IMPACT OF MDGs RETRAINING WORKSHOPS ON PROFESSIONAL COMPETENCE OF BASIC SCIENCE AND TECHNOLOGY TEACHERS IN ENUGU STATE PRIMARY SCHOOLS

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Abstract

This study sought to determine primary school teachers' perception of the impact of the Millennium Development Goals (MDGs) capacity building project on their professional competence, in the area of Basic Science and Technology (BST) teaching. A sample of 300 primary schools drawn from 60 primary schools in Enugu State constituted the research subjects. A questionnaire, constructed by the researcher, validated by experts and tested for reliability using Cronbach alpha method, was used for data collection. The questionnaire sought to determine the impact of participation in the MDGs retraining workshops on teachers' knowledge of some BST concepts, as well as their pedagogical skills. Two research questions and two hypotheses guided the study. The research questions were answered using mean with standard deviation while the hypotheses were tested at 0.05 level of significance using t-test. Results of data analysis showed that the primary school teachers were generally of the view that the MDGs retraining workshops have impacted positively on their knowledge of some BST concepts and have also enabled them to improve on their pedagogical skills. Some recommendations were proffered, one of which is that the workshops should be organized at more regular intervals, in view of its efficacy.

Introduction

The need for capacity building, to enhance the performance of practitioners in any field of human endeavour, cannot be overemphasized. It is in recognition of this fact that the Federal Government of Nigeria has not left any stone unturned in its avowed commitment to the improvement of the quality of teaching and learning at the primary school level. As a means improving teachers' professional competence, the Federal Ministry of Education (FME) commenced a nation-wide capacity building programme for primary school teachers under the Millennium Development Goals (MDGs) project in 2006 (Sharehu, 2009). The FME'S resolve to improve teacher effectiveness at the primary school level is informed by the belief that the concept of Education for All (EFA) could be a mirage if Nigerian children cannot have access to quality education. It is against this background that the FME mandated the National Teachers Institute (NTI) to design and mount a nation-wide retraining programme for 145,000 primary school teachers across the country. The programme is funded from the Debt Relief Grant (DRG) and implemented under the MDGs projects.

Since its inception in 2006, the MDGs retraining workshops for primary school teachers has become an annual event, with thousands of teachers benefiting from it in all the states of Nigeria, including the Federal Capital Territory, Abuja. The NTI provides the general guidelines for the nomination of participants and makes the nomination forms available to state Ministries of Education, through their respective Universal Basic Education Boards (SUBEB/UBEB) and Local Education Authorities (LGEAs) whose collective responsibility it is to select those to be trained each year.

The workshops are conducted in designated centres located in post – primary schools in each of the states. In order to ensure effectiveness in the training, each centre accommodates about 500 participants (Sherahu, 2009). Reputable academics that meet the minimum requirements in the areas of qualification, specialization and experience, as determined by the NTI, are mainly appointed as resource persons to facilitate the conduct of the training exercise. The workshop focuses mainly on four core subjects, namely English Language, Mathematics, Basic Science and Technology (BST) and Social Studies. The facilitation of the workshop by the resource persons is normally geared towards realizing the general objectives of the capacity building project which includes to

- disseminate practical skills that will enhance the teachers' effectiveness and promote greater mastery of the subject matter;
- update the teachers' knowledge of subject matter;
- contribute to the development of positive attitude and self concept by teachers; and
- enable teachers to make pupils perceive learning as an interesting and pleasant activity that promotes the development of self-understanding inquiry and critical thinking (Sharehu, 2009:2).

In the area of Basic Science and Technology (BST), the resource persons are expected to ensure that the participants have a firm grasp of the meaning, philosophy and nature of science. They are also required to demonstrate to the participants, with relevant examples, that science can be taught and learned in the classroom, outside the classroom and even at home. The resource persons are also to ensure that participants comprehend that in the teaching of Basic Science and Technology, they should improvise apparatus and equipment in order to make their lessons activity-oriented and subsequent foster pupils' interest in science (NTI, 2011). This is in line with the assertion by Bajah (1983) that science is not science unless it is accompanied by experimentation and other practical activities. The need to encourage pupils' active participation in science instructions was justified by Abdullahi (1982) and Abimbola (1994) when they respectively observed that students need to participate in scientific enquiry to appreciate the spirit and methods of science and also to make science less abstract and thus boost students' interest in the subject.

Having been made an annual programme since its inception in 2006, there is need to ascertain the impact of the MDG retraining workshops on the participants (primary school teachers), especially in terms of enhancing their effectiveness in Basic Science Technology teaching. Presently, there is paucity of research evidence on the efficacy of the MDGs retraining workshop in equipping Basic Science and Technology teachers with the skills and competencies needed for their optimum performance. Thus, the problem of this study, posed as a question, is what is the impact of the MDGs retraining

workshops on the professional competence of BST teachers? The study therefore sought to determine the perceived impact of MDGs retraining workshops on BST teachers' knowledge of the subject matter, as well as their pedagogical competence.

