APPRAISAL OF QUALITY ASSURANCE MEASURES IN THE MANAGEMENT OF SECONDARY SCHOOLS AND ITS IMPLICATION ON SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS EDUCATION

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ABSTRACT

This study appraised the extent of funding and provision of physical facilities as quality assurance measures in the management of public secondary schools in South East Nigeria. Descriptive research design was adopted for the study using a sample of 1, 456 respondents which comprised 343 principals and 1,113 teachers was used for the study. A researcher developed instrument known as Appraisal of quality assurance measures in the management of secondary schools questionnaire (AQAMQ) was used for data collection. The instrument was face validated and properly trial tested. Reliability indices of 0.72 and 0.75 were estimated using Cronbach alpha method for the two clusters of the instrument. Data collected were analysed using mean and standard deviation to answer the research questions and independent samples t-test to test the hypotheses at 0.05 level of significance. The findings of the study showed that funding of secondary education and provision of physical facilities are carried out to a low extent in secondary schools in South East Nigeria. Further analysis showed that there were significant ($p \leq .05$) differences in the mean ratings of principals and teachers with respect to how those quality assurance measures are being carried out in secondary schools. This finding implicates the Science, Technology, Engineering and Mathematics Education (STEME) career in the sense that students' choice of careers in STEME will be very low if adequate provision of funds and physical facilities are not ensured at secondary education.

KEYWORDS: Appraisal, Quality assurance measures, Management Science Technology Engineering & Mathematics Education

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INTRODUCTION

Funding and provision of physical facilities are important factors needed in any organization including schools for the realization of set goals and objectives. (Wunti et al., 2017) noted that the importance of school facilities in the development of effective educational system at the secondary school level cannot be over emphasized. For the achievement of quality teaching and learning in schools, funds are needed for the payment and procurement of support services in the system. The level of funds available to a large extent determines the extent of achievement of school objectives (Nwafor et al., 2015). Physical facilities in the school setting go a long way to motivate students to learn (Akomolafe & Adesua, 2016). The quality of education delivered by teachers is dependent on several factors of including funding and school facilities (Asiyai, 2012). However, Ekundayo (2012) showed that

most secondary schools in South East Nigeria lack adequate funds and subsequently, have inadequate teaching facilities, equipment and trained teachers. The author re-instated that money is a very important resource in the educational system and needed to be well allocated because through it, all other vital elements in the school can be obtained.

Report by Kalagbor (2010) shows that this shortfall in education funding manifest in inadequate staff accommodation, classroom congestion, lack of recreational facilities and boarding facilities for students, poor equipped laboratories, workshops and libraries, water and electricity supply. This is further corroborated by Okadigbo (2010) who indicated that Nigeria's secondary school education is characterized by dilapidated infrastructure, obsolete equipment, outdated books and irrelevant curriculum resulting from inadequate funding. This is in tandem with United Nation Education Scientific and Cultural Organization UNESCO, (2008) earlier report that in Nigeria the inability of the Federal Government to adequately fund educational programmes culminates into poor educational outcomes due to poor provision of facilities in schools.

Facilities, buildings and equipment are required to enable people carry out their activities effectively. Okorie and Uche (2005) pointed out that quality in teaching and learning result from interplay among a broad range of success factors such as basic school facilities, classrooms, and standard libraries and staff offices. The facilities are necessary in schools which according to Onyeachu (2006) observed that students learn more when facilities like buildings, comfortable seats are available. Aguba (2009) observed that physical facilities form the hard ware through which education curriculum (software) is transmitted to the group being educated. The author further emphasized that to enhance high quality of education at the secondary school level, adequate physical facilities such as standard classroom blocks, standard library and well equipped laboratory, good chalk boards, computers, film and projectors are used for teaching and learning and also as supportive facilities for the teachers' professional growth in the system.

Theoretical background of the study

This study was anchored on the total quality management theory was propounded by Deming in 1994. The theory emphasizes important methods of ensuring quality in the management of education with specific reference to maintaining effectiveness and efficiency while reducing wastage in the system. The total quality management theory places emphasis on collaborative team work, the crave for quality and continuous improvement and professionalism in executing assignment. Deming theorized that in order to effectively manage resources in the education sector, the school manager must be knowledgeable and have the skill for assuring that quality of resources are intact. This theory is related to the present study in that high standards of teaching can only be achieved by adequate funding and provision of physical facilities.

