# EXAMINATION OF THE CURRENT STATE OF GOVERNMENT BUILDINGS IN SENIOR HIGH SCHOOLS IN WA MUNICIPAL

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**Article Received:** 10-05-20          **Accepted:** 27-06-20          **Published:** 05-07-20

## ABSTRACT

Building maintenance is a phenomenon that transcends all disciplines over the world and its importance cannot be overemphasized It has become very critical in institution success such that its intervention is indispensable. Public senior high school buildings in Ghana represent significant investment of the tax payers' money and therefore maintaining these buildings is important. However, there seems to be paucity of studies on the examination of the current state of maintenance of government buildings in senior high schools in general and Wa Municipality in particular. This research seeks to bridge this knowledge gap by examining the current state of maintenance of government buildings in senior high schools in Wa Municipal of the Upper West Region of Ghana. Study methods include the use of questionnaire, interview guides, focus group discussion guide and observation checklist for data analysis. A total of 393 respondents (197 students, 140 teachers and 56 school management) who took part in this study were purposively selected. The study also found out that the current state of all the public senior high school buildings in the Wa Municipality is satisfactory for academic work; albeit poorly maintained with some buildings in a bad state. The study identified that the major defects on some of the school buildings are related to the state of services (students mean = 2.523, teachers mean = 2.321, school management mean = 2.464), fittings and furniture (students mean = 2.457, teachers mean = 2.500, school management mean = 1.982), as well as the finishes and windows (students mean = 2.609, teachers mean = 2.429, school management mean = 1.804). The school buildings which were highly affected were detected

to be school dormitories, and teachers' bungalows; whereas the school administration block and the school laboratory were found to be relatively in good state with reference to the number of defects. The study recommends that there is an urgent need for maintenance works to be carried out on public senior high school buildings in the Wa Municipality and also there should be a conscious effort to include maintenance activities in the budget both at the Assembly level and the school level in the Wa Municipality to ensure regular maintenance of their senior high school buildings.

## INTRODUCTION

In Ghana, there are a number of public buildings springing up as a mark of a developing nation. Most of the public buildings include senior high school buildings. These buildings make up the built environment that supports teaching and learning (Adeboyeje 2000). Besides providing conducive environment for teaching and learning, school buildings' expenditure constitutes a greater proportion of Ghana's investment in education (Affare, 2003). However, these buildings cannot remain new throughout their entire life, a new or old school building requires maintenance (Allotey, 2014). In fact, before a building is completed, maintenance problems start to creep in.

Prior to the twentieth century maintenance of government buildings was considered a necessary evil. Technology was not in an advanced development, there was no alternative for avoiding failure. With the advent of technological changes and after the Second World War, maintenance of government buildings came to be considered as an important function by stakeholders. This is why Iyagba (2005) asserted that public school buildings maintenance remains a key issue of concern to all stakeholders.

A number of people see government senior high school buildings maintenance as an avoidable task, fragmented and uncoordinated which contributes little to the built environment (Wood, 2005). Maintenance of public senior high school buildings ensure sustainable management of state property which brings about improve utilization of buildings (Wood, 2005). Hence, the safety of occupants who live in a regularly maintained building can always be assured. According to Soleimanzadeh (2013), when school buildings are neglected, defects occur and they result in extensive and avoidable damage to the building fabric.

Some government senior high schools' buildings in Ghana have not seen any significant maintenance since they were constructed, some dating back from the colonial era (Wood, 2005; Adesoji, 2011). This has resulted in damages and deterioration to some government senor high school buildings in the country. It is with this concern that some stakeholders in Ghanaian Education have indicated their trepidations to the maintenance of government buildings in senior high schools. Notable among them is the former Ghana's Deputy Minister of Education in charge of Tertiary Education (NDC Regime), Samuel Okudzeto Ablakwah who according to Allotey. (2014), is reported to have said that;

> *"the extent to which some government buildings in Ghana are been maintained is not good and if stakeholders of the educational sector do not put in measures to ensure an efficient and effective maintenance of the buildings especially those in the Senior High*

*Schools (SHS's) a time will come that all these buildings will collapse and students will not get a place to learn"* (Allotey, 2014).

According to Joy News report on 18th May, 2017 during facilities management day in Ghana, the president Mr. Femi Akimode is reported to have said that;

*"Public buildings maintenance in Ghana is a problem, as such stakeholders must ensure that government buildings are maintained".*

Again, Joy New report on 19th May, 2017, the Minister for Housing (Hon. Atta Akyia) who speaking to joy news on his visit to some public basic and senior high schools' buildings in Wa Municipality and Eastern Region is reported to have said that;

*"The state of conditions of government school buildings in Ghana is bad".*

Critical example is the dilapidated Wa Senior High Technical School boy's dormitory, Wa Senior High School dining hall, Wa Northern Star classroom block, Wa Community Development classroom block, Wa Islamic Girls dormitory block and Wa Technical Institute building technology department block of the Wa Municipality as reported by Joy news on 27th February, 2016. Even though the National Building Regulation of Ghana LI 1630 clause twelve (12) section one (1) specifies clearly regular maintenance of government buildings but a preliminary survey by the researcher to some of the public senior high schools buildings in the Wa Municipality is in a bad state. In view of these, it has been considered necessary to examine the current state of maintenance of government buildings in senior high schools in the Wa Municipality

## REVIEW OF RELATED LITERATURE

### Public SHS/SHTS Buildings in Ghana

Fulmer (2009) defined Public building as any type of building that is accessible to the public and is funded from public sources. Typically, public buildings are funded through tax money by the government, state or local government. All types of governmental senior high school (SHS) or senior high technical school (SHTS) buildings are considered public buildings (Fulmer, 2009; Agyefi-Mensah et al., 2012). Buildings constitute a greater percentage of the infrastructure in most public SHS's especially in the boarding schools. Examples are dormitories, classrooms, laboratories, assembly hall(s), administration block, dining hall(s), kitchen complex, libraries, staff accommodation, and chapel (Allotey, 2014).

Over the years, Ghana Government through the GETFund has been making huge investments in public senior high school buildings in the education sector. For instance, in 2010, GETFund expended GHC296.42 million on educational infrastructure (Monetary Policy Report of Bank of Ghana, 2011). This amount, according to the report does not include maintenance costs but simply covered construction and consultancy costs. Agyefi-Mensah et al. (2012) however observed that, public (government) senior high school buildings in general are built with the intention to operate for a very long time. They further added that the consequent impact of school buildings on capital investment, resource utilization, the quality of the environment and overall quality of human life can be very significant. It is therefore important that, public

senior high school buildings meet performance requirements in economic, ecological and social sustainability terms hence the need for its maintenance.

**Aims and Objectives of SHS/SHTS Buildings Maintenance**

The function of maintenance is to maximize the aesthetic and economic values of buildings and other infrastructure, as well as increase the health and safety of the occupants. According to Aris (2006), some of the specific objectives of senior high school buildings maintenance include, to: perform daily housekeeping and cleaning; develop and execute a system of regularly scheduled maintenance actions; undertake major repairs based on lowest life-cycle cost; complete improvement projects; provide for easy and complete reporting of maintenance work; monitor the progress of maintenance works; estimate and track costs accurately; schedule all planned work in advance; allocate and anticipate staff; and continually seek workable solutions to maintenance problems. These objectives however, encapsulate maintenance in its totality, combining technical and administrative actions. This brings to bare, the management aspect of maintenance of public senior high school buildings in Ghana including those in the Wa Municipality of the Upper West Region of Ghana.

The primary aim of maintaining government buildings in senior high school is to ensure that the building continue to serve the purpose for which it was put up (Agyefi-Mensah et al., 2012). The purposes for which senior high school buildings maintenance are undertaken include:

   a. To maintain the value of the buildings: A better maintained school buildings normally has greater value (Afranie & Osei-Tutu, 1999: Allotey, 2014).
   b. To ensure optimum use the buildings: Good maintenance should allow senior high school buildings to be used to their full potential.
   c. To create or maintain suitable appearance of the buildings: This can make a positive contribution to the built environment and social conditions. Dilapidated school buildings can contribute to social deprivation and badly maintained services and facilities, waste energy and resources and can affect the environment (Mydin, 2014).
   d. To maximize the life of main components and materials of the buildings by extending periods between repairs and replacements;
   e. To ensure that the buildings do not detract from surroundings and also maintain a suitable appearance (Cobbinah, 2010).

Considering maintenance needs, Zulkarnain et al. (2011) emphasised that the prime aim of school buildings maintenance is to preserve the building in its initial stage, as far as practicable, so that it effectively serves bits purpose. The author further added that the main purposes of maintaining government school buildings (including senior high school buildings) are:

   • Retaining value of government investment in education.
   • Maintaining the building in a condition in which it continues to fulfill its function.
   • Presenting a good appearance.

