Effects of lecture method-enriched with think-pair-share techniques on interest in matter concepts among basic science students, Gboko, Benue State, Nigeria.

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ABSTRACT

This study examined the effects of lecture method-enriched with Think-Pair-Share technique on Interest in Matter Concepts among Basic Science Students in Gboko, Benue State, Nigeria. The study employed quasi experimental design. A randomly selected sample of 139 students from two schools out of total population of 2,445 upper basic II students from 25 co-education schools in Gboko Metropolis was used for the study. The schools were randomly assigned into experimental and control group. The experimental group were taught matter concept using lecture method-enriched with Think-Pair-Share technique while the control group were taught the same concept using lecture method. Two instruments were used for data collection: Matter Concept Performance Test (MCPT) using Pearson Product-Moment Coefficient (PPMC) test retest and the reliability coefficient was found to be 0.85; and Basic Science Interest Questionnaire (BSIQ) on five point Likert's scale and the reliability coefficient was found to be 0.86 using Cronbach Alpha. Two research questions and two null hypotheses were formulated for the study. The data collected were analyzed to answer research questions and the null hypotheses on interest were tested using Mann-Whitney u-test on 0.05 level of significance. The study found out that the instructional technique enhanced and aroused students’ interest in basic science. The study concludes that the instructional technique is a feasible innovation to the enhancement of students’ interest in basic science. The study recommended that lecture method-enriched with think-pair-share technique should be encouraged among teachers of Basic Science to enhance students’ interest.

Key words: Lecture method-enriched, think-pair-share technique and Interest.

INTRODUCTION

Basic Science by conception and definition emphasized the content as well as the process of science, the development of mental skill, acquisition of appropriate motor capabilities and the evolution of positive attitude amongst others. The Vienna Congress, 1968 of the United Nation Education, Scientific and Cultural Organization (UNESCO), Uche and Umoren (2016) define Basic Science as approaches in which concepts and principles of science are presented so as to express the fundamental unity of scientific thought and to avoid premature or undue stress on the distinction between the various scientific fields. This definition emphases that Basic Science is a composite all-embracing course, it lays no emphasis on the traditional boundaries of the various science subjects. It is a course that serves as a good foundation for scientific literacy, personal growth, social relevance, process of enquiry and general education. This definition shows that presentation of the course by teachers for effective comprehension requires specialized skills. Alebiosu et al. (2012), observed that, there are various objectives of basic science which are the reasons by which Nigerian government introduced Basic Science teaching in Nigerian upper basic level. Some of the
objectives are: Basic science provides students at the upper basic level, a sound basis for continuing science education in single science subject; it enhances the scientific literacy of the citizenry; it allows students to understand their environment in its totality rather than in fragments; it allows students to have a general view of the world of science; and the processes of science serve as unifying factors for the various science subjects. The importance of basic science in everyday life can never be over emphasised. It serves as the bedrock which provides the required training in scientific skills to meet the growing needs of the society.

Teaching and learning of Basic Science among Upper Basic levels in Nigeria is predominantly by lecture method. Anaekwe et al. (2010) define lecture method as a process of delivering verbally a body of knowledge according to pre-planned scheme. The lecture method is the easiest, cheapest and can be used to cover the syllabus and teach large groups of students. However, using this method reduces students to passive listeners and does not encourage the acquisition of critical thinking skills and students’ active participation in the lessons. This traditional lecture strategy was used as a control in this study. Therefore, an enriched lecture strategy refers to the strategy that is used in conjunction with other strategies such as Think-pair-share that will ensure active participation of students in the classroom interaction pattern. In this strategy, a good basic science teacher should ensure a two-way communication pattern and shared responsibility by asking questions and encouraging students to ask their own questions. There should be collaborative learning where students think about their responses to a problem that has been given by the teacher, then discuss the solution with their partner and share the solution in front of the class. The advantage of the learning technique think pair share according to Tint and Nyunt (2015)is that it gives students the opportunity to work alone and collaborate with others. Arianti (2020) stated that learning type think-pair-share has three stages, namely stage thinking (thinking), stage pairs (pairing), and phase (sharing). Another advantage of this technique is the optimization of student participation. This technique provides more opportunities for each student to be recognized and show their participation to others (Suryaya et al., 2014). Therefore, enriched lecture method instructional strategy entails structuring lecture method in the classroom in such a way that the students are at the centre of learning while the teacher acts as a facilitator. In this strategy students are encouraged to construct learning themselves, while the teacher ensured active participation through questioning, brainstorming and debates during the lesson. By so doing, a good Basic science teacher ensures that students’ interest and attention span are captured during the lesson.

