

SCIENCE TEACHERS REQUIREMENT AND AVAILABILITY IN UPPER BASIC SCHOOLS IN EDO STATE: LOCATION ANALYSIS

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Abstract

Teachers are trained to further the human development capacity of the society. The deployment of science teachers in the right quality and quantity to the school system enhances the development potential of the system. Otherwise, students may not have the opportunity to further explore their potential in the field of science and technology. In order to find out the position of affairs in the requirement and availability of science teachers in the upper basic education level in the three senatorial districts of Edo State, this study was set out. The human capital theory as expounded by Schultz (1961) and Becker (1962) formed the anchor for the study. It explored the ex post facto research design while all the

upper basic education in Edo State formed the universe of the study. Multi stage sampling technique was adopted for sampling the schools for closer investigation as the phenomenon was examined in urban and rural schools as well as on senatorial basis. Three research questions were propounded and answered using percentages, average and pictorial illustrations. The study found that there was inadequate supply of science teachers to the three senatorial districts of Edo State. Even though rural schools were worst affected the urban schools were marginally staffed. It was suggested that the proprietor should employ science teachers from the locality of the schools to teach in the upper basic schools in the state.

Introduction

The importance of teachers in human capital development can never be over emphasized. The Nigerian government through the National Policy on Education (FRN, 2016) asserts that no education system can rise above the quality of teachers in the system. In other words, an education system is as good as the quality and quantity of its teaching workforce. Teachers are specialists, trained and deployed for the utility of their acquired skills in teaching the various disciplines in the education sector. Accordingly, a teacher is someone who is trained in at least one of the teaching subject areas in any of the following institutions:

- a. Colleges, Faculties and Institutes of Education
- b. National Teachers' Institute
- c. Schools of Education in the Polytechnics

- d. National Institute for Nigerian Languages (NINLAN)
- e. National Mathematical Centre (NMC) (FRN, 2016)

There is the need to balance not just adequacy but also competency in various academic disciplines in the broad arts, social science and science based subject areas. Another factor that can affect supply of teacher is the geographical location of schools. Every state in Nigeria has three Senatorial Districts namely North, Central and South Senatorial Districts. The distribution of teaching resources in Nigeria has been found to tilt favourably towards the urban schools to the disadvantage of rural schools. Oghuvbu (2008), Imakpokpomwan and Aghenta (2009), and Nwadiani and Ojogho (2014) found that urban schools are better staffed than rural schools.

This study was hinged on Human Capital theory popularized by Theodore Schultz (1961) and Gary Becker (1962). Human capital formation exponents argue that investment in human capital leads to greater economic outputs. They state that expenditure on tangible capital like factories and plants are worthwhile because they are assets that can yield income and other useful outputs over a long period of time. But such tangible forms of

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capital are not capable of renewing themselves; rather, they depend on the services of the human factor to propel them for productivity. Therefore expenditure on education, training, travels and medical care are regarded as investment in human capital development which energizes manpower for higher productive capacity in the economy. Their key assumption of human capital proponent is that the rate of return on investments in human capital can lead to pecuniary and non-pecuniary gains because humans are the change agents that could influence all other factors of production. While the other factors are passive agents, human capitals are active in taking the necessary decisions that create wealth for the society. Thus, teachers are active agents that utilize other teaching resources in transforming the pupils who came into the school without the needed skills (in a sense raw, so to say, and ready for transformation) for higher productivity. They can be transformed for bad or good depending on the quality and quantity of the teachers in the school system. The society benefits if adequate teachers are employed, equitably deployed and functionally utilized in the relevant subject areas.

Oghuvbu (2008) studied the distribution of teachers in Delta State of Nigeria and found that there are more urban teachers in Delta State resulting in only 20% of the teachers available in the rural schools. According to his findings, 'There are no teachers in most rural junior secondary schools'. The study also found that school location significantly influenced the distribution of teachers among secondary schools in the state. In a study of the demand and supply mix of teachers in Upper Basic Education in Delta State, Imakpokpomwan, Ejije and Adeyemi (2017) investigated the position of teaching personnel deployment in the Universal Basic Education in Delta State. They found a balance in the allocation of teachers.