There is a growing awareness worldwide on the importance of the maintenance of public senior high school buildings (Aris, 2006). Regular maintenance retains the value of investment and assists in retaining the economic life of the school buildings. According to Cobbinah (2010), maintaining economic assets such as senior high school buildings ensures that they

appreciate in value and result in a return, either socially or economically. Aris (2006) also observed that, maintenance is a productive activity at both private and national levels. The author further explained that, at the private level, proper maintenance leads to lower depreciation costs and consequently, higher profitability. While at the national level, proper maintenance leads to lower expenditures on replacement. Thus, allowing more expenditure on expansion into new productive investment.

Frequent maintenance of senior high school buildings brings such benefits as comfort and satisfaction to its users (Allotey, 2014). Maintaining government buildings in senior high schools especially those in the Wa Municipal of the Upper West Region of Ghana ensure that investments made by the government in the educational sector do not only yield the highest possible returns over the life of the buildings but also fulfills the ultimate responsibility of providing the needed human satisfaction and comfort and protecting state property. Akasah et al. (2010) emphasized that, maintaining public senior high school buildings simply means protecting national asset. This goes to explain further the importance of maintenance of public senior high schools' buildings in Ghana especially those in the Wa Municipality of the Upper West Region of Ghana.

Finally, buildings in general expresses physically, the complex social and economic factors which give structure and life to the school community (Cobbinah, 2010). Conditions and quality of public senior high school buildings are a measure of public pride, prosperity, priorities, social values and virtues. These combine with other variables to give image and meaning to the country's unique characteristics. However, Njuangang and Liyanage (2012) shared the view that, despite the significance of maintenance of senior high school buildings, it appears maintenance often takes low priority among stakeholders responsible for public senior high school buildings in some developing countries. Allotey (2014) asserted that public senior high school buildings maintenance is of great significance to the economy not only because of the scale of expenditure involved but also because it is important to ensure that the buildings is used as effectively as possible hence the need to assess the maintenance of government buildings in senior high schools in the Wa Municipality.

**Current State of Public SHS/SHTS Buildings in Developing Countries**
The existing senior high school buildings in most developing countries are in a state of decay due to lack of maintenance and repair (Allotey, 2014). The present conditions of government buildings in senior high schools impact negatively on the quality of education offered in a country (Akasah, 2010). For the purpose of this study, such conditions therefore raised the question: what is the current state of senior high school buildings in the Wa Municipality of the Upper West of Ghana? The need for provision of adequate school buildings maintenance at all levels of education is paramount (Cobbinah, 2010).

The maintenance situation as observed by many Ghanaian researchers (Afrane and Osei – Tutu, 1999; Affare, 2003; Obimpe, 2003; Barimah, 2005; Kyeremateng, 2008; Cobbinah, 2010; Nartey, 2011) in all sectors predominantly the public sector in general and the education sector in particular poses a big challenge to development. It can be inferred from the findings of these authors that those at the helm of affairs and other stakeholders who play diverse roles seem to have a fair idea of what ought to be done.

Afrane and Osei-Tutu (1999) and Cobbinah (2010) reported the current maintenance situation in some senior high schools in Ghana by the following observations: no maintenance staff in

the schools; low budgetary allocations for maintenance; and the absence of plans and arrangements for maintenance. Kyeremateng (2008) observed that senior high schools in Ghana did not have documents containing maintenance policy rather schools had an unwritten policy which sought to ensure that school buildings were maintained as and when needed. Senior high school buildings serve several needs of society; primarily as shelter from weather and as general living space for academic activities. Smith (2013) stressed that, the state of some public senior high schools in Ghana lack maintenance. To this end, this study is set out to ascertain the state of maintenance of public senior high school buildings in the Wa Municipality of the Upper West Region of Ghana?

According to Cobbinah (2010), a general shortage of space currently exists in all the sub-sectors of the educational system in Ghana. The expansion of the education system, mainly through the introduction of universal primary education, progressive free education and free senior high school education currently in Ghana for example, has put pressure on senior high school buildings that did not expand at the same rate as the school population. The visible result of the current situation is the critical condition of some senior high school buildings in Ghana (Allotey, 2014). This is coupled with how much people should pay to achieve timely maintenance of senior high school buildings elements. Information on system of maintenance being practised clearly defines the difference between private and public senior high school buildings. Abdul-Manan (2011) and Smith (2013) emphasized the poor maintenance culture exposing the current state of public senior high school buildings in some developing countries in a deplorable state. To this end, this study is set out to ascertain the state of maintenance of senior high school buildings in the Wa Municipality of the Upper West Region of Ghana?

The state of disrepair and deterioration of some public senior high school buildings in Ghana is, therefore, of great concern. Kindred (2004) postulated that the structural life of a building is the period which it expires, that is when it ceases to be an economic proposition to maintain the building. This is why Smith (2013) stressed that, public senior high school buildings in most developing countries need maintenance. According to Kindred (2004) senior high school buildings which lack maintenance affect the comfort of the users (students, teachers, management and visitors) who live or work in such buildings and this does not ensure sustainable built environment as well as resource management hence the need for maintenance of school buildings (Njuangang & Liyanage, 2012).

**Defects and Deterioration Found on Public SHS Buildings**

Defects and deterioration are common problems in school buildings. Allotey (2014) defined defects in buildings as premature failure resulting from errors of workmanship, design, the use of faulty materials or inadequate/lack of maintenance. According to Cho *et al.* (2006), building works in public senior high schools which fall short of complying with the requirements of contract, specifications or contract drawings, together with conditions of its quality and any implied terms, durability, workmanship, design or performance, aesthetics, etc. can be defined as defective building works. A building defect may include any problem that reduces the beauty and value of building as a result defect was defined as the deterioration of building features and services to unsatisfactory quality levels of requirement of users (Sherwin, 2012).

Marshall *et al.* (2009) in their study identified typical defects found in poorly designed, built and/managed public senior high school buildings to include cracks in walls, bulging/bowing of walls, rising dampness, uneven ground floor slabs, movement in upper floors, damp penetration of roofs, cracks to renders, loose/hollow render, condensation, faulty heating, plumbing and electrical, and blockages/leaks to drainage.. Buys and Martyn (2013) also assessed the perceptions of built environment stakeholders on the causes and types of defects on public senior high school buildings in South Africa. The study revealed that cracks (in floors, walls and beams), dampness, roof problems, plumbing leakages, detachment, structural instability, etc. were among the types identified with buildings.

Abdul-Manan (2011) sought to discuss some common maintenance problems and defects of public senior high school buildings. His study revealed that water proofing issues that lead to water penetration into the buildings, cracks, soil settlements and stains on walls of buildings were among some of the defects identified with the buildings. Mydin *et al.* (2014) identified common defects associated with some public senior high schools' buildings in Malaysia. Defects such as peeling of paints, dampness, surface discolouration, timber decay, cracks, roof leakages, etc. were identified with the school buildings.

Aris (2006) set out to assess the user perspectives of defects associated with public senior high schools' buildings in Tronoh, Malaysia. The study revealed that a total of 20 out of 32 defects were found to be very critical to the building users. Faulty electrical systems, faulty air conditioning system, faulty doors and windows, damaged floors and roof damages were the defects that required urgent maintenance. Mydin *et al.* (2014) tried to analyze defects identified on different types of walling systems in some public senior high school buildings in Malaysia. Their study revealed that diagonal cracks on external walls, detachment of paints from walls, dampness, surface stains, among others were common in the buildings hence the need for maintenance of buildings.

From the literature review little is known about the current state of government buildings in senior high schools in the Wa Municipality. This therefore justifies the need to assess the current state of the public senior high school buildings in the Wa Municipality in order to fill the gap in literature.

## METHODOLOGY

### Research Design

The study used the mixed methods research design, employing both qualitative and quantitative research approaches. Creswell (2013) and Ampofo (2019) has made strong arguments for mixed methods research that offset the weaknesses of both quantitative and qualitative research as follows; that mixed methods research provides more comprehensive evidence for studying a research problem than either quantitative or qualitative research alone. The strategy permitted the usage of several approaches (Ampofo, 2019) and a triangulation of methods (Nasse, 2020; Ampofo, 2017) in addressing the research issues.

### Study Area

The location for this study is Wa Municipal Area with its capital as Wa, which is also the regional capital of the Upper West Region of Ghana. Wa lies between latitude 9° 50' N to 10° 10' N and longitude 2°17 W and 2° 37 W, thus covering an area of approximately 1,180 square kilometers which is about 32% and 2.5% of the region and nation respectively. The

Municipality is bounded to the north by Nadowli District, to the south by both Wa East and West Districts, to the East and West by Wa West and East Districts respectively. According to 2010 population census, Wa population was estimated to be 135,638 (female 65,887/Male 69,751) with a growth rate of 2.7% per annum (Wa Municipal Assembly, 2017). The spatial distribution of the population displays a typical character of a young municipality, a heavy concentration of the population in Wa town surrounded by smaller towns and rural settlements.

