ENSURING AN APPROVED TEACHER PUPIL RATIO FOR EFFECTIVE SCIENCE EDUCATION IN SECONDARY SCHOOLS

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Abstract.

The provision of a qualitative science education is sine qua non for technological growth arid development. The teaching of science in Nigerian schools appears to be in a rowdy, confused and unfriendly environment where the best is not likely to be achieved. This paper examined teacher-pupil ratio in the light of science education, re-appraised determinant of teacher - pupil ratio and emphasized the need for adherence to a standard teacher - pupil ratio to. reposition science education in Nigeria. The way forward for science education, was proposed.

Introduction

The performance of students in internal and external examinations in science subjects in Nigeria and indeed most part of Sub-Saharan Africa, appears to be on the decline. This decline in achievement and performances has been attributed to lots of factors ranging from inadequate preparation to the perceived difficulty of understanding the subject matter in the sciences. (Ekwevugbe and Omoraka, 2005)

Science education according to Oraifo (1997) refers to an enterprise that occurs at two main levels: as in educational institutions and at the larger society, there are strong methodological and compelling utilization motives to its theory and practice. The teaching and learning of science in our schools have been giving parents, guardians and the genera! public a cause for concern. In most schools in Nigeria, facilities seem to be inadequate and as such, students are crowded into laboratories only to learn by "seeing" and not by "doing". There is usually a teacher who tries to demonstrate practicals either on the chalkboard or in some cases with only one or two sets of apparatus. This situation to say the least does not help to improve the misfortunes suffered by the teaching and learning of science in our schools.

This paper is an attempt to examine the concept of teacher - pupil ratio and its usefulness in repositioning science education in Nigeria. .

Teacher - pupil Ratio

Teacher - pupils ratio refers to the proportion of students to teachers in the school system (Ovwigho, 1991). The teacher-pupil ratio helps to determine the average number of students that are allocated to a teacher in a given educational level at a given time. The recommended teacher - pupil ratio at the secondary school level is 1:40. (FRN, 1998). Teacher - pupil ratio may be classified as adequate if it adheres to what is stipulated in the National Policy on Education, that is where there are 40 students or less to one teacher. -

In most schools in Nigeria, what we observed are teachers, that are crowded round by over 80 students during practical/demonstration classes.

Muritala (1998) stated that the number of classes in a single arm of a class is too many and each class consists of as many as 70 to.75 students. Over populated classrooms are however common place and these are far from enabling in promoting science learning (lyobhebhe, 2005). Teaching and learning cannot take place in a depersonalized environment. Warm interaction will require that the teacher handle a prescribed "Optimum" number of students. This according to Durojaiye, (1976) has a twofold function:

- the teacher can pay adequate attention to the individual child in terms of proper supervision and monitoring and
- the teachers effort are not spread so thinly across the classroom causing low productivity for teachers and students.

For these reasons, the student is confident that the teacher will have "time" for him or her and as such cannot fade to the background because his absence or non-participation will be noticed. This interaction between the student and" teacher which is as a result of an adequate Teacher-Pupil Ratio will aid learning and this learning will help to reposition science education in Nigeria.

Determinants of the Level of Teacher—Pupil Ratio

There are several determinants of the level of teacher- pupil ratio in Nigeria schools. For the purpose of this paper however, we shall examine just a few.

* **Quest for Improved Standard of Education**

The standard of education today especially in our secondary schools is said to be on the decline. This decline is manifested in the most disturbing phenomenon of failure in public examination, (Zainfada, 2002). Widespread incidences of examination malpractice have tended to further reduce students drive for genuine scholarship. Guardians, students and parents now hire teachers, and undergraduates (mercenaries) to sit and write examination for their children and wards (Ezeh, 2004).

In the opinion of Obanya (2002) cited in Umo (2004) quality outcomes in education can only come about through the interplay and combination of quality inputs and quality processes that include successful learning. The quest for an improved standard of education and indeed science education can be adduced to governments attempt at expanding facilities, recruiting new teachers and hence reducing the level of the teacher-pupil ratio for effective science education.

