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Effect of Resource Factors and Quality of Instruction on Performance in Mathematics of Nigeria Secondary School Students

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Abstract

It seems that Nigeria's educational system has been undergoing improvement only on quantitative when it comes to the number of enrolments in students and schools. However, little effort has been put in place in terms of capacity (physical and material resources, human and financial resources) to manage high enrollment. Resources capacity in secondary schools was nothing to write home about. Most of these resources in secondary school were dilapidated. To worsen the scenario, the scarce resources allocated to these schools are grossly inadequate compared to students' enrollment and come late to the end-users in the public secondary schools. The various stakeholders in the education sector express stern concern about the consistently poor performance of students in secondary schools, especially in mathematics. Since secondary school education is expected to be free by the government, coupled with population increase, it is reasonable for people to take advantage of the free education program. Although the government and private sector of education keep providing qualified teaching staff and non-teaching staff, students in secondary schools still face poor performance in mathematics. The effect of all these on the academic performance in Nigeria's mathematics secondary school students concerns researchers of this empirical work. It is based on these issues and many more that this work sought to empirically investigate the impact of resource factors and quality of instruction on the performance of Nigeria secondary school students in mathematics.

Keywords: resource factors, performance, mathematics, quality, instruction

A. Introduction

Several authors have put forward numerous definitions of education. Even though there may not be a universally acceptable definition of the term, any definition of education embodies the complete process of learning. There is imparted knowledge, trained faculties, and developed

skills. In Nigeria and other developing countries, together with their developed counterparts, the position of secondary school education in the educational system occupies both strategic place and the connection between primary education and university education levels. Secondary school education is expected to be the foundation and pillar of attaining tertiary knowledge in higher institutions. The standard of living of citizens and the country's development in the area of gross domestic product (GDP), politics, society, technology, science, and culture depends on the development of sound secondary school education. It is quite disheartening that the role of secondary school education nowadays lacks the required standards that we expect from them. These have led to a chorus of disapproval from the general public over students' continuous poor performance in a secondary school in their general examinations (Ashikhia, 2010). The standard of education of a country is directly or indirectly connected to students' academic performance. It is, therefore, very much necessary to maintain high academic performance in both internal and external examinations. Over some years back, findings from researches and reports from various national news dailies have revealed horrible academic performance in the public examinations among secondary school students (Nwokocha, & Amadike, 2005).

One of the most reliable measures of school performance of Nigeria secondary school students is via the Senior School Certificate Examination (SSCE), which is a public examination in the country. This examination is externally coordinated with much confidence among the general public. The forms of education that are received by students immediately after the completion of their primary schools' education and before they go in for the tertiary education is referred to as secondary education. It is well understood that without secondary school education, it will be tough for primary school students to further their education in the country and even outside the country. If one looks at the aims and objectives of establishing secondary schools in the country, no one will doubt students' performance after completing secondary school education. Though every education system has one or two problems, yet lapses in the Nigerian education system has become an eyesore. The lapses had sometimes been described as disastrous (Ogunsaju, 2010). There is no doubt that there are still few students with high academic performance even in public schools, but the extreme failure rate in the WASSCE has run down the good ones that can be found among them. Poor results were recorded on English Language and mathematics initially, but this later spread across other subjects that did not exclude Arts and Social Sciences. Secondary schools nowadays cannot either justify the confidence that the general public has in them or justify the reason for substantial budgetary allocations that were consumed annually. The bottom line is that performance in mathematics among secondary school students has been woeful over the years

This poor performance in mathematics among secondary school students has been given every stakeholder in the education sector a serious headache, considering that education at all levels virtually in all developing countries is regarded as an investment. This then led to a diverging opinion concerning the falling standard of education not only in the developing countries but also all over the globe. A major tool that is generally acceptable in the measurement of this standard is students' performance, especially in mathematics and English in Nigeria secondary school examinations. The failure seems to be more among students in secondary school because of secondary school education, which can be termed 'consumer-producer status' compared to other levels of education (primary and tertiary education). This 'consumer-producer status' is because secondary school education consumes the products of primary education and produces the products that will be consumed by the tertiary level of education. Going by the aims and objectives of secondary school education which focus on preparing secondary school students for tertiary level of education and to become useful to the general society at large, the aftermath of the above failure of secondary school education will then lie on the inability of secondary school students to gain admission into tertiary institutions and to become useful to the general society at large. It is on this note that this paper empirically investigates the effect of resource factors and quality of instruction on performance in mathematics of Nigeria secondary school students.