Using the 2010 Population and Housing Census figures, Wa's population is 50 times higher than the next populous settlements (Busa, Sagu, Charia, Kperisi and Boli) each with a population below 3,000 people. The significance of this type of distribution is that Wa town provides the highest level services (first level services and functions) in health, education, finance, administration of justice and security, commerce and transportation amongst others to its hinterland and patent services for resource mobilization, peace building and community needs identification (Wa Municipal Assembly, 2017).

One of the most common challenges to be addressed in Wa Municipality is the issue of maintenance of government buildings in senior high schools in the Wa Municipality of the Upper West Region of Ghana. The study was conducted in all the eight public senior high schools in the Wa Municipality of the Upper West Region. Geographic Information System was used to collect the coordinates of the schools and this is geographically shown in Figure 1.
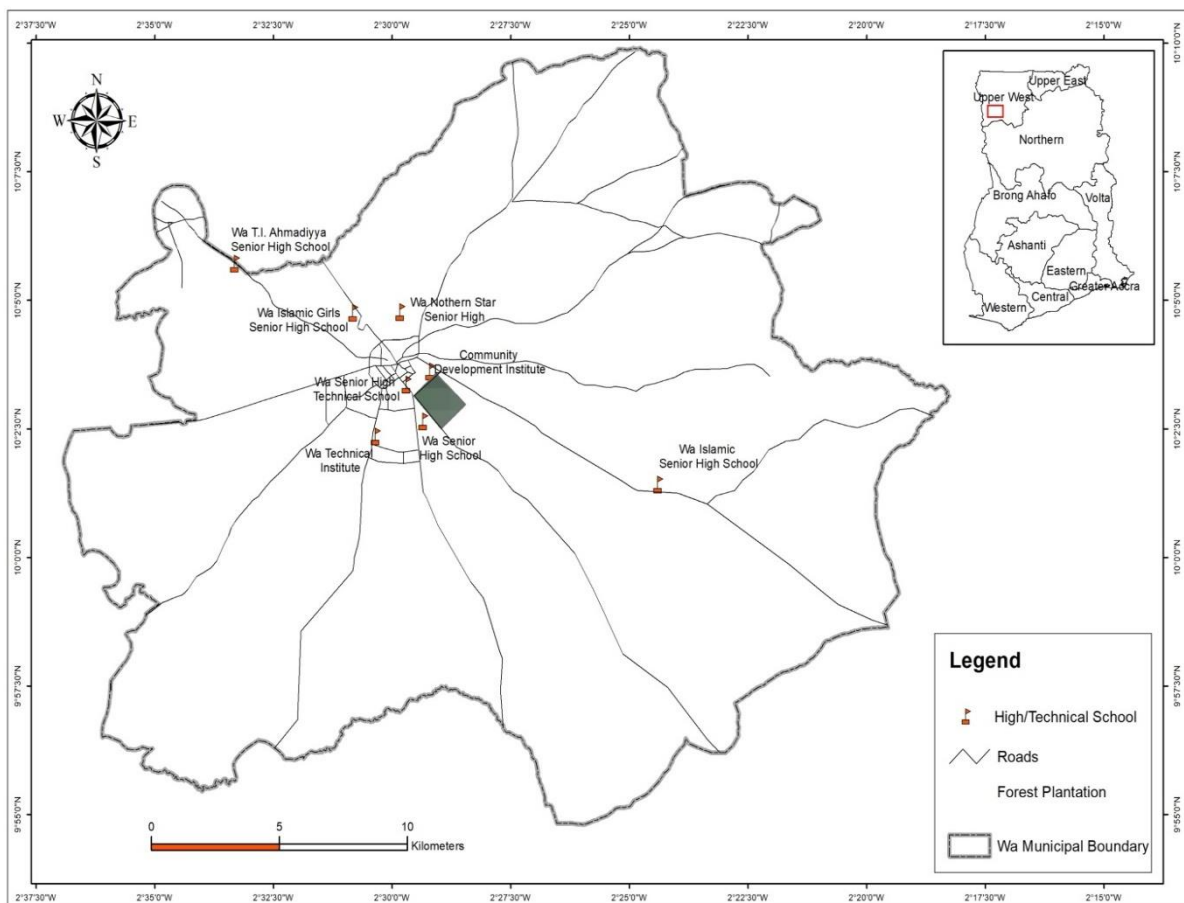


. Figure 1: Map of Public Senior High/Technical schools in Wa Municipality
Source: Field Survey (2017)

**Research Design**

A cross sectional survey was used as a design for the study. Cross-sectional research involves using different groups of people who differ in the variable of interest but share other similar characteristics, such as socioeconomic status, educational background, and ethnicity (Creswell, 2013; Ampofo, 2017). The study used mixed method approach. Both quantitative and qualitative data collection methods were used.

Quantitative data were collected using questionnaires showing stakeholder's responsibilities in public senior high school buildings maintenance practices.

Qualitative data were captured using observation checklist, focused group discussion and Key Informants Interview (KII) guides with key stakeholders at the Wa Municipal Education Service, the school levels and the Wa Municipal Assembly department in charge of maintenance of government buildings and PTA Chairman of the schools. Specific key stakeholders were asked questions that are relevant to this study. All the eight (8) public senior high schools in the Wa Municipality were visited and the maintenance e of their buildings status were assessed. The eight (8) schools are:

- Wa Senior High Technical School
- Wa Senior High School
- Wa T.I. Ahmadiya Senior High School
- Wa Islamic Senior High School
- Wa Islamic Girls Senior High School
- Wa Northern Star Senior High School
- Wa Technical Institute
- Wa Community Development Institute

**Population and Sampling Frame**

The target population for this study was all forms two and three students, teachers and school management/staff in all the eight (8) public senior high schools in the Wa Municipality. The field data collection began on 5th November, 2017 and ended on 5th December, 2017. The eight (8) government senior high schools in the Wa Municipality have a teacher population of 455 teachers with 95 representing females and 360 representing males. All the eight government senior high schools have a school management population of 77 with 40 representing females and 37 representing males and a student population of 6140, with 3440 students representing SHS 2, and 2700 students representing the SHS 3. The teachers, school management and students were selected because they are likely to have an idea about the maintenance of government buildings in senior high schools in the Wa Municipality since they are the users of the school buildings. Table 1, 2 and 3 shows the population distribution for this study.

Table 1 shows student population distribution for the eight schools.

Table 1
*Target Student Population Distribution for 2017*

| | | STUDENTS POULATION | | |
| | SENIOR HIGH SCHOOL | FORM 2 | FORM 3 | TOTAL |
|---|---|---|---|---|
| 1. | Wa Senior High Technical School | 600 | 540 | 1140 |
| 2. | Wa Senior High School | 560 | 480 | 1040 |
| 3. | Wa T.I. Ahmadiya Senior High School | 500 | 420 | 920 |
| 4. | Wa Islamic Senior High School | 520 | 310 | 830 |
| 5. | Wa Islamic Girls Senior High School | 426 | 62 | 488 |
| 6. | Wa Northern Star Senior High School | 60 | 48 | 108 |
| 7. | Wa Technical Institute | 520 | 560 | 1080 |
| 8. | Wa Community Development Institute | 254 | 280 | 534 |
| | **TOTAL** | **3440** | **2700** | **6140** |

Source: Field Survey (2017)

Table 2 shows teacher population distribution for the eight schools.

Table 2
*Teacher Population Distribution for the Eight Schools in 2017*

| | | TEACHERS POPULATION | | |
| | SENIOR HIGH SCHOOL | FEMALE | MALE | TOTAL |
|---|---|---|---|---|
| 1. | Wa Senior High Technical School | 14 | 76 | 90 |
| 2. | Wa Senior High School | 16 | 70 | 86 |
| 3. | Wa T.I. Ahmadiya Senior High School | 10 | 55 | 65 |
| 4. | Wa Islamic Girls Senior High School | 8 | 21 | 29 |
| 5. | Wa Islamic Senior High School | 15 | 35 | 50 |
| 6. | Wa Northern Star Senior High School | 7 | 13 | 20 |
| 7. | Wa Technical Institute | 20 | 75 | 95 |
| 8. | Wa Community Development Institute | 5 | 15 | 20 |
| | **TOTAL** | **95** | **360** | **455** |

Source: Field Survey (2017)

Table 3 shows the distribution of school management/staff population for the eight schools.

