

# Relative Effect of Games and Simulation on Primary School Mathematics in Educational District V of Lagos State, Nigeria

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## **Abstract**

*This study sought to determine the relative effect of games and simulation in primary school students' performance in mathematics. Data were collected from a sample of 300 randomly selected SSII students from 10 primary schools in educational district V of Lagos state. Analysis of Variance (ANOVA) was used to analyze the data collected for the study. The research design that was used in this study is the Quasi-experimental research design, which consist of two groups, (experimental and control groups), a pre-test and post-test will be administered to both groups. Mathematics Based Achievement Test (MBAT) would be used for this study together with Card Games. The findings of this study have shown that the use of games and simulations technique does increase the students' interest in Mathematics. It also shows that some relationships exist between the technique of instruction and students' skill in solving Mathematical problems. This study, thus asserts that the adoption of relevant instructional strategies would lead to high interest, which in turn will enhance meaningful learning and improved performance in Mathematics. Recommendations were also raised that Faculties and Colleges of Education should ensure that teacher trainees are provided with enough opportunities to master the principles behind the use of games and simulations and how to develop them for effective teaching and learning of mathematics.*

**Keywords:** Educational games, Mathematics, Pupils Performance, Probability, and Simulation.

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## **I. Background to the Study**

Mathematics without doubt remains very important to all disciplines and fields of human work and study (Adelaja, 2016). It has continued to play significant role in the development of both the individuals and nations. Mathematics is also a fundamental science that is needed for the understanding of most fields in the sciences and technological education. Therefore, Mathematics is a necessary tool needed to be able to function effectively in the present technological age (Aremu, 1998). According to Abakpa and Iji (2011) teaching and learning of Mathematics consistently generate interest among scholars over the years. Mathematics is an intellectually stimulating subject that affects every talent of human activities such as Politics, Economics, Science and Technology. Despite the benefits of Mathematics to our day-today activities and as an agent of nation's development and wealth creation, students interest in the learning of mathematics has not been favourable due to certain factors such as students' background, learning environment, non-utilization of viable instructional strategies among others (Ali, 1998 and Nkwo, 2003). There has been repletion of poor performance and failure of students in mathematics at primary school level (Olaleye, 2004 as in Olosunde and Olaleye, 2010).

In most of Nigerian classrooms, Mathematics instruction is hardly related to real life situations even when it is obvious to do so with little or no efforts. According to Iji (2002) mathematics teaching in Nigeria still follows the traditional pattern, where there is overreliance on textbooks with only occasional demonstrations and experimental classes. In an average classroom, one finds a teacher at the blackboard jotting down important facts, students furiously copying all that is written and said, expected to memorize the facts and spit them out in an examination (Sowunmi & Aladejana, 2013). Akinsola and Popoola (2004) claimed that many teachers use only the techniques they know even if such techniques are not relevant to the concept under discussion. This explains the persistent high failure in mathematics which is occasioned by low interest in the subject among the students (Aburirne, 2004; Imoko and Agwagah, 2012). Research findings such as Galadima (2010), Alio and Habor-Peters (2011), as well Imoko and Agwagah (2013), attributed the problem of students' low interest and achievement in mathematics to poor quality instructional techniques, incompetence and nonutilization of appropriate teaching techniques by teachers.

Classrooms in the years past, according to Aladejana (2013), were a cycle of memorization, repetition, and note copying. So far these patterns of teaching mathematics do not seem to be effective in helping students perform better. Neither do these methods help in promoting students' interest nor do they help improve students' achievement in the subject. Amoo, (2002) findings show that students display poor performances due to lack of interest. Literature is replete with facts students' intrinsic and extrinsic interest positively affect their achievement in mathematics and that achievement of students in mathematics largely depends on their interest in mathematics (Uhumuavhi and Umoru, 2005; Shiaki, 2005; Aligba; 2005). Imoko and Agwagah (2006) assert that the adoption of relevant instructional strategies will enhance meaningful learning and interest in mathematics. Effective teaching of mathematics should emphasize active learning (participation by learners). Thus, the 21st Century classroom must be matched with the 21st Century education which should be flexible, creative, challenging, and complex. It is in recognition of this fact that emphasis in mathematics education is now on the need for re-examination of instructional practices in the nation's educational institutions. In so doing, a lot of activities such as games and simulations plus others that appear attractive to young learners, especially those that could promote interest in learning, call for attention. The term simulation and game has been used interchangeably with 'games with simulated environments', 'teaching games', 'learning games', 'instructional games', and 'educational games'. Simulation and game is a game-based strategy that can be used for teaching and learning at any level of education. Simulation games in the classroom are used to copy what are found in real life situations. According to Enciso (2011), simulation and game is defined as an activity that works, fully or partially, on the basis of players' decision. Simulation games are an excellent supplement to the standard lecture. Simulation and games are an educational tool where students learn through the application of theory and decision-making to a simulated real- world scenario (Sowunmi and Aladejana, 2013). Simulation and games are also an active learning method, but with an incredible improvement potential.

