

# MAINTENANCE OF PUBLIC SECONDARY SCHOOL BUILDINGS: USERS' PRACTICES IN NIGERIA

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## Abstract

The sustainability of infrastructure in public secondary schools in Nigeria requires an attention. One of the ways to attain this is the adoption of maintenance strategies and policies. The application of maintenance strategies among various users demands urgency for policy formation. The study examined the secondary school building conditions and users opinions in Nigeria. The study data were collected through questionnaire administered on the users of the public secondary school buildings in the study area. The data collected were subjected to descriptive statistical tool. The study found out that there are maintenance attempts by the school principals in one way or the other. None of the selected school has a maintenance manual and definite strategy in place. Also the users' attitudes and lack of maintenance funds are major factors to the dilapidated condition of the secondary school buildings. The study recommends a need for more governance support, development of policy and users' awareness on the essence of maintenance as a practice in Nigeria.

Keywords: maintenance, policy, secondary school building, sustainability, Nigeria.

## 1. INTRODUCTION

Buildings require adequate maintenance as they get older over time. Building maintenance is required to ensure the safety of building occupants and properties. Lack of maintenance can result in unsafe, unhealthy and hazardous environment. However, much can be done at the design stage to reduce the rate of subsequent maintenance works. All elements of a building deteriorate at a greater or lesser rate depending on materials, methods of construction, age and environmental conditions [1]. Neglect of maintenance, in most buildings, results to rapidly increasing deterioration of the fabric and finishes of a building accompanied by harmful effects on the contents and occupants. Some building owners most often try to keep maintenance expenditure to a minimum, ignoring the adverse long-term effects of such a practice.

Maintenance has become a principal issue in the life of public buildings. The importance attached to public secondary schools, in the society, requires that maintenance issues be considered at all times. Maintenance plays a major role in the performance of public secondary schools. Public buildings are assets developed by government and used by the people. The continuous neglect of the assets of educational institutions is not only storing potential enormous bill for the future, but is also seriously affecting the quality of work and achievement of many learners [2]. The primary objective of building maintenance is to preserve buildings in their initial functional, structural and aesthetic state [3]. This is to ensure that such a facility continues to remain in such state and retain its investment value over a long period of time. Buildings are generally required to provide safe and conducive environment for the performance of various human activities. The ability of a building, to provide the required environment for a particular activity, is a measure of its functionality [4]. Therefore, as the components of a building begin to deteriorate, it becomes necessary to take some measures to ensure that the desired characteristics of that facility, which provide safety and convenience, are retained through adequate maintenance.

Much has been written on maintenance of public secondary school buildings in Nigeria. However, very little is known and documented on the objectives and outcome of maintenance. It is important to know that lack of maintenance strategies and policies are the major contrition to the existing conditions of

public school buildings. Precisely, much is not known on the reality of maintenance strategies on the existing public secondary schools in the past and present. As a result, it has become increasingly difficult to identify a precise existing maintenance strategy and options providing solutions in addressing maintenance problems. In addition, there is paucity of empirical data on the public secondary school buildings and infrastructure.

## **1.1 Aim of the Study**

Given the facts raised above in the maintenance of the public secondary school buildings, there is an urgent need for quick decision making and upgrade of the deteriorated school buildings in order to have befitting study environments. This is not possible without up-to-date information about the present condition of those buildings and the perspectives of the users'.

The principal aim of this study is to investigate the users' perspective of maintenance policies and strategies that are put in place for the public secondary school buildings.

The scale of the study must be understood – the study is made at the Local Government Area regional to reveal general condition of the Ogun State Secondary School buildings. It is hoped that this study has some significance, at least in creating awareness of the existing and current condition of the public secondary school buildings in Ogun State, Nigeria.