Table 3
*Distribution of Population of the Eight Schools' Management for 2017*

| | | SCHOOL MANAGEMENT POPULATION | | |
| | SENIOR HIGH SCHOOL | FEMALE | MALE | TOTAL |
|---|---|---|---|---|
| 1. | Wa Senior High Technical School | 7 | 6 | 13 |
| 2. | Wa Senior High School | 5 | 6 | 11 |
| 3. | Wa T.I. Ahmadiya Senior High School | 4 | 5 | 9 |
| 4. | Wa Islamic Girls Senior High School | 4 | 3 | 7 |
| 5. | Wa Islamic Senior High School | 5 | 5 | 10 |
| 6. | Wa Northern Star Senior High School | 3 | 3 | 6 |
| 7. | Wa Technical Institute | 9 | 5 | 14 |
| 8. | Wa Community Development Institute | 3 | 4 | 7 |
| | **TOTAL** | **40** | **37** | **77** |

Source: Field Survey (2017)

**Sample Size and Selection of Participants**

All the eight (8) government senior high schools in the Wa Municipality of the Upper West Region of Ghana were used for the study. Table 4 shows the sample size for the three

categories of respondents used for the study. From table 4, the total sample frame of students was 6140, total sample frame of teachers were 455 and total sample frame of school management were 77. An error margin of 7% was used to calculate the sample size for students, teachers and school management/staff using Miller and Brewer (2003) formula. The 7% error margin was chosen for convenience which means that 93% of the information gathered from the respondents is accurate.

Miller and Brewer (2003) formula shown below:

$$n = \frac{N}{1 + N\,(\propto)^2}$$

Where: n= required sample size, 1= constant, N= sample frame, $\propto$= level of significance or margin of error.

Table 4
*Sample size for the three categories of respondents based on Miller and Brewer (2003) formula*

| Sample size determination for students | |
|---|---|
| SAMPLE SIZE (n) | ? |
| TOTAL POPULATION | 6140 |
| CONSTANT(1) | 1 |
| ERROR TERM(e)% | 7% |
| Exponent | 2 |
| (N(e)^2) | 30.086 |
| 1 +(N(e)^2 | 31.086 |
| n = N/(1+N(e)^2) | 197 |
| **Sample size determination for teachers** | |
| SAMPLE SIZE (n) | ? |
| TOTAL POPULATION | 455 |
| CONSTANT(1) | 1 |
| ERROR TERM(e)% | 7% |
| Exponent | 2 |
| (N(e)^2) | 2.2295 |
| 1 +(N(e)^2 | 3.2295 |
| n = N/(1+N(e)^2) | 140 |
| **Sample size determination for school management** | |
| SAMPLE SIZE (n) | ? |
| TOTAL POPULATION | 77 |
| CONSTANT(1) | 1 |
| ERROR TERM(e)% | 7% |
| Exponent | 2 |
| (N(e)^2) | 0.3773 |
| 1 +(N(e)^2 | 1.3773 |
| n = N/(1+N(e)^2) | 56 |
| **Total Sample Size for students, teachers and school management** | **393** |

Source: Field Survey (2017)

The representative sample selected was then proportionally distributed for all the eight public senior high schools used for the study based on the population of each school. This ensures that equal representation of the respondents of each school to take part in the study and this is shown in Table 5, Table 6 and Table 7.

Table 5 shows the proportional distribution of students sample size.

Table 5

*Proportional Distribution of Student's Sample Size*

| SENIOR HIGH SCHOOL IN WA MUNICIPAL | STUDENTS POULATION | | | SAMPLE SIZE | | |
|---|---|---|---|---|---|---|
| | FORM 2 | FORM 3 | TOTAL | FORM 2 | FORM 3 | TOTAL |
| 1. Wa Senior High Technical School | 600 | 540 | 1140 | 19 | 17 | 36 |
| 2. Wa Senior High School | 560 | 480 | 1040 | 18 | 15 | 33 |
| 3. Wa T.I. Ahmadiya Senior High School | 500 | 420 | 920 | 16 | 14 | 30 |
| 4. Wa Islamic Senior High School | 520 | 310 | 830 | 17 | 10 | 27 |
| 5. Wa Islamic Girls Senior High School | 426 | 62 | 488 | 13 | 2 | 15 |
| 6. Wa Northern Star Senior High School | 60 | 48 | 108 | 2 | 2 | 4 |
| 7. Wa Technical Institute | 520 | 560 | 1080 | 17 | 18 | 35 |
| 8. Wa Community Development Institute | 254 | 280 | 534 | 8 | 9 | 17 |
| **TOTAL** | **3440** | **2700** | **6140** | **110** | **87** | **197** |

Source: Field Survey (2017)

Table 6 shows the proportional distribution of teachers sample size.

Table 6

*Proportional distribution of teachers' sample size*

| SENIOR HIGH SCHOOL | TEACHERS POPULATION | | | SAMPLE SIZE | | |
|---|---|---|---|---|---|---|
| | FEMALE | MALE | TOTAL | FEMALE | MALE | TOTAL |
| 1. Wa Senior High Technical School | 14 | 76 | 90 | 4 | 23 | 27 |
| 2. Wa Senior High School | 16 | 70 | 86 | 5 | 22 | 27 |
| 3. Wa T.I. Ahmadiya Senior High School | 10 | 55 | 65 | 3 | 17 | 20 |
| 4. Wa Islamic Girls Senior High School | 8 | 21 | 29 | 2 | 6 | 8 |
| 5. Wa Islamic Senior High School | 15 | 35 | 50 | 5 | 11 | 16 |
| 6. Wa Northern Star Senior High School | 7 | 13 | 20 | 2 | 4 | 6 |
| 7. Wa Technical Institute | 20 | 75 | 95 | 6 | 23 | 29 |
| 8. Wa Community Development Institute | 5 | 15 | 20 | 2 | 5 | 7 |
| **TOTAL** | **95** | **360** | **455** | **29** | **111** | **140** |

Source: Field Survey (2017)

Table 7 shows the proportional distribution sample size of school management/staff.

Table 7

*Proportional distribution of school management/staff's sample size*

| SENIOR HIGH SCHOOL | SCHOOL MMANAGEMNT POPULATION | | | SAMPLE SIZE | | |
|---|---|---|---|---|---|---|
| | FEMALE | MALE | TOTAL | FEMALE | MALE | TOTAL |
| 1. Wa Senior High Technical School | 7 | 6 | 13 | 5 | 4 | 9 |
| 2. Wa Senior High School | 5 | 6 | 11 | 4 | 4 | 8 |
| 3. Wa T.I. Ahmadiya Senior High School | 4 | 5 | 9 | 3 | 4 | 7 |
| 4. Wa Islamic Girls Senior High School | 4 | 3 | 7 | 3 | 2 | 5 |
| 5. Wa Islamic Senior High School | 5 | 5 | 10 | 4 | 4 | 8 |
| 6. Wa Northern Star Senior High School | 3 | 3 | 6 | 2 | 2 | 4 |
| 7. Wa Technical Institute | 9 | 5 | 14 | 6 | 4 | 10 |
| 8. Wa Community Development Institute | 3 | 4 | 7 | 2 | 3 | 5 |
| TOTAL | 40 | 37 | 77 | 29 | 27 | 56 |

Source: Field Survey (2017)

A total of 393 respondents (thus 197 students, 140 teachers and 56 school management/staff) took part in this study. Their selection was influenced by the main objective of the study and also on the aspect of trying to get variations in experiences as far as possible.

According to the theoretical and conceptual framework presented, it was evident that assessment of government senior high school buildings condition is the responsibilities of stakeholders such as government, Ministry of Education, Ghana Education Service, District/Municipal/Metropolitan Assembly, School Management, teachers, non-teaching staff, PTA, Students, and Professionals like contractors, facility managers and architects. The first group of participants involved in the study are students, teachers and school management. These are the people who are using the school buildings every day as such they may have an idea about the current state of the school buildings, this include both the students, teachers and school management/staff. The second category of respondents to participate in the study significantly included two (2) public servants and these are the Wa Regional Director of Education and the Wa Municipal Department of Maintenance Officer. The third category of respondents were Parents Teachers Association (PTA) chairman of each senior high school and the Chairman of each School Management Committee (SMC) who have interest in what goes on in the school buildings maintenance. The fourth and the last group was the Students Representative Council (SRC) and non-teaching staff (example carpenters, masons etc) that support the maintenance of government buildings in senior high schools. For confidential reasons, the names of these respondents will not be disclosed in the study.

**Sources of Data Collection**

The research outsourced information from both secondary and primary data. Secondary data on the examination of the current state of maintenance of government buildings in senior high schools in the Wa Municipality were obtained from literature: Afrane (1999); Afare (2003); Obimpe (2003); Barimah (2005); Kyeremateng (2008); Cobbinah (2010); Nartey (2011); Buys

(2013) and Allotey (2014). Also condition based assessment of public school buildings data were collected from the Wa Municipal Department of Maintenance of Government Buildings. Information on past decade maintenance works activities carried on public senior high school buildings in Wa Municipality was also obtained from the Wa Municipal Department of Maintenance and Wa Municipal Education Office. The primary data were the information taken solely from the field as first hand data and these were collected from the targeted respondents of the study namely; students, teachers and school management as well as key informant interviews and observation checklist collected from the field.

