UNIVERSAL BASIC EDUCATION SCIENCE CURRICULUM CONTENT IMPLEMENTATION: IMPLICATIONS FOR TEACHER EDUCATION AT THE PRIMARY LEVEL

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Abstract

Perceived difficulty levels of primary school teachers in the implementation of UBE programme science curriculum content to enhance scientific literacy was investigated in Obio/Akpor, Emohua and Port Harcourt Local Government Areas of Rivers State. The initial 300 samples, which reduced to 120 due to instrument mortality were drawn by simple random technique from 15 schools and consisted of teachers with above two years experience. The instrument for data collection was Teacher Perception of Primary Science Curriculum Content Implementation Difficulty Level (TPPSCCIDL) designed by the researcher to elicit perceived difficulty levels of curriculum content by teachers and reason categories for the difficulty level. Two research questions guided the conduct of the study while data generated were analyzed with mean and percentages. The result showed that teachers generally perceived concepts in the physical sciences difficult to implement than those in other science areas. The reason categories provided for difficult and sample concepts revealed crises situation in classroom implementation, which may prevent actualization of scientific literacy by Universal Basic education. The implication is that teachers education be refocused towards enhancing understanding and internalization of concepts in the curriculum for effective implementation of Universal Basic Education.

Introduction

Universal Basic Education (UBE) was launched in Nigeria in 1999 to actualize a number of global efforts directed at providing education for all by the year 2002. Some of these global efforts according to Ijiga (2005), are:

1. New Delhi 1990 Declaration on Education of E - 90 countries
2. Ougadongou 1992 Declaration on Education of Women and Girls
3. Amman 1996 Affirmation on the pursuit of goals of jomtien
4. O.A.U. Decade of Education in Africa 1997-2006 etc
5. Durban 1998 statement of commitment on Collaboration for Inter-African Development on Education.

The major focus of all these global trend in education were aimed at eradicating illiteracy in all it ramification in the citizenry. Hence the emergency of Universal Basic Education programme in Nigerian school system should mark the end of illiteracy and usher in advent of sustainable human and material development necessary for the actualization of the goals and aspiration of the nation. For the Universal Basic Education to achieve industrialization and technological advancement, which the nation since longed to achieve solid foundation must be laid to achieve' the objectives of the Universal Basic Education which among others include:

i. Reducing drastically incidence of dropout from the formal school system
ii. Ensuring the acquisition of the appropriate level of literacy, numeracy, manipulative and lifelong learning. (Federal Ministry of Education 2000:1).

The role of teachers in achieving these objectives cannot be ignored. This is because when the right knowledge, is provided by teachers in the various subjects, meaningful education vital for national building will emerge. Hence adequate knowledge of curriculum content, effective delivery strategies and stimulating activities are necessary to sustain student in school and also sustain their literacy, numeracy and manipulative capabilities. The major actors in achieving this task in the school system are the teachers. The national policy on education 2004 has not been silent in emphasizing teachers quantity and quality as a crucial issue to meaningful development particularly at the primary level. Research finding (Jegede 2001, Ajayi 2001, Dorayi 2000), further support this. The researchers' personal experience and those of others who participated in the workshop organized by National Teachers Institute Kaduna (NTI)

under the Millennium Development Goals Project for re-training of primary school teachers suggest that primary school teachers have shallow knowledge of science curriculum content. This was revealed in the type of question they asked about content in the curriculum. The training however, focused on delivery with emphasis on methods and evaluation method. If teachers content knowledge is shallow it will be difficult for them to implement the content of the science curriculum in order to achieve sustainable human and material development especially at the primary level which is the bed rock of education. Also science content at this level consists of basic concepts which if not well understood will hinder understanding of higher concepts later at the higher level of education. Therefore, the question which arises for this study is what are teachers' perception of primary science curriculum content and what reason category inform the difficulty level revealed?

Two research questions guided the conduct of the study.

1. To what extent do primary school teachers with qualification in science perceive the implementation of primary science curriculum content and reasons for difficulty level shown
2. To what extent do primary school teacher without qualification in science perceive the implementation of primary science curriculum content and the reasons for difficulty level shown.

