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Impact of Mathematical Games Upon the Academic Achievement of Low Achievers in Mathematics at Primary Level

KEYWORDS: Mathematical Games, Low Achievers, Academic Achievement

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ABSTRACT *Students with low achievement in mathematics have higher level of anxiety, low academic performance, school related stress and poor social skills. Low achievers are found at every level. Teachers and parent seek the newest instructional method always to make them as an equal member of their peer for this games work as motivational source. Researches indicate that games work as catalyst to increase the performance in the class, reduce anxiety and promoting social skills. The aim of the study is to introduce mathematical games for enhancing the performance of low achievers. Quasi experimental method was used. The findings are analyzed by t-test. The result indicates that there is a statistically significant increase in academic achievement of the students in the experimental group that taught by mathematical games.*

Today the government of the day has an important social obligation to provide equal opportunities of education to all type of citizens. The primary education is the first stage of formal schooling that begins at the stage of +5 and span over the next +5 years in the life of the child. It is the stage in which the children are taught with basic concepts of literacy and numeracy as foundations for the further learning. Literacy and numeracy constitute the language and basis of mathematics. The prime objective of the primary education is to make student more versed in literacy and basic arithmetic. Literatures on educational and economic consequences of poor mathematics achievement were viewed and integrated with reviews of epidemiological, behavioral genetic and cognitive science studies of poor mathematics achievement. Poor mathematical competencies are common among adults and result in employment difficulties in many common day to day activities (Sahin, 2008).Low mathematics achievement significantly related to later high mathematical anxiety hardly related to later mathematics achievement. Low achievers in mathematics do not process problem information effectively or efficiently, they lack or do not apply the resources needed to complete these complex cognitive activities. Causes of low achievement in mathematics are lack of interest, motivation, recall, recognition, low IQ level and lack of the use of modern methods of teaching.64.3% students up to 8^{th} class are not able to read the watch and 41.9% of students are not able to count the money (Dainik Jagran,2009).

To help these students become as a good problem solver, teacher should adopt certain motivational instructional strategies, techniques, methods or programs for the betterment of these students one of the technique is learning through mathematical games.

A mathematical game is a multiplayer game whose rules, strategies and outcomes can be studied and explained by mathematics .It aims to teach through lively activities combining education with entertainment. This combination transforms the game into an effective tool includes a play with activity. Researches reveal that educational games can improve learning because they increase motivation (Virvou, M., Katsionis, G. and Manos,K.2005), create conditions for better memory retention (Oblinger, 2004; Lee & Peng, 2006),improve and enhance visual spatial perception ability (Pievec, M. and Kearney,P.2007), create cognitive conflict (Chen, Lien, Annetta & Lu, 2010) and it can generate various competencies such as motor, cognitive emotional, social and personal (Kretschmann,2010).

Literature

There are many researches about low achievers. Since this study is considered in term of games and low achievers, it is selected several researches about this issue;(1).Van Adams ,2008 investigated that use of vocabulary strategies and the effectiveness of it in building confidence in low achievers and shows that the use of vocabulary strategies built the confidence and increases the achievement of students, in other study (2) Mansuresh Kebritchi, 2010 studied the effect of modern mathematics computer game on mathematics achievement and class motivation reveals that students who played the games in their classrooms and school labs have greater motivation as compare to ones who played games in their school labs, also (3) Panagiotakopoulos, 2010. designed an educational game which addressing mathematics for enhancing mathematical calculation skills shows that students would benefit from educational games and would be happy to work within an environment that motivated them and indirectly forced them to deal with mathematical operations while playing. Regard to previous researches teachers should apply mathematical games to increase motivation as well as achievement of low achievers and promote them.

Objectives of the study

1.To identify low achievers in mathematics in the regular classroom.
2.To study the effect of mathematical games upon the academic achievement of low achievers of class fifth students.

Hypothesis of the study

The major hypothesis related to the experimental phase of the study is that "There will be no significant effect of mathematical games upon the academic achievement of low achievers at primary level."

Design of the study

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Quasi experimental method was used by the researcher in order to conduct the research work. Researcher adopted two group (experimental and control), Pre- test and Post- test experimental design. Firstly the low achievers are identified by the test. Pre-test was administered on both the groups before testing the effect of mathematical games upon the academic achievement of low achievers of the sample. For four weeks, teaching practice with the mathematical games was given to the experimental group and teaching practice without the mathematical games was given to the control group. Mathematical games implemented during teaching phase were based upon fraction, least common factor and concept of geometrical shapes. After completion of teaching phase, post- test was administered on the groups. The obtained data of pre -test and post- test were compare to the test the hypothesis.