## Methods of Data Collection

Data for this study were collected using the mixed method approach and it includes surveys, interviews, observations and focus group discussions. The mixed method design was used for the study. In this case, the observed data supports the survey and interview data. Also the mixed method approach was used in order to assess respondent's experiences on the current state of maintenance of government buildings in senior high schools in the Wa Municipality.

Through interviews and focus group discussions the researcher was able to obtain the stakeholders awareness level, opinions, points of views regarding the current state of maintenance of government buildings in senior high schools in the Wa Municipality. Through observation, the researcher saw what some stakeholders actually did with regards to the maintenance of the school buildings hence enabling the researcher to obtain a deep understanding of the current state of maintenance of government buildings in senior high schools in the Wa Municipality. This help the researcher to examine the current state of maintenance of government buildings in senior high schools in the Wa Municipality.

## Data Analysis and Presentation

Quantitative Data: After collection, survey data were edited and coded. This is where data were examined for errors and omissions and corrected where necessary and possible. In the coding process, data were organised into categories after which, numerals were assigned to each item before entering them into the computer. After entering using SPSS version 20 programme, the computer was used to generate quantitative results including the percentages, frequencies and means (averages).

Qualitative Data: After data collection, data were coded and analysed. Editing involved examining data for errors and omissions after which, corrections were made accordingly. Coding involved organizing data into classes/categories in relation to the themes/objectives of the study. After this, interpretations were made before making conclusions.

## RESULTS AND DISCUSSION OF RESULTS

## Analysis of Demographics of Respondents

The initial aspect of the data analysis focuses on a summary statistic of the respondents. As explained earlier in the chapter three, the study captured the views of students, teachers and school management of the public senior high schools in the Wa Municipality concerning the maintenance of their school buildings. The descriptive analysis therefore implemented on the three classes of respondents. Tables 8 and 9 give a report of the summary statistics of the sampled respondents. It offers demographic information about the respondents' gender, their position, age, experience and highest level of education.

Table 8
*Demographic Characteristics of Sampled Students*

|  | Details | Frequency | Percent |
|---|---|---|---|
| Gender | Male | 107 | 54.3 |
|  | Female | 90 | 45.7 |
|  | **Total** | **197** | **100** |
| Age | 14-18 | 87 | 44.2 |
|  | 19-23 | 100 | 50.8 |
|  | 24-28 | 10 | 5.1 |
|  | **Total** | **197** | **100** |
| Level of SHS | SHS2 | 110 | 55.8 |
|  | SHS3 | 87 | 44.2 |
|  | **Total** | **197** | **100** |

Source: Field Survey (2017)

Majority of the students who responded to the survey instrument were males (54.31%). It is also observed that most of the sampled students (50.76%) are between the ages of 19 - 23years. Meanwhile, the researcher mostly concentrated on students who were either in their second year (55.84%) or their third year (44.16%); as this group was assumed to possess enough information concerning the current state of the school buildings and how their school buildings have been renovated or upgraded over the past years.

Table 9
*Demographic Characteristics of Sampled Teachers and Management*

|  | Details | Teachers | | Management | |
|---|---|---|---|---|---|
|  |  | Frequency | Percent | Frequency | Percent |
| Sex | Male | 111 | 79.3 | 29 | 51.8 |
|  | Female | 29 | 20.7 | 27 | 48.2 |
|  | **Total** | **140** | **100** | **56** | **100** |
| Age | 24-29 | 20 | 14.3 | 0 | 0 |
|  | 30-35 | 35 | 25 | 10 | 17.9 |
|  | 36-40 | 50 | 35.7 | 15 | 26.8 |
|  | 41-45 | 25 | 17.7 | 25 | 44.6 |
|  | 46-50 | 10 | 7.1 | 6 | 10.7 |
|  | **Total** | **140** | **100** | **56** | **100** |
| Educational Level | Masters | 25 | 17.9 | 8 | 14.3 |
|  | Professional | 0 | 0 | 5 | 8.9 |
|  | First Degree | 110 | 78.6 | 33 | 58.9 |
|  | HND | 5 | 3.6 | 10 | 17.9 |
|  | **Total** | **140** | **100** | **56** | **100** |
| Experience | 4yrs - 5yrs | 5 | 3.6 | 2 | 3.6 |
|  | 5+ | 135 | 96.4 | 54 | 96.4 |
|  | **Total** | **140** | **100** | **56** | **100** |
| Department Served | Maintenance | 0 | 0 | 8 | 14.3 |
|  | Projects | 0 | 0 | 8 | 14.3 |
|  | Facilities | 8 | 5.7 | 8 | 14.3 |
|  | Premises and Property | 8 | 5.7 | 8 | 14.3 |
|  | None | 124 | 88.6 | 24 | 42.9 |
|  | **Total** | **140** | **100** | **56** | **100** |

Source: Field Survey (2017)

Aside the student population, the study also focused on sampling the responses of both teachers and school management. Majority of the teachers and school management/staff are males (79.29% for teachers; and 51.29% for management). It is also revealed that averagely most of the teachers and management staff are 30 years and above with a first-degree educational qualification. More than 90% of the teachers and management staff were also identified to have served their school for more than 5 years. While the majority of the teachers have never served under any maintenance department (88.57%), only 24 out of the total number of 56 management staff representing (42.86%) were reported not to serve in any of the maintenance department.

**Building Types in Senior High Schools in Wa Municipal**

To examine the current state of maintenance of government buildings in senior high schools in the Wa Municipality, it is necessary to examine the current state of buildings. Table 10 provides a census of the number and types of buildings at all the eight sampled public senior high schools within the Wa Municipality. The inventory of all the physical buildings in the schools was important first step to estimate the maintenance obligation of the schools after ascertaining the current state of these buildings.

Table 10

*Inventory of School Buildings*

| TARGET BUIDINGS | | TYPES | | |
|---|---|---|---|---|
| | Single Storey | Blocks of Flat | Total Number | Average Age of School |
| Classroom blocks | 15 | 20 | 35 | 30 |
| School library | 1 | 6 | 7 | 20 |
| School laboratory | - | 4 | 4 | 25 |
| Administration block | 4 | 4 | 8 | 30 |
| Staff/teachers bungalows | 2 | 52 | 54 | 30 |
| Dormitories | 12 | 37 | 49 | 25 |

Source: Field Survey (2017)

Having observed the total number of the buildings in the eight public senior high schools, the study set out to examine the state of the limited number of buildings observed. The assessment of teachers, students and school management were received. It is generally observed because, each group of respondents have unequal access to varied forms of the school's buildings as such their assessment would differ. Thus, to provide a holistic picture of the situation on the ground, there was the need to include all the varied perspectives. Table 11 shows the results of the state of school dormitories and teachers' bungalows. Generally, it was indicated by the respondents that both the dormitories and teachers' bungalows are in a deplorable state. This is revealed by the overall mean of 2.766 by the students, 2.595 by the teachers and 2.966 by the management; for school dormitories. In terms of teachers' bungalows, the overall means obtained were 3.136 for students, 3.048 for teachers and 3.927 for management. The overall means stipulates the overall assessment of the respondents concerning the current state of the buildings. Interestingly, it is detected that the assessment of the teachers tends to be lower compared to the management and students. This was to be expected given the fact that

teachers were likely to compare the buildings with perceived standards for academic work whereas management would come from a position of defense.

Table 11

*State of Dormitories and Bungalows*

| School Dormitories | Student | Teachers | Management |
|---|---|---|---|
| | Mean | Mean | Mean |
| Structural elements (beams, columns, upper floor slabs and stairs) | 2.680 | 2.571 | 4.286 |
| Walls (external and internal walls) | 3.010 | 2.821 | 3.732 |
| Finishes (wall finishes, floor finishes and ceilings) | 2.680 | 2.429 | 3.179 |
| Windows | 2.609 | 2.571 | 2.929 |
| Doors | 2.711 | 2.429 | 2.536 |
| Roofs | 3.239 | 2.500 | 3.786 |
| Services (sanitary appliances, building service equipment, disposal installation, water, ventilation, electrical, protection installation, drainages, external services) | 2.523 | 2.321 | 2.464 |
| Fittings and furniture | 2.457 | 2.500 | 1.982 |
| Sanitation of the environment | 2.985 | 3.071 | 1.804 |
| **Overall Mean** | **2.766** | **2.579** | **2.966** |
| **Staff/Teachers Bungalows** | | | |
| Structural elements (beams, columns, upper floor slabs and stairs) | 3.371 | 3.214 | 3.571 |
| Walls (external and internal walls) | 3.320 | 3.143 | 3.536 |
| Finishes (wall finishes, floor finishes and ceilings) | 2.863 | 2.857 | 3.893 |
| Windows | 3.117 | 3.143 | 4.107 |
| Doors | 3.117 | 3.071 | 4.179 |
| Roofs | 3.472 | 3.214 | 3.804 |
| Services (sanitary appliances, building service equipment, disposal installation, water, ventilation, electrical, protection installation, drainages, external services) | 2.812 | 2.857 | 4.357 |
| Fittings and furniture | 2.883 | 2.786 | 3.929 |
| Sanitation of the environment | 3.269 | 3.143 | 3.964 |
| **Overall Mean** | **3.136** | **3.048** | **3.927** |

Source: Field Survey (2017)

The assessment reports of the respondents shows some interesting observations. First, in terms of dormitories, the students revealed that the three critical areas of poor state are fittings and furniture (mean = 2.457), services (mean = 2.523) and dormitory windows (mean = 2.609) respectively. To the teachers, critical areas respectively include services (mean = 2.321), doors and finishes (mean = 2.429) as well as roofs, fittings and furniture (mean = 2.500). In addition, the management identified that sanitation (mean = 1.804), fittings and furniture (mean = 1.982) and services (mean = 2.464) are the most critical areas that needs urgent attention. Based on the group assessments, it is clear that the fittings and furniture and services of the school dormitories are visibly. They are not in good state.

