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PERCEIVED MATHEMATICS COMPONENTS OF THE UNIVERSAL BASIC EDUCATION AS SYNONYM OF CURRICULUM DEMOCRATIZATION IN SCIENCE AND TECHNOLOGY

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Abstract

The paper examined the Mathematics Components of the Universal Basic Education in relation to the principle of democratization of topics towards attainment of goal of Science and Technology in the 21st century. As a descriptive study it made use of fifty (50) Mathematics teachers drawn from ten (10) randomly selected junior secondary schools in Oshodi/Isolo Local Government Area of Lagos State. Adapted 4-Likert Scale Achievement Test (LISAT) instrument of Emekwe (2010) with reliability of 0.69 was used to collect the data, which was subjected to Statistical analysis of Chi-square at 0.05 level of significance. Two research questions and hypotheses were raised, and the findings showed that there is a significant relationship between the component of Mathematics of the Universal Basic Education and Basic Science ($X^2_{cal} > X^2_{val}$, df= 15, P< 0.05). Secondly, there is significant relationship between the component of Mathematics of the Universal Basic Education and Basic Technology ($X^2_{cal} > X^2_{val}$, df= 15,P< 0.05).

Based on these findings the study recommended more emphasise on some topics in the UBE Mathematics curriculum that show more understanding of Basic Science and Basic Technology to be taught by the teachers. It was further suggested that such topics should be scheduled at each level of Universal Basic Education in the scheme of work.

Key words: Mathematics, Universal Basic Education, Democratization, Science and Technology

Introduction

The importance placed on the teaching and learning of Mathematics world-wide is no longer new as every nation sees the subject as the language to understand science and technology, which are the indices of development. In a desire for development Nigeria follows the same suit in budgeting high for the teaching and learning of the subject. According to Deniyan (1998), technology is thought of as"know-how" while science is usually regarded as "know-why". Technology is the practical application of scientific or other knowledge it is therefore a major source of economic expansion. For the rural societies of Africa to transform into modern and urban industrial state, there is the need for the transmission of scientific and technical knowledge (Dewith, 1992 quoted by Emekwe, 2010). Nigeria is not only aware of the values of science and technology, she has actually derived this in the area of energy, increase in physical materials, information and communication technology leading to globalization medicine, which lead to health and economic prosperity and generally living conveniences steaming from altering the paradigms under which society operates. It has been found that Mathematics is the bedrock of science and technology. As Aminu (1995), opines Mathematics is not only the language of the science, it is the essential nutrient for thought, reasoning and therefore progress. There is an urgent need for the rapid development of the country and this could be achieved through the learning of Mathematics.

Unfortunately, Benard (2000) observed that the teaching and learning of Mathematics at all levels of education is at a dismal state, despite efforts at improving the situation through curriculum review; As reported by Jimoh (2001), the UBE was intended to provide functional education for all at the pre-primary, primary and junior secondary school levels, in trade and craft centres and out-of-school youths and adults. Its mathematical aspects focuses on improving numerical and manipulative skills of Nigeria children. Going by the afore mentioned "Mathematics crisis" in the UBE curriculum, the need therefore arises to re-assess component of UBE Mathematics in relation to science and technology, with a view to finding a suitable shift in these component to enhance the advancement of science and technology in Nigeria. Therefore, the study examine the UBE Mathematics content along side the requirements and needs of Basic Science and Technology. To achieve these stated goals two research questions and hypotheses were raised as follows:

RQ 1. What is the relationship between the component of Mathematics in the Universal Basic Education and Basic Science?

RQ 2. What is the relationship bewteen the component of Mathematics in the Universal Basic Education and Basic Technology?

H_1 There is no significant relationship between the component of Mathematics of the Universal Basic Education and Basic Science?

H_2 There is no significant relationship between the component of Mathematics of the Universal Basic Education and Basic Technology?

Methodology

The study was a survey research which made use of Nigerian Mathematics teachers in junior secondary schools in Oshodi/Isolo Local Government Area of Lagos State. All the Mathematics teachers of the junior secondary schools in the mentioned-area of Lagos State constituted the target population. Using the stratified sampling technique, fifty mathematics in ten were selected. There were five teachers per school. The major instrument 4-Likert Scale Achievement Test (LISAT), used in the research work was a structured questionnaire (Emekwe, 2010), which has two sections. Section A sought for respondent's bio-data as well as their background of teaching Mathematics. Section B contained twenty (20) questions relevant to the study, though prepared in a 4-Likert format of responses. The consistency of the instrument was determined in the pilot testing among some selected Mathematics teachers in the junior secondary schools outside the ones used in the sample, and their responses were scored using Pearson moment correlation method, with a reliable coefficient of 0.69 obtained.