Review of related empirical studies

Wanjiku (2013) revealed that government and households were the major sources of financing secondary education but were inadequate to provide adequate educational resource materials. Walis (2008) indicated that the sources of funds available to secondary schools are inadequate, methods of disbursing funds to secondary schools are ineffective, while indiscipline and corrupt leadership lead to embezzlement of secondary school education funds. Nzepume (2011) found that the provision of physical facilities in Imo State public secondary schools is inadequate; laboratory and library blocks are not well equipped; classrooms have small spaces with leaking roofs. Agangan (2008) revealed that provision of physical facilities and equipment in secondary schools is made, suggesting that physical facilities and equipment in secondary

schools are inadequate. Bolorunduro (2008) showed that effective management and utilization of schools' physical facilities and equipment enabled students to acquire appropriate skills, motivate them towards effective learning and boost the image of the school, among others. Adewuni (2009) showed that physical facilities and equipment are not adequately provided in the secondary schools in the state. Asiyai (2012) found that school facilities in the schools are in a state of disrepair.

Most of the physical facilities that are germane to effective learning/academic performance of students are inadequately provided in public secondary schools today (Akomolafe & Adesua, 2016). Osaro and Wokekoro (2018) found that the public secondary schools are in a deplorable state of dilapidation as a result of lack of funding. Senior secondary schools in Bauchi state are not adequately funded which leads to inadequate provision of school facilities (Abdullahi, 2015). Odey (2018) revealed that available physical facilities in schools in Ebonyi State are generally inadequate. Apart from dwindling economy, mismanagement of educational funds to expanding problems of infrastructure in schools have been major handicap to management of schools (Ugwulashi, 2017). Ekpoh (2018) found that majority of the teachers were not satisfied with their schools' physical working environment due to lack of adequate physical facilities. Matthew (2013) found that the challenges militating against the achievement of the objectives of secondary education in Nigeria include inadequate fund; inadequate and decay infrastructural facilities; inadequate and low-quality teachers among others.

Lyimo et al. (2017) found that there are inadequate physical facilities such as classrooms, desks, chairs, classrooms in most of the secondary schools. Physical facilities were found to be inadequate for teaching and learning processes in schools (Edokpolor, 2019). Availability and use of physical facilities in social studies were found to be below average and pupils scrambled to use the little available resources (Wambua et al., 2018). Adamu (2017) found that there was inadequate workshop space area, storage areas, ventilation, heating system, first aid box and training materials/equipment in technical schools in Bauchi State. Most of the schools did not have adequate school buildings to support the educational programme projected (Ojeje & Adodo, 2018). Inadequate classroom space, lack of laboratories, dilapidated infrastructure, employment of unqualified teachers, lack of fund among others constitute challenges to effective running of schools (Ogunniran, 2018). Nwaogu and Oyedele

(2019) revealed that inadequate facilities are a significant problem affecting teaching in public secondary schools in Obio-Akpor local government area of Rivers state.

The foregoing showed that there are a lot of challenges to the running of secondary education in various parts of Nigeria and beyond. Among the empirical studies reviewed, none was carried out in South East Nigerian schools to ascertain the level of funding and provision of physical facilities for effective teaching and learning. Thus, this gap in literature necessitated this current study. This study, therefore, appraised the extent of funding and provision of physical facilities as quality assurance measures in the management of public secondary schools in South East Nigeria.

RESEARCH QUESTIONS

- To what extent is secondary education funded in South East Nigeria?
- To what extent are physical facilities provided in secondary schools?

Hypotheses

The following null hypotheses were formulated to guide the study and were tested at 0.05 level of significance:

H₀₁: There is no significant difference ($p < 0.05$) in the mean ratings of principals and teachers on the extent to which secondary education is being funded in South-East Nigeria.

H₀₂: There is no significant difference ($p < 0.05$) in the mean ratings of principals and teachers on the extent physical facilities are provided in secondary schools.

