Journal of Education and Practice
ISSN 2222-1735 (Paper) ISSN 2222-288X (Online)
Vol.5, No.30, 2014

Evaluation of Topical Coverage and Study Questions of Approved Integrated Science Textbooks in Ebonyi State Junior Secondary Schools, Nigeria

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Abstract
This study assessed the topical coverage and study questions adequacy for six approved integrated science textbooks in Ebonyi state junior secondary schools (JSS). Two research questions, namely: 1. how do the contents of integrated science textbooks in Ebonyi state junior secondary school cover the content specified in the core-curriculum? 2. How adequacy is the study questions of each of the integrated science textbooks in Ebonyi state junior secondary schools? One hypothesis which states that the contents of the integrated science textbooks in Ebonyi state JSS do not significantly deviate from the specifications of the core-curriculum guided the study. The sample comprised six integrated science textbooks, twenty one secondary schools and sixty three integrated science teachers. A 5-point quantities approach for content evaluation of science textbooks (QACEST) Formula was used to answer research question while the null hypothesis was tested using Chi-square test of goodness of fit. The data showed that the STAN series integrated science textbooks had adequate topical coverage and study questions while the LONGMAN series had no study questions at all. Based on these findings, it was concluded that the integrated science textbooks in Ebonyi state junior secondary schools have acceptable content validity and study questions. LONGMAM series integrated science textbooks cannot be considered adequate in terms of study questions.

INTRODUCTION

The essence of integrate science as stated in the National curriculum for junior secondary schools is to begin to teach the pupils what science means (FME, 2004). The integrating principles of the subject is intended to produce a course which stresses the foundational unity of science and lays adequate foundations for subsequent specialist study in science (Maduabum, 1999). When the term integration is applied to a science course, it is diversified and presented in such a way that the child gains the concept of the fundamental unity of science (Aniodo, 2001).

The educational objectives of integrated science are aimed at enabling the child to gain the commonality of approach to the problem of the scientific nature (Maduabum, 1999). For the objectives of integrated science to be achieved, the use of good textbooks is a very important single resource to the integrated science teachers. As observed in Maduabum (1999), textbooks provide the teacher with the guidance and saved the teacher time in planning. Textbooks expose the learner to common learning experiences. To the teacher, the texts are valuable assets to facilitate teaching and learning. The beginning teacher uses textbooks for support and to gain self confidence (Sheldon, 2005). Textbooks also are used to obtain information, make observations, solve problem and arouse pleasure in reading. Textbooks facilitate the students' understanding of the topic discussed through the use of study questions provided in them. Textbooks, especially science ones also provide a procedure for teaching the topic. Therefore, no meaningful teaching and learning can be easily achieved in the absence of good textbooks (Ali, 1998).

For integrated science textbooks to play their role effectively, the content should be satisfactory, especially the topical coverage and study questions (Okafor, 2004). Mama (1998) opined that good textbooks with adequate topical coverage were inevitable for self assessment of learning in the absence of the teacher and good topic coverage and study questions were the best criteria for content analysis.

If textbooks from where these concepts are to be learnt are faculty and lacking in any way, they will affect the measuring as well as the conceptual knowledge of the students. It is therefore important that the contents of science textbooks, especially the approved integrated science textbooks should satisfy the requirement of curriculum if the objective of creating a scientifically and technologically literate policy is to be achieved.

Ali (1998) stated that concepts in science do change from time to time rendering an older edition of a book obsolete, therefore integrated science textbooks have to be continuously evaluated in order to examine their topical coverage and study questions so as to give the right types of education as well as meet the dynamic changes in the field of science and technology.

The problem

For long now, there had been poor performance of students in Junior secondary School Examination (JSSE) in integrated science in Ebonyi state. There are also research evidence supporting such poor performances (Salami, 1998; Omebe, 2005). The poor performance had been attribute to many factors ranging from the attitude of

student towards the subject, lack of motivation, poor method of teaching, poor basic science background in primary schools to lack of teaching materials. These problems have been the center of discussion in conferences, workshops and seminars. Experts are recruited to teach integrated science and other subjects, using various methods but the results are far from desirable.

It is being speculated that the quality of integrated science textbooks that the children use are recommended without subjecting them to proper evaluation. There is the likelihood that textbooks in use in schools may lack basic qualities with negative consequences for the learner. Therefore the objective of my research was to evaluate the topical coverage and study questions of approved integrated science textbooks in Ebonyi state junior secondary schools. I specifically determined the topics of the integrated science textbooks in the core-curriculum and examined the adequacy of the study questions. I hypothesized that **t**he topical coverage of the integrated science textbooks in Ebonyi state junior secondary school did not significantly deviate from the specifications of the core-curriculum.

METHODOLOGY

The evaluation research design was used for the study; this design makes value judgment on programme or projects based on certain pre-determined criteria (Ali, 2006). STAN series and LONGMAN series were evaluated. The evaluation was done on six approved integrated science textbooks, 63 teachers and twenty one secondary schools. A 5-point quantities approach to content evaluation of science textbooks (QACEST) developed by Nworgu (1988) was used for data collection. It adopts a set of five criteria which include topic coverage, learning activities, study questions, illustration and chapter summary. Since QACEST is a modification of a validated evaluation model, I did not consider it necessary to subject the model to any other validation procedure.