Research questions

The following research questions guided the study.

1. What is the impact of the MDGs retraining workshops on the primary school teachers' knowledge of relevant concepts in Basic Science and Technology (BST)?
2. To what extent has participation in the MDGs retraining workshops improved the pedagogical competencies of BST teachers?

Hypotheses

Two null hypotheses were formulated to guide the study.

Ho 1: There is no significant difference between the mean ratings of male and female primary school teachers on the extent to which participation in the MDGs retraining workshops has improved their knowledge of relevant concepts in BST.

Ho2: There is no significant difference between the mean ratings of male and female primary school teachers on the extent to which participation in the MDGs retraining workshops has improved their competencies in BST instructions.

Methodology

Survey research design was adopted in the study. The population for the study comprised all the teachers in government-owned primary schools in Enugu State that have participated in the MDGs retraining workshops since its inception in 2006. There are 1113 government owned primary schools spread among the six education zones in Enugu, Awgu, Agbani, Nsukka, Obollo-Afor and Udi education zones.

Simple random sampling was used to draw three education zones (Enugu, Nsukka and Udi) out of the six education zones in the state. In each of the sampled education zones, 20 primary schools were drawn by the same sampling procedure and used for the study, giving a total of 60 schools. Finally, 5 teachers in each of the sample schools, who have participated in the MDGs workshops, were used as research subjects in the study. Thus, a total of 300 primary school teachers (135 males and 165 females) participated in the study as respondents. The head teachers of the sampled schools supplied the lists of teachers who had participated in the MDGs workshops since its inception, from which the sample was drawn.

The instrument for data collection was a structured questionnaire. The questionnaire consisted of three sections A, B and C. Section A was concerned with bio-data of the respondents while sections B and C dealt with the impacts of the MDGs retraining workshops on the teachers' knowledge of BST concepts and their pedagogical competencies respectively. Section B contains 16 items while section C has 10 items, giving a total of 26 items for the two sections. The teachers were expected to give their responses using a 4-point scale of Very high extent (VHE), High extent (HE), Low extent (LE) and Very low extent (VLE), with nominal values of 4, 3, 2 and 1 respectively. The instrument was validated by presenting it to three experts, two in Science Education and one in Measurement and Evaluation, all from Enugu State University of Science and Technology (ESUT). The validators were requested to critically scrutinize the instrument to ensure its suitability and appropriateness in addressing the research questions posed in the study. Consequently,

the validators made some comments which helped the researcher to modify some of the items or replace some of them out-rightly. The validated instrument was later administered to 30 primary school teachers serving in Ebonyi State and have participated in the MDGs retraining workshops. Data obtained from their responses to the various items on the questionnaire were used in determining its reliability, using Cronbach alpha formula. Reliability indices of 0.78 and 0.82 were obtained for sections A and B of the instrument respectively. At the end, a reliability coefficient of 0.84 was obtained for the instrument.

In the course of carrying out the actual study, the researcher, with the aid of three research assistants, visited the sampled schools to administer the questionnaire. The respondents (primary school teachers) were given sufficient time to respond to the questionnaire, after which it was retrieved from them the same day. This enabled the researcher to have 100% return rate for the instrument.

The research questions were answered using mean and standard deviation while the hypotheses were tested at .05 level of significance using t-test.

Results

The results of data analysis are presented in tables according to the relevant research questions and hypotheses that guided the study.

Research question one: What is the impact of the MDGs retraining workshops on primary school teachers' knowledge of some Basic Science and Technology (BST) concepts?

Table 1: Mean ratings of primary school teachers on the perceived impact of the MDGs workshops on their knowledge of relevant BST concepts. N = 300

S/N	Items	VHE 4	HE 3	LE 2	VLE 1	- X	SD	Decision
	Indicate the extent to which participation in MDGs workshop has helped you to clearly understand the following BST topics/ concepts							
1	States of matter – solid, liquid and gas and their characteristics	121	105	64	10	3.12	0.86	High
2	Change of state of matter	90	65	60	85	2.53	1.19	High
3	Evaporation, sublimation and condensation	50	63	102	85	2.26	1.05	Low
4	Levers – parts, classes and uses	44	73	100	83	2.26	1.02	Low
5	Radiation, conduction & convection	35	68	122	75	2.21	0.95	Low
6	Energy – Types, sources and conversion from one form to another	120	96	54	30	3.02	0.99	High

