

## A Study on the Role of Drama in Learning Mathematics

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### Abstract

Present educational systems needs modern strategies for teaching and learning. Mathematics education has to change for students in elementary schools. One of the modern strategies, it is drama activities. The drama is as empirical aspect of learning. The student may learn from what they are doing in drama. They are so active instead having a passive shape in drama, in fact, students are learning, finding experiences and new paths from drama as well. The students could find its capabilities, recommendations and strength-weakness points through the different drama. This study is looking to investigate the role of drama so that have a better understanding of mathematical concepts in Zahedan's girly elementary students (2011-12). This research is used on 36 three grade students through quasi-experiment method. The emerging results clearly showed that using drama in mathematics education has been better results against the traditional teaching. Then it seems that cited method is suitable for elementary students to learn mathematical concepts.

Keywords: Mathematic education, drama, teaching, perception, mathematical concepts.

### 1 Introduction

The academic progress of students are taking various elements that if to be identified these element and their quality impacting on academic progress then clearly could be found the goals of education system. Today we cannot accept that even in pre-elementary mathematic, a series of naive persons have to teach courses and because nature of mathematics and its learning complexities, showing least unsuitable practices that will be created a serious diversions (Alamalhodaee, 2002) [1]. The mathematics became tough and stressful for students then its educational practice should be treated as a game or drama and training advices instead a traditional practice since drama could help students to have a better learning. In the case of school mathematics, these considerations are subversive because of the dominant belief that learning of mathematics is an individual process and that the social interaction does not play significant role in it (Chaviaris, 2006) [1, 5]. In this view, this dominant belief creates relations of power among the

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students during their interaction in the mathematics classroom. For example, the mathematical ideas of high-achievement students during a mathematical discussion, seem to be more respectable than the proposals of low-achievement students (Kafoussi et al., 2010) [1, 9]. Towards this direction, one question for mathematics educators is how students could change their participation in classroom mathematical practices into a more democratic context, based on the mutual respect of ideas of their classmates and the development of equivalent relationships. The drama has been used in education to serve multiple dimensions of it: the students "arts education, the students social and emotional development, the support of the teaching of other cognitive subjects like language, history, mathematics, etc". (Fleming et al., 2004) [1, 7]. Drama in education refers to the dramatic techniques that support and strengthen the learning in the classroom. Some terms like developmental drama, creative dramatics, educational drama, and mantle of the expert have been used to describe different approaches of the engagement of the drama in classroom teaching practices [1]. According to Osborne (1983), during the learning process; students arrange new information by the help of their own cognitive style, abilities, attitudes, experiences. It can be said that information should be analyzed, evaluated, and made sense in people's minds. Then, in the process of education, information will be developed and education occurred by the interaction of teacher and students. Education process should be entire with all levels which includes from concrete experience, observation-reflection, abstract concepts, to generalization and implementing concepts in new situations [2, 11]. Providing an attractive learning environment, students' participation actively to activities during the process for students Math's learning is more enjoyable. Then dramatization is important for students to gain experience. Dramatization is an animation by casting roles on a subject using gestures, mimics. It is also representation of the events that can't be experienced by the students as if they can be experienced. Dramatization in education is an activity which provides learners all learning styles as whole and learning by experience these are by movement, active learning, social learning, learning by discussion, emotional learning, collaborative learning, and learning by discover (Koc & Dikici, 2002) [2,10]. This study is trying to use drama and its same activities so that elementary students have a better mathematic learning.

## 2 Literature Review

This study is used to investigate the role of drama to better understanding of mathematical concepts in elementary students, also there are similar researches like as Salimi (2000) indicated that their practice have suggested the various educational advices to teachers. The results of this research show that game has been a suitable role in mathematics education [16]. According to Baji-Gál, Elek, and Nagyné (2001), although children are born with the ability to think and solve problems, it is dependent on the teacher to offer the students the opportunities to experience situations where they can practice and learn problem solving firsthand. Moreover, while using drama play as the means of experiencing problem solving, students gain deeper content knowledge through the creative processes they use to develop and enact the stories [3]. Drama, in the past years and modern education systems are frequently used method that has always stood in front of us. In the 20th Century drama has stood an important status in our country and the world, in the 21st Century it is a matter of fact that it will still protect its importance (Okvuran, 2003) [12]. Sengün and Iskenderoglu (2010) have argued that there were not enough creative drama studies in mathematics education. Concerning the studies investigated, it can be said that they were mostly quantitative natured studies. The researchers of these studies proved that mathematics instruction with creative drama method has positive effects on student achievement, attitude and creativity [14]. Saab (1987) examined the effects of drama-based mathematics instruction on sixth graders compared to textbook mathematics instruction and the results showed a significant increase in mathematics achievement [15]. Duatepe and Ubuz (2002) pointed out that drama-based mathematical instruction appears to have a significant effect on students' geometry achievement compared to the traditional teaching, promoting students' imagination by improvising a concept or an event and helping them to

experience all aspects of the concepts [6]. Breen and Hannula's work (2003) used playing and acting in a drama as an environment for mathematics educators' reflection on different interpretations of mathematics classroom research findings [2].

### 3 Hypothesis

Using drama in mathematics education has been better results against the traditional teaching.

