READABILITY OF APPROVED INTEGRATED SCIENCE TEXTBOOKS IN EBONYI STATE JUNIOR SECONDARY SCHOOL

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Abstract
This study assessed the readability of six approved integrated science textbooks in Ebonyi State Junior Secondary Schools. The study covered the three education zones of Ebonyi State; Abakaliki, Onueke and Afikpo zones. Two research questions guided the study. The sample comprised six approved integrated science textbooks; sixty three integrated science teachers and twenty one secondary schools in Ebonyi State. One instrument was used; integrated science textbook readability (ITRT). This is a close technique for determining the readability of integrated science textbooks. The two research questions were answered using mean and standard deviation. The findings revealed that the six approved integrated science textbooks were readable and there is little variation in their reading ability across class levels. Based on these findings, conclusions were drawn and recommendations made.

Introduction
The ability to read effectively can be regarded as a scale for measuring the learners’ level of literacy. Reading is a way of acquiring experience through understanding of other documented experiences of lives. Reading according to Okafor (2004) is one of the major avenues of communication. Communication is very crucial in every day life to the fact that a break down in communication is associated with problems capable of bringing retrogression.

The readability of a textbook is the extent the reader including students, understand what was read in a particular book passage, read it at optimum speed and finds it interesting (Robert, 2002). In considering readability, one has in mind the level of difficult in reading and understanding the contents of a given text. This determines the student’s ability to understand and obtain meaning from the text.

It is sometimes desirable in education to measure the difficulty level of a particular text in relation to the class for which it is assigned. One of such measures is readability. Macndip (1995) defined readability as the linguistic and conceptual difficult levels of a textbook. The ease with which a text can be read and understood by the students depends on author’s choice of semantic and syntactic structure. Integrated science involves abstract contents and concepts like energy, atoms, molecules, ion etc. One has to arrange the topics in ascending order of difficulty considering the cognitive level of the students who use the textbook. Ideally, the concept in each chapter are gradually introduced, developed and ultimately the application are presented so that the students can
make meaning from them. Ali (1998) said that in all good quality textbooks, information are presented on the basis of moving from known to unknown and from the least difficult to the most difficult and often using examples drawn from the environment of the students.

Indeed, the development of physical concepts in integrated science should be on ascending or progressive order of difficult in which the reader must use previous knowledge. This should be strictly adhered to because of the difficulties students encounter in reading integrated science textbook as a result of physical terms, increasing complex and abstract language of science. One of the effects of reading disability is lack of interest. Other problems associated with reading disabilities are emotional, psychological imbalances and so many other bad behaviours in the classroom. The poor message from science textbooks may change the meaning of a particular science or integrated science concept. This situation is very serious and in order to alleviate this problem, good integrated science text has to be provided. A good integrated science textbook is the type that has a simple and understandable form and at the end of each chapter there may be review questions to give a sense of direction on what the reader ought to have learnt from reading the chapter. For integrated science textbooks to play its role effectively the readability level should be satisfactory and that is done through evaluation of integrated science textbooks.

Every endeavour that needs improvement or modification qualifies for evaluation. Evaluation may be regarded as a mission oriented activity that is concerned with providing information to decision makers (Akinada, 2004). It is also a process of determining what the actual education outcomes are and comparing them with expected outcome. Evaluation embraces the whole sphere of education namely: the teacher, the learner and the learnt materials.

Every year in Nigeria, a lot of integrated science textbooks are published for secondary schools. The issue is that most of these books are published and pushed into the market without proper evaluation by specialists (Salami, 1998). When one goes into an integrated science classroom, one observes that the main tool for instruction is one of those books. This, therefore, calls for a continuous evaluation of integrated science textbooks to determine their readability and appropriateness.

The Problem

There has been consistent poor performance of students in JSSE in integrated science in Ebonyi State. There are also research evidences which indicated poor performance of students in JSSE integrated science all over Nigeria (Salami, 1998 and Omebe, 2005).