Second, in terms of the teachers' bungalows, the students and teachers concurred that fittings and furniture (mean = 2.883 for students; mean = 2.786 for teachers), services (mean = 2.812 for students; mean = 2.857 for teachers) and finishes (mean = 2.863 for students; mean = 2.857 for teachers) were the worst deplorable. In contrast, the management identified that

finishes (mean = 3.893), walls (mean = 3.536) and structural elements (mean = 3.571) were relatively in their worse states. Whereas services are the common factor that runs through the assessment report of the respondents, it is also pointed out that the finishes of the teachers' bungalow are also not in a good state. Meanwhile the school management showed that items such as windows (mean = 4.107), doors (mean = 4.179) and services (mean = 4.357) concerning the staff, teachers' bungalows as well as the structural elements (mean = 4.286) of the school dormitories are in a good state

Beside the bungalows and school dormitories, the respondents were also made to provide their assessment of the state of classroom buildings and school library. Table 12 provides the assessment result and revealed that the state of the classroom blocks and school libraries are in a satisfactory state. The scale of measurement of the mean was based on the responses and the Likert scale used in the study. The overall mean values which indicate the general perception of the respondents were mostly close to the average of 3.00 which represents a moderate or satisfactory condition. Nonetheless, the general pattern of the group evaluations pointed out that both the teachers and the students agreed that classroom blocks are the most deplorable among the two school facilities; whiles the management noted that the school library was the most appalling. Even so, the assessments of the teachers were largely lower compared to that of management and the students.

The breakdown of the assessment reports of the respondents was also performed and the results showed that in terms of the classroom blocks, the students noted that the fittings and furniture (mean = 2.883), services (mean = 2.477) and finishes (mean = 2.782) accounted for the poor state of the classroom blocks. Mostly agreeing to this assertion, the teachers also reported that the critically poorer areas of classroom blocks are services (mean = 2.714), finishes (mean = 2.714) and classroom windows (mean = 2.857).

Table 12

*State of Classroom Blocks and Library*

| Classroom Blocks | Student | Teachers | Management |
|---|---|---|---|
| | Mean | Mean | Mean |
| Structural elements (beams, columns, upper floor slabs and stairs) | 3.218 | 3.143 | 3.893 |
| Walls (external and internal walls) | 3.218 | 3.107 | 4.268 |
| Finishes (wall finishes, floor finishes and ceilings) | 2.782 | 2.714 | 3.929 |
| Windows | 2.985 | 2.857 | 3.929 |
| Doors | 3.086 | 2.929 | 4.286 |
| Roofs | 3.371 | 3.286 | 3.571 |
| Services (sanitary appliances, building service equipment, disposal installation, water, ventilation, electrical, protection installation, drainages, external services) | 2.477 | 2.714 | 4.107 |
| Fittings and furniture | 2.883 | 2.929 | 3.857 |
| Sanitation of the environment | 3.168 | 3.143 | 3.750 |
| **Overall Mean** | **3.021** | **2.980** | **3.954** |
| **School Library** | | | |
| Structural elements (beams, columns, upper floor slabs and stairs) | 3.624 | 3.714 | 3.893 |
| Walls (external and internal walls) | 3.624 | 3.429 | 3.464 |
| Finishes (wall finishes, floor finishes and ceilings) | 2.883 | 2.857 | 2.000 |

| | | | |
|---|---|---|---|
| Windows | 3.244 | 3.107 | 3.375 |
| Doors | 3.472 | 3.286 | 3.714 |
| Roofs | 3.680 | 3.286 | 3.821 |
| Services (sanitary appliances, building service equipment, disposal installation, water, ventilation, electrical, protection installation, drainages, external services) | 2.782 | 2.571 | 2.821 |
| Fittings and furniture | 2.883 | 3.286 | 3.071 |
| Sanitation of the environment | 3.574 | 3.571 | 3.714 |
| **Overall Mean** | **3.307** | **3.234** | **3.319** |

Source: Field Survey (2017)

Meanwhile, according to the schools' management issues such as the sanitation of the environment (mean = 3.750), fittings and furniture (mean = 3.857) and roofs (mean = 3.571) associated with the classroom blocks are relatively poor; whereas the services (mean = 4.107), doors (mean = 4.286) and walls (mean = 4.268) associated with the classroom blocks are also in a good state. Based on the group assessments, it is clear among the critical areas of the classroom blocks and school library that require urgent attention, the relatively poor condition of the finishes and fittings and furniture works are the most critical areas.

Table 13, additionally provides the assessment of the study respondents concerning the state of the school administration block and laboratory. It should be noted that the evaluations indicated that both facilities are in a satisfactory good state. This conclusion is supported by the overall mean of 3.558 for students, 3.341 for teachers and 3.831 for the school management; concerning the state of the schools' administration blocks. In terms of school laboratories, the overall means obtained were 3.189 for students, 3.079 for teachers and 3.780 for management.

It is also obvious from the pattern of responses that the current state of the school laboratory is relatively the most dilapidated. According to the evaluations of the students the fittings and furniture (mean = 3.421), services (mean = 3.218) and finishes (mean = 3.731) accounted for the poor state of the school administration block; whereas the current condition of the school laboratory is accounted for by services (mean = 2.731), finishes (mean = 2.914) and the windows (mean = 3.015). The evaluations of the teachers suggested that the current state of the school administration is contributed to by the deplorable states of factors such as services (mean = 2.857), finishes (mean = 3.214), doors and window (mean = 3.286); whereas that of the school laboratory is accounted for services (mean = 2.857), fittings and furniture (mean = 2.929), as well as the finishes, doors windows and structural elements (mean = 3.000). The management general conferred to the assessment of the teachers; and also structural elements (mean = 3.821), windows (mean = 3.482) and doors (mean = 3.714) are the three critically deplorable areas identified on the school administration block; whereas that of the school laboratory is also accounted for fittings and furniture (mean = 3.571), structural elements (mean = 3.714), as well as the roof structure (mean = 3.643).

Table 13

*State of School Administration Block and Laboratory*

| School Administration Block | Student | Teachers | Management |
|---|---|---|---|
| | **Mean** | **Mean** | **Mean** |
| Structural elements (beams, columns, upper floor slabs and stairs) | 3.680 | 3.429 | 3.821 |
| Walls (external and internal walls) | 3.731 | 3.429 | 3.893 |
| Finishes (wall finishes, floor finishes and ceilings) | 3.371 | 3.214 | 3.929 |
| Windows | 3.492 | 3.286 | 3.482 |
| Doors | 3.675 | 3.286 | 3.714 |
| Roofs | 3.761 | 3.714 | 3.821 |
| Services (sanitary appliances, building service equipment, disposal installation, water, ventilation, electrical, protection installation, drainages, external services) | 3.218 | 2.857 | 3.929 |
| Fittings and furniture | 3.421 | 3.429 | 4.000 |
| Sanitation of the environment | 3.675 | 3.429 | 3.893 |
| **Overall Mean** | **3.558** | **3.341** | **3.831** |
| **School Laboratory** | | | |
| Structural elements (beams, columns, upper floor slabs and stairs) | 3.523 | 3.000 | 3.714 |
| Walls (external and internal walls) | 3.371 | 3.214 | 3.750 |
| Finishes (wall finishes, floor finishes and ceilings) | 2.914 | 3.000 | 4.071 |
| Windows | 3.015 | 3.000 | 3.821 |
| Doors | 3.218 | 3.000 | 3.750 |
| Roofs | 3.523 | 3.429 | 3.643 |
| Services (sanitary appliances, building service equipment, disposal installation, water, ventilation, electrical, protection installation, drainages, external services) | 2.731 | 2.857 | 3.804 |
| Fittings and furniture | 3.086 | 2.929 | 3.571 |
| Sanitation of the environment | 3.320 | 3.286 | 3.893 |
| **Overall Mean** | **3.189** | **3.079** | **3.780** |

Source: Field Survey (2020)

Based on the group assessments, it is clear the state of services, fittings and furniture, as well as the finishes and windows of the school administration block and the school laboratory are relatively poor conditions.

