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İLKÖĞRETİM FEN ÖĞRETİMİNDE ETKİNLİK TEMELLİ ÖĞRENMEYE KARŞI DRAMA*

ACTIVITY-BASED LEARNING VS. DRAMA IN ELEMENTARY SCIENCE

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Abstract

The present study aimed at examining the effects of activity-based learning and drama on science achievement. In order to do that the subject of "Matter and Energy for Living Things" was chosen. An achievement test, prepared by the researchers, on the subject was applied as pre-test to the 8th grade students in a public school in a small town. After getting information from the teachers and administrator and also based on the test scores, two classes (high achievers, low achievers) were selected as a sample. Each class was divided into two groups and assigned as activity-based learning and

* **Bu makale Crosscheck sistemi tarafından taranmış ve bu sistem sonuçlarına göre orijinal bir makale olduğu tespit edilmiştir.**

drama. Then, students selected the group which they wanted to study in. Overall, totally 76 8th grade students participated in the study. The subject was enriched by activity-based learning and drama in both classes. After the treatment the achievement test was used as post-test to the whole groups. The results showed that there is a significant difference between pre-tests and post-tests of activity-based learning and drama groups in both classes. There is a significant difference between activity-based learning group and the drama group in high achievers class favoring the activity-based learning group while low achievers of both groups performed statistically equal on the post-test.

Key Words: activity-based learning, drama, science education

Öz

Bu çalışmanın amacı, ilköğretim II. kademe fen öğretiminde etkinlik temelli öğrenme ve drama tekniği kullanılmasının öğrenci başarılarına etkilerini karşılaştırmaktır. Bu araştırma için "Canlılar için Madde ve Enerji" ünitesi seçilmiştir. Bir ilköğretim okulunda öğrenim görmekte olan öğrencilere konu ile ilgili başarıyı ölçme testi ön test olarak uygulanmıştır. Okul yönetimi, öğretmenler ve test sonuçlarına göre, akademik başarısı yüksek ile akademik başarısı düşük olmak üzere eşit sayıda öğrenciden oluşan iki sınıf örneklem olarak seçilmiştir. Bu sınıflar da kendi içlerinde etkinlik temelli öğrenme grubu ve drama grubu olmak üzere rastgele iki gruba ayrılmıştır. Sonuç olarak çalışmaya 8. sınıfta öğrenim görmekte olan toplam 76 öğrenci katılmıştır. Akademik başarı durumlarına göre oluşturulan her iki sınıfta etkinlik temelli öğrenme ve drama tekniği ile ders anlatımından sonra, aynı başarı testi her gruba son test olarak uygulanmıştır. Analiz sonucunda hem akademik başarısı yüksek sınıfta hem de akademik başarısı düşük sınıfta ön test ile son test arasında anlamlı farklılık saptanmıştır. Ayrıca akademik başarısı yüksek sınıfta etkinlik temelli öğrenme yaklaşımı uygulanan öğrenciler ile drama tekniği uygulanan öğrenciler arasında anlamlı bir farklılık tespit edilmiştir ($p<.05$). Bu farklılık etkinlik temelli öğrenme yaklaşımı uygulanan öğrenciler lehine olmuştur. Ancak akademik başarısı düşük sınıfta etkinlik temelli öğrenme yaklaşımı uygulanan öğrenciler ile drama tekniği uygulanan öğrenciler arasında anlamlı bir farklılık tespit edilmemiştir ($p>.05$).

Anahtar Kelimeler: etkinlik temelli öğrenme, drama, fen öğretimi

INTRODUCTION

In recent decades science education reforms focuses on inquiry worldwide. Indeed, science education aims at promoting students to be curious and ask questions about nature and make connection between nature and science concepts as well as improving their understanding of science. Therefore, science educators need to employ methods and techniques enabling students to be active participants. Active learning is the main method engaging students in the learning process.

Active learning rooted in constructivism that it creates student-centered learning environment. Although active learning is a broad concept, it can be defined as an instructional method which provide meaningful learning and allow students to think about what they are doing, and to take responsibility for their own learning (Bonwell & Eison, 1991; Karamustafaoğlu, 2009; Kember & Gow, 1994). In active learning students are at the center of learning and they use higher order thinking skills such as problem solving and critical thinking (Carnell, 2007; Hager, Sleet, Logan & Hooper, 2003; Kronberg & Griffin, 2000; Yuretich, 2004). Students direct their own learning in this kind of learning process that active learning can be used throughout the course.

