

EVALUATION OF INTEGRATED SCIENCE TEXTS USED IN SECONDARY SCHOOL IN ENUGU STATE

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Abstract

This study X-rayed Junior Secondary III Integrated Textbooks used in Enugu State. Five approved Integrated Science textbooks were investigated. Contents of the texts considered in line with the integrated science syllabus were based on topical coverage, illustration index and chapter summary index. Quantitative approach to content evaluation of science textbooks (QACEST) developed by Nworgu (1988) was used for the analyses. Longman Integrated Science by Ndu and Olarewaji (2006) and Integrated Science, A New Approach by Bajah (1991) Book 3 were found to be good in terms of topical coverage and illustration indices. In terms of chapter summaries, Longman Integrated Science by Ndu et al (2006) and Model Integrated Science by Adaeze Ashakpa (2006) were found to be good while Nigerian Integrated Science Project (STAN 1988) Book 3 and Simplified Integrated Science by Abani (2006) and Model Integrated Science by Adaeze Ahiakpa were poor in topical coverage and illustration indices.

Introduction

Integrated Science formed the basis for the core science subjects. Over the years, there has been poor achievement in science subjects in secondary schools. Some of the causes of the poor achievement could be traced back to foundation level of primary science and Integrated Science. The foundation laid in primary and Integrated Science as unified whole forms the basis for Chemistry, Physics, and Biology. The quality of future scientists depends largely on the quality of Integrated Science (ITS) lessons they received in secondary schools and the quality of ITS textbooks depends on the topical coverage, illustration and chapter summary indices; that is how far the textbooks satisfy the contents of ITS syllabus. Textbooks are recommended to students by school authority without considering on how far the texts meet the demands of its syllabus. Recommendation of textbooks at times, depends on how much the authors could give to the authorities and sellers of such texts. To select ITS textbooks, due consideration should be given to appropriateness of the texts to the contents of the ITS syllabus and necessary indices. Eze (1990) outlined criteria for selection of books as coverage, suitability, illustration, coherence, currency and scientific approach. Nworgu (1988) also developed a qualitative approach to content evaluation of science textbooks (QACEST). In the approach index of topical coverage (ITC) illustration index (ILI) and chapter summary index (CSI) were considered. This study used this approach to validate the ITS textbooks. There are many ITS textbooks but only few of them were investigated in this study. The result of this study may lead to revision of some aspects or even the entire ITS textbooks to improve their adequacy and appropriateness to

the demands of ITS syllabus, since high quality textbooks facilitate teaching and learning processes.

Methodology

The design for the study is descriptive survey and the sample for the study were 5 Integrated Science textbooks 3 and the instruments for data collection are index of topical coverage, (ITC), illustration index (ILI) and chapter summary index (CSI). The data were collected from Junior Secondary School III Integrated Science Syllabus and he recommended ITS textbooks. The method of data analysis was quantitative approach to content evaluation of science textbooks (QACEST) developed by Nworgu (1988).

The formulae for QACEST are as follows:

$$\text{Index of Topical coverage (ITC)} = \frac{1}{2} \left(\frac{Tt}{TS} + \frac{STt}{STs} \right) \text{ where}$$

Tt = Number of topics in the prescribed syllabus covered by the text.

TS = Number of topics in the prescribed syllabus

STt = Number of sub-topics in the prescribed syllabus covered by the text while

STs = Number of sub-topics in the prescribed syllabus
Illustration Index (ILI) = $\frac{La - Lb}{La + Lb}$ where

La = Illustration with activity

Lb = Illustration without activity

$$\text{Chapter Summary Index (CSI)} = \frac{N - R}{N + R} \text{ where}$$

N = Number of statements in the summary which link the materials of the chapter with new material to facilitate more permanent learning and transfer.

= Number of statements in the summary which are more repetitions of the materials of the chapter.

Research Questions

Two research questions guided the study.

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1. To what extent do the five approved Integrated Science textbooks cover the prescribed syllabus in Integrated Science?
2. What are the levels of illustration, topical coverage and chapter summary indices covered in the ITS textbooks.

Results

Table 1: Topics, Sub-topics, Illustration, Activities and Summary in the Five ITS Textbooks.

ITS Textbook	Number of topics in the prescribed syllabus (TS)	Number of sub-topics in the prescribed syllabus covered (Tt)	Number of topics in the prescribed syllabus covered (Tt)	Number of sub-topics in the prescribed syllabus covered (STt)	Number of illustrations with activity (La)	Number of illustrations without activity (Lb)	Number of statements in the summary linked to the materials of the chapter (N)	Number of statements in the summary which are more receptive of the material of the chapters.(R)	
Nigerian Integrated Science project Textbook 3 by STAN		22	81	22	56	79	51	67	40
Integrated Science: A New Approach for Junior Secondary Schools Book 3 by T. Baja		22	81	16	58	86	32	58	36
Model Integrated Science Book 3 by Adaeze Ashiakpa		22	81	12	40	18	15	80	21
Simplified Integrated Science Pupils Textbook 3 by Abani L.		22	81	12	21	25	10	-	-
Longman Integrated Science Book 3 by Ndu and Olarewaju		22	81	17	80	102	16	101	6

This table revealed that Model Integrated Science Book 3 by Adaeze Ashiakpa and simplified Integrated Science Pupils Textbooks 3 by Abani only coerced 12 out of 22 topics prescribed in ITS syllabus. Only ITS textbook.