B. Literature Review
1. Performance in Mathematics of Nigeria Secondary School Students
The poor performance of students in secondary schools' external examinations conducted by the West African Examinations Council, National Examination Council and NABTEB has been a serious concern to stakeholders. Adeyemi (2011) submitted that available data showed that a 75 percent rate of failure was recorded in WAEC with something similar in NECO.

Figure 1. WAEC Results Statistics 2018 For Nigeria: Result Statistics for 5 Credits Including English Language only, Including Mathematics only and both Mathematics and English language.

Source: National Bureau of Statistics (NBS): WAEC RESULTS STATISTICS 2018
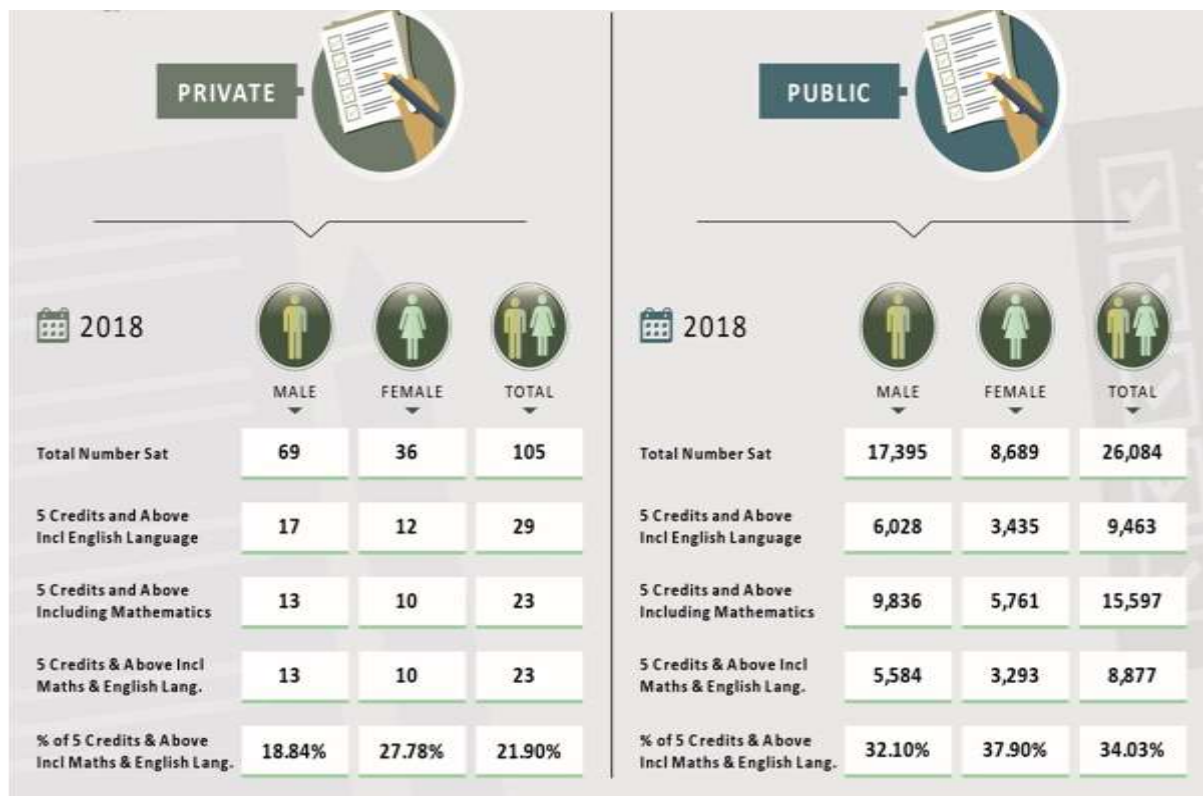

