

# THE ROLES OF GAMES IN TEACHING AND LEARNING OF MATHEMATICS IN JUNIOR SECONDARY SCHOOLS

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## ABSTRACT

The paper examined the role of games in teaching and learning of Mathematics in junior secondary schools. The research seeks to enhance the status of games in teaching mathematics in junior secondary schools curriculum because of the place of Mathematics in the teaching and learning of other subject areas. Though viewed by learners with negative attitude and hatred, the paper reveals that the use of games and activities can make the mathematics enjoyable. In the paper, practice, motivation, understanding and suppression of anxiety are some of the reasons behind the use of games in Mathematics teaching and learning. Since Mathematics is a dreaded subject, the paper concluded that basic facts must be learned before moving to basic application and each level of application should build on already learned materials.

## INTRODUCTION

Generally, studies show that Mathematics lessons are filled up with much talking and writing. This promotes negative attitude and poor performance in the subject (Kankia, 2008). Findings have also shown that students maintain a poor attitude towards Mathematics learning (Hostestein & wetch, 1989; Ebenezer & Zeller, 1993) cited by Ogwu (2003). Students develop fear and hatred for the learning of Mathematics especially when mathematical symbols, signs and formulae are not understood. Mathematics is a subject which is said to be brain tester. There are so many Mathematics games that sharpen one's logical thinking.

Mathematics is beauty which is seen and felt and must be understood to be employed (Ekwueme, Meremiku & Erukoha, 2009). A clear idea of one's knowledge of what goes on in Mathematics classroom these days reveal that teaching procedures in use makes mathematics instructions boring and uninspiring (Oragwam, 2006). The use of games could provide a good alternative that could drive Mathematics to our environment.

Games are competitive interaction among participants to achieve pre-specified goals. Agwagah (2001) stated that a game is regarded as mathematical when the players can

perceive /or influence the course of the game on the basis of mathematical considerations. An instructional game is a structured activity with set rules for play in which two or more students interact to reach clearly designated instructional objectives (Harbor-Peters, 2001). The strength of games in mathematics teaching and learning is in the ability of a game to provide drill and practical application.

Games are used variously as ice breakers, to introduce new concepts, for the consolidation of ideas, for removing drudgery from drill and for creating a positive and enthusiastic atmosphere in classrooms. It removes fear from the students about the concept learnt in mathematics. From the explanation of games above, one can infer that games involve competition.

However, Crowe (1973) revealed that no attempt has been made towards exploring mathematical games in complementing secondary school Mathematics instructions. This gap is more amplified by lack of attention paid to Mathematical games by many junior secondary school Mathematics textbooks, Mathematics journals and other materials (Kankia, 2008). It is on the basis of this little attention that this paper tries to highlight the usefulness of games in the understanding of mathematics in junior secondary schools.

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### Games and Mathematics Curriculum

Mathematics curriculum planners are always making efforts to include different types of methods and strategies for teaching and learning of the subject, but always forgetting games. There are doubts as to whether secondary school teacher education programs in Mathematics pay any attention to helping prospective teachers of the subject acquire necessary competencies in designing and using mathematical games (Kankia, 2008).

It has been revealed by Adeniyi (1988) that 98% of Mathematics lessons in Nigerian junior secondary schools are conducted using either development or practice activities, while only 20% of the lessons involve games methods. However, persistent practice in mathematics activities are often burdensome, tasking and creates considerable tension. It makes learning unpleasant, less stimulating and less motivating.

But games relax tension; clear boredom and foster environment where teaching and learning are pleasant, interesting, exciting, stimulating, motivating and at the same time improve student's performance in Mathematics (Crowe, 1973). Games develop fun, pleasure, satisfaction and a sense of competitiveness in the learners. They also improve and promote creative skills, problem-solving ability and bring about effective and retentive learning. Hence, there is every need to place special emphasis on teaching and learning through games (Mesch, 2006).

Akpan (1988) asserted that Mathematics educators could improve the teaching and learning of the subject through games particularly at the early stage of education. He further stated that, "children are natural lovers of games, hence it could be a good strategy to incorporate and consolidate teaching and learning with games" (pp.22-23). Children develop mathematical knowledge in part through their play and exploration of the world around them. Mesch (2006) posit that a learner remembers one-fifth of what he hears, one-half of what he sees and three-quarters of what he does. With games learners will understand, remember and perform very well in Mathematics since games are practical illustrations of Mathematics.

### ADVANTAGES OF USING GAMES IN TEACHING-LEARNING MATHEMATICS

Mathematics helps learners find meaning in their environment. As they learn to

reason, connect ideas, analyze situations and think logically, they gain important tools and concepts for making sense out of a real life situation (Encarta Encyclopedia, 2002)

- i. Games provide parent-child interaction as well as opportunities for exploring ideas and more opportunities for communication and discussion that is normally available in the classroom. Games also help to stimulate the use of mathematical language, especially if this is pre-structured. It is important that Mathematics activities are enjoyable, both in order that the parents and children can relax while engaged in a mathematical activity, and so the motivation to continue will be high.
- ii. Games are highly motivating because the child is actively participating and is in control
- iii. It involves immediate feedback and an element of competition
- iv. Games have well-defined limits and directions
- v. Games are meaningful experiences, somewhere between concrete reality and the abstract world
- vi. Games can be used to consolidate class work or to encourage and enable a child to extend his or her skills. Experiences shows that ideally games should meet the following criteria:
  - a. Enjoyable
  - b. Allow equal competition or co-operation between child and parent
  - c. Easy to understand
  - d. Flexible and allow extension
  - e. Encourage discussion
  - f. Not look like school work
  - g. Attractive
  - h. Well packaged and easily kept together
  - i. Inexpensive.

