

## INCREASING PRESCHOOLERS' ACADEMIC ACHIEVEMENT IN BASIC SCIENCE EDUCATION THROUGH PLAY-WAY METHOD FOR GLOBAL COMPETITIVENESS

**Charles Chinedu Oraelosi; Elizabeth N. Ebizie\*; Mkpoikanke Sunday Otu; Uchenna Eugenia Uzodinma; Juliana N. Ejiofor & Onyinyechi Igwe**  
Department of Educational Foundations, Faculty of Education  
University of Nigeria, Nsukka

**Correspondence: Elizabeth N. Ebizie;** Department of Educational Foundations, University of Nigeria, Nsukka

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### Abstract

*This study investigated the effects of play-way method on the academic achievement for global competitiveness of pre-schoolers in Basic Science Education. The study adopted quasi-experimental design. One research question and one hypothesis guided the study. The population of the study comprised ECCE III children of public pre-primary schools in Nsukka Local Government Area. Two pre-primary schools were selected at random for the study. One school was used for control group while other was used for experimental group. Pre-schoolers in control group were taught using conventional method while those in experimental group were taught using play-way method. An instrument entitled "Basic Science Education Achievement Test (BSEAT) was used for data collection. The instrument was subjected to face validation by three experts. The experiment lasted for four weeks of two periods in each week. The data collected for this study were analyzed using mean scores for answering the research question while analysis of covariance (ANCOVA) was used to test the hypothesis. Major findings indicated that play-way method facilitated higher global competitiveness in pre-schoolers as there was a significant difference in the mean achievement of the two groups. The study concluded that there was a significant difference in the achievement of pre-schoolers. Based on this conclusion, the researcher recommends that the play-way method should be an instructional technique at the core of the early childhood educational curriculum for global relevance and competitiveness.*

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**Keywords:** Pre-schoolers', academic achievement, basic science education, Global Competitiveness

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### Introduction

Basic Science Education in Nigeria is meant to cultivate citizens with knowledge and skills that will enable them cope with rapid changing realities in the global market. Therefore, the Federal Republic of Nigeria made provision in her National Policy on Education (FRN, 2014) to buttress the relevance of Basic Science Education. These are as follows: Basic Science Education shall emphasize the teaching and learning of science products, process and principles. This will lead to fundamental and applied research in sciences at all levels of life. According to the policy statement, the goals of basic science education shall be to cultivate

inquiring, knowing and rational mind; inculcate the conduct of a good life and democracy; and produce scientists for national development. Despite the overwhelming relevance and laudable objectives of Basic Science Education, the practices and product of Basic Science Education continued to be discouraging. Science Teachers Association of Nigeria, STAN (2019) stated that the structures and appropriate activities that foster effective implementation of the objectives are either inadequate or lacking at basic education levels in Nigerian schools. Afuwape and Oriola (2017) believed the myriad of challenges of Basic Science Education are the issues of quality and delivery at the basic levels especially the preschool. It therefore becomes necessary to search for more effective strategies which will be suitable and efficient for promoting the level of pre-schoolers' achievement for global relevance and competitiveness in Basic Science Education. In attempt to achieve these requirements, innovations in teaching/learning should be adopted and one of those innovations is play-way method. Play-way method of learning is child-centred approach that engages the child naturally, pleurably and actively with objects in the environment (Oraelosi, Ngwoke & Obiweluzor, 2019). Wilmeth (2004) conceptualized play-way method as play arranged into pleasing, natural and interesting patterns. Learning is done by the child on the principle of natural unfolding of his potentials rather than the overt instruction by a teacher (Ibiam, 2012). The author further stated that it is a case of the child learning from his/her own experiences and the teacher staying at the background providing the resources for learning. The teacher provides systematic activity which presents itself to the child naturally through play-way method. Operationally, play-way method is a child-centred preset plan of action that engages children didactically in a classroom to achieve all round development.