Figure 2: WAEC Results Statistics 2018 For Sokoto State: Result Statistics for 5 Credits Including English Language only, Including Mathematics only, Including both Mathematics and English Language

Source: National Bureau of Statistics (NBS): WAEC RESULTS STATISTICS 2018

Figures 1 and 2 above revealed the low performance in mathematics among Nigeria secondary school students in both private and public examinations in not only Sokoto state but also Nigeria as a whole. It is crystal clear from figure 2 that secondary school students in Sokoto state did not score up to 22% (5 Credits and above including Mathematics and English) in the private examination and not score up to 35% (5 Credits and above including Mathematics and English) in the public examination. It is also very clear from figure 1 that Nigeria secondary school students did not score up to 34% (5 Credits and above including Mathematics and English) in the private

examination and not up to 49% (5 Credits and above including Mathematics and English) in the public examination.

2. Reasons for Poor Academic Performance

Some of the reasons for poor academic performance especially in mathematics among Nigeria students as put forward by researchers consist of inadequate qualified and competent teachers, lack of basic equipment, facilities and instructional materials that will aid effective teaching, archaic methods of teaching and phobia to major subjects, whether students stay in school or with their parents (Edwards & Knight, 2012).

Furthermore, the mental health and physical fitness of secondary school students are significant factors in their academic performance, especially in mathematics. When these are present, their participation and concentration in learning will increase in school. Edwards & Knight (2012) had found a positive relationship between regular physical activity and performance among Nigeria secondary school students. This indicates that secondary school students with better mental health and physical fitness have higher chances of attaining high academic performance among Nigerian students in secondary schools. More so, the accessibility of sporting facilities enhances academic performance among Nigeria secondary school students. The presence of exercise among these students can boost the performance of their brains. Regular exercises increase the functioning of their brains, which leads to the use of working memory. It is also clear that students who stay in school will enjoy these facilities than their counterparts who stay at home with their parents.

Several factors that are related to students' performance, such as resource factors, quality of instruction, parental roles, students' attitudes towards learning, and activities that students engaged in after school, can all determine the academic performance of senior secondary students in Nigeria. Academic performance has mainly been associated with many factors that are daily confronting secondary school students.

Evidence from records shows that students are not doing well at the secondary school level, which has led to a loss of confidence in the general public's educational sector. For example, academic performances of secondary school students used by the general public to assess schools' efficiency and effectiveness have witnessed severe setbacks. The magnitude of these setbacks in terms of poor students' academic performance in mathematics and English in internal and external examinations have been revealed by earlier researchers (Ajayi, 2010; Adeyemi, 2011). Odesola (2011) explained that result of senior secondary school students in English language and mathematics in certificate examination has been on the downward trend owing to some socio-psychological factors.

One of the most critical resources is human resources; this is due to their decisive role in the production processes. A country with quality human resources has possessed primary indicators in measuring the growth and development of such a country. However, the quality of this vital resource (teaching staff) in our great country's education sector is nothing to write home about (Osagie, & Okafor, 2015). Efficiency and effectiveness in the secondary school system could be ensured through passionate teaching staff and a sound monitoring system that will bring the best out of these staff. When these are in place, the performance of secondary school students in mathematics could be guaranteed. In a scenario whereby teaching staff are not passionate, inexperienced, and not qualified to teach the subject they are teaching, secondary school students will not be encouraged to learn, and this will necessitate the urgent need to employ passionate, experienced, and qualified teachers to teach these leaders of tomorrow. Therefore, it is clear that the critical role of human resources cannot be overemphasized in any sector of the economy (Ogunsaju, 2010).