Table 2: Extent of Topical Coverage Illustration and Chapters Summary Indices

Integrated Science Textbook	Topical Coverage Index (ITC)	Page	Illustration Index ILI	Chapter Summary Index (CSI)	Remarks
1 Nigerian Integrated Science Project (NSP) by Science Teachers' Association (STAN)	0.4	144		0.2 0.3	ITC, ILI, and CSI are poor since 0.6,0.8 and 0.7 respectively were not covered
2 Integrated Science A New Approach by Bajah S.T.	0.5	136		0.5 0.4	Good 0.5 of ITC and ILI were covered while 0.6 of CSI was not covered
3 Longman Integrated Science by F.O. Ndu & Ndu,L.O. & Olareweju, A.O.	0.9	144		0.7 0.9	Very good in ITC and CSI only 0.1 is not covered but 0.3 of ILI remained uncovered
4. Model Integrated Science by Adaeze Ashiakpa	0.3	102		0.1 0.6	0.7, 0.1 and 0.4 of ITC, ILI and CSI respectively were uncovered.
5 Simplified Integrated Science by Abani L.		0.2	77	0.4 0	Very poor in ITC and very poor in CSI

For ITC and ILI, the maximum value is one (1) and the minimum value is zero (0) while the maximum and minimum values for CSI are one (1) and minus one (-1) respectively.

Discussion

The result of topical coverage index of Nigerian Integrated Science Project (NISP) textbook III by STAN is 0.4 considering the maximum and minimum values for ITC which are 1 and 0 respectively. The extent to which NISP textbook III by STAN cover the prescribed syllabus in ITS is poor .The level of illustration provided by the text is very poor (0.2) while the result of

chapter summary index (CSI) of the same text is 0.3. Since the maximum value for chapter summary index (CSI) is 1 and the minimum value is -1, the chapter summary provided by Nigerian Integrated Science Project Textbook III is also poor.

In the second text, Integrated Science, A New Approach for Junior Secondary School III by Bajah (1991), the ITC was found to be 0.5. The ILI was also found to be 0.5. The extent of coverage ITC and the level of illustration (ILI) are fairly good. The chapter summary of the text was found to be 0.4, meaning that the level of chapter summary of the text is somehow poor. That is 0.6 of the chapters lack chapter summary.

From Longman Integrated Science book III by Ndu and Olarewaji, the index of topical coverage (ITC), illustration index (ILI) and the chapter summary index (CSI) were found to be 0.9, 0.7 and 0.9 respectively.

Looking at the maximum values for ITC, ILI and CSI which is 1, the ITC, ILI and CSI for the Longman Integrated Science text by Ndu and Olarewaji were very good comparatively. The Integrated Science text by Ndu and Olarewaji covered almost all the topics prescribed in the Integrated Science (ITS) syllabus. The extent of illustration and chapter summary indices of the some text were also high and fairly good.

The ITC, ILI and CSI for Model Integrated Science book 3 by Adaeze Ashiakpa were found to be 0.3, 0.1 and 0.6 respectively. The extent to which model Integrated Science by Adaeze Ashiakpa covered the prescribed syllabus is poor. The level of illustration provided by the text was very poor. On the other hand, the chapter summary index of the text was good, considering the maximum value for CSI of 1 (one).

The simplified Integrated Science book III by Abani, has the following values for ITC, ILI and CSI 0.2, 0.4 and 0.0 respectively. The values for the areas of consideration were very poor. The text failed to cover the prescribed topics in the ITS Integrated Science syllabus. The extent of illustration index in the text (0.4) was also poor and the text completely lacked chapter summary index. It is like the text did not pass through the table of experts before publication and recommendation for use in our secondary schools.

Among the five ITS texts evaluated, only Longman Integrated Science by Ndu et al and Integrated Science. A New Approach by Bajah provided fairly sufficient topical coverage and illustration. Textbook with enough topic coverage makes teaching and learning easy and it is an important aspect of textbooks. Eze (1990) maintained that sufficient topical coverage is the main thing that counts on the quality of good textbooks.

ITS text by Ndu and Olaweraji (2006) also has high (0.7) illustration index which adds to the quality of the textbook. According Maduabum (1989) sufficient illustration of a text promotes learning and recall and it helps to access how good the text is.

The level of chapter summary provided by a text goes to expose the quality of the text. Ogbe (2002) have the view that good test books provide sufficient chapter summary. The ITS textbooks evaluated have poor chapter summary indices except Longman ITS textbook by Ndu and Olaweraji (2006) and Model ITS textbook by Adaeze Ashiakpa (2006). The simplified ITS text by Abani, (2006). has no chapter summary at all and so will not do much in facilitating teaching and learning of Integrated Science.

Conclusion

Good quality textbooks should have good topical coverage, good illustration and good chapter summary indices. This study exposed the fact that some of the textbook recommended for ITS are not adequately okay for teaching and learning of Integrated Science. Integrated Science A New Approach Text III by Bajah, (1991) and Longman Integrated Science by Ndu (2006) are good in terms of topical coverage and so should be recommended for teachers and students of ITS. Model ITS and simplified ITS texts by Adaeze Ashiakpa (2006) and Abani (2006) respectively, should be revised to ensure that the users get maximum knowledge and skills from the texts and they serve as good foundation for Chemistry Physics and Biology.

Recommendation

From the findings of this study, the following recommendations were made:

1. That the ITC, ILI and CSI should be validated before ITS texts are recommended for use in our secondary schools.
2. That only ITS texts with very high and complete ITC, ILI and CSI should be used in teaching ITS in our secondary schools.

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