimental and control groups were selected randomly among the two classrooms. The "classification and measurement" subscale items of the " Scientific Process Skills Scale for 60-72 Months of Children " developed by Özkan (2015) were used as a pre-test to determine whether the classification and measurement skills differed before the program was implemented and after the programme the scale used to investigate between the pretest and posttest scores of the experimental group and the posttest scores of the experimental and control groups. KR 20 value of the scale of the scale is .82 for classification and .86 for measurement. One activity was performed for 2 days in a week during 8 weeks in the experimental group. During the study, the activities were prepared by the researchers for control group 2 days in a week for the same period. At the end of the study, there was a significant difference between the pretest and posttest scores of the experimental group and the posttest scores of the experimental and

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control groups. There was no significant difference between the pretest and posttest scores of the control group.

STRUCTURED ABSTRACT

1. Introduction

The preschool period is one of the most important periods of life because the child gains many skills and habits in this period. In this period children learn faster than other periods of life. According to Clements (2001), the preschool period is an effective period for the development of the skills of calculation, measurement, and prediction for children (Clements, 2001). Drama is an effective method that can be used in learning mathematics. Because drama is a way of learning that children can learn by doing and living and discuss their ideas. According to Önder (2010), it is not difficult to understand and explain the value of playing a role-playing game, which is one of the forms of play in which children tend to play while their natural tendencies in playing. The purpose of this research is to examine the effect of drama based mathematics activities on the basic scientific process skills of 5-year-old children.

2. Method

An experimental research model with pretest posttest control grouped experimental model was used. 8-week experimental study designed to examine the effects of the program on the basic scientific process skills to classification and measurement skills, 20 children chosen from two branches of a special school attached to the National Education in Kadıköy district of Istanbul in 2016. 10 of these children are in the experimental, 10 of them are in the control group. 5 of the children are girls and 5 are boys. Experimental and control groups were selected randomly among the two classrooms.

2.1. Data collection Tools

The "classification and measurement" subscale items of the " Scientific Process Skills Scale for 60-72 Months of Children " developed by Özkan (2015) were used to collect data.

2.2. Analysis of data

SPSS 17 program was used for data analysis. Mann Whitney U analysis was performed on nonparametric tests to determine the difference between pretest scores of children in the experimental and control groups and between the posttest scores of the children in the experimental and control groups. The Wilcoxon signed rank test was conducted to examine the differences between the pretest-posttest scores of the children in the experimental group and the control group. Before these tests were performed, the Kolmogorov Smirnov test was applied to determine whether the distribution was normal and the non parametric tests mentioned were used because the distribution appeared to be non-normal.

3. Findings

At the end of the study, there was a significant difference between the pretest and posttest scores of the experimental group and the posttest scores of the experimental and control groups. There was no significant difference between the pretest and posttest scores of the control group.

4. Conclusions and recommendations

There is a significant difference between the classification and measurement posttest scores of the experimental and control groups. Likewise, the pretest and posttest scores of the experimental group also differ significantly. According to this result, it can be said that the applied program is effective on the experimental group. In literature, it is seen that different programs have an effect on scientific process skills. The following suggestions can be given to researchers, educators and families in the direction of the results obtained from the research.

- In this research, the effect of the drama method mathematical activities on the classification and measurement skills was examined. The researchers advised to examine the effects of educational programs prepared in different ways on children's scientific process skills.

- This study was conducted with 5-year-old children. Research on mathematics, science, and scientific process skills can be done with children in different age groups.

- It may be suggested that parents doing activities that improve their children's skills such as asking questions that support scientific process skills, encouraging their children to ask questions.

Keywords: Scientific process skills, preschool, drama, mathematic activities.

