Effect Of Play-Way Method On Children’s Acquisition Of Basic Science Process Skills

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Abstract

The study focused on the effect of play-way method on children’s acquisition of the basic science process skills. This study was carried out in Nsukka Local Government Education Authority of Enugu State, with the sample of 105 preprimary three children in four intact classes from the four schools selected. Basic science process skills acquisition observational schedule (BSPSAOS) was used for data collection. The data collected for this study were analyzed using mean and standard deviation for answering the research questions while analysis of covariance (ANCOVA) was used for testing the hypotheses at 0.05 level of significance. Based on the data collected and analyzed, the study revealed that the children taught Basic Science using play-way method acquired higher basic science process skills than those taught with conventional method. There was significant (P<0.05) difference in the mean scores of children’s acquisition of basic science process skills when taught using play-way and conventional methods. Based on the findings, the study among others recommended that children should be exposed to the use of play-way method in teaching and learning process and curriculum planners should incorporate the use of play-way method in restructuring Basic Science curriculum in the country.

Keywords: Basic Science Children, Play-way method, Process skills
Introduction

There is downward trend in the acquisition of basic science process skills which have probably culminated into phobia for science subjects at other levels of education in Nigeria generally and Nsukka Local Government Education Authority in particular. Science process skills are the abilities scientists utilize in carrying out studies and investigations on the areas of interest. According to Tunnicliffe (2013) science process skills are measurable, demonstrable and procedural skills necessary for scientific investigations and inquiry. Science process skills are those abilities that could trigger latent tendencies of scientific attitude, critical thinking and guided inquiry (Opong, 2005). Lack of the basic science skills seems to have affected education generally which is recognized as a means of transforming the entire society for the well-being of the citizens and for national development. To achieve this goal of national development, the preprimary level of education must be taken seriously as it contributes to the overall development of the child. However, there have been cries and worries about the method of teaching at this level which could be responsible for this trend.

Basic science education is a systematically planned programme for development of problem-solving and life-coping skills. According to Ayodele (2003), basic science education is an exposure to scientific content, materials and skills. According to the author, basic science education is a carefully programmed activities and instructions that will impact basic life’s skills. Unfortunately, not much attention is paid to this level of education as children are observed to be taught using the conventional method instead of the play-way method as prescribed by the Federal Republic of Nigeria in the National Policy on Education. As a result, children who are supposed to be active learners and playful are observed to be denied play-based instruction so they resort to sleeping and crying most of the time because of lack of activity. This downward trend in the acquisition of the basic science process skills may also be attributed to spending more time engaging in highly structured play (organized sport and video games) while open-ended and imaginative play are neglected, thus hampering children’s development.

Given these thoughts and worrisome trends in the children’s acquisition of the basic science process skills and it’s after effects, there is need to explore the effect of play-way method on children’s acquisition of basic science process skills in Nsukka Local Government Education Authority. Play-way method of learning is child-centred approach that engages the child naturally, pleasurably and actively with objects in the environment. It is 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 sensori-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. Thus, in acquiring basic science process skills, the role of play should be emphasized. Children explore the sensory qualities of objects and acquire motor, mental and science skills through play and it is observable through the child’s physical movements and interactions with objects in the environment (Piaget, 1957). Children delight to participate in open-ended activities, dramatic play, singing and dancing which occur either in formal or informal settings. Thus, the purpose of this study is to examine the effect of play-way on children acquisition of basic science process skills.
in Nsukka Local Government Area of Enugu State, South East, Nigeria. The hypothesis that there is no significant difference in the mean scores of children taught basic science process skills using play-way method and those taught using conventional method was tested at 0.05 level of significance.

**Method and Materials**
The design of this study is a quasi-experimental design. Specifically, the non-equivalent group design. It sought to find out the effect of play-way method on children’s acquisition of basic science process skills. It is a quasi-experimental design because the treatment and control groups will be assigned to two intact classes. The study was conducted in Nsukka Local Government Education Authority of Enugu State with a population of 852 2020/2021 preprimary three children (ECE 111; 4-5 years). The sample size for this study comprised 105 children which represent about 12% of the population drawn from four pre-primary schools in Nsukka Local Government Education Authority.

The instrument for data collection is Basic Science Process Skills Acquisition Observational Schedule (BSPSAOS). It is a 52-item Basic Science Process Skills Acquisition Observational Schedule (BSPSAOS) with a four likert’s rating scale meant to determine the children’s acquisition of Basic Science Process Skills through play-way method. The instrument has six clusters as follows: Observation skills with items 1-7; Communication skills with items 8-16; Classification skills with items 17-26; Measurement skills with items 27-35; Inference skills with items 36-43; and Prediction skills with items 44-52. The scale ranges from Strongly Agree (SA= 4), Agree (A=3), Disagree (D= 2), to Strongly Disagree (SD= 1). The items were developed from information acquired through review of relevant literature validated by experts.

**Experimental Procedure**
This study involved two groups of subjects which are the play-way method group and the conventional method group. The play-way method group was experimental group while conventional method group was a 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 samples of the lesson plans for the play-way teaching method and the conventional lesson plan appeared in Appendices B & C pages 100 & 105 respectively. The class teachers served as research assistants. The research lasted for four weeks.

The researchers visited the school of interest to seek the managements’ permission to carry out the study in their school. On reaching the schools of interest, they presented an introductory letter to the managements/head-teachers of the proposed schools and then officially obtain their permission to carry out the experimental exercise. The researchers sought the co-operation of the head teachers of the schools involved to enable him build in his research programme into the school schedule without disrupting the later. Once the permission is granted, the researcher commenced the process. The researchers were not directly involved in the execution of the treatment.
programmes but gave the validated lesson plans to the research assistants in both treatment and control schools. However, the researchers monitored the progress and play the role of a supervisors.