This study is concerned with Play-way method as a natural way the child acquires much of his early knowledge about the world. Jean Piaget's work has helped child educators to understand play in terms of cognitive development by presenting play in three stages: practice play that occurs during the sensory-motor stage; symbolic or dramatic play seen during preoperational stage; and games with rules prevalent at the concrete and formal operations stage. Knowledge is generally acquired and structured through play at every stage of children's development (Piaget, 1965). Thus, for academic achievement in Basic Science Education, play may be of a great asset. This is because children explore the sensory qualities of objects and acquire motor, mental and science attitudes/skills through play and it is observable through the child's physical movements and interactions with objects in the environment (Piaget, 1957). Naturally, children delight to participate in open-ended activities, dramatic play, singing and dancing which occur either in formal or informal settings. Play-way method could provide them with facilities to engage in activities meaningfully. According to Ilorah (2015), children play activities are grouped into: self-selected type, traditional African type and school organized type. Self-selected type takes an informal form of hide and seek, pulling or pushing objects, jumping on an object, running with bicycle wheel, role modeling (of the father, mother, teacher), construction work, hunting insects and so on. Traditional African type also called informal includes chasing exercise, skipping, koso, oga, ncholokoto and so on. And also, school organized type that is formal takes the form of learning corners, climbing the slide, running competitions, football, swing, singing, dancing, drawing, dramatization and so on. The traditional classroom teaching method used in majority

of schools in Nigeria is the conventional method which utilizes rote teaching approach. The conventional method of teaching mostly involves counting of numbers, reciting letters of the alphabet, singing and clapping, which cannot make for in-depth transmission of knowledge (Nnachi, 2016). There is too much dependence on and imitation of the teacher in such classroom. It is important to note that efficacy of learning lies in the method of passing on instructions in the classroom. Ora-Bright (2010) stated that effective teaching is more than classroom arrangement, children reciting and repeating accurately and teachers covering their scheme of work which are the basic nature of conventional method. Of great concern to the researcher, is why preschool educators in Nigeria have continually preferred to use the conventional method despite the fact that researches over the years have proved play-way method to be more effective in increasing the academic achievement and development of pre-schoolers. Abiodun (2014) conducted a study on the effects of play-way method on the numeracy skills of early basic education pupils in Ekiti State, Nigeria. Four research questions and four hypotheses guided the study and quasi-experimental design adopted. The population of the study was all the early basic education school children in Ekiti State with 120 children as sample size. Two instruments achievement test and interview were used for data collection. Data were analysed using mean, standard deviation and (ANCOVA). The result revealed that there was significant difference in the performance of pupil in favour of those in guided play group. Peters (2012) carried out a research study on play method and pupils in the development of social skills in pre-primary schools in Uyo Senatorial District of Akwa Ibom State. Six research purposes, questions and hypotheses were formulated to guide the study. The study adopted a correlation research design with population 10,124 nursery two pupils and proportionate sampling technique was adopted to select 360 nursery two pupils. Mean, standard deviation (SD) and regression coefficient were used for analyses. The major findings of the study were that availability and utilization of play materials significantly relate to pupils' cognitive and interactive skills development. Anake (2016) carried out a study on effects of play-way method on pupils' achievement in Biology and interest in Basic Science in Udenu Local Education Authority. Ten research questions and hypotheses guided the study and it adopted quasi-experimental design. The population of the study was 1034 primary four pupils with 120 pupils drawn through a multi stage procedure. The data was analyzed using descriptive statistics and (ANCOVA). The results revealed that the pupils taught Basic Science using play-way method achieved higher than those taught with conventional method. The play-way method of instruction was superior to the conventional method in facilitating pupils' achievement in Basic Science.

### **Purpose of the study**

The purpose of the present study was to determine the effects of play-way method on pre-schoolers' academic achievements in Basic Science Education for global competitiveness. One research question and one hypothesis guided the study, which are:

### **Research Question**

What are the mean achievement scores of pre-schoolers in Basic Science Education who were taught with play-way method and those taught with conventional method?

