

## **Impacts of Step-B Projects on Mathematics and Biology Teachers Exposure to Modern Teaching Method in Federal Government Colleges in Rivers State (2008 – 2013)**

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**Abstract:** *This study, which is non- experimental, investigated the impact of Science and Technology Education Post Basic (Step-B) Projects on Mathematics and Biology teachers' exposure to modern methods of teaching their subjects in Federal Unity Colleges in Rivers State. Samples of 15 Biology teachers, 20 mathematics teachers, were drawn using purposive sampling technique. Two research questions guided the study. One researcher-made instrument, validated by the researcher's supervisors and experienced Biology and Mathematics subject teachers, was used to generate data for the study. The instrument is projects analysis instrument for teachers' questionnaire (PAITQ) used to collect primary data. The reliability of (PAITQ) was established by pilot testing using smaller samples that possessed similar characteristics as the main study sample but did not participate in the main study. The Cronbach's Coefficient Alpha was used to analyse the data generated. The reliability coefficient of PAITQ was 0.83. The research questions were answered using weighted arithmetic mean. The following results were obtained: Step-B Project capacity building project exposed Biology and Mathematics teachers to modern teaching methods of teaching their subjects.*

**Keywords:** *Science and Technology post Basic (Step-B)*

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### **I. Introduction**

Science, Mathematics and Technology have become such critical factors of economic and social development that life without them can no longer be contemplated. In addition to the fact that, through Science, Mathematics and Technology, a nation develops its manpower in such critical areas as agriculture, engineering, architecture, medicine and other science- based professions and technologies, the benefits of mathematics and science have trans-versed every conceivable sphere of human life. For example, man's ability to produce high quality goods and services has improved tremendously. New drugs, vaccines, sophisticated equipment and tools have been produced which are helping in the diagnosis and treatment of various diseases thereby enhancing longevity. High-yielding varieties of crops and animals as well as disease-resistant varieties have been developed. Through Science, Mathematics and Technology, transportation and communication have improved remarkably; sophisticated buildings that provide comfortable accommodation for people have also been constructed. As a result of these benefits that accrue from the pursuit of Science, Mathematics and Technology, many countries have been making frantic efforts towards their development in order to keep pace with the rest of the globe world (Adejoh, 2006). Adeyemi and Adaramola (2014) were of the opinion that to 'improve the technological development in Nigeria, the country needs to develop her Science and Mathematics skills' Adeyemi and Adaramola (2015) said Education must be made relevant to the need of the Nigeria Economy (which is a desire to reducing poverty and giving priority to small and medium scale enterprises) and create a good society that can compete globally.

Mulemwa (2002) points out that, the fast changing applications of Science, Mathematics and Technology and the global reliance on its processes and products in all areas of human endeavour have made them invaluable that any society or country without them risks being alienated from the global village.

### **Statement of the Problem**

Government through Federal Ministry of Education has initiated efforts toward enhancing and improving the productivity of teachers in the Unity Colleges, especially in the Biology and Mathematics subjects through sending teachers abroad for capacity building, organising local workshops, conferences, seminars and in-service training programmes. The bedrock of development is Biology and Mathematics. Through these subjects technological products emanates. Without good foundation in these subjects, the nation may not be able to make a breakthrough in Science and Technology advancement which is a prerequisite for overall development. According to Ahmed (2013) "when local communities are able to apply modern research outcomes to local challenges, they are better positioned to take significant steps towards addressing their country's economic, agricultural, environmental, health and social needs." Given this state of affairs in Unity

Colleges in Nigeria, the problem of this study is posed as a question is: What was the impact of Science and Technical Education Post-Basic (STEP-B) Projects on enhancing productivity of Biology and Mathematics teachers in Federal government Colleges in Rivers State.

### **Purpose of the Study**

The purpose of the study is to analyse Step-B Projects and their impact on Biology and Mathematics in Federal Government Colleges in Rivers State. The following are the specific objectives of the study:

- 1 To establish what Step-B Project has put in place for the capacity building enhancement of Mathematics teachers on modern method of teaching in Federal Government Colleges in Rivers State, between 2008 and 2013.
- 2 To identify what Step-B Project has put in place for the capacity building enhancement of Biology subjects teachers on modern method of teaching in Federal Government Colleges in Rivers State, between 2008 and 2013.

### **Research questions**

The following research questions were raised to guide this study.

