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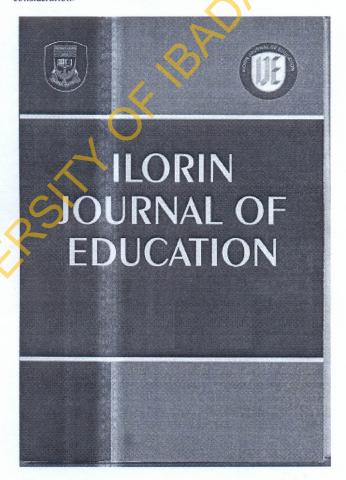CURRENT   ARCHIVES   UNILORIN JOURNALS

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ANALYSIS OF NATIONAL EXAMINATIONS COUNCIL JUNIOR SCHOOL CERTIFICATE EXAMINATION QUESTIONS IN TWO CORE SUBJECTS

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Abstract

The study is an analysis of content coverage of Junior School Certificate Examination Syllabi by National Examinations Council Papers in Two core Subject. The extent to which items on the test represent Bloom's Taxonomy of Educational Objectives (cognitive domain) was also analysed. The ex-post-facto research design was adopted in the study. Examination syllabi for Social Studies and Integrated Science and question papers for a three year period were collected and analysed using descriptive statistics. Findings indicated that NECO JSCE Integrated Science and Social Studies questions cover between 50% and 60% of the examination syllabI. Most of the areas not adequately covered were very relevant to everyday life. Generally, Social Studies multiple choice items were easy but in 2001 and 2003 the essay items were difficult as 33% and 40% were at the application level respectively. Integrated Science multiple choice questions and essay questions for 2004 were difficult as they covered 30% and 46% application level respectively. In view of the findings, it was suggested that to meet the standard of NECO questions, the subject teachers should develop in students the skills and strategies for answering higher order questions to keep pace with the changing patterns of questions presentation.

Key words: National Examinations Council, Junior Secondary School Certificate Examination, Standard, Bloom's Taxonomy of Educational Objectives, Cognitive domain.

Introduction

Examinations, whether written or oral, have been identified by educational institutions, examination bodies and other establishments providing training, as the best means of determining the competence of a person after having been exposed to a set of training experiences. According to Obemeata (1999 & 2000), test items used for this purpose, usually take time to organise because they should possess acceptable level of validity and reliability as well as permit a high degree of usability. In addition, the items must be developed by experts in the field from the syllabus, supposed to have been covered for a stated period of time by s students. But, do all these efforts and precautionary measures make these items faultless or perfect? In an earlier development, Soriyan (1979) maintained that developing and reviewing examination syllabus involves enormous thinking and energy. To ensure that the syllabus produced is appropriate, he suggested that a group of people consisting of education experts members of the National Working Team, the International Panel and Examination Committee should work together until a final copy of the syllabus is produced.

Against what is standard compared? Since standard is maintaining a certain level of acceptability of the quality of a thing using some criteria (Okwilagwe, 2009), examination bodies like Joint Admissions and Matriculation Board (JAMB) and West African Examinations Council (WAEC) may have so much in common with NECO in terms of item development even though the purposes are different. WAEC and NECO develop items that are used for certification and as such, for comparison of their standards Certainly, there are criteria from WAEC that can be used as yardstick for the analysis. In April 1966 for instance, the Certificate Awarding Committee of WAEC, requested that the Test Development and Research Office (TEDRO) carry out a study on the standard of WASC papers over a period of at least five years (1960-65). This exercise was basically to analyse the WAEC questions during the stated period. Making reference to the above Commission, Soriyan (1968) presenting his findings under two headings: ëStandard of the Examination Papers as Determined by the Standard of Studentsí Performanceí, and ëStandard of the Examination Papers as Determined by Bloomís Taxonomy of Educational Objectives in the Cognitive Domaní, made the following recommendations to the Council. (i) That, commissioned subject specialists should look into the intellectual abilities involved in their subjects and make sure that all the requirements and skills are covered by their questions; and (ii) they should also decide on the proportions of the abilities that are to be represented.