### Research Hypothesis

There is no significant difference in the mean achievement scores in Basic Science Education of pre-schoolers taught in a play-way method and those taught with conventional method.

### Methodology

The design of this study is a quasi-experimental design. Intact classes from two different preschools were used. The population of this study comprised all the pre-schoolers in Early Childhood Care and Education three children (ECCE III; 4-5 years) in 50 public pre-primary schools in Nsukka Local Government Area of Enugu State, as at 2022/2023 session. From the 50 schools, two schools were randomly selected. One school was used as experimental group while the other was the control group. The instrument used for data collection was the Basic Science Education Achievement Test (BSEAT). The test was in multiple-choice format containing 30 items considering the age of the children involved. Each question had 4 options among which one is the correct answer while the others served as distractors. The pre BSEAT and the post BSEAT contained the same item questions but the item numbers were re-shuffled to make them appear different in the post BSEAT. Any score from 15 and above was considered acceptable while scores below 15 were considered not acceptable. The instrument was carefully validated by three experts, two in Childhood Education and the other in Measurement and Evaluation and its reliability tested on 20 pre-schoolers of Community Primary School Ibagwa, Igboeze South Local Government Area, Enugu State. The reliability co-efficient of the BSEAT was determined through test-test method. A value of 0.82 was obtained. The instrument was administered by the regular preschool teachers (research assistants) of both schools used for experimental and control groups. The research question was answered using mean while the  $H_0$  was analyzed using ANCOVA at 0.05 level of significance.

### Experimental Procedure

The two groups which are the play-way method group, and the conventional method group were taught the same instructional content (from *National Early Childhood Curriculum for Ages 0-5 Years* NERDC, 2007). The play-way method group was the experimental group while conventional method group was the control group. Data collection for this study was done in stages by the researcher and with the help of research assistants. The researcher prepared two sets of lesson plans. One set for the play-way teaching method and the other set for the conventional lesson plan. For each lesson topic, a lesson plan was prepared by the researcher with the help of experts in Childhood Education. Each lesson plan was designed for use in teaching for 30 minutes a period. The research lasted for four weeks.

For the experimental group, the play-way method was used in teaching the class which consists of heterogeneous group of pre-schoolers of mixed ability in the classroom. A BSEAT was administered to the pre-schoolers before instructions began. This was used to determine the initial academic achievement of the pre-schoolers prior to instruction. The class was coordinated by their regular classroom teacher for Basic Science Education who for each lesson, introduced the topic for the lesson and then broke down the course content of the lesson and assigned play materials to pre-schoolers to play with. During this play, pre-

schoolers interact, manipulate, explore and help each other to operate and understand the play objects while the teacher moved around as a facilitator and offered assistance where necessary. At the end of the stipulated time for the play activities the teacher leads the pre-schoolers to discussions, questions and answers based on the play activities' objectives. The pre-schoolers were made to understand the learning objectives of the play. At the end of the four weeks instruction, pre-schoolers' achievement was measured by BSEAT.

For the controlled group, the conventional rote method was employed, encouraging recitation, repetition and imitation. A BSEAT was administered to the pre-schoolers before instruction began. The teacher explained all the concepts to be learnt while the pre-schoolers listened, repeat, and recite after the teacher; often assisted to take down notes. Pre-schoolers were made to understand that reward was based on their ability to get the answers correctly. Class work was carried out individually. At the end of the four weeks' instruction, pre-schooler's achievement was measured by a BSEAT (reshuffled).

**Table 1: Mean Scores of Pre-schoolers Achievement in BSEAT for Experimental and Control Groups**

G r o u p	P r e - T e s t		P o s t - T e s t	
	N	Mean	Mean	Mean Gain
T r e a t m e n t	30	16.27	22.87	6.6
C o n t r o l	30	17.55	17.68	0.13

Table 1 showed mean scores of 16.27 and 17.55 for the experimental and control groups respectively for pre-test, and 22.87 and 17.68 for post-test. The mean gain score for the experimental group was 6.6 while that of the control group was 0.13. These implied that the children taught Basic Science Education using play-way method (treatment) had higher mean gain than their counterparts who were taught using conventional method (control).