- 1 To what extent did Step-B Project capacity building project expose Mathematics teachers to modern methods of teaching Mathematics in Federal Government Colleges in Rivers State, between 2008 and 2013?
- 2 To what extent did Step-B Project capacity building project expose Biology teachers to modern methods of teaching Biology in Federal Government Colleges in Rivers State, between 2008 and 2013?

## **II. Methodology**

This study employed a survey and ex-post facto designs. The study fits into the survey design in the sense that data were collected from a representative sample of Unity schools, teachers and experts for the purpose of describing in a systematic manner the characteristics and facts about the implementation of the Step-B Project and their effects on productivity of Science, and Mathematics teachers and generalizing the findings to these programmes in all the Federal Government Colleges in Nigeria and other Step-B Projects that were investigated. Nwanko (2011) is of the opinion that ex-post facto “design involves collecting and analyzing data about some variables retrospectively or about variables which are already in place without manipulating any of them.”

### **Population/Sample**

Population for this research were 14 Biology and 20 Mathematics teachers in Federal Government Colleges in Rivers State.

There are three (3) Federal Government Colleges in the State out of 104 in Nigeria. The three colleges spread across the State namely, Federal Government College, Rumuokoro in Obio/Akpo Local Government Area of Rivers State, Federal Science and Technical College, Ahoada in Ahoada East Local Government Area of Rivers State and Federal Government Girls’ College, Abuloma in Port Harcourt City “Local Government Area of Rivers State”. There was also a total population of 20 Mathematics teachers and 14 Biology teachers in the State. The population of 20 Mathematics and 14 Biology were censused.

### **Research Instrument**

The Projects Analysis Instruments for Teachers Questionnaire (PAITQ) which was developed by the researcher was used to collect information from teachers with regard to the implementation of the Step-B Projects, Biology and Mathematics programmes in the respective colleges. A total of 16 items were initially drawn for each of the questionnaire and subjected to ranking pre-trials using four experienced Science educators and Mathematics educator each. These experts were requested to examine the relevance of instrument item in relation to the research questions posed. They were also required to rephrase the items to make them simpler as well as delete those that were not relevant. A final version of the instrument was arrived at after a consideration of the entire rankings.

### **Reliability and Validity**

To establish the validity of this instrument, the researcher gave them to a panel of experts made up of four experienced Biology and Mathematics educators to ensure face and content validity.

To establish the reliability of this instrument, the instrument was pilot tested using smaller samples that possessed similar characteristics as the main study sample but did not participate in the main study. In order to establish the internal consistency of the rating scale in the instruments, the Cronbach’s Coefficient Alpha

Method was used. The reliability coefficient of Project Analysis Instrument for Teachers Questionnaire (PAITQ) was 0.83

**Data Collection**

Permission was sought from the principals of the Unity Colleges for the use of the schools and the teachers. Each college was visited by the researcher and the questionnaire (PAITQ) was personally administered to the teachers to obtain the necessary information with regards to the implementation of the Step-B Projects, Biology and Mathematics programmes in the respective colleges. The teachers were instructed on how to complete the questionnaires to ensure that mistakes were not made. The Biology and Mathematics teachers of the respective colleges served as research assistants and helped the researcher to assess the resources put in place in the colleges for implementing Step-B Project.

**Data analysis**

Weighted arithmetic mean (XW) was employed to analyse the research questions.

**Research Question One:** To what extent did Step-B Project capacity building project expose Mathematics teachers to modern methods of teaching mathematics in Federal Government Colleges in Rivers State, between 2008 and 2013?

**Table 1 Breakdown of Responses (Mathematics Teachers) To Items 1-8 of Thequestionnaire**

S/N	STATEMENT	RESPONDENTS					
		VA(4)	MA(3)	SA(2)	IA(1)	TOTAL	XW
1	How would you rate capacity building programme organised by Step-B Project toward modern instruction in your college? WEIGHT OF RESPONDENTS	7 (28)	9 (27)	3 (6)	1 (1)	20 (62)	3.10
2	How would you rate the level of participation of Mathematics teachers on capacity building on modern method of assessment by Step-B Project? WEIGHT OF RESPONDENTS	9 (36)	6 (18)	6 (6)	2 (2)	20 (61)	3.05
3	How would you rate the resource persons for the workshops and conferences in terms of mastery/soundness in their subject areas delivery? WEIGHT OF RESPONDENTS	9 (36)	9 (27)	1 (2)	1 (1)	20 (66)	3.30
4	How would you rate/judge support materials like laptops, conference bags, paper, pen, snacks and so on provided by the organiser? WEIGHT OF RESPONDENTS	5 (20)	5 (15)	6 (12)	4 (4)	20 (51)	2.55
5	How would you assess the quality and duration of the capacity building on modern method of project method by Step-B Project? WEIGHT OF RESPONDENTS	7 (28)	6 (18)	4 (8)	1 (1)	20 (55)	2.75
6	How would you rate the capacity building (Conferences, Workshops, Seminars, etc.) that enhanced teaching in modern method in your subject? WEIGHT OF RESPONDENTS	11 (44)	5 (15)	2 (4)	2 (2)	20 (65)	3.25
7	How would you rate Step-B Project's organised orientations/programme that enhanced your students learning outcome? WEIGHT OF RESPONDENTS	7 (28)	6 (18)	6 (12)	1 (2)	20 (60)	3.00
8	How would you rate the impact of Step-B Project on your college in respect of their aim and objectives? WEIGHT OF RESPONDENTS	5 (20)	8 (24)	5 (10)	2 (2)	20 (56)	2.80