## **1.2 The Study Area**

The study area is Ado-Odo/Ota Local Government Area which is one of the 20 Local Government Areas of Ogun State, Nigeria. The study covered thirty-six out of the existing forty-seven public secondary schools in the study area. Maintenance evaluation of public secondary school buildings in this study was carried out using three sources of data on maintenance, namely; the public secondary school buildings users' opinion (academic and non-academic staff); the secondary school buildings' maintenance managers (Principals or Vice-Principals) and observation survey of the public secondary school buildings by walkthrough the school buildings using a scale to rate the building condition and components. The users' opinion (academic and non-academic staff) was obtained with respect to the effects of adequate and inadequate maintenance has on school buildings. The investigation was focused on the following basic school facilities: (i) Classrooms (ii) Laboratories (iii) School hall (iv) Library (v) Art Studio (vi) Computer rooms (vii) Toilet facilities (viii) schools compounds.

## **2. LITERATURE REVIEW**

### **2.1 Deterioration of Buildings**

All elements of buildings deteriorate at a greater or lesser rate depending on materials, method of construction, age, environmental conditions, usage of building, and method of design and maintenance management. Before maintenance would be required in buildings, much can be done at the design stage to reduce the amount of subsequent maintenance work [1]. The deterioration of a building hampers its ability to perform adequately and thus is important to ensure proper maintenance for building continuity [5]. The continued efficient and effective performance of any building depends partly on the nature or condition of the buildings and partly on other factors. Some factors like methods of construction, age and environmental conditions, usage of the building, method of design and maintenance management of buildings determine the deterioration level of buildings. Understanding how existing buildings affect occupants, designers can minimize problems and have successful design features. Post occupancy evaluation of some selected Secondary Schools in Minna, Nigeria, noted that there are deterioration factors [6]. The maintenance of a building, the building usage, exposure to natural forces, correction and identification of defects would increase the life span of the buildings and the safety of users. In agreement with that statement, the major problem in many schools is overcrowded classrooms, the study also established that private schools are far less well maintained than public ones [7].

Buys (2004) cited Shen *et al.* (1999) noted that sometimes maintenance is delayed and occasionally, insufficient number of maintenance staff was cited as the main cause for delays in carrying out maintenance work [8]. However, [9] explained that deterioration can however be avoided or rectified through maintenance of the building. Failure to undertake regular maintenance of a building will ultimately in reduce the life span of the building and finally its demolition. It would be difficult to find one best solution to promote safety and reliability of maintenance activities or to determine and

describe deterioration factors in general. The opinion of the users will definitely assist the maintenance manager in the maintenance delivery.

## **2.2 Building Inspection as a Way out of Deterioration and Disrepair**

Walkthrough at intervals is fundamental to good maintenance, together with knowledge of design. In doing that, all properties should be inspected at regular intervals to identify any deterioration and disrepair, in order to document the required maintenance jobs. Shohet et.al, [10] described regular inspection as a fundamental part of a preventive maintenance. The study suggests that a building condition survey be carried out so as to identify the optimum moment for intervention, with the aid of prioritization of actions and planning for the future. They recommended the use of non-technical staff, building users and regular/ periodical visitors to provide the maintenance function with vital information regarding condition which would otherwise wait until a subsequent inspection cycle or until failure becomes impossible to ignore. The occupier of any building should bring to the attention of the building owner or his representative all failures which affect his tenure [11]. Such a failure is by simple wearing out, failure, accidental or deliberate damage so that the owner or his representative will decide on the methods of dealing with the maintenance by inspection; based on the type of property and age.

## **2.3 Users' Perspective on Maintenance of Public Secondary School Buildings**

The physical causes of maintenance problems include all natural/physical factors that negatively affect the durability of the building. A number of factors were considered to influence deterioration of secondary school buildings. These range from building age, lack of funds, poor response from maintenance bodies, long waiting for materials to building location among others. There are different causes of deterioration and hence maintenance problems. The major ones are; age or period of construction, environmental factor, location, poor construction, design, life of buildings, life cycle of building component, [11]. Lack of maintenance policy and strategy, poor maintenance culture as well as poor users' attitude are major contributive factors in maintenance of public buildings in Nigeria, [7].