DRAMA TEMELLİ MATEMATİK ETKİNLİKLERİNİN 5 YAŞ ÇOCUKLARIN TEMEL BİLİMSEL SÜREÇ BECERİLERİNE ETKİSİ

ÖZET

Bu araştırmanın amacı, drama temelli matematik etkinliklerinin 5 yaş grubu çocukların sınıflama ve ölçme becerilerine etkisinin incelenmesidir. Bunun için öntest sontest kontrol gruplu deneysel araştırma modeli kullanılmıştır. Programın sınıflama ve ölçme becerilerine etkisini incelemek amacıyla yapılan 8 haftalık deneysel çalışmada, 2016 yılında İstanbul ili Kadıköy ilçesindeki Milli Eğitim'e bağlı özel bir okulun anasınıfına devam eden okulun iki şubesinden 20 altı yaş çocuğu ile çalışılmıştır. Bu çocukların 10'u deney, 10'u kontrol grubunda yer almaktadır. Çocukların 5'i kız, 5'i erkektir. Deney ve kontrol grupları ise iki şubedeki öğrenciler arasından random olarak seçilerek belirlenmiştir. Grupların sınıflama ve ölçme becerilerinin program uygulanmadan önce farklılık gösterip göstermediğini belirlemek için öntest olarak "60-72 Aylık Çocuklar İçin Okul Öncesi Bilimsel Süreç Becerileri Ölçeği"nin 'sınıflama ve ölçme' alt boyutunun maddeleri uygulanmıştır. Ölçeğin ilgili alt boyutların KR20 değeri sınıflama için .82,

ölçme için .86 dir. Deney grubuna 8 hafta boyunca haftada 2 gün 1 etkinlik uygulanmış, araştırma süresince kontrol grubuna da aynı süre boyunca haftada 2 gün araştırmacı tarafından MEB 2013 programına uygun olarak hazırlanan etkinlikler uygulanmıştır. Araştırmanın sonunda, deney grubunun öntest ve sontest puanları ile, deney ve kontrol gruplarının sontest puanları arasında anlamlı farklılık görülmüştür. Kontrol grubunun öntest ve sontest puanları arasında ise anlamlı bir fark görülmemiştir.

Anahtar Kelimeler: Bilimsel süreç becerileri, okul öncesi, drama, matematik etkinlikleri

1.Introductıon

The preschool period is one of the most important periods of life because the child gains many skills and habits in this period. Children are quite clear to learn at this time that development is extremely faster. It is important that using succesfull methods and techniques for teaching. They must be appropriate for child's development and age. Instead of using methods such as narration, the methods that the child actively participates in and provides by learning and doing will be more effective.

According to Önder (2002), drama is group activities based on pre-determined clear and explicit educational aims, in which all children, together with their teachers, perform, express, role play, play and discuss with more great motor movements (Önder, 2002). Drama is not describes as theater, acting or actor. However, drama studies use theater techniques and use theater forms. In its essence is the concept of play, which is the root of your acting word. Briefly, drama is a playful process and it is a group interaction, animation, questioning and evaluation process (Yildiz, 2016). Among the teaching methods, it is stated that the role playing method which is a part of the drama has a special value. The child plays in a "playful" process by observing an experience, an idea, and sometimes an abstract concept or behavior in the group work, using the old cognitive patterns, observes, feelings and experiences. Children have the possibility to assume another identity, to understand how others feel, think and act. The important thing in teaching is to make the child active. Being able to act together with the body and sense organs of the child and bringing them to life by reviving them is an indication of how appropriate the drama is as a method in this process (Üstündağ 1996; Koç 1999, as cited in Yıldız 2016).

According to Clements (2001), the preschool period is an effective period for the development of the skills of calculation, measurement, and prediction for children (Clements, 2001). Children start with formal education, a set of mathematical discoveries and information based on previous experiences. These mathematical experiences may not include mathematical terms for us in an academic sense. Children in early childhood can not perceive the abstract direction of mathematics naturally. They know how to count, collect and decipher them, but they can not show it on paper. In this period, children learn concepts related to mathematics by doing and living and experimenting, not by directly conveying information. For this reason, teachers should prepare educational environments in which children can ask questions, discuss ideas, research, and put forward various ideas (Akman, 2002, Aktas Arnas, 2005). One of the effective methods that can be used in learning mathematics is drama. Because drama is a way of learning that children can learn by doing and living and discuss their ideas. Also, according to Önder (2010), it is not difficult to understand and explain the value of playing a role-playing game, which is one of the forms of play in which children tend to play while their natural tendencies in playing play can be seen (Önder, 2010). According to Çepni (2005) and Lind (2005), scientific process skills are the skills that we use to create knowledge, to