* **Available Resources**

Resources in the secondary school system include, human, fiscal, modern equipment and so forth that impart positively on the educational system. The teacher - pupil ratio in any state or region may be determined by the amount of qualified manpower that it has. Certain human resources in the secondary schools are scarce and others need specialized and long period of training. In the secondary school system, teachers of certain subjects such as Biology, Chemistry, Health Science, Integrated Science, Introductory Technology, Mathematics, Physics among others are in short . supply. In Delta State for example, there are only 146 Introductory technology teachers to manage 370 secondary schools, while subjects like Physics have only 368 teachers which translate to less than one teacher per school. But, because there are bigger schools with more than one teacher, some schools end up not having at all. Warri - South Local Government Area for instance has 4 secondary schools but only 2 Physics teachers as shown in the table below.

Table I: Distribution of Science Teachers by L. G. A as at March, 2004

LGA	INTRO. TECH.	MATHS	PHYSICS	BIOLOGY	CHEMISTRY	INT. SC
Aniocha North	II	21	13	13	11	6
Aniocha South	8	29	17	18	20	2
Bomadi	.	14	•4	• 10	3	2
Burutu	!	17	5	7	8	2
Ethiope East	8	32	15	31	28	9
Ethiope West	1	31	17	17	13	3
Ika North East	6	78	24	67 -	36	6
ika South	10	69	26	47	53	4
Isoko North	3	33	10	17	20	3
Isoko South	6	39	14	22	25	6
Ndokvva East	4	17	7	7	5	3
Ndokwa West	8	42	10	23	18	9
Okpe	2 '	28	9	24	17	10
Oshimili North	-	22	13	28	25	4
Oshimili South	10	46	10	42	28	5
Patani	4	18	4	7	5	3
Sapele	10	67 '	35	47	46	24
Udu	2	28	9	27	10	1
Ughclli North	25	105	28	83	57	10
Ughelli South	-	38	12	29	23	10
Ukwani	6	26	18	21	28	1
Uvwie	10	74	26	91	73	17
Warri North	2	11	-2	• 14	2	-

Warri South	9	!03	37	119	46	7
Warri South West	-	9	3	6	5	-
Total	146	997	368	817	605	147

Source: Statistics Department, Post Primary Education Board, Asaba

The shortage of these critical resources has tended to raise the level of the teacher - pupil ratio in some cases. These shortages were however attributed to lack of funds when Aghenta (2004:17) posited that "secondary schools are poorly or inadequately staffed The teachers both in number and quality are crucial to quality education and their inadequacy therefore is a threat to human resources development in Nigeria."

Another important resources which determines the level of the teacher - pupils ratio is Infrastructural facilities. Infrastructural facilities are defined by Olubor and Ogonor (2002 :46) as "the operational inputs of every instructional programme and they are necessary for utmost learning achievement." In the same vein, facilities are those equipment that enable workers to achieve the goals of an organization. Facilities are plants, equipment, materials and so forth (Ehiametalor, 2001). These important educational inputs are however lacking in most secondary schools across the country. This poor state of infrastructural facilities will continue to breed crowded classrooms and over stretch the few manageable classroom until new structures are built and decaying ones rehabilitated. When resources are inadequate, students will crowd round teachers in classrooms and laboratory to the detriment of science education.

Population of School going-age

The population of school going-age especially at the secondary level is made up of pupils of between ages 12-18 years. This population is however affected by several other factors including:

i. birth rate

ii. death rate

iii. dropout rate

The population today, appears to be on the increase because of improved medical care and unplanned child bearing practices etc. In the assertion of Joe (2004), the ever increasing population of children at the different levels of education in Nigeria constitutes a problem. The overall effect of mass production of children apart from affecting governments' plans at providing social amenities for the populace, increase the population of school going-age to be catered for, as a result the level of the teacher - pupil ratio is affected. When the children are enrolled due to government's policy of universal basic education, it will translate into more students being caterered for by a single teacher. In the absence of improved facilities, there will be overcrowding and science education will be worse for it.