He further suggested that the procedure should involve the preparation of individual subjectís table of specification by the commissioned item writers, editing of the set questions by subject officers, allowing the moderating committee of subject experts to moderate them and establish statistical characteristics of difficulty and discriminating powers, especially for multiple choice items. These processes, no doubt, are the basics when developing standard questions that are used in any external examination. It is, therefore, expected that every examination body should engage in these processes before any examination is taken by candidates. He, however, expressed reservation over the age-long practice of candidates having to make a choice of questions in essay tests. His fears were hinged on maintaining test fairness. He contended that it is difficult, if not impossible, to compare candidatesí performance in one question with that of another and went further to say that two questions which seem equal in strength may not after all be, since one may be measuring a higher cognitive ability than the other. Soriyan (1968), provided a solution to this challenge by explaining that studentís scores on two different objective questions can only be equated if their means are not significantly different, otherwise, there was no basis for making such comparison. This contribution provided an avenue for the improvement of the standard of WAEC question papers.

Another issue which needs to be focused on in the NECO JSCE questions being analysed is the educational goals highlighted by the National Policy on Education (FGN, 2004) as it concerns the Junior Secondary School. The Universal Basic Education (UBE) programme which was launched in 1999 by the government of the Federal Republic of Nigeria amed to eradicate illiteracy, ignorance and poverty as well as stimulate and accelerate national development, political consciousness and national integration. The scope of UBE as contained in its manual is three-fold and covers provision of programmes and initiatives for early childhood education and development; six-year primary education; and three-year junior secondary education. The UBE bill was signed into law on the 26th of Act makes primary and junior secondary education free and compulsory for all children within the target population and also guarantees regular Federal Government funding of the programme in federal government schools. The Act also provides for the establishment of the Universal Basic Education Commission (UBEC) to co-ordinate the implementation of the programme at the national level. Though, the junior secondary school section in all federal government schools was abolished by the then Minister of Education Dr Chinwe Obaji in 2004 and resuscitated in 2009, the junior secondary school which is the main area of focus of this study still has its objectives intact. It is both prevocational and academic in nature. In specific terms, the objectives to JSS are encapsulated as:

(i)   inspiring the students with a desire for self-improvement and achievement of excellence;

(ii) raising a generation of people who can think for themselves, respect the views and feelings of others, respect dignity of labour, appreciate those values specified under our broad national goals and live as good citizens; and

(iii) providing technical knowledge and vocational skills necessary for agricultural, industrial, commercial and economic development.

The subjects taught at JSS are such that will enable the students to acquire further knowledge and skills (FGN, 2004). In addition, the students who complete JSS are to be streamed into; (i) the senior secondary school; (ii) the technical college; (iii) in out-of-schools vocational training centres; and (iv) apprenticeship scheme. An important aspect of this streaming the Policy further stated is that eit will be based on the results of a final test or examination to determine the academic ability, aptitude and vocational interest of the students to ensure appropriate placement.

In view of this, the questions for the final examinations, therefore, must be valid and reliable to achieve the above set purpose. According to Obemeata (2000) and Anastasi & Urbina (1997), the validity of a test is the degree to which the test actually measures what it purports to measure, while reliability is the precision or the consistency with which a test instrument measures a sample of behaviours (Ayodele, Adegbile & Adewale, 2003). Validity is the most important pre-condition when developing test items. As such, the validity of a test score according to American Education Research Association as cited by Cizek (2007) is the degree to which accumulated evidence and theory support specific interpretations of test scores entailed by proposed uses of a test. In view of this, the test should sample wide content area as well as have good and reasonable difficulty and discriminating indices. Also, the content (examination syllabus) should guide students in clear terms as to what is expected of them. To determine the academic ability of students, the six categories of the Bloom's taxonomy of educational objectives in the cognitive domain is often used as a guide. In his study, Soriyan (1968) discovered that there is a parallel relationship between the standard of WAEC examination questions and Bloom's Taxonomy of Educational Objectives. This direct link should also reflect in the question papers used in NECO examinations, especially as it is a relatively new examination body. Since NECO was established with an indigenous outlook both in character and operation, the expectations of the stakeholders in

education is that the standard of its certificate should be better than those of other examination bodies. More so, that the Council is supposed to be operating within local context and is accessible to adequate information on the educational needs of the nation. The validity of NECO certificates definitely can be determined by ascertaining the quality of the item characteristics of its examination papers, especially in the core subjects, two of which are the focus of this study.