Method

The study adopted the survey research design. All the classroom teachers in State Government owned primary schools in Obio/Akpor, Emohua and Port Harcourt Local Government Areas of Rivers State with not less than two years teaching experience formed the population of the study. Random sampling by balloting was used to select fifteen State Government owned primary schools were used for the study (six from Obio/Akpor, three from Emohua and six from Port Harcourt Local Government Areas). All the classroom teachers with requisite experience as specified above totaling about 300 were included in the study but the 120 who responded positively were used as sample for the study.

The instrument for data collection was a questionnaire known as Teachers Perception of Primary Science Curriculum Content Implementation Difficulty Level (T.P.P.S.C.C.I.D.L). The questionnaire is divided into two sections. Section A elicited personal data of the respondents, which include qualification.

Section B ascertained the difficulty level of teachers in implementing the curriculum content of the primary science in the classroom. Responses about difficulty level were sort on the contents of primary science curriculum, which are spread under environment, health, energy, and technology. The response format show implementation difficulty acceptability indicator of very simple, simple, difficult and very difficult. These were scored 5, 4, 3, and 2 accordingly. Also suggested reasons for the implementation difficulty level chosen by teachers for each content area were provided which include

1. Topic is abstract and no concrete object to illustrate it.
2. No clear understanding of the topic.
3. Topic can be illustrated with everyday experience
4. Topic also occur in other subjects and the knowledge acquired from other subject aided content delivery during instruction.

After construction the instrument was validated by two experts' in science education and one test and measurement expert in a tertiary institution in Port Harcourt. Their suggestions and correction were incorporated into the final draft of the instrument. To obtain the reliability of the instrument copies were given to 30 teachers randomly selected from primary schools not used for the study with same requisite experience as those used for the study. The reliability was calculated using Cronbach Alpha reliability and a reliability coefficient of 0.75 was obtained. The instruments were administered by the researcher personally in the schools. Guide line on how to complete the questionnaire was given to teachers individually in their classroom during their free periods. It took the fastest teachers 3 days to complete the questionnaire while some teacher used two weeks. The teachers were allowed to complete the questionnaire at their own pace to enable them think about the difficulty experienced during implementation and provide reason for such. The teachers were urged to be honest in their response because it is a way of identifying their problem and providing adequate assistance. The delay in the collection of instrument may be responsible for instrument mortality rate as earlier specified. The questionnaire were scored and sorted according to qualification in science or level of exposure to science as explained below. Teachers who obtained certificate in science at tertiary level and those who offered and passed science at Teacher Grade II level were tagged as qualified to teach science while those who

obtained certificate in other subject and those who did not offer science at the Teacher Grade II level were tagged as not qualified to teach

science. Mean *(X* ') and percentages were used to analyse the data generated. The decision rule is that mean 3.5 and above showed that the content is simple and Mean *(X)* below 3.5 showed that, the content is difficult.

Results

. The results are presented according to the research questions

Research Question One:

To what extent do primary school teachers with qualification in science perceive the implementation of primary science curriculum content and reasons for difficulty level shown. This research question is answered in table I . Mean and percentages are used.

Table 1: Mean difficulty level and reason categories **of primary science curriculum content. Implementation as perceived by teacher with qualification in science**

Item	Primary science curriculum content	*X* Difficulty level	Difficulty Level Remark	Percentage reason category			
				1	2	3	4
1	Using the sense: touch, smell, taste	4.24	Simple			90	10
2	Modeling with: clay, raffia and making a leaf print.	3.74	Simple			80	20
3	Water: sources, cycle, purification and change of state.	3.90	Simple			80	20 ,
, 4	Food: sources, classes, test for, starch and balanced diet	4.28	Simple			10	90
5	Soil: types, properties, soil and gardening.	4.00	Simple			50	50
6	Colour: How rainbow is formed (separation of light by prism, water droplets or empty biro case) primary, secondary and tertiary colours.	T 3 7 ~	Difficult	30	60	10	
7	Heat: sources of heat and effect of heat.	4.02	Simple		20	80	
8	Temperature: types of thermometer and uses.	3.82	Simple			20	'80
9	Human Body: skeletal system, muscular system, joints and muscles.	3.75	Simple			80	20
10	The body at work: digestive system, excretory system and respiratory system.	3.77	Simple		40	40	20
n	Soap and Alkali: making soap. Types of soap and uses of soap.	3.00	Difficult		80		20
12	Pulley: as a simple machine and uses	3.10	Difficult	20	80		
13	Lever and friction; parts of lever, classes, and advantages of friction.	3.32	Difficult	30	70		