Physical and material resources are other vital resources that cannot be overstated in the education sector. The need for these resources plays a vital role in successful teaching and learning among secondary schools' teachers and students. The stated aims and objectives of secondary school education could not be attained without physical and material resources like spacious classrooms, enough school buildings, chairs and tables, reading materials, libraries, instructional materials, equipped laboratories, internet, and other relevant facilities. These and other educational facilities have been identified as significant factors contributing to the academic performance of secondary school students in the education system (Uchedu, 2013)—identified educational facilities as the primary factor contributing to academic achievement in the school system.

Levin (2011) found a positive relationship between educational attainment and returns in terms of social and economic status. This then led to an argument on factors that responsible for educational attainment and the operation of these very complex factors. There are needs to consider numerous factors that have always been viewed as cogent at different aspects of education systems if there is a need to delve into different educational attainment indicators. The status of the immediate environment, city, region, or country in terms of economic activities will go a long way in determining the indicator of educational attainment. Also, factors that are connected with students, teachers, and schools that operate at various intermediate levels need to be considered.

3. Resource Factors and Student Academic Performance

The hallmark of effective teaching and learning in the secondary school setting is students' academic performance. Idiaghe (2014) found that adequate resources had a positive relationship with secondary school students' academic performance. Therefore, the types of resources available in secondary schools will go a long way in determining the academic performance of secondary school students. Unconducive classroom makes teachers uncomfortable during teaching, and students also exhibit an unwelcome attitude towards other students. Resources that are below the accepted standard could teach by the teacher to be less effective, and when teaching is not achieving its goals, there will be no learning on the part of students. This will lead to poor academic performance among secondary school students. It was concluded that the school environment affects and influences the academic performance of secondary school students.

Empirical reviewed in this study are related to the present study. Azih (2008) carried out a study on teachers' assessment and the availability of teaching facilities for the teaching of business studies in Abakaliki Urban secondary schools of Ebonyi State. The study made use of primary data with the use of questionnaires as the instrument used in collecting data, which was analyzed with the use of mean. The study found that most secondary schools in Abakaliki urban lack the necessary facilities for effective teaching and learning for an ideal secondary school. It also found out that the quantity and quality of business studies teachers are insufficient.

Other researchers, Ugwuanyi and Eze (2008), conducted a study on the appraisal of educational resources' availability to implement the dictates of secretarial studies program in Nigerian polytechnics. In the study, thirty-three business educators of polytechnics located in Kogi and Benue states constitute the sample. The instrumentation was primary data through the use of questionnaires, and data generated were analyzed using t-test and mean statistics. The result of the study found out that physical facilities that include classrooms, laboratories, furnished staff offices, and textbooks/journals were adequate in the polytechnics, electronic typewriters, computers, and Dictaphones were not adequate. In contrast, micrographics and electronic communication equipment were not available for training secretaries in the states. Also, financial resources were not adequate, and this has affected the facilities installed. The study also revealed that personnel was adequate, but lecturers who are ICT compliant were lacking. It also found that no significant difference exists between the mean responses of lecturers and instructors. The study recommended, among other things, that adequate financial resources should be allocated to the secretarial studies department in the polytechnics. This study is consistent with the recent study because it assessed educational resources available for secretarial studies.

Similarly, Fabiyi and Adetoro (2011) investigated the availability and utilization of instructional facilities and academic performance: A study of UME students in conventional schools and coaching centers in Lagos State. The study was a survey type, and it was guided by three research questions and one hypothesis. The sample size was 3753 selected through a stratified random technique with questionnaires and observation as the instruments for data collection. Mean, and chi-square was used to analyze the data. The study found a strong relationship between the performance of students in UME and the utilization of instructional facilities in both the conventional schools and coaching centres. The study also revealed that students performed well in UME in which adequate and appropriate instructional facilities were not only provided but also well utilized.

Adeogun and Osifila (2012) investigated the relationship between resource factors and students' academic performance in the Lagos state of Nigeria. The study was a survey design, and all the teachers and principals of secondary schools in Lagos state constituted the study's population. It was guided by four research questions and four hypotheses. Data was gathered

through a checklist and questionnaire and, after that, analyzed with chi-square statistics. The study found that there were not enough resources factors in the selected schools and that physical facility, financial and human resources were significantly related to students' academic performance. This study is consistent with the recent study because it investigated resource factors and their impacts on students' achievement.