Studies show that active learning is more effective than traditional methods at improving exam scores (Hake, 1998; Balch, 2005), students science attitudes (Gibbons, 1994; Reynolds & Peacock, 1998), interest and learning (Livingstone & Lynch, 2002), and assisting learning process (Balch, 2005; Benedict &Anderson, 2004). Drama and activity-based learning are two of active learning strategies. Drama in education is informal, spontaneous, and exploratory learning process (Jahanian, 1997). Students are actively involved in learning and they take their own responsibility for learning in drama. Drama stimulate creative thinking, higher order thinking skills, and meaningful learning that it supports cognitive learning (Metcalfe, Abbot, Bray, Exley, & Wisnia, 1984; Wagner, 1998; Jahanian, 1997). In addition, drama facilitates social growth by developing understanding self and others as well as improving communication skills (Jahanian, 1997; Freeman, Sullivan & Fulton, 2003), motivates students (Odegaard, 2003), and develops social skills (Courtney, 1995). Activity-based learning involves the process of doing, being, and critically reflecting as well as interacting with environment. Thus, it promotes critical thinking skills. Especially hands-on activities improve self-efficacy and critical reflection (Schroeder, Scott, Tolson, Huang, & Lee, 2007).

Activity-based learning and drama have some similarities in terms of enhancing meaningful learning, higher order thinking skills, and engaging students in learning. Although studies show that they both influence student achievement in some way, which one is more effective for students with different achievement level. Overall, in an effort to improve science teaching, the current study aims at examining the effects of activity-based learning and drama on student science achievement. The following research question framed this study:

What are the effects of activity-based learning enriched instruction and drama enriched instruction on students' science achievement in terms of high achievers and low achievers?

METHOD

Participants

The present study was conducted in a public elementary school in a small town of Turkey. An achievement test was applied as a pre-test to all students at the school. After getting information about achievements of classes from the teachers and administrator and also based on the test scores, two classes (high achievers, low achievers) were selected as a sample. Each class was divided into two groups and assigned as activity-based learning and drama. Then, students selected the group which they wanted to study in. Overall, totally 76 8th grade students participated in the study. Figure 1 shows the sampling procedure.

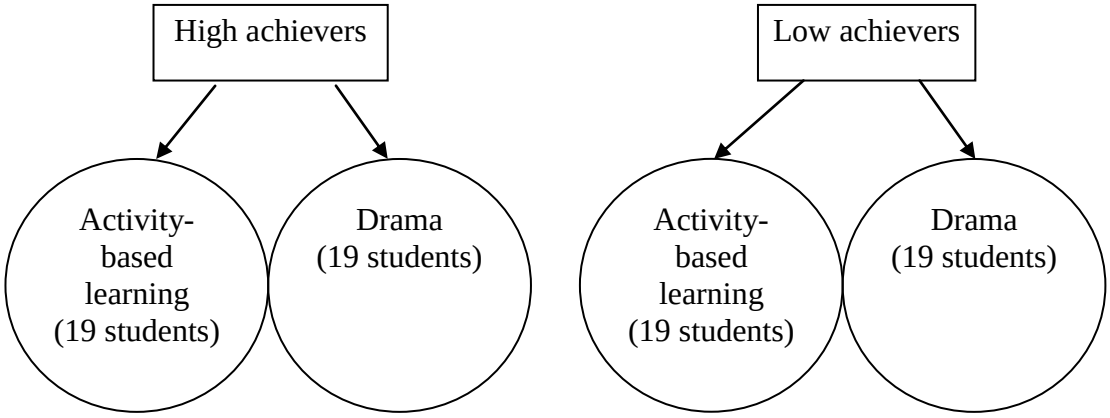

Figure 1. *Sampling procedure*

Instrument

Matter and Energy for Living Things Achievement Test (MELTAT)

The questions of the MELTAT were selected from the suggested books to assess students' achievement about matter and energy for living things. In order to meet the standards for establishing the content validity, the test was examined with two elementary science education instructors at a university and three science teachers at an elementary school. After detailed examination, 25 multiple choice questions were chosen. Possible MELTAT scores range from 0 to 25, with higher scores showing greater achievement in the content. The MELTAT was administered as a pretest and posttest to each group to assess students' science achievement about matter and energy for living things. The Cronbach's alpha value of science achievement test was found to be 0.81.