Since all the overall means are below the average mean value of 4, it is concluded that most of the school buildings are in a satisfactory good state. That is they are in a state that are considered useful and manageable for academic work; albeit not meeting good standards. Figure 1 demonstrates that the student dormitories in the selected government senior high schools in the Wa Municipality is the most deplorable; whereas the teachers and the students concurred that the school administration block is relatively good among the set of deplorable buildings. According to the school management however, the classroom blocks are rather in a satisfactory good state.
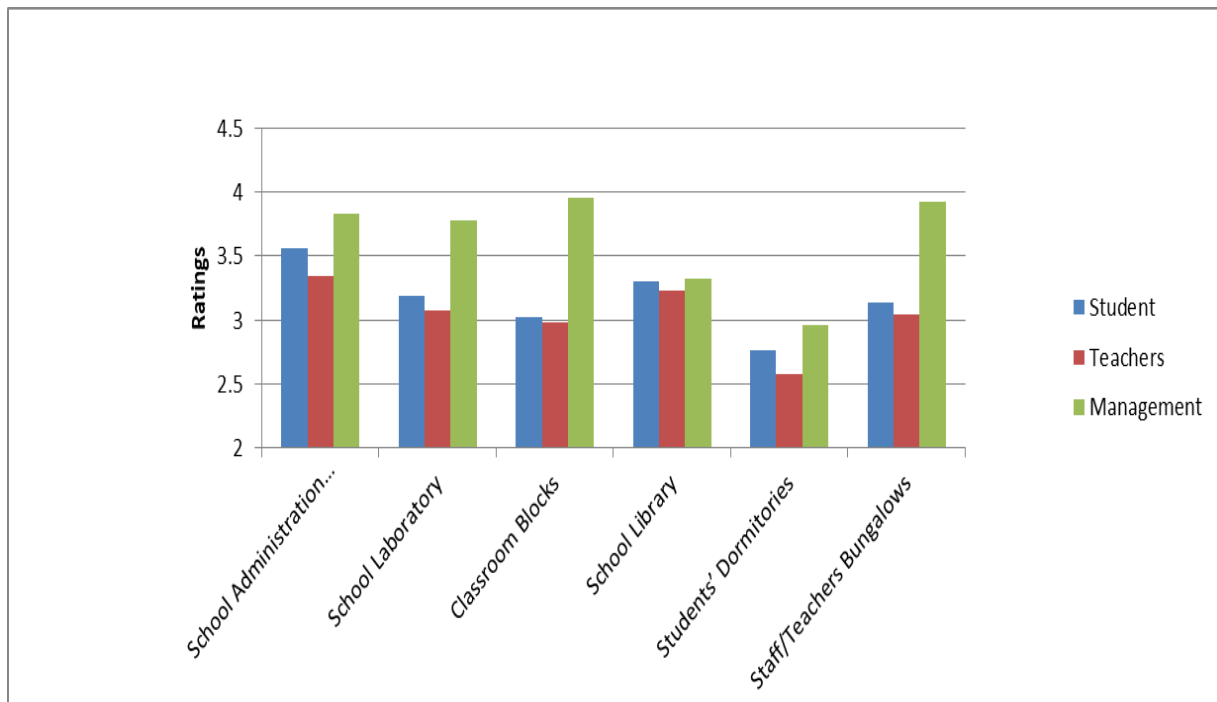
Figure 2: Overall Ratings of School Buildings Current State
Source: Field Survey (2017)

It is also obvious that there are differences in ratings with management staff offering high ratings in all categories followed by the students. The students' ratings are relatively close to that of the teachers. This can be explained by the fact that the ratings are likely to be influenced by the social reality which defines the context of each respondent. For instance the student may be limited by the short time span they may have spent in the school; thereby may not have adequate historical memory to assess the current state of the school buildings based on what it used to be at least for the past five years; even so their ratings can be considered as statistically not different from that of the teachers.

In terms of the differences in assessment of management and teachers, it expected that management although accepting the fact that buildings are not in their high standards; may naturally provide higher ratings from a viewpoint of defense due to the fact that they are likely to feel obligated to be the engineers of the quality of the school buildings maintenance.

**Critical Defects on the School Buildings**

Having identified the school buildings which are most deplorable and the general state of the physical facilities; the researcher attempted to find out the critical defects of the targeted school buildings. The respondents were entreated to point out these serious defects. The survey responses were analyzed using the relative importance index to identify the critical defects associated with target building. The relative importance index helps in finding the contribution a particular variable makes to the prediction of a criterion variable both by itself and in combination with other predictor variables. Thus, the contributions of students, teachers and school management were compared. Because the ratings of the respondents are not the same, the analysis was conducted separately for each group of respondents. Tables 14 reports the results showing the critical defects and faults associated with the targeted buildings. The exposure of these defects will unravel the areas that need urgent redress or are a concern to the

practitioners. It is generally observed that the school management identified fewer defects concerning the school buildings compared to the students and teachers.

The relative importance scores as depicted on Table 14 show that the respondents recognized that school dormitories as having defects such as peeling of paints (RII = 76.23), electrical defects (RII = 75.48), faulty doors (RII = 73.41) and staining or discoloring of dormitory walls (RII = 72.17).

Table 14
*Critical Defects of Public Senior High Schools Buildings in the Wa Municipality*

|  | School Dormitories | Teachers Bungalows | Classroom Blocks | Library | Laboratory | Administration Block |
|---|---|---|---|---|---|---|
| Peeling of paints | 76.23 | 71.98 | 72.18 | 69.80 | 69.67 | 67.29 |
| Leakages in ceilings | 61.27 | 49.65 | 38.97 | 41.37 | 38.21 | 33.76 |
| Staining/discoloring of walls | 72.17 | 68.45 | 67.02 | 72.62 | 67.09 | 58.81 |
| Damaged roofs | 55.39 | 45.44 | 44.64 | 39.70 | 39.16 | 33.14 |
| Electrical defects | 75.48 | 49.08 | 64.74 | 76.67 | 66.58 | 51.79 |
| Cracked walls | 64.83 | 51.71 | 46.50 | 41.84 | 40.12 | 34.44 |
| Cracking of floors | 29.79 | 40.05 | 29.37 | 28.12 | 25.74 | 30.09 |
| Damaged windows | 69.20 | 54.08 | 58.40 | 56.43 | 48.72 | 44.36 |
| Damaged wall | 47.45 | 44.76 | 41.07 | 42.32 | 37.26 | 35.14 |
| Faulty doors | 73.41 | 53.13 | 66.27 | 65.18 | 53.51 | 37.23 |

Source: Field Survey (2017)

**Note:** RII = Relative Importance Index, where each statement by the respondents ranges from 1 to 5 where 1 represent lower response integer and 5 represent high response integer. The higher the relative importance index above 50% the higher the defects.

Table 7 also shows that the respondents recognized that staff and teachers bungalows have also developed defects with peeling of paints (RII = 71.98), and staining or discoloring of walls (RII = 68.45) being the most common and critical defects. Concerning the classroom blocks, the results showed that defects such as peeling of paints (RII = 72.18), staining or discoloring of walls (RII = 67.02), faulty doors (RII = 66.27) and electrical faults (RII = 64.74) are the most critical. Meanwhile, electrical defects (RII = 76.67), staining or discoloring of walls (RII = 72.62), peeling of paints (RII = 69.80) and faulty doors (RII = 65.18) have been identified as the critical defects found on the school libraries. The school laboratory were noted not to have a lot of defects aside the peeling of paints (RII = 69.67), staining or discoloring of walls (RII = 67.09) and electrical defects (RII = 66.58). It was realized that among the school building, it is the school administration block which currently little defects; although respondents identified that the paint on the school administration block is peeling (RII = 67.29). Therefore it is evident that it is the school administration block and the school laboratory that has little defects; while the student dormitories and staff/teachers bungalows are the most faulty school buildings in the Wa Municipality.