4.   Quality of Instruction and Student Academic Performance

The hallmark of any efficient teaching and learning in secondary school settings is the academic performance of students. Educational resources are provided in school to produce students with the right and desired behavior, skills, and competencies. However, in this present state of dilapidated and shortage of required resources for efficient teaching and learning in our secondary schools, will students' academic achievement be positively skewed? It is common to observe that students' performance over the years is drastically declining, and this may not be unconnected with the state of resources in our schools. Oghuvbu (2012) submitted that students' academic performance and the standard of education depend on resources available in school and the standard of those available resources.

Fabiyi and Adetoro's (2011) research revealed that classrooms that are well arranged expertly could be used to enhance the academic performance of secondary school students in our country. High academic performance among secondary school students is not limited to classroom management. It also encapsulates all other components that make the environment of secondary school conducive for teaching and learning. All these are expected to work hand in hand for better academic performance among these students. The researchers did not ignore the role of teachers who are instructional leaders and managers of these classrooms. They emphasized that classroom teachers need to possess the expected skills and interest in effective teaching and learning to guarantee better academic performance among secondary school students. It is the responsibility of teachers to make sure that everything that is needed to manage the classroom effectively is in place and ensure that all challenges to effective teaching and learning are avoided.

5.   Quality of Instruction and Academic Achievement

It is generally accepted that extra effort on any given task will raise the level of output in virtually all sectors of the economy. Also, longer days at work may increase rates of injury as the level of output increases. To what extent is this generally accepted idea accepted in the educational sector? Can we then say that extra money spend will increase the academic performance of secondary school students in the educational sector? Answers to these questions are not complicated, as responses from our environments provide a clear answer. The educational sector is entirely different from other sectors in the economy. High academic performance among secondary school students is not only a function of quality at which lesson is being instructed. Quality at which lesson is being instructed is a necessary condition but not sufficient condition. Secondary school students sometimes exhibit various characters as the quality of instruction changes (Fabiyi, & Adetoro, 2011).

Research on quality of instruction often supports the findings that more time spent on quality of instruction increases the academic performance of secondary school students. However, other views pose some questions concerning the strength of this evidence. There could be differences between academic performance and vocation among secondary school students. Academic performance could be boasted through the quality of instruction, but this could not be the case in invocation schools among secondary school students. On the other hand, low academic performance could increase the quality of instruction, which will, in turn, raise academic performance and vocation among secondary school students. This perhaps makes it easy to identify students who are lagging behind and make a considerable effort to increase their academic performance. It is therefore difficult to determine a priori when the connection between academic performance and quality of instruction overemphasizes or understates the causality effect (Fabiyi, & Adetoro, 2011).

Furthermore, it is possible that the level at which any causal connection between academic performance and quality of instruction is connected to the environment of the classroom. High quality of instruction could lead to poor academic performance in mathematics when the archaic curriculum, lack of matter of subject knowledge by teachers, unruly behavior are present in the secondary school setting.

C. Method

This study is an empirical review on the effect of resource factors and quality of instruction on performance in mathematics among Nigeria secondary school students. The study uses numerous empirical research on resource factors, quality of instruction, resource factors and academic performance, quality of instruction, and academic performance. The study also makes use of data from WAEC results statistics in the National Bureau of Statistics.

D. Findings and Discussion

This paper found out from the various empirical review that there was a significant relationship between resource factors and the quality of instruction in the country. This goes in agreement with the findings of Ugwuanyi and Eze (2008). They conducted a study on the appraisal of the availability of educational resources to implement the dictates of secretarial studies programs in Nigerian polytechnics. The paper found that facilities such as classrooms, laboratories, furnished staff offices, and textbooks/journals were fairly adequate among secondary school students, electronic typewriters, computers, and Dictaphones were not adequate. In contrast, micrographics and electronic communication equipment were not available for training secretaries in the states. Also, financial resources were not adequate, and this has affected the facilities installed. The study also revealed that personnel was adequate, but lecturers who are ICT compliant were lacking.