METHODS

Research Design

The design of this study was evaluative descriptive research design, aimed at ascertaining the extent of the application of quality assurance measures in the management of public secondary schools in South-East Nigeria. This is in line with Crowe (2011) who remarked that evaluative descriptive research design is concerned with gathering of detailed information to be used, as a basic, for judging performance indices in terms of best practices and standards. This design has been adopted by Eze et al. (2020), Okeke et al. (2020a,b), Ugwuanyi et al. (2020) in similar studies.

Participants

The sample size for the study is 1,456 comprising 343 principals and 1,113 teachers in the 7 education zones that were sampled for the study. The sample size was obtained through the multi-stage sampling procedure. The first stage involved sampling three states out of the five states of South-East geopolitical zone using simple random sampling technique by balloting with replacement. The second stage involved the use of non-proportionate stratified random sampling technique to sample 7 education zones from 15 education zones in the three states. The third stage involved the use of simple random sampling technique in sampling 10% of the teachers present in each of the education making a total of 1,113 teachers. However, all the 343 principals in the 7 education zones sampled were used for the study.

Instrument for Data Collection

The instrument for data collection was a questionnaire titled: Appraisal of Quality Assurance Measures in the Management of Secondary Schools Questionnaire (AQAMQ). The instrument (AQAMQ) had two clusters A and B. Cluster A comprised of 8 items on the extent to which secondary schools were being funded. Cluster B had 10 items on the extent to which physical facilities were being provided in secondary schools. The questionnaire items were designed on a 4-point response options using the 4 point Likert scale of Very Low Extent (VLE) (1 point); Low Extent (LE) (2 points); High Extent (HE) (3 points), and Very High Extent (VHE) (4 points).

Validity and reliability of instrument

The instrument for this study was face-validated by five experts. The experts were requested to validate the instrument in terms of its relevance and the adequacy of the items in getting the required information, the grammatical construction and the sequence of the items. The comments and suggestions of the five experts were used to produce the final copy of the instrument. In order to determine the reliability of the instrument in this study, the researcher administered twenty copies of the questionnaire to principals and teachers in secondary schools in Delta State, which was outside the study area. Cronbach Alpha method was applied to measure the co-efficient of internal consistency and therefore reliability of the instrument. The computed reliability estimate values were 0.72 and 0.75 for clusters A and B.

Data collection procedure

Copies of the instrument were administered with the help of six research assistants. This ensured the coverage of the remote parts of the zones. All the research assistants were personally met at their respective schools and offices to educate them on the contents of the instrument, timely distribution and retrieval. They were also instructed as a matter of ethical consideration, to assure the respondents that information accessed and secured in the course of this study would be protected from unauthorized persons and that information obtained would be used for the sole purpose of the study. The research assistants assisted the researcher in both the administration and collection of the questionnaire after completion by the respondents.

Method of data analysis

Descriptive statistics of mean and standard deviation were used to answer the research questions while inferential statistics of t-test of independent samples was employed to test the seven null hypotheses formulated for the study at 0.05 level of significance. In answering the research questions, a mean score between 0.5 – 1.49 was considered very low extent, while between 1.5 – 2.49 was low extent, 2.50 – 3.49 was considered high extent, while 3.50 – 4.00 was considered very high extent.

RESULTS

Research Question One: To what extent is secondary education funded in South East Nigeria?

Table 1: Mean ratings and standard deviation of the principals and teachers on the extent to which secondary education is funded in South East Nigeria

Item Statement	Group	N	Mean	Std. Deviation	Decision
1. Through grants by federal government	Principals	343	2.26	1.26	LE
	Teachers	1113	2.50	1.25	HE
2. Through payment of education levies by households	Principals	343	2.13	.99	LE
	Teachers	1113	2.54	1.10	HE
3. Through donation from non-governmental organizations (NGOs)	Principals	343	1.83	1.03	LE
	Teachers	1113	2.03	1.11	LE
4. Through aids from international organizations e.g UNICEF	Principals	343	2.07	1.01	LE
	Teachers	1113	2.27	1.14	LE
5. Through money generated from sale of agricultural product in schools	Principals	343	1.94	.99	LE
	Teachers	1113	2.07	1.09	LE
6. Through grants by the state government	Principals	343	2.50	1.01	HE
	Teachers	1113	2.77	1.02	HE
7. Through donation from philanthropic individuals	Principals	343	2.07	1.03	LE
	Teachers	1113	2.23	1.14	LE
8. Through P.T.A levies	Principals	343	2.20	1.08	LE
	Teachers	1113	2.56	1.17	HE
Cluster Mean	Principals	343	2.12	.54	LE
	Teachers	1113	2.37	.70	LE