14	Minerals and us: types and sources.	3.25	Difficult		60		40		40
15	Forces: types, gravitational, muscular, electrical, frictional.	3.00	Difficult	20	80				
16	Plant: parts of plant, useful part.	4.25	Simple			40	60		60
17	Reproduction: Asexual and sexual in plants.	3.84	Simple		20	40	40		40
18	Air: Elements, observation keeping record.	3.39	Difficult		60	30	10		10
19	Weather: elements, observation and keeping record.	3.21	Difficult		50	10	40		40
20	Sound: different sounds, types instrument that produce sound.	3.00	Difficult		80	20			
21	Measurement: metric unit measuring	3.61	Simple			80	20		20
22	Matter: states.	3.25	Difficult		40	40	20		20
23	Changes in Nature: animals plants metamorphosis	3.20	Difficult		60	20	20		20
24	Man and his environmental erosion, types, causes, effects and Pollution — kinds, sources, effects and prevention.	4.18	Simple			80	20		20
25	Health and safety: some diseases, causes, prevention and cure.	4.40	Simple			20	80		80

N = 47 per item

Reason categories index

1. Topic is abstract and no concrete object to illustrate it.
2. No clear understanding of the topic
3. Topic can be illustrated with everyday experience
4. Topic also occur in other subjects and knowledge acquired from other subject aided content delivery during instruction.

From table 1 the mean scores of items 6, I I , 32, 13, 14, 15, 18, 19, 20, 22, and 23 are below 3.50, which showed that teachers with qualification in science perceived the concepts in these items difficult to teach. While, the mean scores of items 1, 2, 3, 4, 5, 7, 8, 9, 10, 16, 17, 21, 24 and 25 are above 3.50, which showed, that teachers with qualification in science perceived the concepts in these items simple to teach.

Research Question Two:

To what extent do primary school teachers without qualification in science perceive the implementation of primary science curriculum content and reasons for difficulty level shown. This research question is answered in table 2. Mean and percentages are used.

Table 2: Mean Difficulty Level and Reason Categories of Primary Science Curriculum Content. Implementation as Perceived by Teachers without Qualification in Science

Item	Primary science curriculum content	$\overline{X}$ Difficulty level	Difficulty Level Remark	Percentage reason category			
				1	2	3	4
1	Using the sense: touch, smell, taste	3.52	Simple			60	40
2	Modeling with: clay, raffia and making a leaf print.	3.50	Simple			80	20
3	Water: sources, cycle, purification and change of state.	3.95	Simple			80	20
4	Food: sources, classes, test for, starch and balanced diet	4.10	Simple			10	90
5	Soil: types, properties, soil and gardening.	3.79	Simple			50	50
6	Colour: How rainbow is formed (separation of light by prism, water droplets or empty biro case) primary, secondary and tertiary colours	2.50	Difficult	20	80		
7	Heat: sources of heat and effect of heat.	3.50	Simple			70	30
8	Temperature: types of thermometer and uses.	3.40	Difficult		40	40	20
9	Human Body: skeletal system, muscular system, joints and muscles.	3.60	Simple	40		40	20
10	The body at work: digestive system, excretory system and respiratory system.	3.87	Simple		20	20	60
11	Soap and Alkali: making soap. Types of soap and uses of soap.	2.90	Difficult		80		20
12	Pulley: as a simple machine and uses	2.80	Difficult	20	80		
13	Lever and friction: parts of lever, classes, advantages of friction.	2.90	Difficult	20	80		
14	Minerals and us: types and sources.	2.80	Difficult	20	60		20
15	Forces: types, gravitational, muscular, electrical, frictional.	2.80	Difficult	60	20	20	
16	Plant: parts of plant, useful part.	4.10	Simple	10	20	60	10
17	Reproduction: Asexual and sexual in plants.	3.25	Difficult	40	40		20
18	Air: Elements, observation and keeping record.	3.00	Difficult	40	40	20	
19	Weather: elements, observation and keeping record.	3.00	Difficult		30	10	60
20	Sound: different sounds, types of instrument that produce sound.	2.80	Difficult		80		20
21	Measurement: metric unit for measuring	3.50	Simple			60	40
22	Matter: states.	3.00	Difficult	20	60	20	
23	Changes in Nature: animals and plants metamorphosis	3.00	Difficult		40	60	
24	Man and his environmental erosion, types, causes, effects and control. Pollution – kinds, sources, effects and prevention.	3.50	Simple		60	40	
25	Health and safety: some common diseases, causes, prevention and cure.	4.60	Simple		60	40	

N = 73 per item

Reason category index same as shown below table 1.