Procedure

The students of the four selected groups were taught by a single researcher who is certificated on drama. In order to making students familiar, the researcher entered the classrooms 2 weeks before the treatment. She introduced herself and instructed a science subject other than the subjects in "Matter and Energy for Living Things" unit enriched by activity-based learning and drama in each group. As such, students learned the procedures and important points about the instructions.

Hands-on activities, puzzles, competitions, and presentations were employed in activity-based learning groups. On the other hand, students wrote scripts and played related to the subject individually or in small groups. During the treatment, the researcher guided the students in all groups. Duration of teaching was seven weeks with a period of approximately four science class a week.

The MELTAT were applied to whole groups as a pretest one week before the treatment and as a post-test after the treatment. Test application took approximately one class hour for pre-test and post-test separately.

DATA ANALYSIS

Descriptive Statistics

In this part, the descriptive statistics, namely mean, standard deviation, minimum, maximum, skewness and kurtosis are reported. The calculations were performed for all groups as shown in Table 1. "A skewness and kurtosis value between -1 and +1 is considered excellent for most psychometric purposes, but a value between -2 and +2 is in many cases acceptable" (George & Mallery 2003, p. 98). The skewness and kurtosis values for the groups in the current study were within -2 and +2 which are considered to be acceptable for normal distribution.

Table 1. *Descriptive statistics*

As presented in the Table 1, for high achievers, activity-based learning group showed a mean increase ranging from 12.16 to 21.32 in their level of science achievement as drama group showed mean increase ranging from 13.32 to 19.42 in their level of science achievement from the pretest to posttest. On the other hand, for low achievers, activity-based learning group showed a mean increase ranging from 7.68 to 11.26 in their level of science achievement as drama group showed mean increase ranging from 6.68 to 13.00 in their level of science achievement from the pretest to posttest.

Therefore, activity-based learning group of high achievers shows the highest increase indicating that the students in this group performed overwhelmingly better score than the students at the other group. Additionally, high achievers show greater increase at activity-based learning whereas low achievers show greater increase at drama.

Inferential statistics

Independent t-tests were utilized to compare the scores of drama and activity-based learning groups in high and low achievers (see Table 2).

Table 2. *Difference on science achievement between the pre-test scores of drama and activity-based learning groups*

			N	*M*	*SD*	*t*		*p*	
Name of the Variables			*N*	*M*	*SD*	*Skew.*	*Kurt.*	*Min.*	*Max.*
High Achievers	Activity-based Learning	Pretest	19	12.16	3.70	-.13	-1.04	6	18
		Posttest	19	21.32	2.00	-.30	-.40	18	25
	Drama	Pretest	19	13.32	5.43	-.08	-1.56	4	21
		Posttest	19	19.42	2.85	-.75	-.07	13	23
Low Achievers	Activity-based Learning	Pretest	19	7.68	2.26	-.17	-.27	3	11
		Posttest	19	11.26	3.28	.11	-.65	5	17
	Drama	Pretest	19	6.68	2.14	-.84	1.58	1	10
		Posttest	19	13.00	2.49	-.10	-1.18	9	17

High Achievers	Drama	19	13.32	5.43	.77	.45
	Activity-based Learning	19	12.16	3.70		
Low Achievers	Drama	19	6.68	2.14	-1.40	.17
	Activity-based Learning	19	7.68	2.26		

The results of the independent t-tests displayed that there was not a significant difference in the scores for drama groups (M =13.32, SD=5.43) and activity-based learning groups (M = 12.16, SD = 3.70); t (36) =.77, p>.05 for high achievers. Similarly the results for low achievers indicated that there was not a significant difference in the scores (M=6.68, SD=2.14) and activity-based learning groups (M = 7.68, SD = 2.26); t (36) = -.1.40, p>.05 for drama groups. These findings suggest that students' science achievement regardless of the groups at the time of starting experiment were equivalent.