In Nigeria, emphasis is increasingly placed on academic qualifications; hence, schooling is beginning to be part of people's life style. For people to be encouraged, a befitting academic environment must be established, [12]. Taking a look at Singapore, schools are handled with care to the extent of having guidelines on standards and criteria for the planning of primary and secondary schools, [13].

## **3. METHODOLOGY**

The research approach adopted in this study comprises of a quantitative research defined as an inquiry into a social or human problem, based on answering certain questions. This research involves a cross sectional survey approach from which statistical data were collected to answer questions in respect of the main subject of study. Questionnaires are the main instruments used. The population for the study comprises of the academic and non-academic staff of the public secondary schools representing the users. The population was determined by selecting respondents at random, four hundred (400) staff members were selected in the secondary schools for the users' category among the 1000 working force in the study area. This is in line with the recommendation by [14] who advocated 40% sample size for any study. This resulted in a total sample size of 400. Out of 100 questionnaires distributed, 307 of them were completed, returned and considered useable. Primary data was collected through questionnaires whilst secondary data was extracted from journals, text books, seminar papers, lecture notes and occasional publications. The data were processed and analyzed using SPSS statistical analysis software. Descriptive statistics, using mainly simple percentages(%) were applied to collect data where applicable, from variables in the study. This helped in clarifying results.

## **4. RESULTS AND DISCUSSION**

### **4.1 Characteristics of the Respondents**

A total of 400 members of staff representing 30.7% of the staff strength in the thirty-six public secondary schools in Ado-Odo/Ota L.GA were involved in the questionnaire survey. As contained in Table 1, 62.2 % and 37.7% of the respondents were females and males respectively.

**Table 1: Sex of Respondents**

Sex of respondent	Frequency	Valid Percent %
Male	116	37.8
Female	191	62.2
Total	307	100.0

Source: fieldwork, 2013.

Table 1 indicates the total sample frame used for the study. This result was not unexpected since there was a prevailing dominance of female teachers in both public and private secondary schools across States in Nigeria.

#### 4.2. Status in the Selected Public Secondary Schools (SSTA)

The teaching profession is made up of two groups' namely academic and non-academic staff. Both groups are very important because while the academic staff may have a better insight into the school's relationship with Ministry of Education, the non-academic staff have a better insight into the history of the school because they are rarely transferred. Table 2 presents the status of the respondents as 90.6% of respondents were academic staff.

**Table 2: The Status of Staff (SSTA)**

Status in the School	Frequency	Valid Percent
Academic staff	278	90.6
Non-academic staff	29	9.4
Total	307	100

Source: fieldwork, 2013.

Approximately, 10% of the respondents were non-academic from whom additional information concerning the physical characteristics of the public secondary schools' buildings was sourced.

#### 4.3 Respondents' Academic Qualifications (ACADQU)

The academic qualifications of respondents in the study area were as presented in Table 3. By the Nigerian educational standard, the lowest qualification for a teacher in a secondary school is National Certificate of Education. A closer look at Table 3 shows that 86.7% of respondents had a minimum of National Certificate of Education. This is a clear indication that majority of teachers in public secondary schools in Ogun State were qualified to teach at this level.

**Table 3: Respondents' Academic Qualifications**

Highest Academic Qualification	Frequency	Valid Percent
SSC	10	3.3
OND	28	9.1
NCE	77	25.1
B.Sc./HND	170	55.4
M.Sc.	18	5.9
Ph.D	1	0.3
Others	3	1.0
Total	307	100

Source: fieldwork, 2013.

From Table 3, 6.2% of respondents hold either M.Sc. or a PhD degree. That this caliber of teachers were also found teaching in secondary schools showed that the State Government has been doing everything possible to encourage their teachers to advance in knowledge so as to be competitive even among civil servants in the State.