This paper also found out from the various empirical review that there was a significant correlation between the quality of instruction and the academic performance of Nigeria secondary school students in mathematics. The paper found a significant connection between the quality of instruction and student academic performance in the country. However, the finding of this study was consistent with those of earlier researchers in a research survey conducted in Islamabad, Pakistan by Nafees, Farooq and Tahirkhalh (2012) revealed that secondary school students who are well-equipped with all the needed facilities perform higher in their academic performance than their counterparts that are not well-equipped with all the needed facilities. Those well-equipped students are efficient in-class activities and other skills in their schools. The academic performance of secondary school students who fall in the problem-based region still high because they are provided with required facilities to perform better. At the final examination period in their terminal classes, secondary school students with well-equipped facilities and those with little or no needed facilities will sit for the examination together. Therefore, it is no surprise that secondary school students from both groups will expect to perform better in their academic performance.

This paper also found out that there was a significant correlation between resource factor and academic performance of Nigeria secondary school students in mathematics. The findings indicated a significant relationship between resource factor and Nigeria's secondary school students' academic performance in mathematics. This was inconsistent with the findings of Adeogun and Osifila (2012), who investigated the relationship between resource factors and Nigeria secondary school students' academic performance. The study found that there were not enough resources factors in the selected schools and that physical facility, financial and human resources were significantly related to students' academic performance.

Lastly, the paper again found out that there is a significant relationship between resource factors, quality of instruction, and Nigeria's secondary school students' academic performance in mathematics. This is inconsistent with the findings of Fabiyi and Adetoro (2011). They investigated the availability and utilization of instructional facilities and academic performance: A study of UME students in conventional schools and coaching centers in Lagos State. The study found that there is a strong relationship between the performance of students in UME and the utilization of instructional facilities present in both the conventional schools and coaching centers. The study also revealed that students performed well in UME in which adequate and appropriate instructional facilities were not only provided but also well utilized.

E. Conclusion and Recommendations

From the various empirical reviewed and the findings of the study, the authors arrived at the following conclusions about the study.

The academic performance of Nigeria secondary school students in mathematics has not reached 50 percent. This means that the performance of secondary school students in Nigeria in mathematics had been low and recently still lack improvement. The availability of resource

factors in Nigeria secondary school will go a long way in determining the quality of instruction that will enhance academic performance in mathematics. This indicates that the academic performance of students in mathematics can be improved through the quality of instruction and that availability of resources several factors, too, can improve the quality of instruction. The quality of instruction of the available resource that will enhance performance in mathematics influences Nigeria secondary school student academic performance in mathematics. This indicates that before the quality of instruction could positively impact academic performance in mathematics, there should be available necessary resources.

There was a positive relationship between the availability of resource factor and Nigeria secondary school student academic performance in mathematics. This indicates that when there is an increase in the availability of resource factors, there will be an increase in the academic performance of Nigeria secondary school students in mathematics. Both availability of resource factors and quality of instruction jointly influence Nigeria's secondary school student academic performance in mathematics. This also indicates that the availability of both availabilities of resource factors and quality of instruction will bring about better academic performance among Nigeria secondary school students in mathematics.

Based on the various empirical reviewed and the study's findings, the author arrived at the following conclusions about the study. (1) Adequate training resources should be provided for Nigeria secondary school teachers to have a sound academic performance in not only mathematics but also other secondary school subjects; (2) government at all levels should not only increase allocation to education but also to ensure that the fund allocated to education is well spent; (3) the administrator of secondary schools should involve the community people in the provision of school resources; (4) government all levels, parents, and private organizations should rally round to provide resource factors to all Nigeria secondary schools for effective teaching and learning; (5) school administrators should be conversant with universal principles of managing available resources to bring about sound academic performance in mathematics and other secondary school subjects.

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