Interest could be considered as the feeling of an individual towards a particular object or an activity. It means that a child will develop interest in any object or activity that is found to be attractive or stimulating to him. Therefore, in a classroom situation, the learner will be attentive during a lesson only if the instruction is of interest to the learner. Nwafor (2015) viewed interest as a response to liking or disliking to an event, an activity, person or situation. Bimbola and Daniel (2010) observed that basic science plays vital role in Nigerian science education programme, because it prepares pupils at the upper basic level for the study of core science subjects at the senior secondary school level which in turn brings about students interest in science oriented courses at the tertiary institutions. Baram-Tsabari (2011) examined the implications of “citizen science”, that is, science which relates in reflexive ways to the concerns, interests and activities of citizens as they go about their everyday lives, for the form and content of school science education; he suggested constructing science curricula that enable young people to engage in science-related issues that are likely to be of interest and concern to them. Obioma (2010) identifies poor primary school background, lack of interest on the part of the students, incompetent teachers in primary schools, female students not being interested in science subjects, perception that science courses are difficult, large class syndrome, psychological fear of science subject, poor methods of teaching and lack of qualified science teachers as causes of lack of students interest in science education. Interest, according to Okigbo and Okeke (2011), is an important variable in learning because when one becomes interested in an activity, one is likely to be more deeply involved in that activity.

Gender difference is as old as the creation and has featured severally in academic discourse. It is the character of being male or female, man or woman, boy or girl. Gender disparity according to Danjuma (2015) globally militates against equitable participation of boys and girls in Science Education especially in Africa. Hamdallah et al. (2014) submitted that females face a number of inequitable difficulties that limit their potentials in participation in the Sciences. This implies that gender peculiarities affect teaching, learning and academic performance of pupils in Basic Science. Gender difference in performance in science exists. For instance, Wakili (2018) and Godpower-Echie and Owo (2019) found that boys were better in performance in Basic Science than the girls. However, Oludipe (2012), Danjuma (2015) and Shaibu (2016) found no gender disparity among students’ performance in Basic Science. This study is an attempt to add to the existing knowledge on performance in Basic Science across mixed-ability and gender using TLIM.

Objectives of the study

The objective of the study was primarily to determine the effect of lecture method - enriched with think-pair-share
technique on interest among Basic Science Students.

**Research question**

1. What is the difference between the interest level of Basic Science Students taught matter concept using lecture method-enriched with Think-Pair-Share techniques and those taught using lecture method?
2. Is there any difference between the interest level of male and female Students of Basic Science taught matter concept using lecture method-enriched with Think-Pair-Share techniques?

**Null hypothesis**

- $H_{01}$: There is no significant difference in the interest level of Basic Science students taught matter concept using lecture method-enriched with Think-Pair-Share techniques and those taught using lecture method.
- $H_{02}$: There is no significant difference in the interest level of male and female students taught matter concept using lecture method-enriched with Think-Pair-Share techniques.