National Examinations Council (NECO), as a relatively young examination body, has been conducting Junior Secondary School Certificate Examination for federal government colleges, a few States of the federation and some allied institutions since the mid -1900s (FGN, 2004). The expectation of the standard of NECO questions is that it should be high, as this is crucial to the quality of the certificate it awards. It therefore became imperative that a study be carried out to critically analyse the content coverage of the questions that led to the award of the JSC specifically, with a view to finding out their strengths and weaknesses and make recommendations that will further improve the standard of the whole process of examining and certificate award by NECO.

Statement of the Problem

In one of the several efforts to prove its worth and to achieve the mandate given to it, NECO instituted a question and answer forum, where the public was allowed to send in questions and contributions concerning its activities. The outcome of the meeting was that NECO is an untested examination body which needs to standardise its certificates. In order to ascertain, therefore, the worth of its certificates, this study was designed to analyse NECO JSCE item in Social Studies and Integrated Science.

Research Questions

The following questions guided the study:

1. To what extent do NECO JSCE questions between 2001-2004 represent the Social Studies and Integrated Science syllabi?

2. At what levels of Bloom's Taxonomy of Educational Objectives were questions used in 2001-2004 Social Studies and Integrated Science operating?

Methodology

The ex-post-facto design was adopted in this study. It involved mostly documentary analysis of JSCE questions in the two core subjects (Integrated Science and Social studies) for the three year period, the national JSCE syllabuses and the schemes of work for JSCE for the two core subjects under analysis.

There was no formal construction of research instruments rather the 2001, 2003 and 2004 NECO JSCE question papers in the two core subjects were obtained and tables of specifications were produced from the contents covered by items on each subject. These were used to determine the content coverage of NECO items. Documentary analysis of data was performed on the examination syllabus, question papers, table of specification, were studied and the pieces of factual information to answer research question one. The cognitive level of each of the items was also classfied to the appropriate thinking level of the first three cognitive domains of Bloomës Taxonomy of Educational Objectives meant for this level of education and age of the learners: these are knowledge, comprehension and application levels. Analysis of each of the test items under these categories provided answer to research question two.

Results

Tables 1a – 1d present the distribution pattern of the content coverage of the examination syllabi by NECO questions in the two core subjects from 2001 - 2004.

S/N	(a) Topics with the highest number of items	Year and Percentage of Questions		
		2001	2003	2004
1	Common Heritage and National Symbol.	27(34%)	24(30%)	14(18%)
2	Educational Institutions.	24(30%)	20(25%)	30(38%)
3	Nigerian cultural patterns and their historical origin.	9(12%)	15(21%)	19(24%)
4	National Economic life	5(6%)	11(14%)	7(9%)
5	Social environment and civic responsibilities.	5(6%)	3(4%)	3(4%)
	(b) Topics with few items	**2001**	**2003**	**2004**
6	Legal and Political institutions	3(4%)	3(4%)	2(3%)
7	Socialization, its agencies and processes.	3(4%)	1(2%)	3(4%)
8	Science and Technology	2(3%)	2(3%)	1(1%)
9	World Transport and Communication.	2(3%)	1(2%)	1(1%)
	(c) Topics with no item	**2001**	**2003**	**2004**
10	Physical features and natural resources.	0%	0%	0%
11	Co-operation and conflict	0%	0%	0%
12	Some sub-topics under: Institutions, Nigerian cultural patterns and their historical origins, Technology, Origin of man, National economic life, The world and its people, and World Transport and Communication.	0%	0%	0%
	Total	80(100%)	80(100%)	80(100%)

Results in Tables 1a-b show that the first five highly ranked topics in item representation in Social Studies are ëEducational institutionsí (24-38%) and ëCommon Heritage and National Symbolsí (18-34%). These were followed closely by ëNigerian cultural patterns and their historical originsí (12-24%), ëNational Economic Lifeí (6-14%) and `Social environmentí (4-6%).

The next group had one or two items set in the period are ëLegal institutioní (3-4%), Socialization, (2-4%); Science and Technology (1-3%) and World transport and communication (1-3%). At the other extreme, Table 1a also showed those topics which had no single item throughout the three-year period. They are ëPhysical features and Natural resourcesí, ëCo-operation and Conflictí, ëOrigin of maní, ëNational Economic Life.íëThe world and its people and ìWorld Transport and Communicationí.