Findings

A clear understanding of the result of the study could be appreciated via comprehensive analysis of the adapted 4-Likert Scale Achievement Test (LISAT) used to solicit information from respondents and as shown below:

Table 1: Adapted 4-Likert Scale Achievement Test for Mathematics teachers

S/N	Item Statements	Mathematics	Relational	4	3	2	1
1	4.8m of cloth cost ₦2232 the cost of 1m of cloth is ₦465.	Number & numeratic	Basic Science				
2	The value of 3(3x-y) when x=2 and y=-3 is 9	Algebraic Equation					
3	The perimeter of a rectangle is 20, if the breadth is 4, its area is 2	Geometry					
4	When recording data, the tally marks IIII IIII III represent the number 20.	Statistics					
5	A number is chosen at random from the whole numbers 30 to 39 the probability that is divisible by 3 is $^2/_5$.	Probability					
6	The bearing of A from P is 243°, the bearing of P and A is 63°.	Trigonometry					
7	In one year, a hospital admitted 1525 patients, 671 of these w treated for malaria, their percentage is 44%.	Number & numeratic					
8	The valkue of (-4) x (-6) x (2) is -48	Number & numeratic					
9	1424 In Roman numerals is MCMXIV	Number & numeratic					
10	The place value of 5 in the 249.056 is five hundredths.	Number & numeratic					
11	The value of 0.000549 in standard form is 5.49×10^{-4}	Number & numeratic	Basic Technology				
12	The value of 64 x 3.8 + 36 x3. 8 = 380	Number & numeratic					
13	Data's are represented with all of the following (1) frequency ta (2) pictogram (3) bar chart, (4) pie chart (5) quartile.	Statistics					
14	A bowl contains 30eggs, five of which are broken. If an egg chosen at random, the probability that it is not broken is 5/6.	Probability					
15	When x-4y=-6 and 2x+3y=10 is solve simultaneously, he values x and y are 2 and 2.	Equations					
16	In a class test, the marks of a student in eight subjects were follows, 71, 30, 45, 96, 92, 62, 84, 70, the median of the marks =72	Statistics					
17	The value of $2y^2-3$ if y= 5 is 47	Equations					
18	A box contains four blue balls and six red balls. If a ball is selec at random, what is probability of selecting a blue ball = 2/5	Probability					
19	If the angles of polygon are 90°. $4y^0$, 100°, 120° and $(7y-34)^0$, the value of y is 20.	Geometry					
20	These are Pythagorean triples (3,4,5), (6,810) and (7,12,13).	Geometry					

Source: Adapted from Emekwe(2010)

Table 1 above described the source of Mathematics topics out of the six broad topics in the subject relative to the three areas of human endeavours on which teachers of mathematics were expected to give their candid opinion. Though some topics seem to have occurred more than others, they serve as foundation topics in mathematics. of

others, and. On research question 1, which sought the relationship between the component of Mathematics in the Universal Basic Education and Basic Science, the teachers responded as shown in Table 2 below

Table 2: Relationship between the component of Mathematics in the Universal Basic Education and Basic Science

Item statements	SA	A	D	SD	Mean	S.D	Criterion	Remark
1	124	27	8	6	3.30	17.412	2.50	Positive
2	32	16	54	11	2.26	8.748		Negative
3	120	24	14	5	3.26	16.838		Positive
4	0	0	64	16	1.60	9.062		Negative
5	116	39	10	3	3.40	16.727		Positive
6	120	30	10	5	3.30	16.959		Positive

As the table 2 shows majority of the respondent agreed that items 1, 3, 5 and 6 extracted from number and numeration, geometry and probability has a relationship with the knowledge of Basic science. Thus, if these topics are well handled by the teachers they could enhance the development of the students' skill in the relevant areas. On the other hand, it was discovered that respondents were somewhat sceptical about the adequacy of appropriateness of items 2 and 4 extracted from Algebraic equation and statistics even though they could contribute to the knowledge of Basic Science extent of their appropriateness to the skill in basic science, Their judgment notwithstanding, the could be useful in other components of Technology. The implication of the finding is that topics that emphasized concrete use of object and which students could ascribe value to should be upheld in the course of teaching Mathematics at the elementary stages in order to stimulate their interest in the basic science.(see table 1)

On the second research questions raised, which sought to find out the relationship between the component of Mathematics in the Universal Basic Education and Basic Technology, the responses are displayed in table 3 below

Table 3: Relationship of the component of Mathematics in the Universal Basic Education on Basic Technology

Item statements	SA	A	D	SD	Mean	S.D	Criterion	Remark
7	124	21	12	6	3.26	17.307	2.50	Positive
8	20	15	52	14	2.02	7.916		Negative
9	0	0	64	18	1.64	9.123		Negative
10	96	33	18	6	3.06	13.975		Positive
11	152	36	0	0	3.76	21.528		Positive
12	116	21	18	5	3.30	16.287		Positive

Table 3 shows the respondents' opinions on the relationship between the component of Mathematics in the Universal Basic Education and the Basic Technology. Item statement 7, 10, 11 and 12 extracted from number and numeration, and algebraic equation have are believed to relationship with the knowledge of Basic Technology. If these topics are well handled, the topics could enhance the performance of the students' skill in basic technology appropriately. The respondents believed that the skill of basic technology is not restricted to only these two topics in Mathematics and so disagreed with the premise that item statements 8 and 9 have nothing to do with the knowledge of basic technology. By close inference respondents believed that these topics have varying importance to the understanding of the basic technology, depending on how they are presented to students to see their relationship(see table 1).