**METHODOLOGY**

This study adopted quasi-experimental design involving pretest and posttest. Pretest ($O_1$) was administered to the experimental and control group to determine students’ equivalence in terms of their interest in basic science. After the administration of the pretest, the experimental group was taught matter concepts using lecture method-enriched with Think-Pair-Share technique ($X_1$), while the control group were taught using lecture method ($X_0$). After six weeks of treatment, both groups were subjected to posttest ($O_2$) in order to measure their interest. From 27 Junior Secondary Schools in the population out of total population of 2,445 students which comprised 1,312 male and 1,133 female, 4 schools were randomly selected and assigned to experimental and control group. The sample of 139 was in line with central limit theorem recommended by Tuckman (1975) and Sambo (2008). Two instruments: Matter Concepts Performance Test (MCPT) and Basic Science Interest Questionnaire (BSIQ) were administered to the group as pretest before treatment. After treatment, the subjects were administered the same instruments to determine the difference if any in their interest level. For the treatment of the experimental group, students were taught matter concepts using lecture method-enriched with Think-Pair-Share technique while the control group were taught the same concepts using lecture method. The teaching lasted for a period of six (6) weeks, 45 min per week. After the completion, a posttest was administered. Introductory letter was collected from the Head of Science Department which was taken to the selected schools for the purpose of data collection. The instruments Matter Concept Performance Test (MCPT) and Basic Science Interest Questionnaire (BSIQ) was administered to students after the treatment from the selected public schools and retrieved immediately on completion, while scores were then collated based on stated research questions and hypotheses formulated. The null hypotheses were restated along with the appropriate statistical tools which were used for testing them. The statistical tools include descriptive statistics mainly mean, standard deviation and frequency which were used to answer research questions and inferential statistics mainly Mann-Whitney U-test were used to test the null hypotheses at 0.05 level of significance.

**RESULTS**

Table 1a shows that difference exist in the interest level among upper Basic students when exposed to lecture method-enriched with Think-Pair-Share technique and lecture teaching method in matter concepts. Their mean scores were finally selected and randomly assigned to experimental and control group. The sample of 139 was in line with central limit theorem recommended by Tuckman (1975) and Sambo (2008). Two instruments: Matter Concepts Performance Test (MCPT) and Basic Science Interest Questionnaire (BSIQ) were administered to students after the treatment from the selected public schools and retrieved immediately on completion, while scores were then collated based on stated research questions and hypotheses formulated. The null hypotheses were restated along with the appropriate statistical tools which were used for testing them. The statistical tools include descriptive statistics mainly mean, standard deviation and frequency which were used to answer research questions and inferential statistics mainly Mann-Whitney U-test were used to test the null hypotheses at 0.05 level of significance.

<table>
<thead>
<tr>
<th>Groups</th>
<th>N</th>
<th>Mean Rank</th>
<th>Mean Rank Diff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>74</td>
<td>80.18</td>
<td>21.76</td>
</tr>
<tr>
<td>Control</td>
<td>65</td>
<td>58.42</td>
<td></td>
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</tbody>
</table>

Table 1a: Mean Rank Test Difference on the Interest Shown in matter concepts among upper Basic Students in Experimental and Control Group.
the interest level shown by upper Basic students when exposed to lecture method-enriched with Think-Pair-Share technique and those taught with lecture method was significant in favor of the experimental group. Therefore the null hypothesis which stated that there is no significant difference between the interest level of Basic Science students taught matter concept using lecture method-enriched with Think-Pair-Share technique and those taught using lecture method is hereby rejected. This shows that the technique is productive.

In Table 2a, the outcome of the statistics shows that difference exist in interest among gender when upper Basic students were exposed to lecture method-enriched with Think-Pair-Share technique. Their computed mean rank scores were 29.35 and 45.22 for male and female respectively, indicating a mean rank difference of 15.87 in favor of female. This indicates that female students show more interest in Basic Science than male students in the experimental group.

The result in Table 2b shows that the p-value of 0.001 was observed at U-statistics of 390.5. Since the p-value was less than the alpha value of 0.05, it therefore implies that the difference in the interest level between male and female upper Basic II students when exposed to lecture method-enriched with Think-Pair-Share technique was significant in favor of female students. Therefore the null hypothesis which stated that there is no significant difference in the interest level of Male and Female students taught matter concept using lecture method-enriched with Think-Pair-Share technique is hereby rejected. This indicates that the technique is gender amicable.

