Resources Used by Universal Basic Education (UBE) Teachers in Teaching Basic Science and Technology in Nigeria

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Abstract
The study investigated the extent to which UBE teachers put their training experience into practice with regard to the utilization of resources for teaching basic science and technology. The design of the study was descriptive survey research design. The population consisted of all 13630 primary school teachers in Enugu State, Nigeria. The sample consists of 1363 Basic Science and Technology teachers randomly sampled. A 30 – item questionnaire was used to collect data from the teachers. The face validity of the instrument was determined by four experts and found to be valid. Crombach Alpha method was used to determine the reliability of the instrument which yielded an index of .86. Three research questions which guided the study were analyzed using mean. The findings of the study show that basic science and technology teachers occasionally involve other teachers and class pupils as resource persons in teaching basic science and technology; they sparingly involve parents, community members, community leaders, NGOs, UNICEF, and UNESCO. With regard to material resources; they use textbooks, real objects and chalk/white board always and occasionally use charts, flat pictures, posters, cartoons, mockups, models, science and technology corners, improvisation and flannel board. However, they sparingly use the electronic resources and never use computer assisted instruction and internet. Based on the findings, some recommendations were made which include that industry school partnership should be encouraged. This is a situation where schools work collaboratively with ICT firms for the purposes of supply of ICT facilities, training and retraining of teachers and pupils.
Keywords: Resources, Universal Basic Education, Basic Science and Technology, Teaching.

1. Introduction

Securing access to basic education for all is one of the Millennium Development Goals which is of utmost importance to many developing countries. In Nigeria, following the decision of the Federal Government to introduce the 9 – year Basic Education Programme and the need to attain the Millennium Development Goals (MDGs) by 2015, the need to implement the National Economic and Empowerment Development Strategies (NEEDS), the existing curricula for primary and junior secondary school (JSS) have been renewed, re-structured and re-aligned to fit into a 9 – year Basic Education Programme (NERDC 2007) The new curriculum reflects depth, appropriateness, and inter-relatedness of curricula contents. Moreover, emerging issues which covered value reorientation, peace and dialogue including human rights education, family life, HIV/AIDS education; entrepreneurial skills etc were incorporated into the relevant contents of the new curriculum.

Primary education is a major component of the UBE programme. The core objectives include: the universalization of access and quality in the delivery of basic education. Others are to inculcate in children permanent literacy, numeracy and the ability to communicate effectively (NTI-TESSA 2007). To ensure effective achievement of these core objectives, Basic Science and Technology are included as core subjects of the UBE curriculum.

According to NERDC (2007), in selecting the contents of the Basic Science and Technology, three major issues shaping the development of nations worldwide, and influencing the world of knowledge today were identified. These are globalization, information and communication technology and entrepreneurship. The desire that Nigeria be identified with contemporary development worldwide call for the infusion of relevant contents of four approved curriculum innovations in the areas of:

i.   Environmental Education (EE)
ii.   Drug Abuse Education (DAE)
iii.   Population and Family Life Education (POP/FLE)
iv.   Sexually Transmitted Infection (STI, HIV/AIDS)
        The overall objectives of the curriculum are to enable the learners to:
- develop interest in science and technology
- acquire basic knowledge and skills in science and technology
- apply scientific and technology knowledge and skills to meet societal needs

- take advantage of the numerous career opportunities offered by science and technology
- become prepared for further studies in science and technology (NERDC 2007, P. iv)

These objectives are laudable and are at the hearts of the needs of every nation. Consequently efforts are being made towards the achievement of these objectives. In order to achieve a holistic presentation of science and technology contents to learners, the thematic approach to content organization was adopted. Consequently, four themes were used to cover knowledge, skills and attitudinal requirements. These according to NERDC (2007 P. v) include:

1.   You and Environment
2.   Living and Non Living Things
3.   You and Technology
4.   You and Energy

The functionality of any curriculum lies in its implementation which essentially is a function of the quality of the teachers. Quality of teachers can be measured by the qualifications, experiences, skills and competencies they posses. Teachers' competences include their ability to acquire and manage resources for teaching and learning process.