Nwadiani and Ojogho (2014) investigated resources allocation in primary schools in Delta State. They sought to find the teaching personnel available based on the urban, rural (upland) and rural (riverine) locations. Data obtained from the schools was analysed using percentages and pictorial illustrations. On the average, from the available specialist mathematics teachers in post, they found 86.2% located in urban areas, while the

rural areas had 13.8% distributed as 12.0% rural upland and 1.8% rural riverine. In the same vein, specialist science teachers were distributed as 82.9 urban and 17.1% rural (12.2% upland rural and 4.9% riverine rural). The position of staffing for Physical and Health Education in the primary schools in Delta State during the period covered by the study also toe the same pattern as 79.2% of them were deployed to the urban areas whereas 20.8% were rural based categorized as 11.1% upland rural and 9.7% riverine rural. The bottom line is that the urban primary schools had the larger share of teaching staff deployment in science and science based disciplines in the primary schools during the period as revealed in the study.

Academic programmes in the upper basic education level are streamlined into science and science based subjects, and the social science and arts based subjects. The science and science based subjects at that level of the educational system in Nigeria are Mathematics, Pre-Vocational Studies and Basic Science and Technology. On the other hand, the Social Science subjects are Business Studies and National Values while the art based courses are English Studies, French, National Languages such as Hausa, Yoruba or Igbo and a local language such as Edo, Ishan and Afemai Languages according to the location of the school. Other subjects in the arts based subject group include Religious Studies and Creative and Cultural Arts. Cognitive development of academic subjects could result in future career development of the students toward the particular subject of interest. A student who has the inborn traits toward particular career could be denied the opportunity to further explore the vocation in future if there is no teacher to teach such subject at the basic education level. For example if a student has the inborn traits toward the creative arts, he may not be able to develop that talent if there is no competent, qualified teacher to teach the students to a reasonably comprehension level. Ahmed (2012) testified to the contribution of the teacher in the future aspiration of the students when he stated that the teacher is not only the source of wisdom to the pupils but their source of economic wellbeing in future.

Academic programmes engender intellectual development of individuals and national

development. Ivowi (2006) atteststo the fact that programmes offered in lower levels of education form the basis for entry to tertiary institutions and the world of work. Odutuyi, Bada and Akinwande (2017) underscore the importance of teachers in the development of science. According to them, achieving the goals of science education requires qualified and highly scientifically literate teachers because the quality of the teaching can be influenced by the quality of teachers. Imakpokpomwan (2015) and Imakpokpomwan and Olubor (2018) found the training of teachers to be skewed in favour of arts and the social sciences in the sandwich programmes organized in sampled universities in Southern Nigeria to the detriment of science based courses. Since student inputs in the sandwich programmes are mostly teachers from the basic education level, there could be a dearth of science teachers at that level. Hence, they are not available to seek for admission for higher studies in the sandwich programmes. According to Imakpokpomwan (2015), there is no society that can modernise when science and technology education is relegated to the background. Availability of science based teachers in the school promotes science and technology education. Could it be that with the increased output of trained teachers in the country, science teachers are now adequately employed in upper Universal Basic Education level? Could it be that Edo State government who is the proprietor of public schools in the state has distributed science teachers in proportion to demands imperatives irrespective of location of upper basic education schools in the state? Could it be that no gap exists between teacher requirement and availability in the upper basic education schools in the state? These questions form the basis for this study.

Research Questions

In this study three research questions were raised to direct the work. They are

1. What is the science teacher requirement in upper basic education in Edo State?
2. What is the science teacher availability in upper basic education in Edo State?

3. Is there a gap between science teacher requirement and availability in upper basic education in Edo State?

Method and Procedure

The study is a descriptive survey. The population of the study comprises all the Universal Basic Education schools otherwise called the junior secondary schools in Edo State of Nigeria. Multi-stage sampling technique was employed. Edo State has eighteen (18) Local Government areas stratified into three Senatorial Districts called Edo South Senatorial Districts, Edo Central Senatorial District and Edo North Senatorial District. All the senatorial districts were purposively sampled. Six of the local government areas which constitute 33% of the local government areas in the state were stratified into predominately urban and predominantly rural local government areas of which two local government areas, one representing each strata of urban and rural local government areas were sampled from each Senatorial Districts. Thus, in each of the three senatorial districts, two local government areas were sampled to make up the six local government areas sampled for the study. All the upper Universal Basic Education schools in each of the sampled six local government areas were purposively sampled for the study. Data was collected with the Science Teachers Requirement and Availability Checklist (STRAC) in the 2018/2019 academic session from the Principals of the sampled schools with the support of research assistants. Collected data was analysed using percentages, average and pictorial illustrations.

Research Findings

Research Question 1: What is the teacher requirement in science subjects in upper basic education schools in Edo State?

Table 1 presents the teacher requirement in science based subjects in sampled upper basic education schools in Edo State during the period of the study.