Sample

Sample was selected from the population of primary level students using random sampling technique which were 40 students of class V.

Tools and Techniques: Self constructed Mathematical Games for class V , construction of Objective type test to examine the effect of mathematical games upon the academic achievement of low achievers at primary level ,researcher first of all collected data from regular classroom to identify low achievers .For this purpose researcher made the achievement test of class IV syllabus of mathematics, the students whose scores lie below the first quartile are consider as low achievers and class IV academic record who scored less marks in mathematics.

Researcher used Mean, Standard Deviation and t-test for the study.

Findings

Before beginning of experiment both of the groups were equalized by their means. The difference in means of groups in pretest was 0.10 .The value of skewness of experimental and controlled group is found to be -.28 and -.45 respectively. The value of kurtosis of experimental and controlled group are found to be -.780 and -.790 respectively, which is less than .263 .Thus the curve is leptokurtic which indicates homogeneity of the groups. After implementation of mathematical games the mean value of the achievement scores of experimental and controlled group in post-test are 17.5 and 13.5 respectively. The groups have slightly negative skewness in post-test scores. The calculated value of kurtosis for the experimental group is .39 and 1.26 for the controlled group which are less than .263 , thus the curve is leptokurtic which indicates homogeneity in groups.

Comparison of pre-test and post- test scores of controlled group-

The difference in mean value of pretest scores and post test scores of controlled group is 3.15. The t-value is 2.39 which is more than table value at 0.05 level of significance. Hence there is significant difference is found in the pre-test and post test scores reveals that achievement of students of post- test is more that the pre-test in controlled group.

Test	No. of Students	Mean	S.D.	r value	t-test value	Significance
Pre-test	20	10.35	4.09	.87	2.39	Significant at .05 level
Post-test	20	13.5	5.27			

Table 1.1: Exhibiting Mean (M), S.D. and t-test value of pre-test scores of the controlled Group

Comparison of pre-test and post test scores of Experimental group-

The difference in the mean value of pre-test and post-test scores of experimental group is 7.05.The calculated t-value is 3.64, which is more than table value at 0.05level of significance. Hence significance difference is found in the learning performance of students in experimental group in pre and post- test.

Test	No. of Students	Mean	S.D.	r value	t-test value	Significance
Pre Test	20	10.45	4.559	.26	3.64	Significant at .05 level
Post-test	20	17.5	5.95			

Table 1.2: Exhibiting Mean (M), S.D. and t-test value of pre and post test scores of the experimental Group.

Testing of hypothesis

After studying the intra group result of the groups, the researcher compares the post-test values of experimental and controlled group. This was done to fulfill the objective of comparison of achievement of learners in experimental group and controlled group .With 38 degree of freedom the calculated t value is 2.61 which is found to be more that tabulated value at 0.05 level of significance. Therefore, the null hypothesis that there is no significant effect of mathematical games upon the academic achievement of low achievers at primary level in controlled and experimental group is rejected. This implies that performance of students of experimental group is far better than controlled group. This can be justified on the ground that students in experimental group were more active, alert and enthusiastic during the learning process.

Statistical Techniques Group	Mean	S.D.	M_1. M_2	r value	t-test value	Significance
Experimental group	17.5	5.95	4	.48	2.61	Significant at .05 level
Controlled Group	13.5	5.27				

Table 1.3: Exhibiting Mean (M), S.D. and t-test value of post test scores of the experimental and controlled Group.

Conclusion

It can be concluded that teaching with mathematical games proves to be highly beneficial in increasing the academic achievement of low achievers, students could learn by playing mathematical games that are successfully integrated with the curriculum. The transformation of mathematical phobia to the projection of relationship between mathematics and real life and friendly feeling can be developed among low achievers with mathematics. The finding reveals that teaching with mathematical games makes the classroom environment enthusiastic and increases learning abilities of low achievers. There are many reasons of this improvement such as (1) students are interested to solve various problems (2) they understand the strategies while playing the games (3) it removes phobia related with mathematics and make it as fun mathematics, etc. Researchers suggest that teachers of elementary school should use mathematical games in order to make interesting and interactive class. This research is limited at primary

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level and mathematical games related to fraction, geometry and H.C.F. and L.C.M.

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