Mathematics learning through games can take place outside the classroom in a way that is fun and educational for elementary school students.

### Examples of some Games that can be used in Teaching-learning Mathematics

The hunter and the bird is a good puzzle that can be used in the teaching of subtraction. The puzzle is about a hunter who saw a number of birds on the tree top. The hunter shot and killed seven of them and the question normally asked is: "How many birds were left on the tree". The answer normally given is zero. The

explanation is that since the hunter shoots, any bird that was not killed will normally fly away. This then introduces the idea of zero to children. However, the same game could be modified in the school setting to teach subtraction. For instance, the number of birds on the tree could be specified and number killed could also be specified. If for instance, the teacher said that there were 12 birds and the hunter killed 10 birds, the learners could then be asked to find the number remaining if they could not fly away (Erukoha, 1995).

### **Card game for teaching directed number in JSS.**

Throwing and catching game for multiple addition and also height distance.

### **MATHEMATICAL BEE:**

Mathematical bee is like a spelling bee, but with problems instead of words, students are given a Mathematics problem correctly, they remain in the bee. If they cannot solve it, then they are out of the bee. This gives students a chance to practice solving basic Mathematics problems while competing to be the mathematics bee champion. This also gives teachers the opportunity to observe the students performance in mental calculations, helping to determine areas where students may be having difficulties.

There are many other games that can be used to teach Mathematics, and a creative teacher can easily adapt games for use in the Mathematics class. Using games can help make Mathematics more interesting for the students and less stressful for the students.

For many students, mathematics is a dreaded subject. Basic facts must be learned before moving on to basic application, and each level of application should build on the level before it. All of the facts and formulas become tedious and time-consuming, leading students to avoid the subject whenever possible. Using games to teach Mathematics can help students learn in several ways.

### **REASONS FOR USING GAMES IN TEACHING-LEARNING MATHEMATICS**

**Practice-** using games to teach Mathematics ensures that students are practicing facts and formulas, even if their practice is limited to the classroom. Students not only recite formulas through games, but they learn how to put the formulas into practice in common applications. Such practice helps students develop the ability

to solve problems and build on their knowledge for higher level processes.

**Motivation-** many students find Mathematics tedious and boring. Using games to teach mathematics generates excitement, making Mathematics a fun subject for students. When the subject is interesting, students are more willing to study. In addition, games that allow for competition in class motivate students to study because they want to do well in the competition. This is especially true in younger students who may be motivated simply by the prospect of learning.

**Anxiety-** Mathematics is a subject that creates anxiety for students of all ages. Because games focus on fun, rather than performance, games are excellent method of reducing Math-related anxiety in students. In addition, games allow students to see that other students are at various levels of competence in mathematics, which helps to ease the anxiety that comes with the fear of being behind other students.

**Understanding-** students may not fully understand certain Mathematics concepts, or they may be able to understand concepts without being able to apply them. Using games to teach Mathematics can help students develop a better understanding of both concepts and applications.

### **CONSTRAINTS**

One of the constraints in the use of games could come from lack of re-enforcement on the part of the teachers that will go all out to produce games that will match the concepts in their scheme of work. Most teachers feel it is a waste of time teaching with games because according to most of them, it is time consuming and too cumbersome.

### **CONCLUSION**

Generally, mathematics use games either frequently or sometimes in a term for consolidating already learned concepts. This paper has shown that if games were widely available and teachers were exposed to the theory and construction of games, they would happily consider them as an effective and necessary instructional approach. It will sensitize teachers, researchers, and parents to take up creative art of designing Mathematics games. It will stimulate pupils' interest in solving mathematics as it brings Mathematics home to them.

Since mathematics is a dreaded subject, basic facts must be learned before

moving on to basic applications, and each level of application should build on the level before it. All of the facts and formulas become tedious and time-consuming, leading students to avoid the subject whenever possible. Using games to teach Mathematics helps learners in several ways. It helps in making Mathematics more interesting to the students and less stressful. By observing other students and listening during the games, students will develop the understanding they may have missed during tedious lectures and homework.

### RECOMMENDATIONS

Arising from some of the games reviewed in this paper the researchers are of the opinion that if the recommendations highlighted below are taken into consideration they will go a long way to reduce to the barest minimum the constraints:

- (1) Policy makers should have a clear vision concerning Mathematics and its place in the society.
- (2) Introduction of games in the teaching/learning Mathematics will help foster the learning situation.
- (3) Students' should be motivated, with the use of games.

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