Table 1: Teacher requirement in science subjects in upper basic education in Edo State

S/N	Senatorial District	No. of Schools				Total number of science teachers required			
		Urban	Rural	Total	% share of schools	Urban	Rural	Total	% share of teachers
1	South	13	28	41	39.4	95	75	170	44.27
2	Central	12	14	26	25.0	52	57	109	28.39
3	North	08	29	37	35.6	41	64	105	27.34
	Total	33	71	104	100%	188	196	384	100
	Percentage distribution	31.73	68.27			48.96	51.04		

Source: field work (2020)

The upper Basic Education curriculum contains three science based subjects of Mathematics, Basic Science & Technology and Pre-vocational Studies. The total number of teachers required to teach these subjects in the sampled schools are 384 teachers. Of the number, 188 of them are required in the urban schools while 196 science teachers are required to teach the sciences in the rural schools.

Research Question 2: What is the teacher availability in selected science based subjects in upper basic education in Edo State of Nigeria?

Table 2 presents the available science teachers in sampled upper basic education in Edo State.

Table 2: Available teachers in science subjects in sampled upper basic education in Edo State

SN	Senatorial District	No. of School				Number of Available Science Teachers			
		Urban	Rural	Total	%	Urban	Rural	Total	%
1	Edo South	13	28	41	39.42	45	19	64	56.64
2	Edo Central	12	14	26	25.01	19	10	29	25.66
3	Edo North	08	29	37	35.57	09	11	20	17.70
	Total	33	71	104	100	73	40	113	100
	% distribution	31.7	68.3	100		64.60	35.4	100	

Source: field work (2020)

Sampled urban schools have a total of 33 schools distributed as 13, 12 and 8 in Edo South, Central and North Senatorial districts respectively. The 33 schools form 31.7% of upper basic education located in Edo State. In terms of science teachers available in post, the urban schools took 64.6%. The sampled rural schools are 71 in number, thus constituting 68.3% of the total number of upper basic education institutions in the state. The rural schools have 40 science teachers which is 35.4% to man the 71 upper basic schools.

Research Question 3:

Is there a gap between the science teacher requirement and availability in upper basic education in Edo State?

Table 3 presents the science teacher requirement and availability in the upper basic education in Edo State.

Table 3: Science teacher requirement and availability in upper basic education in Edo State

SN	Senatorial District	Science Teachers Required			Science Teachers Available		
		Urban	Rural	Total	Urban	Rural	Total
1	Edo South	95	75	170	45	19	64 (56.6%)
2	Edo Central	52	57	109	19	10	29 (25.7%)
3	Edo North	41	64	105	09	11	20 (17.7%)
	Total	188	196	384	73	40	113

Source: Field work (2020)

The upper Universal Basic Education institutions in sampled urban schools requires 188 teachers while 73 are available to teach the science based subjects. On the other hand, the rural upper basic education institutions are supplied with 40 science based teachers out of the 196 required to teach in the school. Thus, a wide gap exists between teacher requirement and availability by location in upper basic education in the state. Figures 1a, 1b and 1c present the data in picture.

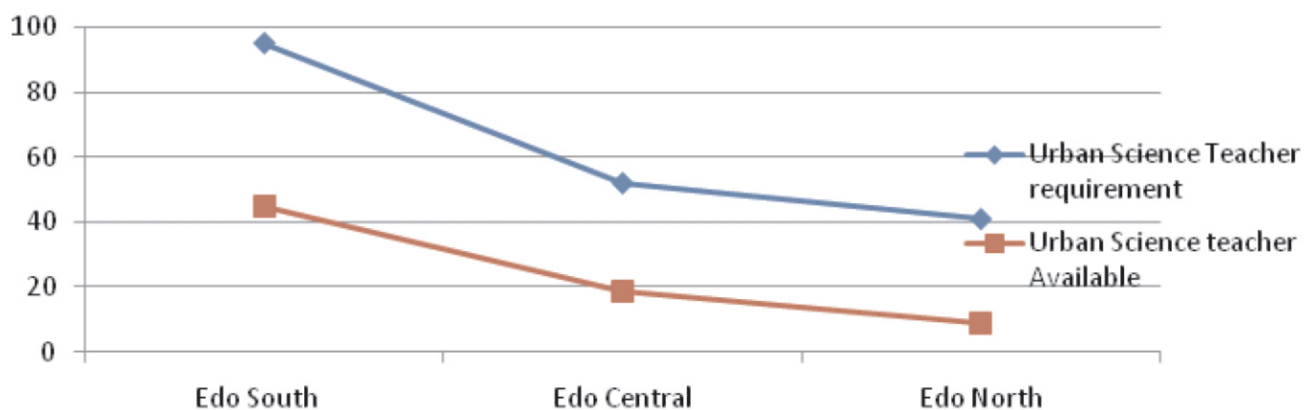


Figure 1a: Urban Science Teacher requirement and availability by location in upper Universal Basic Education in Edo State.