From table 2, the mean scores of items 6,8 11, 12, 13, 14, 15, 17, 18, 19, 20, 22 and 23 are below 3.50, which showed that teachers without qualification perceived these item difficult to teach. While the mean scores of items 3, 2, 3, 4, 5, 7, 9, 10, 16, 21, 24 and 25 are above 3.50 which shows that teachers without qualification in science perceived these item simple to teach.

Discussion

The result obtained from the study as revealed in tables 1 and 2 showed that out of the 120 primary school teachers with over two years teaching experience who completed the questionnaires, 47 have qualification to teach science while 73 do not have qualification to teach science. The result showed that, more of the teachers who handle the teaching of science at the primary school level are not adequately equipped to handle the subject since they did not study science at school. The result is that these teachers without qualification in science are faced with the problem of teaching a subject which they themselves did not study at school. Although these teachers without qualification in science, were well trained in methodology of teaching, this does not replace possession of concepts required for content delivery in science. This finding support the observation of Bajah(1984), that about nine tenth of primary school teachers are not adequately or fully trained for the work. The situation observed by Bajah, has improved greatly with emergency of more institution for the training of teachers but most of the trained teachers did not offer science subject in school. Since teachers teach all subjects at the primary level the fact still stands that these teachers are not fully trained for their work as stress by Bajah (1984).

It is obvious that teachers without adequate qualification in science cannot impact concept that make up science content at the primary level adequately. This is because science concept are logically organized in the curriculum and must be taught according to the nature of science for it to provide scientific literacy which the USE programme is designed to achieve. If teachers without adequate qualification in science continue to teach science misconception about science concept will be transfer to the children. The difficulty level revealed by teachers with qualification in science in the implementation of primary science curriculum content showed, that they still find some content difficult to teach despite their knowledge of science. A close look at teachers perceived difficult showed that they are tilted towards the physical sciences which actually enhance technological advancement. Hence the difficulty perceived in the teaching of lever, pulley, forces, air elements, weather elements, sound and matter are all indication that the training which they received in the science subjects offered in school did not provided the required knowledge to deliver these content areas effectively. This finding calls for a refocus on specific content areas in order to equip teachers delivery of concepts adequately. The reason categories given for the difficult content areas showed that it was taught with shallow knowledge of the content and as such many of their responses showed that the concepts are abstract or that the teachers lacked adequate content knowledge.

The result in table one also showed that, many of the teacher considered content in the Biological Sciences and those that occur in other sciences subjects like Health Science, Agricultural Science and Geography simple to teach as reveal by their perception and reason categories. The flaw of this revelation to scientific growth is that the teachers may have created serious misconception about various science concept in the content areas under review in the learners which may hinder proper understanding of science concepts Mumuni (2002). If UBE is to sustain learner in school for the 9 year, proper understanding of concept must be ensured because the logical organization of knowledge in science demand that the understanding of basic concept enhance understanding of more advance concept. If this is neglected scientific literacy as well as technological breakthrough will not be accomplished. Science is best taught according to its nature and this calls for the training of special teachers to handle the subject. During analysis of teachers questionnaires, it was observed that only few of the teachers with qualification in science obtain the certificate at the tertiary level of education many only offered science at the Teacher Grade II level, several 'years ago when science content at that level was still shallow this could be one of the reasons for the difficulty exhibited by teacher with qualification in the teaching of science concepts in the content areas related to the physical sciences. This finding further confirm the claim by Okebukola (1997), that, science teachers have shallow content knowledge of the topics in the science curriculum.

