



Effectiveness of Educational Games in Mathematics Subject on Achievement of Students of Grade VI

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1. Introduction

Games are very entertaining for all age groups. Children like to play games instead of studying any subject. But if students can learn through games, it might be very useful for students. Through games, students can learn a variety of topics and skills with high enthusiasm. By playing a game, students may be able to understand a new concept or a new topic. However, for the practice to be meaningful, students must be engaged in the learning process. In the present study, the researcher constructed some games in the mathematics subject for the students of Grade VI. The main objective of this study was to check the effectiveness of different games on the achievement of students of Grade VI in the mathematics subject.

2. Objectives of the Study

The objectives of the present study were as follows:

1. To study the effectiveness of games on the achievement of students of Grade VI in the mathematics subject.
2. To compare the achievement of students of the experimental and controlled groups.
3. To check the effectiveness of games on the achievement of students of Grade VI in the mathematics subject in the context of their gender.

3. Variables of the Study

The researcher defined three types of variables in the present study.

1. Independent Variable

Teaching method was the independent variable in the present study. It was stratified into two different values:

- a. Teaching through games
- b. Teaching through traditional teaching method (Lecture method)

2. Moderate Variable

Gender was the moderate variable. It was stratified into,

- a. Boys
- b. Girls

3. Dependent Variable

Students' achievement in the Mathematics subject was the dependent variable.

4. Hypotheses

Ho₁ There is no significant difference between the mean scores of the post-test obtained by the students of the experimental and controlled groups.

Ho₂ There is no significant difference between the mean scores of the post-test obtained by the boys of the experimental and controlled groups.

Ho₃ There is no significant difference between the mean scores of the post-test obtained by the girls of the experimental and controlled groups.

Ho₄ There is no significant difference between the mean scores of the post-test obtained by the boys and girls of the experimental group.

5. Research Method

In present study, the researcher had to study the effectiveness of a modern teaching method (teaching through games) in relation to traditional teaching method (lecture method). To check the differences obtained in achievement, the researcher used Experimental Research Method.

There are three types of experimental research design:

1. Pre-experimental research design
2. True experimental research design
3. Quasi-experimental research design

The researcher used true experimental research design. The researcher selected only post-test equivalent groups research design for this study as mentioned in following figure.

6. Sample of the Study

The present study was conducted in Sakar English Medium School located in Ahmedabad. The researcher selected 60 students from this school and they were distributed in two different groups: 1) Experimental group and 2) Controlled group.

The researcher used first semester marks of Mathematics subject to distribute the students in two different and equivalent groups. The researcher used match pair method to distribute the students. This way, two groups were formulated class-A name is given to controlled and class B name is given to class B from both the groups 30-30 total 60 students were selected that is given in table.

Table 1: Sample of the Study

Name of School	Experimental Group		Controlled Group	
	Boys	Girls	Boys	Girls
Sakar English School	15	15	15	15
Total	30		30	

7. Implementation of Experimentation

It is very necessary to select such a unit that can teach effectively by educational games and Lecture Method and for that Textbook of Grade six. The researcher prepared games on 'Fraction' topic selected from mathematics' textbook of Grade VI.

The teaching for this study is clearly understood according to planning. Teaching is done in the fixed time duration allotted in school time table. At the end of teaching of according to planning 30 marks test was given to the students.

8. Research Tool

In the present study 30 marks Test as Post-Test was developed to assess the achievement of the Grade six Students in Mathematics Subject. The test was developed based on Blue print. The developed test was given to the expert for suggestions and feedback.

The final form of the test was given to the Experimental group and Controlled group as posttest after teaching. Researcher has also developed posttest as the study is only posttest and equivalent groups. Thus, the posttest was research tool in the present study.

9. Collection of Data

Data collection is essentially an important part of the research process. During this process inferences, hypothesis or generalizations tentatively held may be identified as valid, verified as correct, or rejected as undeniable. The data in the present study is in the form of scholastic achievement scores of students in first school examination.

In educational research, usually two types of data are recognized. They are quantitative and qualitative data. Quantitative data are got by applying various scales of measurement. The quantitative data are either parametric or non-parametric. Parametric data are measured data on interval or ratio scales of measurement. Non-parametric data are obtained by applying nominal or ordinal scales or measurement. There data are either counted or ranked. Qualitative data are verbal or other symbolic materials.

In the present study the researcher has taken scholastic achievement score of school examination unit test as pre-test score i.e. before administering the methodology. After teaching them, with different methodologies i.e. Experiment group with demonstration method and controlled group with lecture method, a post-test is administered. The researcher has administered Post-Test for data collection.

10. Statistical Method of Analysis

This section is the heart of the research report. The data are presented in tables and figures accompanied by textual discussion. The tables and figures are constructed and listed in such a way that they clarify significant relationships and become self – explanatory. The formulae and statistical procedures are used for the analysis of the data and are clearly specified and explained in this section. The researcher has tabulated the data in tables, calculated the mean, standard deviation (SD) and t-value for comparison of two methods of teaching science. The reasons for selecting a particular test of significance, the assumptions underlying and the confidence level chosen in avowing at the remarks are presented carefully.