Table 1b: Contents Representation of Social Studies Essay Items from the Syllabus (2001-2004)

S/N	(a) Topics with the highest number of essay items	Year and Percentage of Questions		
		2001	**2003**	**2004**
1	Physical features and natural resources.	4(31%)	5(36%)	4(31%)
2	National Economic life in Nigeria.	3(23%)	2(14%)	3(23%)
3	Social Environment	2(15%)	2(13%)	2(15%)
4	Nigeria cultural patterns and their Historical origins.	1.5(12%)	1.5(11%)	1(7%)
5	Educational Institutions.	1(7%)	1.5(10.5%)	1.5(12%)
	(b) Topics that are least represented			
6	Socialization: Its agencies and processes.	0.5(4%)	1(7%)	0.5(4%)
7	Civic rights and responsibilities.	0.5(4%)	0.5(4%)	0.5(4%)
8	World Transport and Communication.	0.5(4%)	0.5(4%)	0.5(4%)
	Total	**13(100%)**	**14(100%)**	**13(100%)**

Table 1b shows that out of the twenty topics in the Social Studies examination syllabus, only five major topics had the highest number of essay items representation as follows ëPhysical features and Natural Resourcesí(31-36%),

ëNational Economic Life in Nigeriaí (14-23%), ëSocial environmentí (14-15%), ëInstitutionsí (7-12%), and ëCommon Heritage and National Symbolsí(7-12%). Also shown in Table 1b are topics that had very low representation; ëSocializationí (4-7%), ëCivic rights and responsibilitiesí (4%) and World transport and communication (4%).

Table 1c: Contents Representation of NECO JSCE Integrated Science Multiple Choice Items (2001-2004)

S/N	(a) Topic high number of items	Year and Percentage of Questions		
		2001	2003	2004
1	You as a living thing.	29(36%)	16(20%)	34(43%)
2	Saving your energy.	18(23%)	26(32%)	11(14%)
3	Non- living components of the environment.	13(16%)	17(21%)	9(11%)
4	Living components of the environment.	9(11%)	11(14%)	16(20%)
	(b) Topic with low number of items			
5	You and your home.	6(8%)	7(9%)	6(7%)
6	Controlling the environment.	5(6%)	3(4%)	4(5%)
	Total	80(100%)	80(100%)	80(100%)

Table 1c shows some main and sub-topics that were popular to item writers in Integrated Science. Across the three year period, the result reveals that under main topic ëYou as a living thingí, ëdigestioní has the highest item representation, followed in descending order by ëexcretioní, ëanimal nutritioní, ëmovementí, ërespirationí, ëgrowth and developmentí, and ëcharacteristics of living thingsí(20-43%). Similarly, under ësaving your energyí, ëenergyíhad the highest question representation followed by ëforcesí, ëman in spaceí, machine and kinetic theoryí in that order (14-32%). The topic ëNon-living components of the environmentí had (11-21%) questions over the same period while only the sub-topic i.e. ëEcologyí under ëLiving components of the environmentí; had adequate item representation throughout the three years (11-20%). The sub-topics under ëyou and your homeí, ëUses of energy in the homeí and ëAppliancesí had no items throughout the three years. Others are ëControlling the environmentí, ëAir pollutioní, ëWater borne diseaseí and ëour disappearing forestsí.

Table 1d: Items Representation for Integrated Science Theory (Essay)

S/N	Topics with sub-questions representation	Year and Percentage of Questions		
		2001	2003	2004
1	Non-living components of the environment.	5(41.6%)	6(46%)	4(36%)
2	Saving your energy.	3(25%)	2(15%)	2(18%)
3.	Formulae and simple equations.	2(16.6%)	2(15%)	3(28%)
4.	Reaction of water on metals.	2(16.6%)	3(24%)	2(18%)
	Total	**12(100%)**	**13(100%)**	**11(100%)**

Table 1d shows that item specification for Integrated Science essay, ëNon-living components of the environmentí had between (36-46%) and ësaving your energyí (15-25%), with the sub-topics ëformulae and simple equationí (15-28%s), ëReaction of water on metalsí (16-24) were the only topics over the three years.

The rest were either very poorly represented or not covered at all. The aspect of the study that sought for the cognitive levels of coverage of NECO items in the two core subjects as determined by Bloomís Taxonomy of Educational Objectives, are presented in Tables 2a-d.