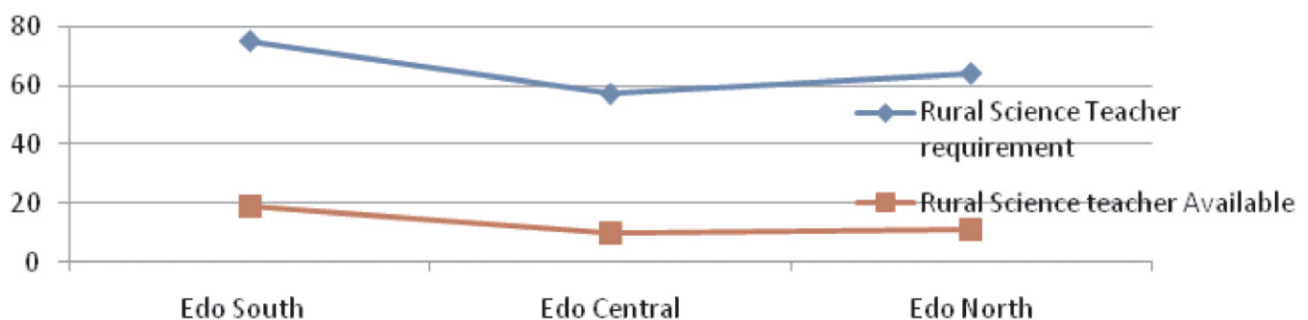


Figure 1b: Rural Science Teacher requirement and availability by location in upper Universal Basic Education in Edo State.

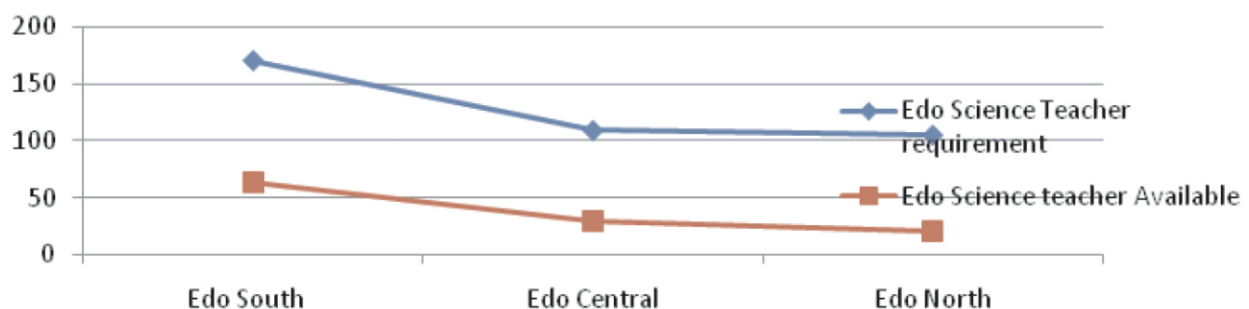


Figure 1c: Science Teacher requirement and availability by location in upper Universal Basic Education in Edo State.

Figures 1a, 1b and 1c demonstrate in pictorial illustration the position of science teacher requirement and availability by urban, rural location in the three senatorial districts joined together. 1a reveals that the teachers available in urban schools are less than the actual number of science teachers required in the school. In Edo South for example, there is a need for 95 science teachers in the urban schools but 45 are deployed to teach the sciences. Thus, in percentage terms, 47.4% are available while 52.6% of the science teachers required are not in post in urban upper basic schools. Figure 1b shows the position of the rural schools. In Edo North rural schools for example, out of the required 64 science teachers, 11 science teachers which constitute only 17.19% of the required science teachers are available. A similar scenario plays out in the other rural schools in the state.