The result in table two showed almost the same trend as the ones reveal in table one. The result in table one were obtained from teacher with qualification in science while the result in table two were obtained from teachers without qualification in science. The analysis of the results in the tables showed that, teachers perception of the implementation of content of the curriculum is based on their ability to verbalize during science teaching and not by giving the learner correct knowledge of science using scientific process. Hands on approach which enhances understanding were not used and science is taught as literature or history. In this regard students listen to science and do not do science. If scientific literacy is to be achieved, learners should be sustained in the classroom by preventing drop out as specified in the UBE objective. Then there is need to refocus the training of teachers to handle science at the primary level of the UBE programme. Importance should be given to concepts prominent in the primary science curriculum to equip teachers for the task they are been prepared for. The teachers to be trained must have basic foundation of science for them to learn concept at higher level taking into consideration the logical organization of science concept. The type of training required to correct the problem observed cannot be designed for short re-training workshop such as the one organized by N.T.I. It call for total overhauling of the teachers and this calls for long-time training focused at each of the concept in the primary science curriculum. Short time retraining does not provide the trainer (i.e resource persons) with pre-test knowledge of the trainee (i.e the teacher) in order to focus instruction during the training session on preconception, misconception and personnel believes inherent in the trainee that may hinder conception, understanding and internalization of concepts in a way acceptable in the community of scientists. Short term training workshop sometimes breed confusion which may not be properly corrected. This was the case observed by the researcher during N.T.I re-training workshop which initiated the commencement of this study.

Implications of the Study

The study revealed that the teachers who implement the primary science content have difficulty in teaching concepts which can be grouped under physical sciences. The problem is a common one among teacher with qualification and those without qualification to teach science. If U.B.E is to join in the global trend to eradicate ignorance by achieving literacy in the stipulated time, then scientific literacy is a must. This can only be achieved if teachers are well equipped to implement the content of the curriculum to achieve the set goal, This can be achieved by refocusing the education of teacher in each concept that occur in the primary science curriculum by providing adequate knowledge both in content and methodology through rigorous training.

Recommendations

Based on the findings of the study it is recommended that a rigorous primary school teachers science education enhancement programme be introduced and should:

i. Be developed based on all concepts in the content of the primary science curriculum.
ii. Emphasis elaborately on the application of concepts in the environment and everyday life situation in order to enhance scientific literacy level of the teachers.
iii. Provide hands on experiences during practical session.
iv. Provide the training in clusters according to level of exposure to science subjects in order to provide avenue for attending to individual differences in understanding.
v. Itemize the instructional method appropriate for concepts in each contents area.
vi. Emphasize on how to incorporate current science instructional technique during delivery.
vii. Run long term and short term courses to satisfy teachers needs.

Conclusion

Nigeria's involvement in the global -trend to eradicate illiteracy is a step in the

right direction. To achieve literacy in all areas scientific literacy should be achieved. Scientific literacy can be achieved in learners if scientific literacy is achieved in the teachers that will implement the content of the curriculum in the classroom. Since many teachers at the primary level have difficulty in teaching concepts that will enhance technological development which directs industrialization. There is need to re focus their training towards achieving the goals of the nation as well as that of U.B.E.

References

Ajayi, T. (2001). Effective planning strategies of USE programme, UBE forum. *A Journal of Basic Education in Nigeria 1, 23-33.*

Ajiga, P. A. (2005). Universal Basic Education (UBE) as a basic for life-long education and economic reliance. *Muliidisciplinary Journal of Research Development* 5 (2) 47-52.

Bajah, S. T. (1984). *The problem of teaching science in West and East Africa.* The teaching of science and technology in Africa education No. 10 Daker Breda Publisher.

Dorayi, A. (2000). The role of teachers in universal basic education scheme. *Proceeding of the Education Mini Submit of UBE for Nigeria 66-67.*

Federal Ministry of Education (2000). *Implementation guidelines for UBE programme.* Abuja: Federal Ministry of Education Press.

Federal Republic of Nigeria (2004). *National Policy on Education.* Lagos: MERDC Press.

Ijiga, P. A. (2005). Universal Basic Education (UBE) As a Basis for Life-Long Education and Economic Reliance. Multidisciplinary Journal *of Research Development.* 5 (2), pages 47-. 52.

Jegede, O. (2001). Producing teachers for UBE through open and distant learning. UBE Forum: a Journal *of Basic Education in Nigeria* (1) 55-65.

Mumuni, A. A. O. (2002). Students misconception of ecological concepts and effects of remediation on achievement. Unpublished Ph.D. Thesis Faculty of Education, University of Port Harcourt.

Okebukola, P. (1997). Fine-tuning the delivery of science education in the 6-3-3-4 system. A paper presented at the 10^{lh} National Conference of the Curriculum Organization of Nigeria, 24-27 June.