The poor performance had been traced to so many factors ranging from the attitude of students towards the subjects, methods of teaching the subject, lack of motivation on the part of the teachers, lack of basic science background at the primary school level to resources for teaching integrated science.
Efforts to provide solutions to the consistent mass failure in JSSE integrated science have often attracted the attention of specialists in the discipline in conferences, workshops and seminars (Jegede, Otuaka and Eniajeju, 1999). Specialists are being recruited to teach integrated science in JSS amongst other subjects. Different methods were adopted to arrest the situation, but the results obtained are still far from what is desirable (Salami, 1998).

Since integrated science textbooks are recommended for schools without subjecting them to proper scrutiny, there is the likelihood that textbooks in use in schools may lack basic qualities and consequently influence performance in the subject, therefore, the researcher deemed it necessary to look into the readability of the approved integrated science textbooks in Ebonyi State junior secondary schools.

Purpose of the Study

The purpose of this study is to evaluate the readability of the approved integrated science textbooks in Ebonyi State junior secondary schools. Specifically, this study seek to

i. Find out the readability scores of each of the integrated science textbook in Ebonyi State junior secondary schools.

ii. Find out how the reading ability of the students in the approved integrated science textbooks vary across class levels.

Research Questions

The following research questions guided the study.

i. What are the readability scores of each of the integrated science textbooks in Ebonyi State junior secondary schools?

ii. How does the reading ability of the students in the approved integrated science textbooks vary across class level?

Method

This study employed evaluation research design. Evaluation study according to Ali (2006) is the type of design that makes use of value judgment on programmes or project based on certain pre-determined criteria. The researcher found this design very useful because it involves making value judgment about integrated science textbooks in Ebonyi State junior secondary schools.

The study was carried out in Ebonyi State of Nigeria. The study covered the three education zones of Ebonyi State, Abakaliki, Onueke and Afikpo.

The population comprised all approved integrated science textbooks in Ebonyi State junior secondary schools, all integrated science teachers in Ebonyi State junior secondary schools and all the students in Ebonyi State junior secondary schools.

Integrated science textbook readability test (ITRT) was the instrument the researcher used for the study. ITRT is a cloze technique for determining the
readability of integrated science textbooks. The ITRT is close deletion passages. The ITRT were developed separately for the three separate classes of JSI, JSII and JSIII. The passages from each textbooks being evaluated were systematically drawn from the sic themes to ensure fair representation of the sections of the textbooks.

The ITRT was face validated by three experts in educational measurement and evaluation from University of Nigeria Nsukka. The ITRT was assessed for reliability using test re-rest procedure. An interval of one week was given for the re-test. Scores obtained from the two administration of the test were correlated using Pearson product moment correlation approach.

The mean readability scores of the students of each class levels together with the standard deviation were calculated and interpreted based on guideline provided by Bormuth (1998) and Harrison, (1980) as shown in the table below. The interpretation of cloze readability scores summarized by Harrison is presented thus.

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 40</td>
<td>Not readable</td>
</tr>
<tr>
<td>40 – 45</td>
<td>Readable</td>
</tr>
<tr>
<td>Above 45</td>
<td>Very readable.</td>
</tr>
</tbody>
</table>

Mean & standard deviation were used to answer the research questions.

Results

The results of the analysis are displayed in the table below:

Research Question 1

What are the readability scores of each of the integrated science textbooks in Ebonyi State junior secondary schools?

Data for answering the above research question was obtained from 21 sampled schools in Ebonyi State junior secondary schools through the mean of the readability scores of the 6 integrated science textbooks as follows:

Table 1: Readability Scores

<table>
<thead>
<tr>
<th>Textbooks</th>
<th>Class level</th>
<th>Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stan</td>
<td>1</td>
<td>42.05</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>40.49</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>41.87</td>
</tr>
<tr>
<td>Longman</td>
<td>1</td>
<td>43.07</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>41.61</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>44.67</td>
</tr>
</tbody>
</table>

For STAN series, the readability score for SSI was 42.05, JSII was 40.49 and JSIII was 41.87. For LONGMAN series, the readability scores for JSI were 43.07, JSII was 41.61 and JSIII was 44.67, respectively.
**Readability of Approved Integrated Science Textbooks in Ebonyi State Junior**

**Research Question 2**

How does the reading ability of the students in the approved integrated science textbooks vary across class levels?