On the research hypotheses raised that there is no significant relationship between the component of Mathematics of the Universal Basic Education and Basic Science

Table 4: Chi-square analysis of the component of Mathematics in the Universal Basic Education on Basic Science

Item statemer	SA	A	SD	D	X^2cal	X^2val	df	Significanc
1	31	9	4	6	129.473	24.996	15	P<0.05
2	8	4	27	11				
3	30	8	7	5				
4	-	-	34	16				
5	29	13	5	3				
6	30	19	5	5				

Table 4 showed the chi-square analysis of respondents' view on the raised hypothesis where it was discovered that there is a significant relationship between the component of Mathematics of the Universal Basic Education and Basic Science ($\chi^2_{cal} > \chi^2_{val}$; df=15, P<0.05). This finding showed that respondents were strongly of the opinion that these components of Mathematics were found useful to the understanding of basic science, and if teachers of Mathematics handled them with care in the course of teaching the students, then modern development for which science is associated with could be enhanced.

Also, on the research hypotheses raised that there is no significant relationship between the component of Mathematics of the Universal Basic Education and Basic Technology

Table 5: Chi-square analysis of the component of Mathematics in the Universal Basic Education on Basic Technology

Item statements	SA	A	SD	D	X^2cal	X^2val	df	Significance
7	31	7	6	6	151.303	24.996	15	P<0.05
8	5	5	26	14				
9	-	-	32	18				
10	24	11	9	6				
11	38	12	-	-				
12	29	7	9	5				

Table 5 showed the chi-square analysis of respondents' view on the second hypothesis where it was discovered that there is a significant relationship between the component of Mathematics of the Universal Basic Education and Basic Technology ($\chi^2_{cal} > \chi^2_{val}$; df=15, P<0.05). By this finding it showed that basic language to understand technology lies in the understanding of Mathematics, and in specific terms the appropriate items that are embedded. This is to demonstrate that no meaningful technology could take place without comprehensive knowledge of Mathematics as an appropriate language.

Discussions

It is no longer news to state why mathematics should be made compulsory for all students in as much everybody wants meaningful development as dictated by the modern science and technology for which Mathematics is a potential instrument. What is new is how to make these topics more relational to basic science and technology so that students will not see these two ideas in isolated way, rather as a complementary knowledge. This is why one could say that there is no aspect of Mathematics that is not essential and useful except those who are entrusted with the use of figures do not understand the excellent of the numbers.

Apart from this the instinct interest in modern science and technology could be fostered as soon as the students do not have phobia for numbers and operations that are the basic tools in Mathematics. This is to show that interest in Mathematics emanates from the interest which students develop in the ability of the teachers of Mathematics that imparted the appropriate knowledge to the students. On a lighter mode and if mathematics were not made compulsory for the students to pass the entire mathematics classroom would have become a ghost areas, and by implication the relevant of the teachers could have been imagined, and state of development would not have been imagined.

Similarly, the study has demonstrated that it is better to catch the development at younger stage instead of amending strong and un-adjusting situation to towards a conceived goal. the implication of this is that Mathematics is made to facilitate development as soon as students understand its rudiments and not for students to be forced in understanding. In as much as students learn the local language either by instinct or otherwise from theirs parents, also the teacher of Mathematics should turn themselves as parent surrogate to make the learning of mathematics flexible for the students to learn as a subject on one hand, as complementary discipline to enhance further development. Further research work is expected to be conducted on the use of the identified topics relativelyto computer and ICT use, which the present study has left out for subsequent one.

References

Amimu J (1995): Quality and stress in Nigeria Education Northern Nigeria Publishing Company.

Benard A.F. (2000): "Mathematics in technological Development: Focus on the next millennium: Implication secondary Education". Abacus, the Journal of the Mathematical Association of Nigeria Volume 25, No1.

Daniyan, M.A. (1999): "The place of Mathematics in the development of science and technology." A le delivered to participants during the workshop on National Fluid mechanics at National Mathematical c Abuja on 23rd April 1999.

Emekwe, P.O.(2010) Mathematics components of the Universal Basic Education (UBE) in relation to Science a Technology in Nigeria. Unpublished M.Ed Dissertation, Science & Technology Education, Lagos State University, Ojo

Jimoh S.A (2001): The role of faculties of Education in the implementation of universal Basic Education schen paper presented at the one-Day workshop on UBE, University of Ilorin.