$$\text{CRITERION MEAN} = \frac{V.A(4)+ M.A(3)+ S.A(2)+ I.A(1)}{4}$$

$$= \frac{10}{4} = 2.5$$

**Analysis**

The mean of weighted means (2.98) is greater than (>) the criterion mean of 2.5. The respondents (Mathematics Teachers) therefore agreed that Step-B Project capacity building project exposed Mathematics teachers to modern methods of teaching mathematics in Federal Government Colleges in Rivers State, between 2008and 2013.

**Research Question Two:** To what extent did the Step-B Project capacity building project expose Biology teachers to modern methods of teaching Biology in Federal Government Colleges in Rivers State, between 2008 and 2013?

**Table 2 Breakdown of Responses (Biology Teachers) To Items 1-8 of Thequestionnaire**

S/N	Statement	Respondents					
		VA(4)	MA(3)	SA(2)	IA(1)	TOTAL	XW
1	How would you rate capacity building programme organised by Step-B Project toward modern instruction in your college? WEIGHT OF RESPONDENTS	6 (24)	3 (9)	4 (8)	1 (1)	14 (42)	3.00
2	How would you rate the level of participation of Biology teachers on capacity building on modern method of assessment by Step-B Project? WEIGHT OF RESPONDENTS	4 (16)	4 (12)	4 (8)	2 (2)	14 (38)	2.71
3	How would you rate the resource persons for the workshops and conferences in terms of mastery/soundness in their subject areas delivery? WEIGHT OF RESPONDENTS	7 (28)	2 (6)	3 (6)	2 (2)	14 (41)	3.07
4	How would you rate/judge support materials like laptops, conference bags, paper, pen, snacks and so on provided by the organiser? WEIGHT OF RESPONDENTS	5 (20)	5 (15)	3 (6)	1 (1)	14 (42)	3.00
5	How would you assess the quality and duration of the capacity building on modern method of project method by Step-B Project? WEIGHT OF RESPONDENTS	4 (16)	4 (12)	3 (6)	3 (3)	14 (37)	2.64
6	How would you rate the capacity building (Conferences, Workshops, Seminars, etc.) that enhanced teaching in modern method in your subject? WEIGHT OF RESPONDENTS	4 (16)	4 (12)	2 (4)	4 (4)	14 (36)	2.57
7	How would you rate Step-B Project's organised orientations/programme that enhanced your students learning outcome? WEIGHT OF RESPONDENTS	4 (16)	6 (18)	1 (2)	3 (3)	14 (39)	2.79
8	How would you rate the impact of Step-B Project on your college in respect of their aim and objectives? WEIGHT OF RESPONDENTS	5 (20)	4 (12)	1 (2)	4 (4)	14 (38)	2.71

### Analysis

The mean of weighted means (2.81) is greater than (>) the criterion mean of 2.5. The respondents (Biology Teachers) therefore agreed that Step-B Project capacity building project exposed Biology teachers to modern methods of teaching biology in Federal Government Colleges in Rivers State, between 2008 and 2013.

### III. Conclusion And Recommendations

Based on the finding of the study, the following conclusions are drawn:

- 1 The capacity building enhancement of Mathematics teachers exposed to Step-B Project programme (Workshop/Conference/Seminar) were improved/enhanced, leading to increase in mathematics teachers' productivity.
- 2 The capacity building enhancement of Biology teachers exposed to Step-B Project programme (Workshop/Conference/Seminar) were improved/enhanced leading to increase in biology teachers' productivity.

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

Government should involve International Organisations, Bodies, NGOS, and Philantropists in education projects that will enhance the system's service delivery.

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