think through problems and formulate results, to facilitate learning, to gain research ability, to make our students active in the learning environment, to develop responsibility for learning, and to enhance the permanence of learning. (Çepni, 2005, Lind 2005, as cited in Özkan, 2015). Scientific process skills are applied part of science in which children are supported by providing opportunities for exploring and researching scientific knowledge (Charlesworth and Lind, 2003). Science and mathematics education presented in a planned and programmed way to the child in the pre-school period is very important for the children to gain the experiences that they can relate to the world they live in and the achievements that enable them to internalize the scientific concepts with their scientific process skills depending on this situation (Veziroğlu, 2011). For this reason, it is expected that the mathematical activities given through drama will improve the scientific process skills. Instead of memorizing, it is aimed to educate individuals who are questioning, researching and having scientific hold. Therefore, the importance of research and inquiry-based education programs that contribute to children's learning by doing and living is great. From this, it is aimed to investigate the effect of drama based math activities on basic scientific process skills of preschool children.

2. Method

2.1.Working group

Twenty 5 -age children from two branches of the school who continues to its kindergarten chosen randomly for experiment and control groups. 10 of these children are in the experiment, 10 of them are in the control group (5 boy, 5 girl).

2.2. Data collection tool

The "classification and measurement" subscale items of the " Scientific Process Skills for 60-72 Months old Children" developed by Özkan (2015), were used to measure the children's classification and measurement skills. In the experimental part of the study, drama based mathematic activities, prepared by the researchers were applied. Before the preparation of the program, 5 academicians were given the final form for the expert opinion.

2.3. Analysis of data

SPSS 17 program was used for data analysis. Mann Whitney U analysis was performed on nonparametric tests to determine the difference between pretest scores of children in the experimental and control groups and between the posttest scores of the children in the experimental and control groups. The Wilcoxon signed rank test was conducted to examine the differences between the pretest-posttest scores of the children in the experimental group and the control group. Before these tests were performed, the Kolmogorov Smirnov test was applied to determine whether the distribution was normal and the non parametric tests mentioned were used because the distribution appeared to be non-normal.

3. Results

Table 1: Mann Whitney U results showing the difference between the pre-test scores of classification of the children in the experimental and control groups

Group	N	M.R	S.R	U	p
Experimental	10	10,85	108,50		
Control	10	10,15	101,50	46,500	,796

As shown in Table 1, no significant difference was found between pre-test scores of experimental and control groups (p> .05). According to this result, it can be said that the experimental and control groups have the same level of classification ability.

Table 2: Mann Whitney U results showing the difference between the pre-test scores of measurement of the children in the experimental and control groups

Group	N	M.R	S.R	U	p
Experimental	10	11,10	111,00	44,000	,684
Control	10	9,90	99,00		

As shown in Table 2, no significant difference was found between pre-test scores of experimental and control groups (p> .05). According to this result, it can be said that the experimental and control groups have the same level of measurement ability.

Table 3: Mann Whitney U test results showing the difference between post-test scores of classification of the children in the experimental and control groups.

Group	N	M.R	S.R	U	p
Experimental	10	14,20	142	13	,004
Control	10	6,80	68		

Table 3 shows the differences in the post-test scores of classification of the children in the experimental and control groups. There is a significant difference between the classification scores of experimental and control groups. (p <.05). According to this result, it can be said that the applied program is effective on the experimental group.