 Teaching and learning resources are those resources that facilitate the achievement of the goals of education. According to Onyejemezi (1996), any established school curriculum calls for ways and means of implementing it in order to reach the goals and objectives at the various levels. These include human and non-human or material resources. Human resources are the different categories of personnel that provide different services in the teaching learning process (Adewoyin 2007). Examples of human resources are the subject teachers, other professionals like doctors, lawyers, engineers, pupils, parents, donor agencies like non- governmental organizations (NGO), UNICEF,UNESCO etc (NTI 2010). The non-human or material resources include physical facilities and instructional materials (Adewoyin 2007,Ofoegbu 2008 and Romiszowski, 1998). These include text books, charts, flat pictures, posters, cartoons, real objects, mockups, models, science and technology corner, science and technology resource centre, improvisation, chalkboard/white board, flannel board etc. Apart from these, there are also Information and communication technology ICT resources. Researchers (Cloke and Sharif 2001, Kainth & Kaur 2010 and Kosakwoski 2005 etc) have indicated the potentials of information and Communication Technology (ICT) to improve instruction.

 In the various workshops organized for UBE teachers, they were taught that apart from the class teachers, other human resources like other teachers, pupils, parents, community members, donor agencies (NGOs, UNICEF, UNESCO) could be used (NTI 2010). Again they were encouraged to keep and use the following:

- Science and technology corner: a corner in the classroom containing locally made resources for science and technology teaching.
- Science and technology resource centre: an established resource centre for basic science and technology teaching, usually managed by the ministry of Education.
- Improvisation: use of locally available materials to device instructional materials in place of standard ones or substitute for original.
- Information and Communication Technology (ICT) resources.

The purpose of this study is to investigate the extent to which UBE teachers put their training and workshop experiences into practice with regard to utilization of resources for teaching basic science and technology.

2. Research Questions.
The following research questions guided the study:
1. To what extent do UBE teachers involve other human resources in teaching basic science and technology?
2. Which material resources do UBE teachers use in teaching basic science and technology?
3. T o what extent do UBE teachers use   ICT materials in teaching basic science and technology?

3. Methodology
The study is a descriptive survey of the resources used by UBE teachers in teaching basic science and technology. The population consists of all the 13630 UBE teachers in Enugu State. The sample consists of 1363 teachers randomly sampled at a workshop. A 30-item questionnaire, with a reliability coefficient of .86 determined using Crombach alpha method was used to collect data from these teachers. *The instrument was face validated by three experts in Educational technology, measurement and evaluation, and science education.* Each of the items has a four point rating scale of Always, Occasionally, Sparingly, and Never. Mean was used to answer the three research questions and was calculated item by item. Interpretations of the means were based on the limit of the real numbers: 3.50-4.00 (Always), 2.50-3.49 (Occasionally), 1.50-2.49 (Sparingly), 0.50-1.49 (Never).

4. Results

1. Research question one: The extent to which UBE teachers use other human resources in teaching basic science and technology?

Table 1: Mean Ratings of the extent of involvement of other human Resources by Basic Science and Technology Teachers.

S/N	Human Resources	Mean	Decision	Rank
1	Other teacher s	3.17	Occasionally	2
2	School pupils	3.31	Occasionally	1
3	Parents	2.49	Occasionally	3
4	Community members	2.00	Sparingly	4
5	Community leaders	1.89	Sparingly	5
6	Non-governmental organizations (NGOs)	1.63	Sparingly	8
7	UNICEF	1.69	Sparingly	7
8	UNESCO	1.89	Sparingly	5
9	Others	1.51	Sparingly	9

Table 1 show that UBE teachers occasionally involve other teachers, school pupils and some parents in the teaching of basic science and technology. However, they sparingly involve community members, community leaders, UNESCO, , UNICEF, NGOs and others.

Research Question Two: Which material resources do UBE teachers use in teaching basic science and technology?