In order to determine the effects of drama and activity-based learning on student achievement, the scores of pre-tests and post-tests were compared in high and low achievers classes through paired sample t-tests (see Table 3).

Table 3. *Difference on achievement score between the pre-tests scores and post-tests scores of drama and activity-based learning groups*

			N	*M*	*SD*	*t*	*p*
High Achievers	Drama	Pre-test Post-test	19	6.11	4.57	5.82	.000
	Activity-based Learning	Pre-test Post-test	19	9.16	4.29	9.32	.000
Low Achievers	Drama	Pre-test Post-test	19	6.32	1.86	14.82	.000
	Activity-	Pre-test					

	based Learning	Post-test	19	3.58	2.17	7.20	.000

As Table 3 shows, drama and activity-based learning significantly increased student achievement in both high achievers class and low achievers class. However, while activity-based learning raised achievement score more in high achievers class, drama raised achievement score more in low achievers class.

To compare the scores of drama and activity-based learning groups in high achievers class, independent t-test was run (see Table 4).

Table 4. *Difference on science achievement between the post-tests scores of drama and activity-based learning in high achievers*

	N	*M*	*SD*	*t*	*p*
Drama	19	19.42	2.85	-2.37	.02
Activity-based Learning	19	21.32	2.00		

As it can be seen at Table 4, the post-test mean scores of the high achievers of the creative drama group was 19.42 and that of the activity-based learning group was 21.32. There was a significant effect for achievement score, $t(36) = 2.37$, $p < .05$, with activity-based learning group receiving higher scores than the drama group.

In order to compare the scores of drama and activity-based learning groups in low achievers class, independent t-test was run (see Table 5).

Table 5. *Difference on science achievement between the post-tests scores of drama and activity-based learning in low achievers*

	N	*M*	*SD*	*t*	*p*
Drama	19	13.00	2.49	1.84	.07
Activity-based Learning	19	11.26	3.28		

As Table 5 displays, the results indicated that there was not a significant difference in the scores for drama groups (M=13.00, SD=2.49) and activity-based learning groups ($M = 11.26$, $SD = 3.28$); t (36) = -.1.84, p>.05. This finding suggests that low achievers of both groups performed statistically equal on the post-test.

DISCUSSION AND CONCLUSION

The effects of activity-based learning and drama on student science achievement were examined and compared in this study. The results of the analyses showed that activity-based learning and drama have significant effect on students' achievement regardless of their achievement level. These findings provide a support to the evidence in the literature that activity-based learning (Küpcü, 2012; Arı, Çavuş, & Sağlık, 2010; Gürbüz, Çatlıoğlu, Birgin, & Erdem, 2010; Stohr-Hunt, 1996; Shymansky, Hedges, & Woodworth, 1990) and drama (Kahyaoğlu, Yavuzer, & Aydede, 2010; Braund, 1999; Kamen, 1992: Metcalfe et al., 1984) increase student achievement. Students were responsible for their own learning and engaged in learning process. Students in every group cooperated with each other and worked together. They shared their experiences and collaborated in learning.

According to the pre-test scores of high achievers there is no significant difference between the activity-based learning group and the drama group. After the treatment, the scores of students in activity-based learning group are higher than the scores of students in drama group. Thus, it can be concluded that activity-based learning is more beneficial than the drama for students who are well-organized, motivated, and attentive. On the other hand, although high achievers in drama group presented more interesting and original work, they indicated that drama wasted their time.

Results show that there is no significant difference between the activity-based learning group and drama group in low achiever class before and after the treatment. However, students in drama group scored higher than the students in activity-based learning group. Hence, it could be claimed that drama helps low achievers in learning process more. Additionally, students faced difficulties searching, presenting, and engaging activities in activity-based learning group.

In light of these results, in order to prompt meaningful learning and motivating students, activity-based learning and drama should be employed more in learning and teaching process. Cognitive styles of students should be considered in grouping students, selecting methods and techniques. Moreover, activity-based learning should be used in high achiever class in which students take responsibility their own learning whereas drama should be preferred in low achiever class. Finally, retention of activity-based learning and drama could be investigated and compared in future research.

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