#### 4.4 Ages of the Public Secondary School Buildings (SCHAGE)

Buildings wear out with age no matter the attention given to them since building elements, e.g. roofing sheets, wooden doors and window frames; have varying life spans. Others such as windows, doors and plumbing fittings become worn out due mainly to the quality of materials and intensity of usage. It was difficult for the respondents to know the age of each building in the schools because, in most

cases, there was no document in the school showing the age of each of the buildings. However, none of the staff had stayed long enough to know or even guess the actual ages of the buildings.

**Table 4: Age of Public Secondary Schools**

School Age	Frequency	Valid Percent
Up to 20	104	33.9
21-30	67	21.8
31-40	107	34.9
41-50	9	2.9
51 and above	20	6.5
Total	307	100.0

Source: fieldwork, 2013.

Data in Table 4 showed that less than 10% of the schools were more than 40 years old, while approximately one-third (34.9%) were between 31 and 40 years old. It was evident that 55.7% of the schools were below 30 years old as well as 56.7% of the schools being between 21 and 40 years of age. This result was not unexpected in view of the developmental status of Ogun State in Nigeria especially in the field of education.

#### 4.5 Ranting Of Maintenance Public School Buildings Due to Users' Practices

In the structured questionnaire, the respondents were asked to evaluate the factors that contribute to the present conditions of school buildings using (1 ) Agree (2) Disagree below:

**Table 5: Deterioration Based on some Deterioration Factors**

S/N	Deterioration Factors	Agree (%)	Disagree (%)
1	Poor Response to Maintenance Requests (NORESP)	13.9	86.1
2	Lack of Replacement of Worn out Building Components (NOREPL)	22	88
3	Users' Attitude (UATITUD)	41.6	58.4
4	Inflation on Price of Materials (INPRIC)	77.8	12.2
5	School Location (SCHLOC)	88.9	11.1
6	Poor Environmental Condition (SCHENV)	83.3	16.7
7	Building Design (SCHD)	61.1	38.9
8	School Buildings Age (SCHAGE)	-	100
9	Over Population of Students in the Classroom (POPULA)	16.7	83.3
10	Due to lack of Maintenance Experts	22.2	77.8
11	Absence of Maintenance Body and Policy	11.1	88.9
12	Lack of Maintenance Training (LACKTRA)	63.9	36.1
13	Based on Un-skilled maintenance person in construction	22.8	72.2
14	Maintenance Culture	19.5	80.5

Source: fieldwork, 2013.

##### 4.5.1 Deterioration Based on Poor Response to Maintenance Requests (NORESP) from Government

The NORESP as rated by the respondent were presented in Table 5. The response in Table 5 revealed that poor response to maintenance was high with 86.1% and only 13.9% revealed that they got quick response to their reported maintenance issues.

##### 4.5.2 Deterioration Based on Lack of Replacement of Worn out Building Components (NOREPL)

Repairs often mean simple replacement of worn out or used components. A building wear out or break down may become obsolete if there is no provision for replacement. The respondents were also requested to rate if the buildings were in their present condition because the worn out building materials were not replaced. The response in Table 5 revealed that 88% indicated that there was no

provision for replacement of deteriorated building materials in school buildings while the remaining (22%) indicated that there was provision for this maintenance activity.

#### **4.5.3 Deterioration Based on Users' Attitude (UATITUD)**

Human beings are unpredictable when public buildings are in use especially where people do all sorts of things like writing on the walls, dragging of chairs on the floor, using the WC without flushing and the likes. Such behaviors can easily contribute to deteriorating condition of buildings. It is important to identify the features and functionality of the school building in relation to the attitudes of the users. To ascertain the attitude of users in the public secondary schools the study also examined the variable of attitude of users' as a deterioration factor. The result is as presented in Table 5. The response in the Table 5 shows that 58.4% were of the opinion that poor user attitudes were contributive factor to the deterioration level of the school while the least rated was 41.6%.