**Table 2: Analysis of Covariance of the effect of play-way and conventional methods' means and achievement on BSEAT**

S o u r c e	Type III Sum of Squares	D	f	Mean Square	F	S i g .
Corrected Model	1348.999	2		674.499	41.851	.000
I n t e r c e p t	191.125	1		191.125	11.859	.000
P r e t e s t	1054.182	1		1054.182	65.409	.000
M e t h o d	565.156	1		565.156	35.066	.000
E r r o r	918.651	5	7	16.117		
T o t a l	25435.000	6	0			
Corrected Total	2267.650	5	9			

a. R Squared = .595 (Adjusted R Squared = .581)

Table 2 above shows a significance of .000 which is <0.05 significance level. This means that there is a significant difference in the mean achievement scores of preschoolers taught with play-way method compared to those taught with the conventional method. The null hypothesis was therefore rejected.

### **Discussion of findings**

The finding of this study revealed that children taught Basic Science Education using play-way method achieved more than those taught with conventional method as the mean gain of the play-way method outweighed that of the conventional method. This finding is in line with Abiodun (2014) and Aneke (2016) who reported the effectiveness of the play-way method in teaching children Basic Science Education. Also, the finding corroborates with Peters (2012) and Abiodun (2014) who demonstrated that game play and play-way approach has improved children's achievement in science related subjects. It is taken that instruction using play-way method enhances pre-schooler's achievement in Basic Science Education than children taught using conventional method. Thus, availability and utilization of play materials will promote children's creative, critical and reflective thinking. One will therefore say that the play-way method of instruction will be the better way to facilitate pre-schoolers' global competitiveness. This is due to the fact that this method is characterized by active children's involvement, thereby engaging the innate abilities of the children and maximizing their full potentials. This finding is possible because children are playful and enjoy activity-based learning. Such activities catch their interest, keep them focused in performing task and sustain their attention. During play activities children interact with peers, communicate ideas to one another and by so doing develop scientific attitudes and abilities. Therefore, incorporation of play-way as a teaching method would enhance pre-schoolers' global competitiveness.

### **Educational Implications of the Finding**

The study goes a long way to prove with the empirical evidence that the play-way method is more effective in facilitating higher academic achievement for pre-schoolers. As a result, the study has educational implications for teachers, curriculum planners, educational administrators and the government agencies:

1. The teachers could, through this study strive to adopt proper teaching methods that appeals to pre-schooler's senses which enhance the academic achievement in school work for global competitiveness. They would equally understand that though some potentials are innate, the children still need activities that enhance the development of such abilities in school work.
2. The study emphasized on the importance of good teaching method in teaching pre-schoolers Basic Science Education. It therefore implies that curriculum planners, through this finding would propose in the curriculum the play-way method and play activities that may enhance pre-schoolers' achievement in Basic Science Education in pre-primary schools in Nigeria.
3. The study equally shows that using play-way as an activity method of teaching is innovative and requires interaction with nature. The implication therefore is that government agencies, through educational administrators should employ qualified teachers who can use play-way method effectively in teaching and learning in preschools or organize in-service training for those already in the system.

### **Conclusion**

Based on the findings of the study, it was concluded that children who participated in play-way method of teaching achieved more than their counterparts who participated in

conventional method of teaching in Basic Science Education in Nsukka Local Government Area. Empirically, it is shown that play-way method enhances and facilitates preschoolers' achievement.

### Recommendation

Based on the findings of the study, the following recommendations are made:

1. Curriculum planners should incorporate the use of play-way method at the core of educational curriculum while restructuring Basic Science Education curriculum in this country. The curriculum should be restructured to reflect the play-based games and instructional analogy as they pertain to Basic Science Education \

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