**DISCUSSION OF FINDINGS**

The research question one was answered by testing the corresponding hypothesis which stated that there is no significant difference between the interest level of Basic Science students taught matter concept using lecture method-enriched with Think-Pair-Share technique and those taught using lecture method. It was observed that students taught using lecture method-enriched with think-pair-share technique indicated more interest towards Basic Science than those taught using lecture method. This implies that the use of lecture method-enriched with think-pair-share technique enhanced and boosted students' interest towards the learning of Basic Science. The increase in the interest towards learning of Basic Science recorded could be due to the use of lecture method-enriched with think-pair-share technique and the general fun experienced during the lesson when lecture method-enriched with think-pair-share technique is used. This supported the findings of Nwaukwa and Okolocha (2020) who observed that the use of think-pair-share technique raises the level of concentration and enhances learning because it is fun. Furthermore, other reasons that could be adduced to be behind enhancement and boosting of students interest when taught with lecture method-enriched with think-pair-share technique could be that students who learned with lecture method-enriched with think-pair-share technique were more attentive and engaged in learning, participated more actively in the classroom, interacted much more with the teacher, their peers. This is in line with Udu (2014) who stated that innovative teaching strategies can affect

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**Table 1b: Mann-Whitney Non Parametric Rank Test Difference in the Interest Shown among upper Basic II Students in Experimental and Control Group.**

<table>
<thead>
<tr>
<th>Groups</th>
<th>N</th>
<th>Mean Rank</th>
<th>Mean Rank Difference</th>
<th>U Statistics</th>
<th>P</th>
<th>Remark</th>
</tr>
</thead>
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<td>Experimental</td>
<td>74</td>
<td>80.18</td>
<td></td>
<td></td>
<td>0.001</td>
<td>S</td>
</tr>
<tr>
<td>Control</td>
<td>65</td>
<td>58.48</td>
<td>21.7</td>
<td>1652.0</td>
<td></td>
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</tr>
</tbody>
</table>

*P≤ 0.05.*

**Table 2a: Mean Rank Test Difference in the interest level of male and female students in experimental group.**

<table>
<thead>
<tr>
<th>Groups</th>
<th>N</th>
<th>Mean Rank</th>
<th>Mean Rank Diff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>36</td>
<td>29.35</td>
<td>15.87</td>
</tr>
<tr>
<td>Female</td>
<td>38</td>
<td>45.22</td>
<td></td>
</tr>
</tbody>
</table>

**Table 2b: Mann-Whitney Non Parametric Rank Difference in the Interest Shown Between male and female upper Basic II Students in Experimental Group.**

<table>
<thead>
<tr>
<th>Groups</th>
<th>N</th>
<th>Mean Rank</th>
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<td>390.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*P≤ 0.05.*
students' interest in learning positively while poor teaching strategies can have negative impact on students' interest in learning. Therefore, with the empirical evidence in this study, it is shown that the use of lecture method-enriched with think-pair-share technique is necessary for boosting students' interest towards learning of Basic Science.

Hypothesis two tested gender difference in the interest level of male and female upper Basic students exposed to lecture method-enriched with Think-Pair-Share technique. The research question two was answered by testing the corresponding hypothesis which states that there is no significant difference in the interest level of Male and Female students taught matter concept using lecture method-enriched with Think-Pair-Share technique. Their interest level scores were 29.35 and 45.22 for male and female respectively, indicating a mean difference of 15.87 in favor of female. The finding therefore concurred with Mari and Peni (2013) that gender differences favored girls in science than their male counterparts. Furthermore, Lawal (2017), Bunkure (2019) and Dahiru (2016) pointed out that girls achieved better than boys in cooperative learning of science. The finding also agreed with Farooq et al. (2011) and Voyer and Voyer (2014) who reported significant difference in favour of girls.

Conclusion

Based on the findings obtained in this study, it is concluded that:

i. There is high increase in the interest level among students when exposed to lecture method-enriched with think-pair-share technique in the favor of experimental group.

ii. Lecture method-enriched with Think-pair-share technique enhanced interest in gender friendly equally well in both Male and female students.

RECOMMENDATIONS

i. Both male and female upper basic science students' should be taught Basic Science with lecture method-enriched with think-pair-share technique as both improve interest when used.

ii. Teachers of Basic Science should be sponsored by government/private school owners to attend regular course trainings, workshops, seminars and in-house training on the use of lecture method-enriched with think-pair-share technique for maximum students' interest.

iii. At the pre-service level, the use and implementation of lecture method-enriched with think-pair-share technique in the classroom should be emphasized in the methodology courses being offered by student teachers.

iv. Parents Teachers Association (PTA) Non-Governmental Organization (NGO) should assist in providing adequate materials and structures for effective use of lecture method-enriched with Think-Pair-Share technique.

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