Table 2a: Distribution of Social Studies Multiple Choice Items According to Bloomís Taxonomy

	Questions Representation					
	2001		2003		2004	
Cognitive level	Number	% age	Number	% age	Number	% age
Knowledge	35	44%	31	39%	22	27%
Comprehension	28	35%	36	45%	35	44%
Application	17	21%	13	16%	23	29%
Total	**80**	**100%**	**80**	**100%**	**80**	**100%**

Table 2a shows that in 2001, the largest number of items 35(44%) were at the knowledge level but in 2003, comprehension had the highest number of items with 26(45%). The lowest number of items were recorded in 2001 and 2003 at Application level while in 2004. knowledge level recorded the lowest number.

Table 2b: Distribution of Social Studies Essay items according to Bloom's Taxonomy

	Questions Representation					
	2001		2003		2004	
Cognitive level	**Number**	**%age**	**Number**	**%age**	**Number**	**%age**
Knowledge	3	25%	2	20%	8	62%
Comprehension	5	42%	4	40%	3	23%
Application	4	33%	4	40%	2	15%
Total	**12**	**100%**	**10**	**100%**	**13**	**100%**

Table 2b showed that Social Studies essay items in 2001 3(25%) were at Knowledge level 5(42%), at Comprehension level 4(33%) and at application level. In 2003, sub-questions set at Knowledge level were 2(20%), Comprehension level 4(40%) and Application 4(40%). In 2004 however, Knowledge level had 8(62%), Comprehension 3(23%) and Application level 2(15%).

Table 2c: Distribution of Integrated Science Multiple Choice Questions According to Bloom's Taxonomy

	Questions Representation					
	2001		2003		2004	
Cognitive level	**Number**	**%age**	**Number**	**%age**	**Number**	**%age**
Knowledge	30	38%	18	23%	33	41%
Comprehension	28	35%	37	46%	23	29%
Application	22	28%	25	31%	24	30%
Total	**80**	**100%**	**80**	**100%**	**80**	**100%**

Table 2c shows the summary of results of the item specification for Integrated Science multiple choice items based on Bloom's Taxonomy of Educational Objectives between 2001 and 2004. In 2001, more questions 30(38%), were set at Knowledge level than at Comprehension and Application levels, 28(35%) and 22(28%) respectively. In 2003, the number of questions set at knowledge level was 18(23%), comprehension level 37(46%) and Application level 25(31%). In 2004, as high as 33(41%) items were at Knowledge level; but at Comprehension and Application levels, 23(29%) and 24(30%) respectively.

Table 2d: Distribution of Integrated Science Essay Questions according to Bloom's Taxonomy

	Questions Representation					
	2001		**2003**		**2004**	
Cognitive level	**Number**	**%age**	**Number**	**%age**	**Number**	**%age**
Knowledge	5	30%	11	58%	4	36%
Comprehension	6	35%	5	26%	2	18%
Application	6	35%	3	16%	5	46%
Total	**17**	**100%**	**19**	**100%**	**11**	**100%**

Table 2d shows that 2001 Integrated Science theory items 5(30%) were set at the Knowledge level, 6(35%) items were at the Comprehension and Application levels respectively. In 2003, the numbers of sub-questions set at Knowledge level were 11(58%), those at Comprehension and Application levels were 5(26%) and 3(16%) respectively. Finally in 2004, 4(36%) items were at Knowledge level, 2(18%) at Comprehension level and 5(46%) at Application level.

Discussion

Findings indicated that there were some content areas with great relevance to everyday life, where items were not set or the very low. With regards to Social Studies multiple choice questions though, not exhaustive, these are: ëInfluence of physical features on settlement patterns in the locality, local government area and stateí, ëInfluence of natural resources on man in the locality, local government, state government and at national levelsí, ëHow natural resources are utilised by man for various purposeí, ëVegetation and human occupationí, ëTypes of wind, cyclones and monsoon etcí, ëDisadvantages of conflict at all levelsí and ëMoral and social responsibility of members of the communityí. Others are: ëDefinition, purpose and Forms of marriageí, ëEconomic institutionsí, ëIdentification of major ethnic groups in Nigeriaí, ëMigrationí, ëCommon social and economic experiencesí, ëBasic features of political organisationí, ëThe making of modern Nigeriaí, ëScience and technology in Nigeriaí, ëConcept of transfer of technologyí and so on and so forth. In the theory section, twelve out of the twenty topics in Social Studies syllabus were covered. is 60% content coverage which is above average for this section of

the paper. The specific areas of Integrated Science NECO syllabus that are affected are topics or sub-topics under ëYou as a living thingí, ëSense organsí, ëReproductioní, ëHealthí, ëYou and your homeí, ëControlling the environmentí, ëWildlife conservationí and all its subtopics. Others include: ëMeasurementí, ëEnergyí, ëKinetic Theory of matterí, ëTools for acids and basesí and ëScience related occupations and their descriptionsí and ëmachinesí. From observations, these topics are either in Agricultural Science, Chemistry or Physics.