7	Ecology – Ecosystem, food chain, food web and pyramid of numbers	75	83	62	80	2.51	1.13	High
8	Reproduction in plants- Photosynthesis	132	101	47	20	3.15	0.92	High
9	Reproduction in animals e.g. Insects and man	142	99	46	13	3.23	0.86	High
10	Force, Friction and work	60	73	96	71	2.41	1.06	Low
11	Pressure, temperature and volume of gases	81	85	74	60	2.62	1.09	High
12	Excretion, respiration and nutrition in plants and animals	100	124	51	25	3.00	0.92	High
13	Diseases and disease vectors, disease prevention and drug abuse	125	133	24	18	3.22	0.83	High
14	Elements, compounds and mixtures	39	64	80	117	2.08	1.06	Low
15	Heat, temperature and expansion in solids	72	83	69	76	2.50	1.11	High
16	Magnets and magnetism	85	92	60	63	2.66	1.10	High
	Grand mean and SD.					2.67	0.98	High

Table 1 shows the respondents had high mean ratings of 3.12, 2.53, 3.02 2.51, 3.15, 3.23, 2.62, 3.00, 3.22, 2.50 and 2.66 for items 1, 2, 6, 7, 8, 9, 11, 12, 13, 15, and 16 respectively. On the other hand, low mean ratings of 2.26, 2.26, 2.21, 2.41, and 2.08 were obtained for items 3, 4, 5, 10, and 14 respectively. A grand mean of 2.67 was, however, obtained for all the 16 items, indicating that participation in the MDGs retraining workshops has fostered the primary school teachers' knowledge of the enumerated Basic Science and Technology (BST) topics/concepts, to a high extent.

Research question two: To what extent has participation in the MDGs retraining workshops improved the pedagogical competencies of BST teachers in Enugu state primary schools?

Table 2: Mean ratings of primary school teachers regarding the extent to which participation in MDGs retraining workshops has improved their pedagogical competence in BST. N=300

S/N	Items	VHE	HE	LE	VLE	- X	SD	Decision
	Participation in MDGs workshop has enabled me to improve my skills in the following areas:							
17	Making the teaching of BST activity – oriented through the use of hands-on activities	98	126	40	36	2.95	0.97 0	High
18	Making my pupils active participants in science instructions	101	78	62	59	2.74	1.12	High
19	Managing large classes effectively during BST lessons	89	95	70	46	2.76	1.04	High
20	Improvisation of some important instructional materials	65	72	94	69	2.44	1.07	Low
21	Arousing and sustaining pupils' interest during BST lessons	120	86	61	33	2.98	1.02	High
22	Teaching BST effectively to accommodate the interests of both slow and fast learners	93	76	73	58	2.68	1.11	High
23	Managing my time effectively during BST instructions	80	95	88	37	2.73	0.99	High
24	Bringing resource persons to address the pupils on some BST concepts	54	49	85	112	2.15	1.11	High
25	Making the pupils work in co-operative learning groups during BST lessons	89	100	56	55	2.74	1007	High
26	Organizing field trips for the pupils to enable them experience science and technology in real life situations	48	56	94	102	2.17	1.07	Low
27	Helping the pupils to establish links between and among some BST concepts through the use of concept maps	32	40	86	142	1.87	1.01	Low
28	Helping the pupils to understand some key science and technology concepts through the use of computers during BST lessons	08	12	116	164	1.55	0.70	Low
29	Assessing learning out comes in BST formatively (i.e as the lesson progresses)	119	122	39	20	3.13	0.88	High
30	Assessing learning outcomes at the end of BST lessons in accordance with stated instructional objective	120	119	36	25	3.23	0.83	High
	Grand mean and SD					2.58	1.04	High

Table 2 shows that the respondents (BST teachers) had high mean ratings for items 17, 18, 19, 21, 22, 23, 24, 25, 29 and 30. On the other hand, the respondents had low mean ratings for items 20, 26, 27 and 28. A grand mean of 2.58 was, however, obtained for all the 14 items (17-30), indicating that participation in the MDGs retraining workshops fostered the pedagogical competences of the Basic Science and Technology teachers to a high extent

Testing of hypotheses

Ho I: There is no significant difference between the mean ratings of male and female primary school teachers in Enugu state on the extent to which participation in the MDGs retraining workshops has improved their knowledge of relevant BST concepts.

Table 3: t-test of difference between the mean ratings of male and female BST teachers regarding the extent to which participation in MDGs workshops has fostered their knowledge of some BST concepts.

Sex	n	x	SD	df	t-cal	t-crit	Decision
Male	135	2.73	1.02				Do not
Female	165	2.61		298	1.00	1.96	reject Ho.