Table 1 shows the mean ratings of principals and teachers on the extent to which secondary school education is funded in South-East Nigeria. The mean ratings of principals to the items on Table 1 are 2.26, 2.13, 1.83, 2.07, 1.94, 2.50, 2.07 and 2.20 while those of the teachers are 2.50, 2.54, 2.03, 2.27, 2.07, 2.77, 2.23 and 2.56 with respect to grants by federal government, payment of education levies by households, donation from non-governmental organizations (NGOs), aids from international organizations e.g UNICEF, money generated from sale of agricultural product in schools, grants by the state government, donation from philanthropic individuals, and P.T.A levies, respectively.

In other words, the mean ratings of both principals and teachers to donation from non-governmental organizations (NGOs), aids from international organizations e.g UNICEF, money generated from sale of agricultural product in schools, and donation from philanthropic individuals corresponding to items 3, 4, 5 and 7 are within the mean range of 1.50 to 2.49 implying that there is low extent of funding of secondary school education with respect to those items. However, there are variations in the ratings of principals and teachers to grants by federal government, payment of education levies by households, grants by the state government, and to P.T.A levies respectively for items 1, 2, 6 and 8. Thus, the overall mean ratings of 2.12 and 2.37 for the principals and teachers respectively imply that funding of secondary school education in the South-East is to a low extent not minding that the teachers had higher mean rating than the principals. Also, the overall standard deviations of 0.54 and 0.70 for the principals and teachers respectively show that there was a wider variation in the individual ratings of the teachers to the items than those of the principals.

H₀₁: There is no significant difference ($p < .05$) in the mean ratings of principals and teachers on the extent to which secondary school education is funded in South-East Nigeria.

Table 2: T-test analysis of the difference in the mean ratings of principals and teachers on the extent to which secondary school education is funded in South-East Nigeria

Group	N	Mean	Std. Deviation	df	t-cal	Sig. (2-tailed)
Principal	343	2.12	.54	1454	-5.986	.000
Teachers	1113	2.37	.70			

Table 2 reveals that the calculated value of t (-5.986) for the difference in the mean ratings of principals and teachers on the extent to which secondary school education is funded in South-East Nigeria, had an associated probability value of 0.000. Since the associated probability value of 0.000 is less than the 0.05 level of significance, the null hypothesis was rejected meaning that there is a significant difference ($p < .05$) in the mean ratings of principals and teachers on the extent to which secondary school education is funded in South-East Nigeria in favour of the ratings of the teachers.

Research Question Two: To what extent are physical facilities provided in secondary schools?

Table 3: Mean ratings and Standard Deviation of the principals and teachers on the extent to which physical facilities are provided in Secondary Schools

Item Statement		Group	N	Mean	Std. Deviation	Decision
9.	Providing adequate furniture for the students by the school	Principals	343	1.94	.97	LE
		Teachers	1113	2.32	1.17	LE
10.	Providing adequate classroom accommodation for students by the school	Principals	343	2.34	1.07	LE
		Teachers	1113	2.57	1.14	HE
11.	Providing adequate office accommodation for teachers by the schools	Principals	343	2.26	1.14	LE
		Teachers	1113	2.46	1.09	LE
12.	Making available a well equipped laboratory by the government	Principals	343	2.07	1.16	LE
		Teachers	1113	2.28	1.21	LE
13.	Providing well equipped library facility in schools by the government	Principals	343	2.10	1.14	LE
		Teachers	1113	2.30	1.20	LE
14.	Providing relevant current textbooks in schools by the government	Principals	343	2.05	1.10	LE
		Teachers	1113	2.29	1.17	LE
15.	Ensuring the fencing of school premises for security by the principals	Principals	343	2.20	1.04	LE
		Teachers	1113	2.16	1.05	LE
16.	Making instructional materials available in schools by principal	Principals	343	2.25	1.03	LE
		Teachers	1113	2.16	1.06	LE
17.	Providing facilities for students' sporting activities by principals	Principals	343	2.27	1.02	LE