Table 2: Mean Ratings of Material Resources Used By UBE Teachers in Teaching Basic Science and Technology.

S/N	Material Resources	Mean	Decision	Rank
10	Text books	3.77	Always	1
11	Charts	3.32	Occasionally	5
12	Flat pictures	3.23	Occasionally	6
13	Posters	3.15	Occasionally	7
14	Cartoons	2.35	Sparingly	12
15	Real objects	3.60	Always	2
16	Mock ups	2.59	Occasionally	10
17	Models	2.85	Occasionally	9
18	Science and technology corner	3.00	Occasionally	8
19	Science and technology resource centre	2.23	Sparingly	13
20	Improvisation	3.34	Occasionally	4
21	Chalkboard/white board	3.51	Always	3
22	Flannel board	2.45	Occasionally	11

Table 2 shows that UBE teachers use textbooks, objects and chalk/white board always for teaching basic science and technology. Nevertheless they occasionally use charts, flat pictures, posters, cartoons, mockups, models, science and technology corner, improvisation, and flannel board while they sparingly use science and technology resource centre in their localities.

Table 3: Mean Ratings of the Extent UBE Teachers Use ICT materials in Teaching Basic Science and Technology.

S/N	ICT Materials	Mean	Decision	Rank
23	Multimedia projector (Powerpoint)	1.89	Sparingly	1
24	Instructional television	1.69	Sparingly	3
25	Close circuit television	1.63	Sparingly	4
26	Radio	1.89	Sparingly	1
27	Tape recorder	1.60	Sparingly	5
28	Video	1.60	Sparingly	5
29	Computer Assisted Instruction	1.40	Never	6
30	Internet	1.34	Never	7

Table 3 shows that these teachers sparingly use multimedia projectors, instructional television, close circuit television, radio, tape recorder, and video in teaching basic science and technology. Again they never used computer assisted instruction or internet.

5. Discussion

The findings of the study show that UBE teachers in Enugu state involve other teachers and school pupils

occasionally in teaching basic science and technology. This is in line with the recommendations of NTI (2010) that human resources other than the class teachers should be involved in the teaching and learning of basic science and technology. However, it was found that teachers sparingly involve parents, community members, NGOs, UNICEF and UNESCO in teaching basic science and technology.   Ranking the involvement of other human resources apart from the class teachers, other teachers come first while NGOs and others came last.

Again the findings of the study indicate that teachers only use textbooks, real objects and chalk/white board always. On the other hand they occasionally use charts, flat pictures, posters, cartoons, mockups, models, science and technology corner, improvisation and flannel board. This is encouraging, however they use science and technology resource centres sparingly which is in contrast to the recommendations of the NTI for UBE teachers. Technology resource centre is very vital for teaching basic science and technology because most of the resources are supposed to be available for school use.

With regard to ICT, it was found that none of the ICT resources investigated was always or occasionally used by the teachers in teaching basic science and technology. This is not in line with the NTI recommendations for teaching basic science and technology. More so it is not in line with the findings of Kainth and Kaur (2010) on the importance of ICT in teaching and learning.

6. Conclusion
Resources are crucial for effective curriculum implementation, hence indispensible for the actualization of the goals of UBE. The findings of the study points to the fact the UBE teachers are gradually using more of the available human and material resources. However their usage of ICT resources is still very poor.

7. Recommendations
Based on the findings of the study, the following recommendations are made.
1. Further training, seminars and workshops should be organized for UBE teachers in order to sensitize them on the potentials of ICT in science and technology education. If they appreciate the importance of ICT, they will be enthusiastic in acquiring the needed skills and competencies.
2. The government and teacher educators should sensitize the teachers on the need and functions of science and technology resource centres.
3. Making the school time table more flexible to enable the teachers build in other programmes like involvement of other human resources.
4 Government, Parents and other stakeholders should join hands in donating ICT facilities to schools.
5. Industry school partnership should be encouraged. This is a situation where schools work   collaboratively with ICT firms for the purposes of supply of ICT facilities, training and retraining of teachers and students.

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