One pertinent question that could be asked is, were these important contents overlooked by examiners over the three year period because they have no adequate understanding of them? This contention is premised on the findings of Falaye and Okwilagwe (2006) that Social Studies school teachers tend to skip the teaching of content they do not understand. Experts wonder if for three years items were not sampled from these topics, how the knowledge received could be assessed? In addition, if assessment of students is a process by which the outcome of learning is determined as expressed by Adegoke (2000), there should be some items from these topics too. The importance of every one of these topics cannot be over-emphasised because they are part of the holistic curriculum presented for Social Studies education at this level (Apara, 2000; Federal Ministry of Education, 2008).

Also, some researchers have blamed limited content coverage by items in soial studis on curriculum overload (Julius, 2002; Obanya, 2002). If the topics in Integrated Science particularly are merely for more knowledge acquisition rather than a planned programme of action that learners are to be exposed to and attain proficiency, it will be better to have them re-assigned to their respective subject areas so that studentsí comprehension of them can be tested. With regard to the science related topics that were not covered in Integrated Science, the experience is that they are not always properly taught by some Integrated Science teachers, especially if their knowledge of Mathematics is shallow. This goes to confirm the apprehension expressed by True as quoted by Ojo (1992) that it seems evident that Mathematics performance could be predictive of performance in Chemistry as well as Physics; because, as he explained a studentís lack of knowledge of Physics concepts has about the same influence on problem-solving ability as does

lack of Mathematics skill. Findings also seem to corroborate those of Falaye and Okwilagwe (2008) as earlier mentioned that teachers engage in selective teaching of topics. From all indications, if questions are not sampled to cover these topics, how then can studentsí knowledge in these areas be assessed? Or effective teaching of these be ascertained? By implication, it would seem in part that the students are poorly being prepared for the continuity of higher education and/or for effective life in the society if they do drop out of school as a result of teaching ineffectiveness.

Other implications of not assessing contents generally are, teachers will tend to handle such topics with levity. In some cases, the topics may not be taught at all or are unofficially removed from the syllabus by the teachers, especially as it seems that there is ësyllabus over loadí in these subjects, thereby, denying the students the knowledge they are supposed to acquire. This is easy to do because most item writers are teachers of these subjects and it is natural to skip unpopular topics which have not been taught while developing items to be validated and/or calibrated. This trend should be promptly checked and discouraged. The junior secondary school programme is supposed to prepare students for placement and specialisation in the senior secondary school; as such topics not taught at the junior school level will be difficult for students to understand when in senior classes. This situation is enough to limit the studentsí interest in a subject and possibly limit chances of choice of career and admission in high institutions if relevant subject contents are not properly treated due to the challenge identified. Furthermore, education is a holistic programme meant to achieve holistic development of the learner. When some topics are not taught, the vacuum created may never be filled by that learner for life.

Finally, a syllabusí is designed in such a way that there are inter and intra-subject linkages by topics for easy delivery and better understanding. When a topic linking one subject to another is not covered by a teacher, this can result in shallow understanding and lack of knowledge connectivity on the part of the learner. Perhaps, this may have been responsible for why some subjects in the Sciences, Technology and Mathematics (STM) are dreaded by many students because they have not been made to see the relevance of these subjects in their everyday life or their relatedness to other subjects. The abstract presentation of subject contents

and low Appreciation of instructional contents by the students could lead to a vicious cycle of low studentsí achievement.