### 4 Method

This study is be under quasi-experimental method. Since it is tried that used of drama in one group till its results compared to other group then quasi-experimental method is suitable for this research. Through this method, researchers will find almost real results than other research methods. Therefore two groups are selected randomly. Groups have same conditions and students and teachers communicated together in both groups. Dramatic activities have been performed in experiment group for one month. In control group, students have learned mathematical concepts via traditional methods.

### 5 Participants

Society population was one girly elementary school in Zahedan city randomly. From this school, two classes are been chosen from three grade via semi-cluster sampling that included of 36 students. Eighteen students have participated in experiment and control groups separately.

### 6 Instrumentation

Math exam is used for pre-posttests. This exam was seven questions for respected subjects in three grade from math book with total scores from 20 for each test separately. This exam is be studied and evaluated under teachers' opinions. Also validity of this exam is computed via split-half test ( $>0.7$ ).

### 7 Collecting Data Method

Firstly two groups are been chosen randomly as control and experiment groups. Pretests are be implemented in both groups. Then traditional teaching has performed for control group and drama activities are be used for experiment groups. Drama activities included many steps. For example, "teaching multiplication":

- Determining the role of three or four students separately,
- Stating one section of story or drama firstly via teacher that students interested to follow it,
- Teacher is as narrator, actors (students) play the roles that they did not know the end of story,
- Teachers has tried that "multiplication subject" has performed invisibly in during story or drama,
- Actors (students) ask that other students (observers) draw cited story or drama on page,
- Finally teacher asks that students (actors) and other students (observers) stated the mean of story and its conclusions.

Through drama activities, other subjects of math book have been taught. This kind of teaching method has been performed for one month and for many subjects. Then posttests have implemented. The results are be collected as data.

## 8 Findings

In Table 1, mean of groups are be indicated. Pretests are same almost. Posttest of experiment group (M=18.3) has more mean than posttest of control group (M=15.2). Also maximum of scores was 20 in posttest of experiment group that are not observed in other tests. In addition, Std value of experiment group's pretest has the most value rather other tests (Std= 1.61).

Table 1: Descriptive statistics of data

Groups	N	Mean	Std	Min	Max
Pretest of control group	18	13.88	1.55	10	16.5
Posttest of control group	18	15.2	1.31	13	17
Pretest of experiment group	18	14.69	1.61	12.5	17.5
Posttest of experiment group	18	18.3	1.57	15.75	20

For using suitable test, One-Sample Kolmogorov-Smirnov test is be studied for both groups. Data are normal ( $P > 0.05$ ). Regard to cited result, it can use of parametric tests; Levene and T-test. As it is be indicated in Table 2, it clears that are been proved the equality of variances ( $P > 0.05$ ). Also the results of T-test have shown that there isn't significant difference between control and experiment groups' pretests ( $P > 0.05$ ). Therefore the means of both groups are same for pretests.

Table 2: The results of T-test for pretests

Pretests	Leven's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
			t	df	Sig	Mean Difference	Std. Error Difference		
	F	Sig					lower	Upper	
Equal variances assumed	0.23	6.4	-1.52	34	0.13	-0.8	0.52	-1.88	0.26
Equal Variances not assumed			-1.52	34	0.13	0.8	0/52	1.88	0.26

It is obvious, the equality of variances are proved ( $P > 0.05$ ) in Table 3. In addition, the results of T-test of Table 3, have proved that there is significant difference between control and experiment groups' posttests ( $P < 0.05$ ). Then it seems that using drama in mathematics education has been better results against the traditional teaching.

Table 3: The results of T-test for posttests

Posttests	Leven's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
			t	df	Sig	Mean Difference	Std. Error Difference		
	F	Sig					lower	Upper	
Equal variances assumed	0.1	0.3	-6.4	34	0.00	-3.09	0.48	-4.08	-2.11
Equal Variances not assumed			-6.4	34	0.00	-3.09	0.48	-4.08	-2.11

## 9 Conclusions

The learning and teaching strategies are one of the most important elements to design education and teaching and when all of these strategies become practical finally we can see presence of learning. The dramatic strategies gave to the teachers the opportunity to evaluate the behaviors and performances of the students in self-role and to compare them to their own experiences of their cooperation in mathematics and its concepts. In this method, the separated practices of each group were taken as built with the others. The students had the situation to discuss on their common and various experiences and practices and to create a fantastic domain on what a productive collaboration in mathematics concepts. Dramatic activities will plan for dividing responsibilities, roles and opportunities in the performance, introducing and implementing the activity for the students, and facilitating student learning. These results of this study show that game-based and dramatic practices can help to better learning of mathematical concepts and these students have better perception of concepts. These causes can be as follow;

- Students can have better perception,
- When students themselves are entered to resolving, they cannot find passing time so they will have a happy morality,
- Observe usage of mathematics in daily life, change students' mind about it,
- Game-based practices mitigate fear and stress between students,
- Most teachers know use of dramatic activities will be helpful to teach mathematical concepts,
- Teachers know this activity rises the creativity among students, and
- Most teachers know this practice making students too interested to participate mathematics classes.

Finally there are suggestion for future researches; 1) such studies to be done for other topics, 2) this study to be done for other academic stages, 3) game-based and dramatic teaching practices to be educated to the mathematic teachers. This research is limited to elementary-girl students.

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