#### **4.5.4 Deterioration of Public Secondary School Buildings Based on High Repair Bills (INPRIC)**

Prices of building materials do change frequently in the market while budgets for building maintenance over the years may not increase as much. The study investigated the lagged effect of inflation on building material prices on the optimal maintenance of public secondary school buildings. Analysis of respondents is presented in Table 5. A glance at the data in Table 5, shows that inflation on materials does affect the maintenance (77.8%). However, only 22.2% indicated that the variable was not a deterioration factor in the present condition of public secondary schools.

#### **4.5.5 Deterioration Based on the Public Secondary School Location (SCHLOC)**

A public secondary school may be affected by its location. Such problem sometimes includes erosion, wind and poor road network. The respondents were also requested to rate if the school location was a deterioration factor. The result of the school location in terms of access to road is in Table 5 indicated that the location of school was not affecting the school buildings. Majority, 88.9% of respondents disagreed while 11.1% agreed.

#### **4.5.6 Deterioration of Public Secondary School Buildings Due to Existing Environmental Condition (SCHENV)**

When a school is located close to a market, dump site or motor park, it can be used as a store, rescue point or garage. Environmental improvement are often more effective than curative efforts and it is another variable. The result in Table 5, confirmed that poor environmental condition had no influence on the present condition of school buildings with 88.3% disagreeing and 16.7 % agreeing. There was a clue that environmental condition had little influence on school buildings.

#### **4.5.7 Deterioration Based of Building Design (SCHD) Of Public Secondary Schools**

Building designs can be good or poor, wasted energy leading to alteration modification and demolition of buildings. The formation of the variable building design was investigated, in other to have the idea of the shape of the curve, whether normal or otherwise. However, the frequency table is presented in Table 5. The result in Table 5, confirmed that building design was not a deterioration factor, since 61.1% of the respondents claimed No, while 38.9% claimed that it is a factor of deterioration.

#### **4.5.8 Deterioration Based on the Age of Public Secondary School Buildings (SCHAGE)**

School age is examined in the context of the school building condition and state of repairs, renovation and replacement of the building components. Some of the schools have been renovated in recent years while some have never experienced any form of renovation works. The School ages were investigated since the ages of the building were not known by the majority of the respondents. The result of the analysis is presented in Table 5. 100% of the respondents tailed with very No, when asked if school buildings were deteriorating because of age. It is very uncommon to have such response but that was the case.

#### **4.5.9 Deterioration Based on Over-Population of Students in the Classroom (POPULA)**

The inadequacy of public secondary school buildings due to the excessive pressure of the student population has become another major concern in the study. The inadequacy of classrooms is also a problem in public secondary schools where an over population of students exist. The study examined the influence of population of students in the Classroom on the school buildings. The result is presented in Table 5. The reflection of the response above indicated that over population of students (83.3%) in the school buildings especially classrooms were rated very high as a contributive factor to the deterioration condition of school buildings, while 16.7 % indicated no.

#### **4.5.10 Deterioration of Public Secondary School Buildings Due to lack of Maintenance Experts**

The omission of building professionals in maintenance works may lead to building deterioration. To ascertain the involvements of maintenance experts, respondents were requested to evaluate the impact of non-involvement of experts in maintenance works that are carried out on public secondary school buildings. The result is presented in Table 5 indicates that there were more positive (77.8%) than negative (22.2%). This is an indication that the variable is one of the factors that is contributing to the deterioration condition of public secondary school in the study area.

#### **4.5.11 Deterioration Based on Lack of Maintenance Body and Policy**

The governments are the owners of the public secondary schools; therefore, they have a duty to maintain them. There is a need to have a policy in place as against the existing ad hoc arrangement. For the purpose of determining how the absence of maintenance body and policy affect school building, the result is presented in Table 5. Around 89% of the respondents indicates 'yes' while the others (11.1%) rated no. This implies that the variable is a contributive factor to the deterioration condition of public secondary school buildings.