Table 2: **Mean and Standard deviation of close text scores of the students on each textbooks and class levels**

<table>
<thead>
<tr>
<th>Textbooks</th>
<th>Class Levels</th>
<th>JS I</th>
<th>JS II</th>
<th>JS III</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAN</td>
<td>(\bar{x})</td>
<td>42.05</td>
<td>40.49</td>
<td>41.87</td>
<td>41.47</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>14.28</td>
<td>13.12</td>
<td>13.38</td>
<td>13.59</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>41</td>
<td>41</td>
<td>39</td>
<td>121</td>
</tr>
<tr>
<td>LONGMAN</td>
<td>(\bar{x})</td>
<td>43.07</td>
<td>41.61</td>
<td>44.67</td>
<td>43.11</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>15.33</td>
<td>12.54</td>
<td>14.85</td>
<td>14.24</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>41</td>
<td>41</td>
<td>39</td>
<td>121</td>
</tr>
<tr>
<td>TOTAL</td>
<td>(\bar{x})</td>
<td>42.56</td>
<td>41.05</td>
<td>43.27</td>
<td>42.56</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>82</td>
<td>82</td>
<td>78</td>
<td>78</td>
</tr>
</tbody>
</table>

From the table 2 above, the overall score of JSI was 42.50; JSII was 41.05 while JSIII was 43.27. Their scores fall within the “readable” range.

The results presented in table 1 on the readability scores of each of the 6 (six) integrated science textbooks evaluated showed that for STAN series, the readability scores for JSI, JSII and JSIII were 42.05, 40.49 and 41.87 respectively while LONGMAN series, the readability scores for JSI, JSII and JSIII were 43.07, 41.61 and 44.67 respectively. However the results show that all the six integrated science textbooks evaluated, all are readable based on Harrison (1980) guideline.

This result is in line with Eze (1993). His findings showed that the textbooks in question have no reading difficulty to the students. In this present work all the texts are readable.

Table 2 above showed the overall mean scores for JSI, JSII and JSIII as 42.56, 41.05 and 43.27 respectively. Their scores fall within the readability range. The textbooks were readable for all the class levels. In other words, evidence from the study tends to suggest that JSIII students are at higher reading level followed by JSI and lastly JSII. Also the standard deviation for JSI, JSII and JSIII was 14.81, 12.83 and 14.12 respectively. Their deviations across class levels are close except JSII that has slightly difference. That implies that there is variation in their reading ability across class levels.

In general, the six textbooks are readable. With readable textbooks right from JSI, the performance of students will greatly be enhanced. It therefore implies that the poor performance of students in integrated science may not be attributed to textbooks alone; other factors may have been responsible.
Conclusions
On the bases of the findings of this study, the following conclusions were made.

i. All the six approved integrated science text books are readable.

ii. There is little variation in their reading ability across class levels.

Recommendations
Based on the findings and conclusions of this study the following recommendations were made.

i. Integrated science textbooks used for teaching students need to be periodically revised with the view to making them readable and enrich them in terms of readability and content. Integrated sciences textbooks that are readily readable and understandable to students have become inevitable for self assessment of learning in the absence of teacher. Integrated science textbooks whose readability are empirically known to be high should be recommended for teaching and learning in schools.

ii. STAN should liaise with the state government to periodically mount conference, seminars and workshops for integrated science teacher, authors and publishers on how to write high quality and standard textbooks. That will update and upgrade their writing skills.

References


Jegede, O.J, Otuaka, Joe & Eniajeju, P.A. (1999). Raising the standard of performance in public examinations in science, technology and
mathematics. STAN position papers No 4 Ibadan Science Teachers Association of Nigeria.