The data analysis and interpretation may either be presented in separate chapter or may be integrated and presented in are chapter. The researcher has just discussed what is analysis and interpretation of data here and will discuss this in details in the next chapter.

11. Testing of Hypothesis

The researcher performed t-test for testing of hypotheses. The results of t-tests are as follows.

H₀ There is no significant difference between the mean scores of post test obtained by the students of experimental and controlled groups.

Table 2: t-test between mean scores of students experimental and controlled groups

Group	N	M	SD	SED	t	Significance
Experimental	30	28.22	2.86	0.78	8.16	0.01
Controlled	30	21.88	3.16			

df	0.05	0.01
58	2.00	2.66

According to above table, the mean scores of students of experimental and controlled groups are 28.22 and 21.88 respectively. Standard deviations are 2.86 and 3.16, standard error of deviation is 0.78 and calculated t-value is 8.16.

For df=58, table t-values are 2.00 at 0.05 level and 2.66 at 0.01 level. Calculated t-value is more than table t-values at both levels. So, hypothesis is rejected and there is a significant difference between mean scores of students of experimental and controlled groups.

Moreover, the mean score of students of experimental group is more than mean score of students of controlled group. Thus, it is revealed that the effectiveness of games on achievement in mathematics subject of students is more than traditional teaching method.

H₀₂ There is no significant difference between the mean scores of post test obtained by the boys of experimental and controlled groups.

Table 3 :t-test between mean scores of boys of experimental and controlled groups

Boys	N	M	SD	SED	t	Significance
Experimental	15	27.87	3.12	1.16	4.10	0.01
Controlled	15	23.12	3.23			

df	0.05	0.01
28	2.05	2.76

According to above table, the mean scores of boys of experimental and controlled groups are 27.87 and 23.12 respectively. Standard deviations are 3.12 and 3.23, standard error of deviation is 1.16 and calculated t-value is 4.10.

For df=28, table t-values are 2.05 at 0.05 level and 2.76 at 0.01 level. Calculated t-value is more than table t-values at both levels. So, hypothesis is rejected and there is a significant difference between mean scores of boys of experimental and controlled groups.

Moreover, the mean score of boys of experimental group is more than mean score of boys of controlled group. Thus, it is revealed that the effectiveness of games on achievement in mathematics subject of boys is more than traditional teaching method.

H₀₃ There is no significant difference between the mean scores of post test obtained by the girls of experimental and controlled groups.

Table 4 :t-test between mean scores of girls of experimental and controlled groups

Boys	N	M	SD	SED	t	Significance
Experimental	15	28.56	2.59	1.04	7.63	0.01
Controlled	15	20.63	3.08			

df	0.05	0.01
28	2.05	2.76

According to above table, the mean scores of girls of experimental and controlled groups are 28.56 and 20.63 respectively. Standard deviations are 2.59 and 3.08, standard error of deviation is 1.04 and calculated t-value is 7.63.

For df=28, table t-values are 2.05 at 0.05 level and 2.76 at 0.01 level. Calculated t-value is more than table t-values at both levels. So, hypothesis is rejected and there is a significant difference between mean scores of girls of experimental and controlled groups.

Moreover, the mean score of girls of experimental group is more than mean score of girls of controlled group. Thus, it is revealed that the effectiveness of games on achievement in mathematics subject of girls is more than traditional teaching method.

H₀₄ There is no significant difference between the mean scores of post test obtained by the boys and girls of experimental group.

Table 4: t-test between mean scores of boys and girls of experimental

Experimental	N	M	SD	SED	t	Significance
Boys	15	27.87	3.12	1.05	0.66	NS

Girls	15	28.56	2.59			
df	0.05	0.01				
28	2.05	2.76				

According to above table, the mean scores of boys and girls of experimental group are 27.87 and 28.56 respectively. Standard deviations are 3.12 and 2.59, standard error of deviation is 1.05 and calculated t-value is 0.66.

For df=28, table t-values are 2.05 at 0.05 level and 2.76 at 0.01 level. Calculated t-value is less than table t-values at both levels. So, hypothesis is not rejected and there is no significant difference between mean scores of boys and girls of experimental group. Thus, it is revealed that the effectiveness of games on achievement in mathematics subject of boys and girls is equal.

12. Findings

Major findings of the present study are as below.

1. The effectiveness of games on achievement in mathematics subject of students is more than traditional teaching method.
2. The effectiveness of games on achievement in mathematics subject of boys is more than traditional teaching method.
3. The effectiveness of games on achievement in mathematics subject of girls is more than traditional teaching method.
4. The effectiveness of games on achievement in mathematics subject of boys and girls is equal.

13. Conclusion

A game is always entertaining almost every aged person. In opposite to it, education is almost boring in traditional way. If game and education are comprised together a marvelous result may occur in the field of education. In present study, the researcher tried to do the same. The researcher prepared a game-based teaching strategy in mathematics subject for the students of grade VI and analysis of the data revealed that game-based teaching strategy is almost more effective than traditional teaching method.

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