	Teachers	1113	2.36	1.04	LE
18. Providing for modern workshop equipment such as audio-visual materials in schools by the government	Principals	343	1.81	1.05	LE
	Teachers	1113	1.95	1.04	LE
Cluster Mean	Principals	343	2.13	.58	LE
	Teachers	1113	2.29	.77	LE

Table 3 reveals that the mean ratings of principals to items 9 to 18 are 1.94, 2.34, 2.26, 2.07, 2.10, 2.05, 2.20, 2.25, 2.27 and 1.81 while those of the teachers are 2.32, 2.57, 2.46, 2.28, 2.30, 2.29, 2.16, 2.16, 2.36 and 1.95, respectively to adequate provision of furniture for the students by the school, adequate classroom accommodation for students, adequate office accommodation for teachers, making available a well equipped laboratory by the government, well equipped library facility in schools by the government, relevant current textbooks in schools by the government, the fencing of school premises for security by the principals, making instructional materials available in schools by principal, provision of facilities for students' sporting activities by principals, and provision of modern workshop equipment such as audio-visual materials in schools by the government.

The mean ratings of both principals and teachers to the above items except provision of modern workshop equipment such as audio-visual materials in schools by the government as items 10 are within the mean range of 1.50 to 2.49 indicating that physical facilities, to a low extent, are provided in secondary schools with respect to those items. Besides, the overall mean ratings of 2.13 and 2.29 for the principals and teachers respectively imply that physical facilities are provided to a low extent in secondary schools in South-East Nigeria not minding that the mean rating of teachers is more than the rating of the principals. Overall standard deviations of 0.58 and 0.77 for the principals and teachers showed that there was a wider variation in the individual ratings of the teachers than those of the principals.

H₀₂: There is no significant difference ($p < .05$) in the mean ratings of principals and teachers on the extent to which physical facilities are provided in secondary schools?

Table 4: t-test analysis of the difference in the mean ratings of principals and teachers on the extent to which physical facilities are provided in secondary schools

Group	N	Mean	Std. Deviation	df	t-cal	Sig. (2-tailed)
Principal	343	2.13	.58	1454	-3.446	.001
Teachers	1113	2.29	.77			

Table 4 reveals that the probability associated with the calculated value of t (-3.446) for the difference in the mean ratings of principals and teachers on the extent to which physical facilities are provided in secondary schools is 0.001. Since the associated probability value of 0.001 is less than the 0.05 level of significance, the null hypothesis was rejected meaning that there is a significant difference ($p < .05$) in the mean ratings of principals and teachers on the extent to which physical facilities are provided in secondary schools in favour of the ratings of the teachers.

DISCUSSIONS

The findings of the study on the extent to which secondary school education in the south-east are funded revealed that secondary schools in the South-East are to a low extent funded. It was also found that there is a significant difference ($p < .05$) in the mean ratings of principals and teachers on the extent to which secondary school education is funded and physical facilities provided in South-East Nigeria in favour of the ratings of the teachers. In other words, secondary education in South East States of Nigeria was not adequately funded by the appropriate authority and physical facilities are

in short supply. The above findings are consistent with the reports by Walis (2008), Napkodia (2013) and Wanjiku (2013). According to Walis, sources of funds available to secondary schools are inadequate; methods of disbursement of funds to secondary schools are ineffective, while indiscipline and corrupt leadership lead to embezzlement of secondary school education funds. Napkodia found that government sector funding of educational institutional is low due to the attitude of government towards education. Wanjiku found that government and households are the major sources of fund for the secondary school education but the provision of educational materials was inadequate.