#### **4.5.12 Deterioration Based on Lack of Maintenance Training (LACKTRA)**

The opinion of the maintenance managers was examined on the effect of lack of maintenance managers training in school maintenance. Table 5 is used to present the data, twenty- three (63.9%) rated no while thirteen (36.1%) rated yes. This implies that maintenance training has no influence on the present condition of buildings.

#### **4.5.13 Deterioration as a Result of the Use of Un-Skilled Maintenance Personnel**

This is another factor that seems to be affecting school buildings. The respondents were asked to indicate their opinion about this variable. The response in Table 5, shows 'yes' indicated that (72.2%) to be the most rated and (27.8%) indicated 'no' to be the least rated.

#### **4.5.14 Deterioration Based on Lack of Maintenance Culture (MATCUL) in Public Secondary Schools**

The respondents were asked to indicate if lack of maintenance culture was a deterioration factor. Table 5 shows the result of the analysis. There was an indication that maintenance culture was a deterioration factor in the schools. In Table 5, only 19.5 % indicated that MATCUL was not a deterioration factor. The result also revealed that 80.5% respondent rated agreed. It was observed during the survey that building users especially the students were somehow abusive with some facilities.

### **5. SUMMARY OF FINDINGS**

The study revealed that lack of maintenance culture is a common users' practice in Nigeria. On the contrary, the users' rated inflation of cost of maintenance and the use of poor quality materials by the maintenance managers as the most significant factor responsible for poor maintenance management of public secondary schools. For the purpose of this study, fourteen deterioration factors were investigated. There is no maintenance body and policy in place for the public secondary schools. There is also a lack of effective national maintenance policy, laws and regulations to compel both maintenance managers of public schools and users to undertake maintenance responsibility of which sanctions can be applied. This is consistent with [6] who stated that the country does not have a maintenance policy which has resulted in the persistent problems of building maintenance.

It is obvious from the study that the population of the students in the classroom was more than the number that the spaces were designed for. Some disrepair could be avoided, if there is quick response to deterioration by the maintenance managers. In most cases, some components were abandoned and allowed to deteriorate for a while before they gain maintenance attention. After building completion, there is no provision put in place for maintenance in the future. Most renovation work was found to be carried out by inexperienced people who are not professionals. Sometimes their charges are found cheaper than the professionals. There is also high deterioration on school building because of lack of maintenance schedule and plan. Even for those that claimed to be having it was observed that they do not apply them properly.

The maintenance condition seems to be worst in the schools because unskilled person were used instead of skilled. Sometimes, some of the students were instructed to carry out some construction and renovation. There is generally a lack of maintenance culture on the part of both the government

and maintenance managers, thus resulting in deferred maintenance of school buildings. Buildings deteriorate because of the users' attitude. Some drag furniture, break louvers, and throw stones at the ceilings. Eventually such students were sometimes not compelled to replace those components. For this reason, the students continue to act in such manner.

The building age sometimes do have influence on academic achievement of students. The modern buildings were preferred over older buildings by the users' because maintenance was not controlled, but when it is controlled, the older buildings would be acceptable. The findings in this study did not agree with [3] view that most maintenance problems can be attributed to poor design. The influence of building design was found not to have much influence on the deterioration condition of buildings in the school investigated. The lack of maintenance of these school buildings negatively affects the users' in their teaching and learning. The working environment are sometimes not conducive for the teachers, the capacity of the classrooms are stretched in some cases doubled. This may result in ill-health, psychological trauma and poor performance.

## 6.CONCLUSION

From the results obtained in this study, the following conclusions are made. The major factors responsible for the state of maintenance of public school buildings in the study area were identified to lack of maintenance culture on the part of both the governments, maintenance managers and the building users, thus resulting in deferred maintenance of the academic buildings in public secondary schools. A majority of the public secondary school building users were also indifferent towards maintaining their buildings because they destroy the facilities the more, on a daily basis. From the population data, there is also pressure on public secondary school buildings by number of users. There is inverse relation between population density and the quality of school buildings conditions. Public secondary schools with fewer people had better conditions as against those with large number of occupants.

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