Discussion of Findings

This study reveals that the majority of the schools (68.27%) are located in the rural areas while urban upper basic schools are 33 (31.73%) in number. It was established also that the 33 urban upper basic schools require 188 science teachers but received a distribution of 73 (38.83%) of their needs in the three senatorial districts. The 71 rural upper basic schools require 196 science teachers to teach the sciences but received 40 which are 20.4% of their need. Percentage wise, the urban schools fair better marginally. This is likely because of population concentration in urban schools where a school may have more than one arm of a class. On the other hand, the rural schools cannot afford to do without at least a subject teacher in the sciences. The plight of the schools irrespective of location, whether in urban or rural areas, cannot support quality learning because of inadequate availability of science teachers. The researchers noted that in some schools in the rural areas the only staff available is the principal of the school or, in some cases, the Principal and his vice are the only staff on the roll call. The findings aligned with the findings of Oghuvbu (2008), and Nwadiani and Ojogho (2014) who found the rural schools inadequately staffed. It however contradicts the findings of Imakpompomwan, Ejije and Adeyemi (2017) who found a balance in teacher distribution among urban and

rural schools in a selected senatorial district of Delta State. This study however establishes that even urban upper basic education is contending with inadequate supply of science teachers.

On the basis of senatorial districts, Edo South received 56.6% of the science teachers distributed even though the district constitutes only 39.42% of the schools in the state. Edo Central has 25.1% of the schools but received 25.7% of the science teachers distributed in the state. Edo North which has 35.57% of the upper basic education in the state was allocated 17.7% of the science teachers distributed. It appeared the further the schools are from the seat of government the less the science teachers allocated. Thus, location of schools affects supply of its teaching workforce. Edo South Senatorial District which is the seat of government has wives of top government officials who teach in schools in the district hence the upper basic schools located there in received higher number of science teachers allocated. On the other hand, the seemingly intractable security problem of kidnapping, robbery and rapping of citizens including teachers and pupils may have informed some teachers refusing rural posting. It thus appears that the further one is from the capital city which accommodates the security command of the state, the higher the risk of falling victim. The rural area used to be isolated from violent crime, but with the advent of kidnapping in Nigeria, nowhere is safe. On daily basis people are being kidnapped on the express roads and taken far into the interior even in rural communities where security operatives are less visible. Possibly this informs more science teachers being distributed to Edo South Senatorial District than the other two Senatorial Districts in the state. The study found that a wide gap exists between science teacher requirement and availability in the upper basic education in the state. In Edo Central for instance, of the 109 science teachers required, only 29 which is 25.1% are in post. Universally, 113 science teachers are distributed to the three senatorial districts instead of the 384 required; thus as much as 70.6% of the required teachers are still not available to teach the sciences in the sampled schools. The problem is likely demand side induced rather than supply side induced because the teacher training institutions keep producing teachers in all subjects including the

science based subjects but the government has not employed those trained to teach in the schools. It is generally known that there is unemployment in the country. However, in Edo State, the last major employment into government services conducted publicly in the state was during the Lucky Igbinedion regime which ended in 2007, over 12 years ago. In 2012, the Adams Oshiomole regime conducted employment exercise into the teaching service. The exercise was alleged to be ridden with irregularities and therefore cancelled by the Edo State government. Ever since, there has been no publicly conducted employment exercise into the upper basic education level in the state. For about a decade, teacher training institutions kept producing teachers with the scarce resources of the state. Yet, the outputs of these institutions are not employed to contribute their services to national development. On the other hand, teachers employed are aging and retiring from public service and some exit the service by death. Without any major inlet for over a decade there is bound to be dearth of the teaching personnel in the subjects sampled for the study.

Conclusion

This study was set out to investigate into the science based teachers requirement and availability in the upper basic education institutions in the three senatorial districts of Edo State. It has been established that the three senatorial districts are facing inadequate supply of science based teachers. The most favoured in the distribution of science based teachers is Edo South Senatorial District. The rural areas are worst affected. Thus, about half of the science teacher requirements to teach in the upper basic education schools even in urban schools are not available. There is the need to close the gap created between science teacher requirement and availability for science education to thrive in the upper basic education institutions in the state.

Recommendations

The following recommendations are made to improve the quality of teaching of science subjects in the upper basic education in Edo State.

- 1) There is the need to employ science teachers into the teaching services of the upper basic education level in the state for distribution to schools in the senatorial districts.

- 2) Since the rural schools largely lack science based teachers, incentives to encourage them to accept rural postings should be developed. Giving rural teachers' allowance, employment of graduates to teach in their localities and giving some steps ahead in the employment cadre for science based teachers who reside in the rural areas for every eight years could motivate some teachers to accept rural posting.
- 3) Government should focus on the security of school personnel so that science teachers in rural locations can feel safe to do their jobs no matter how remote the location is.

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