Most of the physical facilities that are germane to effective learning/academic performance of students are inadequately provided in public secondary schools today (Akomolafe & Adesua, 2016). Osaro and Wokekoro (2018) found that the public secondary schools are in a deplorable state of dilapidation as a result of lack of funding. Senior secondary schools in Bauchi state are not adequately funded which leads to inadequate provision of school facilities (Abdullahi, 2015). Odey (2018) revealed that available physical facilities in schools in Ebonyi State are generally inadequate. Apart from dwindling economy, mismanagement of educational funds to expanding problems of infrastructure in schools have been major handicap to management of schools (Ugwulashi, 2017). Ekpoh (2018) found that majority of the teachers were not satisfied with their schools' physical working environment due to lack of adequate physical facilities. Matthew (2013) found that the challenges militating against the achievement of the objectives of secondary education in Nigeria include inadequate fund; inadequate and decay infrastructural facilities; inadequate and low-quality teachers among others.

Lyimo et al. (2017) found that there are inadequate physical facilities such as classrooms, desks, chairs, classrooms in most of the secondary schools. Physical facilities were found to be inadequate for teaching and learning processes in schools (Edokpolor, 2019). Availability and use of physical facilities in social studies were found to be below average and pupils scrambled to use the little available resources (Wambua et al., 2018). Adamu (2017) found that there was inadequate workshop space area, storage areas, ventilation, heating system, first aid box and training materials/equipment in technical schools in Bauchi State. Most of the schools did not have adequate school buildings to support the educational programme projected (Ojeje & Adodo, 2018). Inadequate classroom space, lack of laboratories, dilapidated infrastructure, employment of unqualified teachers, lack of fund among others constitute challenges to effective running of schools (Ogunniran, 2018). Nwaogu and Oyedele

(2019) revealed that inadequate facilities are a significant problem affecting teaching in public secondary schools in Obio-Akpor local government area of Rivers state.

This result is not too strange to the researcher due to the personal experience of the researcher during the field work. In some of the schools visited, most of the principals complained that they hardly see what they need in running the schools as a result of inadequate provision of fund by the state governments. This poor funding of secondary schools could be associated to corruption that runs through the society. It could also be related to bad administration and financial management on the parts of those responsible for funding schools. In other words, financial mismanagement may involve high level officials and politicians, and distribution of finance, may attract embezzlement of funds at different levels of the administrative hierarchy. This great problem hinders the effective implementation of quality assurance in secondary schools.

This finding is not far from the true nature of most public secondary schools in South East Nigeria. Most schools visited by the researcher had several dilapidated buildings including staff offices. Again, from the researcher's personal experience, most of the materials that were even claimed to be available apart from being inadequate were obsolete. In fact,

some of the schools used for this study had few microscopes and computers of different sizes but were non-functional. The irony of it is that these schools claimed to have such equipment available for use.

The situation in the libraries is not different as they contain few books supplied by the State government. Too many of the books are not current edited publications. The inadequacy of current laboratory facilities, library resource materials and other infrastructure in secondary schools may be associated to lack of political will and inadequate funding to provide them and ensure their maintenance by the government and hosting communities. This kind of situation could result in sharp decline in the quality of the students that graduate from our secondary educational institutions.

Implication on Science, Technology, Engineering and Mathematics Education

These findings implicate the Science, Technology, Engineering and Mathematics Education (STEME) career. To build positive STEME career of in-school adolescents, there must be adequate provision of funds and physical facilities at secondary education level. Thus, the findings of the current study imply that students' choice of careers in STEME will be very low if adequate provision of funds and physical facilities are not ensured at secondary education.

CONCLUSION AND RECOMMENDATIONS

Based on the findings of the study, the following conclusions were drawn; all the quality assurance measures ranging from funding of secondary education, provision of physical facilities, motivation of teachers, relevance of secondary school curriculum, school-community relation, professional development of teachers and whole school evaluation were carried out to a low extent in secondary schools in South East Nigeria. There were significant differences in the mean ratings of principals and teachers with respect to how those quality assurance measures are being carried out in secondary schools. However, their respective overall mean ratings to the various quality assurance measures showed that those measures are being carried out to a low extent.

Based on the findings of the study, the following recommendations are proffered by the researcher.

- State governments should make adequate provision of funds for the implementation of secondary school education programmes in South East Nigeria. Secondary school management should embark on Income Generating Activities such as poultry keeping, dairy farming, pig rearing and crop farming.
- Adequate physical facilities should be provided by government, Non-Governmental Organizations (NGO) as well as the host communities.

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