Research questions were answered using QACEST Formula and the hypothesis was tested at 0.05 level of significant using chi-square test of goodness-of-fit.

RESULTS AND DISCUSSION

Data on Table 1 show the index of topical coverage (ITC) mean scores for the 6 approved integrated science textbooks evaluated. For STAN series, the ITC mean scores for JS1, JSII, JSIII, were .75, .71 and .66 respectively. For LONGMAN series, the means scores were .70, .73 and .78 respectively.

Table 1: **Index of Topical Coverage**

Textbooks		Tt	St	Tt	Ss	Index
STAN	1	91	100	121	130	0.75
	2	88	97	123	130	0.71
	3	51	60	77	86	0.66
Longman	1	85	94	121	130	0.70
	2	91	99	123	131	0.73
	3	60	69	77	86	0.78

The average study question index (SQI) scores for the 6 approved integrated science textbooks in Ebonyi state junior secondary schools are shown in Table 2. For STAN series, the study question index was 0.67 for JS1, 0.62 for JSII and 0.86 for JSIII. The LONGMAN series did not have any study questions at all for JS1, JSSII, JSIII integrated science text books.

Table 2: **Study Question Index**

Textbooks		**N**	**R**	**Index**
STAN	1	60	12	0.67
	2	84	20	0.62
	3	64	5	.086
Longman	1	None	None	None
	2	None	None	None
	3	None	None	None

As shown in Table 3, the calculated Chi-square value for the significance of deviation of textbook content from specifications of core-curriculum (STAN series) was 14. 67 while the critical value ($p < 0.05$) was 18.31. Thus, I did not reject the null hypothesis but concluded that the content of the STAN integrated science textbooks did not significantly deviate from the specifications of the core-curriculum. Similar Chi-square trend and conclusions were drawn for the Longman series.

Table 3: **Chi-square Table of the Significance of Deviation of Textbook Content from Specifications of Core-curriculum (STAN Series)**

Content	JSI	JSII	JSIII	χ^2 cal.	Alpha	χ^2 crit.	Dec.
You as a living thing	(9)	(14)	(11)				
	13	19	14				
You and your home	(13)	(18)	(9)				
	18	24	11				
Living comp. of the environment	(17)	(5)	(10)				
	3	7	4				
Non-living comp. of the environ	(19)	(21)	(30)	14.67	0.05	18.31	Accept
	21	24	33				
Saving your energy	(18)	(4)	(4)				
	21	6	5				
Controlling the environment	(21)	(9)	(4)				
	23	10	6				

Table 4: **Chi-square Table on Significance of Deviation of Textbook Content from the Specifications of the Core-curriculum (LONGMAN Series)**

Content	JSI	JSII	JSIII	χ^2 cal.	Alpha	χ^2 crit.	Dec.
You as a living thing	(9)	(14)	(11)				
	13	19	14				
You and your home	(13)	(18)	(9)				
	18	24	11				
Living comp. of the environment	(17)	(5)	(10)				
	23	7	4				
Non-living comp. of the environ	(19)	(21)	(30)	12.8	0.05	18.31	Accept
	21	24	33				
Saving your energy	(18)	(4)	(4)				
	21	6	5				
Controlling the environment	(21)	(9)	(4)				
	23	10	6				

Results showed that in STAN series, the ITC mean scores for JSS III was the lowest among other classes including those of the LONGMAN series. Thus the STAN series for JSS III had the lowest score as against some other earlier reports. For example, Nweze (2003) found that none of the textbooks he evaluated had total topic coverage of the target syllabuses because of non-revision of the textbooks.

From the results on study questions of each of the integrated science textbooks evaluated, the STAN series for JSS I to JSSIII had study question index mean scores. On the other hand the LONGMAN series had no study question index mean score for all the classes studied. It should be recalled that Eze (1993) seem to have agreed with the above finding. In his study, he found out that topical coverage and study questions were lacking in the different textbooks studied. He recommended revision of text to include those areas.

CONCLUSIONS

Based on the findings of this study, the following conclusions were made:

1. The topical coverage of the six integrated science textbooks in Ebonyi State junior secondary schools closely reflect the contents specified in the core-curriculum. Thus, the integrated science books in Ebonyi state have acceptable content validity.
2. STAN integrated science textbooks I, II and III had study question index scores while LONGMAN series had none. Therefore LONGMN series integrated science textbooks cannot be considered adequate in terms of study questions.

Recommendations

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

1. Integrated science textbooks used for teaching students need to be periodically revised with the view to making them readable and valuable in terms of content. Integrated science textbooks whose

content validity is impeccably known to be high should be recommended for teaching and learning in schools.

2. Authors and publishers of integrated science textbooks should consult integrated science core-curriculum in order to draw topics, performance objectives, content and activities form the said curriculum.
3. STAN and LONGMAN should liaise with the state government to periodically mount conferences, seminars and workshops for integrated science teachers, authors and publishers on how to write high quality and standard textbooks.

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