Table 4: Mann Whitney U test results showing the difference between the post-test scores of measurement of the children in the experimental and control groups

Group	N	M.R	S.R	U	p
Experimental	10	14,50	145	10	,002
Control	10	6,50	65		

Table 4 shows the differences in the post-test scores of the children in the experimental and control groups. There is a significant difference between the measurement scores of the experimental and control groups. (p <.05). According to this result, it can be said that the applied program is effective on the experimental group.

Table 5: Wilcoxon test results showing the difference between pre-test and post-test scores of classification of the children in the experimental group

Pretest-posttest	N	M.R	S.R	Z	p
Negative rank	0	,00	,00	-2,848	,004
Positive rank	10	5,50	55,00		
Equal	0				

In Table 5, the difference between pre-test and post-test scores of the children in the experimental group is given. There is a significant difference between the classification scores of experimental group. (p <.05). According to this result, it can be said that the applied program is effective on the experimental group.

Table 6: Wilcoxon test results showing the difference between pre-test and post-test scores of measurement of the children in the experimental group

Pretest-posttest	N	M.R	S.R	Z	p
Negative rank	0	,00	,00	-2,699	,004
Positive rank	9	5,00	45,00		
Equal	1				

In Table 6, the difference between pre-test and post-test scores of the children in the experimental group is given. There is a significant difference between the measurement scores of the experimental group (p <.05). According to this result, it can be said that the applied program is effective on the experimental group.

Table 7: Wilcoxon test results showing the difference between the pre-test and post-test scores of classification of the children in the control group

Pretest-posttest	N	M.R	S.R	Z	p
Negative rank	0	,00	,00	-1,414	,157
Positive rank	2	1,50	3,00		
Equal	8				

Table 7 shows the difference of pre-test post-test scores of the children in the control group. There is no significant difference between the classification scores of the control group. (p> .05).

Table 8: Wilcoxon test results showing the difference between pre-test and post-test scores of measurement of the children in the control group

Pretest-posttest	N	M.R	S.R	Z	p
Negative rank	4	4,50	18,00	-,551	,582
Positive rank	5	5,40	27,00		
Equal	1				

Table 8 shows the differences in the pre-test post-test scores of the children in the control group. There is no significant difference between the measurement scores of the control group. (p> .05).

4.Discussıon And Conclusion

There is a significant difference between the classification and measurement posttest scores of the experimental and control groups. Likewise, the pretest and posttest scores of the experimental group also differ significantly. According to this result, it can be said that the applied program is effective on the experimental group. In literature, it is seen that different programs have an effect on scientific process skills. Irkörücü (2006) studied with pre-school children at the age of 6 at and examined the effects of mathematical support programs applied to mothers' on children's concept skills. It has reached the conclusion that the home-focused mathematical support program has improved the measuring ability of pre-school children. In another study, Karaman and Ivrendi (2015) found a high level of relationship between socio-dramatic play and children's mathematical skills. Saçkes (2013), found kindergarten children's competency in mathematics process skills was a strong predictor of their performance on science and mathematics achievement tests in the 3rd grade.When we look at the outcome of these researches, it is obvious that the scientific process skills must be gained in early years.

In this research, a drama based mathematics program applied and the effect on the classification and measurement from the basic scientific process skills has been examined. In similar researches, Ölekli (2009) investigated the effect of the drama method on the development of mathematical form perception and number concept in 5-6 year old children. As a result, it was determined that the drama method has effect on number concept and geometry. Erdoğan (2006) has found that drama is effective for teaching mathematics in 6 years children.

The following suggestions can be given to researchers, educators and families in the direction of the results obtained from the research

- In this research, the effect of the drama method mathematical activities on the classification and measurement skills was examined. The researchers advised to examine the effects of educational programs prepared in different ways on children's scientific process skills.
- This study was conducted with 5-year-old children. Research on mathematics, science, and scientific process skills can be done with children in different age groups.
- It may be suggested that parents doing activities that improve their children's skills such as asking questions that support scientific process skills, encouraging their children to ask questions.
- Educators may be encouraged to include mathematics and science events in their programs to support scientific process skills.

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