Need for Adherence to a Standard Teacher - Pupils Ratio for Repositioning Science Education Effective Teaching and Learning

The teaching and learning of science will be more effective when there is a better interaction between teachers and pupils. This interaction could be in the form of teachers going round the class and laboratory to see how well concepts, calculations and ideas have been understood. With a manageable classroom situation, assignments could be given, checked and effectively marked and corrections made even on a one on one basis.

The teaching and learning of Mathematics, Physics, Chemistry, Introductory technology, Integrated science etc can better be achieved in a small teacher - pupil ratio situation. This is also because teachers are able to explain, correct class works, re-correct and re-explain concepts for the benefit of the students. What science education need today is not more than this.

Guide for Policy Makers and Administrators

An adherence to a standard teacher- pupil ratio will mean that classrooms and laboratories

will be built to reduce the seeming over crowded situations in the classroom. Where there is a policy to improve the teaching and learning of science, government and other relevant agencies may be compelled to recruit more science teachers rather than the massive employment that is skewed in favour of the Arts and Social Science subjects. An adequate teacher - pupil ratio will see to it that recruitment of more science teachers is guaranteed.

Policy makers and administrators appear to pay mere lip services to the teaching and learning of science and technology in our .schools. In most schools in Nigeria, there is the absence of equipment for practical teaching and most of the schools in urban areas may not even have a space for students to carryout Agricultural Science practicals talk less of owning a mechanized farm.

Stimulation of the Learners' Interest

The interest of the learners is one important factor that must be considered when we talk about repositioning science education in Nigeria. If the interest of the learner is to be aroused, the learning environment must be made conducive for the teaching and learning of science. This can only be achieved with an approved teacher - pupil ratio. The interest of the learner for science will be killed if the learning environment is not made conducive and attractive to the learner.

Regarding the stimulation of interest, Smith and Laslett (1993:37) posits that "the teacher attention and display of interest in a child's work can refocus the attention of the learner." This is what science education need in Nigeria and the achievement of this goal is only possible where there is a small class size.

Technological Breakthrough and Innovations

The proper and adequate preparation of students in this world of advance technology can only be achieved despite limited resources only when the teaching and learning of science is given its pride of place in our schools. When attention is given to science education for technological growth and development, only adequately trained and prepared students can establish themselves in the spheres of scientific innovations and discoveries.

The teaching and learning of science in a conducive environment will ensure adequately trained technical and scientific manpower who would be able to lift Nigeria out of this scientific and technological backwardness. This is a major reason for clamouring for an improved and repositioned science education in Nigeria.

Way Forward for Science Education in Nigeria

The teaching and learning of science in Nigeria has suffered series of setbacks as a result of non-adherence to laid down policies, programmes and recommendations of experts and scholars. Science education may be Improved and repositioned in the following ways.

- strict adherence to the relevant teacher - pupil ratio in schools across the country
- schools should be made to focus on teaching of science and to admit only the number. they can affectively cope with so as not to water down the standard of education and the efficacy of science as a means to technological advancement.
- Policy makers and administrators should ensure that within the limits of available resources, classrooms and laboratories should be built and the level of infrastructural materials enhanced.
- Government and other stakeholders should ensure adequate financing for science
  education and the various determinants of the level of teacher - pupil ratio carefully evaluated.
- The government should ensure that science teachers are properly trained and provision should be made for training and re-training until enough teachers are made available in 'the education sector.

Conclusion

There is a general belief'that mechanics, welders and other players in the non-formal educational sector are able to learn and practice their trade as a result of the individualized instruction and training that is given to the trainees. An adoption and practice of a standard teacher- pupil ratio as stated in the National Policy on Education in science education will contribute significantly to the attainment of qualitative science education in Nigeria.

Finally, science education can only accomplish great heights in Nigeria when facilities and adequate manpower is put in place and adequate attention given to the learners. The question of how, when and what to do to improve and reposition science education in Nigeria, appears to lie in the practice of a standard teacher- pupil ratio.

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