Table 3 shows that the calculated value of t at 0.05 level of significance and 298 degree of freedom is 1.00 while the critical t-value is 1.96. Since the calculated t-value is less than the critical t-value; the null hypothesis is, therefore, not rejected. This means that there is no significant difference between the mean ratings of male and female BST teachers in Enugu State primary schools regarding the extent to which participation in MDGs retraining workshops has enhanced their knowledge of some BST concepts.

Ho2: There is no significant difference between the mean ratings of male and female BST teachers on the extent to which participation in the MDGs workshops has fostered their pedagogical competences.

Table 4: **t-test of difference between the mean ratings of male and female BST teachers on the extent to which participation in MDGs workshops has improved their pedagogical competences**

Sex	n	x	SD	df	t-cal	t-crit	Decision
Male	135	2.60	1.03				Do not
Female	165	2.56	1.11	298	0.57	1.96	reject Ho.

Table 4 shows that the calculated t-value at 0.05 level of significance and 298 degree of freedom is 0.57 while the critical t-value under the same conditions is 1.96. Since the calculated t-value is less than the critical value; the null hypothesis is, consequently not rejected. This implies that no significant difference exists between the mean ratings of male and female BST teachers in Enugu State primary schools regarding the extent to which their participation in the MDGs retraining workshops has fostered their pedagogical competences in the subject.

Discussion of results

Results of data analysis showed that the respondents (BST teachers) were generally of the view that their participation in the MDGs retraining workshops fostered their knowledge of the Basic Science and Technology concepts that are of interest in this study. This was a welcome development and a realization of one of the general objectives of the MDGs capacity building project, as highlighted by Sherahu (2009), which is to update the teachers' knowledge of the subject. The need for BST teachers to be well grounded in knowledge of the subject matter stems from the popular aphorism that one cannot give what one doesn't have.

That the MDGs retraining workshops has not remarkably enhanced teachers' understanding of some key science concepts, like force, friction, work, elements, compounds and mixtures, evaporation, sublimation and condensation, radiation, conduction and convection, etc. may well be an indication of their poor background in science, as evidenced by their bio-data which revealed that most of them did not have any specialist training in the sciences, either at NCE or degree level.

Data analysis showed that the BST teachers who had participated in previous MDGs retraining workshops attested to the fact that their participation in the workshops had generally brought about an improvement in their pedagogical competences. It is particularly interesting to note that the retraining workshop has enabled the teachers to make their teaching of BST activity-oriented through the use of hands – on activities and making the pupils active participants in science instructions. This again is in agreement with the assertion by Abimbola (1994) that students need to be encouraged to participate in scientific enquiry to appreciate the spirit and methods of science and also to make science less abstract and subsequently boost learners' interest in the subject.

It is also noteworthy to point out that the primary school teachers, in spite of their participation in the MDGs retraining workshop, were still deficient in some pedagogical skills, such as improvisation of some important instructional materials, organization of field trips for pupils, use of concept mapping as an instructional strategy, as well as use of ICT eg computers during BST lessons. This is invariably a negation of the expectation by NTI (2011) that participation in the MDGs capacity building project should enable BST teachers to improvise apparatus /equipment and bring some innovations to bear on their teaching in order to make their lessons activity-oriented and subsequently foster pupils' interest in science.

Conclusion

The MDGs retraining workshop for primary school BST teachers is, undoubtedly, a laudable programme, for it has impacted positively on the teachers' knowledge of some BST concepts, as well as their pedagogical competencies. Since the rest of the education system is built on primary education, it is only proper that this level of education be given adequate attention in terms of equipping the teachers for effective discharge of their duties as facilitators of instructions. It is only by so doing that the goal of laying a sound basis for scientific and reflective thinking can be reasonably attained by primary education in Nigeria.

Recommendations

The following recommendations were made:

1. The MDGs retraining workshops should be organized on more regular basis, atleast thrice yearly, to ensure greater impact on teachers' knowledge of the subject matter, as well as instructional delivery.

2. The teaching of BST in Nigerian primary schools should be left in the hands of only the teachers that have specialist training in science, either at NCE or degree level so that such teachers can effectively benefit from capacity building workshops in BST, such as the MDGs workshop.

References

Abdullahi, A (1982). Science Teaching in Nigeria. ***Journal of Science Teachers Association of Nigeria*, 17(1), 80 – 87**

Abimbola, 1.0. (1994). A critical appraisal of the role of laboratory practical work in science teaching in Nigeria Ilorin ***Journal of Education.* 4 (1&2), 59 – 65.**

Bajah, S. T. (1983). Teaching Integrated Science creatively. Ibadan: Ibadan University Press.

National Teachers Institute, NTI (2011). 2011 MDGs retraining workshops for primary school teachers: Guides for resource persons. Kaduna: NTI Press.

Sherahu, A. L. (2009). A brief on nationwide capacity building for primary school teachers under the Millennium Development Goals projects Kaduna: NTI Press.