**Pre-treatment Phase:** in the first week second contact, before the lessons starts, the basic science process skills acquisition schedule (BSPSAOS) administered as pretest to both the experimental and control groups. After that, the instrument was collected from the teachers by the researchers.

**Treatment Phase:** after the administration of the pretest, the third contact within the first week, the teachers began teaching proper using the lesson plans prepared by the researchers. This lasted for four weeks. Children in the experimental group were taught using the play-way method whereas those in the control group were taught using conventional method. During the actual treatment, instructions in Basic Science contents, which were drawn from preprimary three Basic Science curricula zero to five, were given to those in the treatment group and those in the control group. The purpose is to expose the two groups to relevant experiences in the content areas in which they were tested at the end of the study. But each group were taught separately using the appropriate lesson plan designed for the study.

Also, the teacher leads the class into a discussion session where the children present, share and discuss the items in the observational schedule that are related to topic being taught with the entire class. The teacher however monitors them and asks questions to assess what have been learnt. The teacher corrects the misconceptions that the children may have had during the demonstration and discussion and further explains the topic briefly. The teacher asks the children questions to involve them in the learning process.

After the teaching, the teacher evaluates the children based on the specific objects. Here, the teacher asks the children questions that are relevant to the topic to determine what have been learnt. This could be done individually or to the whole class. Finally, the teacher links the lesson to real life situations by asking the children questions and relating the classroom activities to the things happening in our environment. The teacher summarizes the lesson and ends the class. However, the normal conventional method already known to the teachers will be utilized in the control group in both locations.

**Post Treatment Phase:** this was done in the fourth week. At the first contact, the lesson plan ended and during the second contact, a post test was administered to children in both the experimental and control groups by the teachers.

**Method of Data Analysis**
The data collected were analysed in line with each research question and hypotheses. All the research questions were answered using mean and standard deviation while Analysis of Covariance (ANCOVA) was used to test the hypotheses at 0.05 level of significance.

**Results**
Table 1: Mean and standard deviation of effect of play-way method on children’s acquisition of basic science process skills

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre-Test</th>
<th>Post-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Mean</td>
</tr>
<tr>
<td>Treatment</td>
<td>52</td>
<td>99.51</td>
</tr>
<tr>
<td>Control</td>
<td>53</td>
<td>102.09</td>
</tr>
</tbody>
</table>

Table 1 shows that children taught basic science process skills using play-way method had post-test mean score of 149.17 with standard deviation of 17.12 while the children taught using conventional method had posttest mean score of 92.94 with standard deviation of 18.30. Mean gain scores of 49.66 and -9.15 for the two groups respectively imply that the children taught basic science process skills using play-way method had higher mean gain than their counterparts who were taught using conventional method.

Table 2: Analysis of Covariance of the effect of play-way method on basic science process skills

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>88238.895a</td>
<td>4</td>
<td>22059.724</td>
<td>81.298</td>
<td>.000</td>
<td>.765</td>
</tr>
<tr>
<td>Intercept</td>
<td>16409.670</td>
<td>1</td>
<td>16409.670</td>
<td>60.475</td>
<td>.000</td>
<td>.377</td>
</tr>
<tr>
<td>Pretest</td>
<td>5233.484</td>
<td>1</td>
<td>5233.484</td>
<td>19.287</td>
<td>.000</td>
<td>.162</td>
</tr>
<tr>
<td>GROUP</td>
<td>83923.783</td>
<td>1</td>
<td>83923.783</td>
<td>309.28</td>
<td>.000</td>
<td>.756</td>
</tr>
<tr>
<td>GENDER</td>
<td>130.644</td>
<td>1</td>
<td>130.644</td>
<td>.481</td>
<td>.489</td>
<td>.005</td>
</tr>
<tr>
<td>GROUP * GENDER</td>
<td>76.768</td>
<td>1</td>
<td>76.768</td>
<td>.283</td>
<td>.596</td>
<td>.003</td>
</tr>
<tr>
<td>Error</td>
<td>27134.495</td>
<td>100</td>
<td>271.345</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1647359.00</td>
<td>105</td>
<td>105</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>115373.3900</td>
<td>104</td>
<td>104</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. R Squared = .765 (Adjusted R Squared = .755)
Table 6 shows that the probability associated with the calculated value of F (309.288) for the effect of play-way method on basic science process skills is 0.000. Since the probability value of .000 is less than the .05 level of significance (p<.05), the null hypothesis was rejected implying that there is a significant difference in the mean scores of children taught basic science process skills using play-way method and those taught using conventional method.

**Discussion of Findings**

The finding of this study revealed that the children taught basic science process skills using play-way method acquired the basic science process skills more than those taught with conventional method. Thus, there is a significant difference in the mean scores of children taught basic science process skills using play-way method and those taught using conventional method. This finding is in line with Abiodum (2014) and Aneke (2016) who reported the effectiveness of the play-way method in teaching children basic science process skills and other skills. Moreover, 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 like Mathematics.

It is taken that instruction using play-way method enhances children’s acquisition of the basic science process skills than children taught using conventional method. Thus, availability and utilization of play materials will promote children’s observation, communication, measurement, classification, inference and prediction skills. One may therefore say that the play method of instruction will be the better way to facilitate children’s acquisition of basic science process skills, especially due to the fact that this method is characterized by active children’s involvement, thereby engaging the innate potentials of the children and maximizing acquisition of the basic science process skills. Therefore, incorporation of play-way as a teaching method would enhance children’s acquisition of basic science process skills.

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