As touching the issues of standard it is imperative to reiterate that Bloomís objectives in the cognitive domain consists of six levels arranged in hierarchical order of their complexities (Bloom *et al,* 1971; Adewuyi & Oluokun, 2001). The JSCE questions are usually set to cover only the first three which are knowledge (the lowest), comprehension and application (the highest). This implies that the more the percentage of questions set at higher cognitive levels, the higher the intellectual ability the questions measured, as well as the standard of that paper. With respect to the extent to which NECO Social Studies examination papers cover Bloomís taxonomy of educational objectives in the cognitive domain, findings are that the 2004 multiple choice questions measured mostly comprehension and application questions 45% and 29% respectively; making them more difficult than those of 2001 and 2003. The essay questions for the same year sampled a very high percentage 62% of the questions at the knowledge level. However, 2001 and 2003 essay questions were slightly more difficult because they sampled 42% and 40% comprehension; and 33% and 40% application level questions respectively. NECO Chief Examinerís report given at the end of 2004 theory marking exercise confirmed this.

Concerning the extent to which the standard of NECO Integrated Science examination questions cover Bloomís taxonomy of educational objectives findings indicated that the multiple choice items in 2003 were sampled to measure 46% Comprehension and 31% Application cognitive levels, while those of 2001 and 2004 measured 38% and 41% Knowledge and 35% and 29% Comprehension levels respectively. This means that 2003 had items at than those of 2001 and 2004. However, findings indicated that in the essay test 58% of the items sampled at Knowledge and 16% Application levels in 2003, and 35% were sampled Application level in 2001, while the items in 2004 measured 40% Application level. A careful observation of the pattern of the items used, indicated that an attempt was made to balance up the strength or weakness of the multiple choice section of the papers by the kind of questions set in the essay test for each year.

To ensure that there was a spread across Bloom's behavioural objectives, the difficulty levels of the multiple choice items and essay items in each subject, were organised by NECO to complement each other. This means that, in any one year, when the set multiple choice items were at the lowest levels (knowledge and comprehension), more of the essay items were set at application level and vice-versa. This was the case in 2001, 2003 and 2004. This would seem to be in accordance with the principles of good test construction. As a result, the standard of NECO questions in the two subjects are of good quality and they adequately cover the relevant cognitive domain of Bloom's Taxonomy of Educational Objectives. The implication of this for teaching and learning is that teachers should select and adopt teaching methods that will expose and prepare the learners to comfortably answer questions the three cognitive levels. Teachers should also inculcate a result-oriented study habit in students that would ensure that they achieve better performance in JSC examinations.

Conclusion

The study has indicated a relatively modest 50% - 60% content coverage of NECO Junior Secondary Certificate Examination questions in the two subjects analysed within the three years studied. Of note is that the distribution pattern of multiple choice items in the two subjects, based on the cognitive domain of Bloom's Taxonomy over the three-year-period, were not consistent across the years,

This scenario places enormous responsibilities on school principals, teachers and students to work hard at the task of teaching and learning so as to improve on their current status for an enhanced academic achievement. Syllabusi of these two subjects seem to be over loaded making it almost impossible to adequately cover them by final exmination questions. Unconsciously, teaching and learning have become examination driven rather than learning for the knowledge economy. This places a high responsibility on stakeholders; students, teachers, school administrators, curriculum planners and officials of eamination bodies for a self review or assessment of their activities for better performance. The areas of deficiency observed in this study, specifically, topics not examined that have direct

relationship with the learnersí everyday life should be revisited as psychologists believe that learning is better internalised when linked to experience.

Recommendations

Based on the findings of the study, it is recommended that teacher-made-tests should be constructed to expose students to different types of essay questions as well as skills and strategies for answering them. This will make both teachers and learners to keep pace with the changing patterns of item presentation and scoring. Item developers should improve on the current pattern of items construction to achieve a spread to accommodate all the relevant topics and sub-topics that have been consistently left out by omission or design. Items should sample from all the topics and sub-topics in the syllabus once or twice every three years depending on the learning time devoted to it. Also, NECO subject officers should note the observed areas of deficiencies in the construction and compilation of questions in the two subjects and seek ways of remedying them. There is need for NECO and indeed all examination bodies in Nigeria, to absolutely determine the contents of examination syllabus in terms of the knowledge and skills to be assessed in the national examination. Also, to clearly define what students need to do in order to meet or exceed the standards of the curriculum goals of each subject and the national education goals. Finally, curriculum planners should review the JSC syllabus and the recommended details to be covered to avoid syllabus overload since junior secondary school is only an introductory stage of secondary education.

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