With this trend, more efforts are needed to reduce the rate of failure and low interest in mathematics in public examinations. Also approaches of teaching mathematics that will improve students' interest in mathematics learning to the expectations of all the stakeholders such as students, teachers' parents, general public and government needs re-examination. As such an examination of games and simulations may be complementary to the conventional methods of teaching mathematical sciences in schools, so as to arise students' interest in the learning of mathematics.

Dotun (2005) defined Mathematical games as form of puzzles, magic tricks, fallacies paradoxes or any type of mathematical activities which provides amusement and curiosity. Mathematical games bring joy to the learner and teacher, break resistance or negative attitude to learning by reducing tension, flushing boredom and providing environment for learners to develop interest and acquire skills and competence. Games enhance learners to think Mathematical, imbibe the culture of cooperation, competition, organization and spirit of individualism (Okigbo and Okeke, 2011).

In order to complement other instructional strategies which are being used in the teaching and learning of mathematics, the researcher is of the view that if games and simulations are incorporated to complement the conventional methods of teaching mathematics, the right cognitive skills may be developed for effective teaching and learning of Mathematics (Olosunde and Olaleye, 2010). Simulations and games are miniature realities of situations prepared for man to react, get him ready for real life situations. It involves learning experiences which do not require immediate exposure of the learners to the real object. The practice with the use of teacher made objects before trying the real object is what is meant by simulation. Simulation technique makes learning more practical, vivid and meaningful and helps learners determine the pros and cons implication of a given task (Manguwat, 2014).

### **Research Design**

The research design that is used in this study is the Quasi-experimental research design, which consist of two groups, (experimental and control groups), using the pre-test and post-test format on the two groups.

The experimental group comprised students exposed to teaching and learning with the aid of games and simulation and their support teaching materials, while the control comprise students exposed to conventional teaching and learning method.

### **Analysis of Result**

*Research Question 1: What is the effect of games and simulation on students' performance in primary school Mathematics?*

<b>GROUP</b>	<b>MEANS(X)</b>	<b>STANDARD DEVIATION (SD)</b>
Experimental	53.95	35.70
Control	41.19	28.5
Difference in mean	12.76	

The table 1 above shows that the experimental group has a mean of 53.95 and standard deviation of 35.70, while the control group has a mean of 41.19 and a standard deviation of 28.5 the difference in mean is 12.76.

**Hypothesis 1**

*There is no significant difference in the scores of students taught using games and simulations and their counterparts taught using conventional Teaching method*

**Table 2: Analysis of variance for the experimental and controlled group**

Sources	Sum of square	DF	Mean of Square	F	Sig.
Between groups	373	2	186	2.674	0.30
Within groups	24.891	272	070		
Total	25.264	299			

*The one-way, between-groups analysis of variance is  $F(2, 272) 2.674, p = .030, MSe.,ro; . = 0.070, u = .05.$*

The hypothesis which says that there is no significant difference in the scores of students taught using games and simulations and their counterparts taught using conventional teachers method is rejected.

The finding of this study is supported by earlier findings of Uhumuavi and Urnoru, (2009); Shiaki (2012); Aligba (2012); Imoko and Agwagah (2013) that students demonstrate greater understanding of mathematical concepts and improved performance when taught via strategies that can stimulate and arouse their interest. The finding also agrees with Adetula, (2007), Aremu, (2010); National Teachers Institute (2010), Sowunmi and Aladejana (2013) who, all, asserted that students taught via games-assisted instruction perform better than those taught via conventional method do. This is an indication that the adoption of appropriate instructional strategies would enhance meaningful learning in mathematics. This implies that games and simulations technique can be adopted as a strategy for effective teaching of mathematical concepts. The finding of this study is however in conflict with Egbugara (1988) and Afuwape (2002) which asserted that games have no significant effect on students' achievement.

Further implication of these findings is that the adoption of relevant instructional strategies will enhance meaning learning and interest of learners in mathematics. This complies with earlier posited that games-assisted instruction could sustain students' interest in mathematics, encourage their participation in lessons and help them to retain what they learn for longer time.

**II. Recommendation**

- i. Mathematics teachers should welcome the use of games and simulations in the teaching and learning of mathematics in our schools. This can be done by constantly exposing the students to various games and simulations situations that are related to mathematics concepts to be taught in the classroom.
- ii. School administrators should provide local games such as ludo, playing cards, whot, etc to facilitate meaningful learning in their schools. This will enable the teachers to have access to them for better delivery of their lessons.
- iii. Faculties and Colleges of Education should ensure that teacher trainees are provided with enough opportunities to master the principles behind the use of games and simulations and how to develop them.

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