Figure 3 shows that the most prevalent flaws or defects that any careful observer will find with most of the public senior high school buildings in the Wa Municipality are peeling of paints, staining and discoloring of walls, electrical defects and to some extent faulty doors.
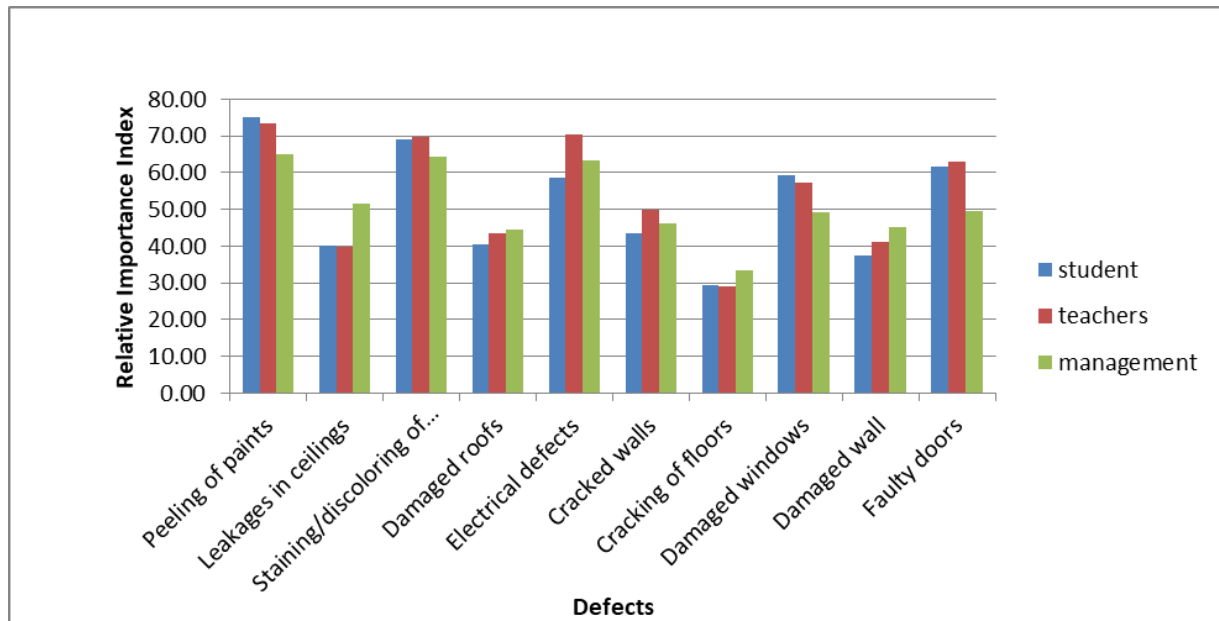


Figure 3: Prevalent Defects of Public Senior High School Buildings in Wa Municipality
Source: Field Survey (2017)

All the school buildings identified with paint peeling issues with school dormitories recognized as the most affected. Electrical defects and staining or discoloring of walls on the other hand were mostly associated with school dormitories and school libraries. Faulty doors were mostly identified with school dormitories; teachers' bungalows and classroom blocks. Figure 3 shows the worse affected school buildings for each related defect.

Plate 5, 6, 7, 8, 9, 10, 11 and 12 shows critical defects on some of the public senior high school buildings within the Wa Municipality.

Figure 3a: Damaged Classroom Roof at Wa Islamic Girls SHS



Figure 3b: Damaged  classroom windows at Wa Senior High Technical School

Figure 3C: Damaged  classroom windows at Wa Senior High Technical School



Figure 3d: Plate 4: Discoloring ceiling of one of the offices in the Administration block at Wa Islamic SHS

Figure 3e: Plate 5: Damaged Doors of one of the classroom block at Wa Community Development Institute



Figure 3f: Plate 6: Damaged Ceiling of one of the classroom blocks at Wa Islamic Girls Senior High School

Figure 3g: Plate 7: Cracked on floors and Floor-peeled-off of one of the classroom block at Wa Northern Star Senior High School



Figure 3h: Plate 8: Exterior cracked teachers bungalow wall at Wa Senior High Teechnical School

Qualitative data was also retrieved through the use of interviews, focus group discussion and observation checklist with some officials of Ghana Education Service, Students' Representative Council, maintenance staff, Non-teaching staff example PTA chairman in all the eight schools, Senior Housemasters/Mistress and some school labors. The significance was to obtain in-depth information concerning the maintenance practice of the public schools and to obtain reasons or explanations to the key patterns and arrangements found through the quantitative data analysis.

Qualitative Data gathered reveals that the current state of Government Senior High School buildings is deplorable. There is therefore the urgent need for maintenance works in a majority of public senior high schools in the Wa Municipality. Although some level of maintenance

works are on-going in some schools, the respondents show that these maintenance works are below average given the quantity of maintenance required. The reports indicated that for a long time maintenance works have not been conducted for majority of school buildings. According to authorities, inspection and supervisory activities that needed to be conducted by government officials have been lacking. From the interview conducted and focused group discussion some officials conferred that they have not been able to visit the government senior high schools in the Wa Municipality to assess the current state; thus are unable to discern the current state of the school buildings in the Wa municipality, although reports have been trickling in incessantly on the poor state of some of the schools. On this, the Municipal Director of GES remarked that:

> *"Since I came into office no maintenance has been done on the buildings in senior high schools under my jurisdiction. None of the documents I came to meet too here is showing that maintenance works have been carried out by GES on the senior high school buildings for the past ten years but if some is done then it may come from the school own funds"*

Both the non-teaching and students' representatives who participated in the focus group discussion also stated that:

> *"There have been some maintenance works on some of the school buildings but this is done if it's an emergency situation. This clearly suggests that maintenance of the school buildings is not considered as a priority in senior high schools in the Wa Municipality as such making the school buildings not looking aesthetic. This means that little attention is given to maintenance of school buildings"*

All the respondents moreover indicated that there are a lot of defects on most of the school buildings and nothing is done about it. The respondents further expressed that the current state of most of the school buildings in the Wa Municipality needs maintenance but the authorities in charge are not doing it. For instance one of the key informants stated that

> *"students pay maintenance fee every year but what the money is used for no one can tell".*

This therefore shows that little attention is given to the public senior high school buildings in the Wa Municipality concerning their maintenance. All the respondents moreover expressed that the current state of the maintenance of public senior high schools buildings in the Wa Municipality is generally not good showing defects such as peeling of paints, staining/discoloring of walls, faulty doors, damaged windows, cracking of floors, cracked walls and electrical defects etc.

## DISCUSSION OF FINDINGS

Findings of this study revealed that most of the government senior high school buildings in the Wa municipality is in a deplorable or shabby state. The findings of the study show that none of the public senior high schools within the Wa Municipality were complying with Ghana's National Building Regulation LI 1630 Section 12 Clause 1. Generally, it was indicated by the

respondents that both the dormitories and teachers' bungalows are in a deplorable state. This is revealed by the overall mean of 2.766 by the students, 2.595 by the teachers and 2.966 by the management; for school dormitories. In terms of teachers' bungalows, the overall means obtained were 3.136 for students, 3.048 for teachers and 3.927 for management. For example, the respondents recognized that staff and teachers' bungalows have developed defects with peeling of paints (RII = 71.98), and staining or discoloring of walls (RII = 68.45). Concerning the classroom blocks, the results showed that defects such as peeling of paints (RII = 72.18), staining or discoloring of walls (RII = 67.02), faulty doors (RII = 66.27) and electrical faults (RII = 64.74) are the most critical. Meanwhile, electrical defects (RII = 76.67), staining or discoloring of walls (RII = 72.62), peeling of paints (RII = 69.80) and faulty doors (RII = 65.18) have been identified as the critical defects found on the school libraries.

It was realized that among the school building, the student dormitories and staff/teachers' bungalows are the faultiest school buildings in the Wa Municipality. This is due to the lack of maintenance culture or efforts to maintain these buildings. Reports showed that most of the school buildings have had their paints peeled, or walls discolored with significant electrical defects. Nonetheless, it has taken a long time before some buildings have been subjected to some level of maintenance and repairs. There is no progressive timelines, planning or policy documents used to ensure the timely maintenance of the school buildings.

The findings of this study support the study by Allotey (2014) who postulated that the existing senior high school buildings in most developing countries are in a state of decay. Also, the findings of this study is consistent with a study by Cobbinah, (2010) on government buildings in Ghana and found that most government buildings in Ghana are in a state of decay. This finding agrees with findings on dormitories and teachers' bungalows of this study that the current state of buildings in public senior high schools within the Wa Municipality owned by the public sector in general and the education sector in Ghana particular possess a big challenge to development. It can be inferred from the findings of Cobbinah (2010) that the current state of senior high buildings especially those in the Wa Municipality is not in a good state which needs maintenance.

Furthermore, the findings of this study are consistent with the study Issahaku (2013) who painted a picture of the current state of dormitories and teachers' bungalows in some senior high schools in Ghana to be in poor state. This is why Kyeremateng (2008) observed that public senior high schools in Ghana did not have documents containing maintenance policy rather schools had an unwritten policy which sought to ensure that school buildings were maintained as and when needed.

In addition, the findings of this study confirm to the study by Smith (2013) who stressed that, the state of dormitories, teachers' bungalows and classroom blocks in some public senior high schools in Ghana lack maintenance. The findings of this study also confirm to the study by Abdul-Manan (2011) who stressed that poor maintenance culture expose the current state of dormitories, classrooms and teachers' bungalows in public senior high school in some developing countries in a deplorable state.

Furthermore, the findings of this study agree with the study conducted by Smith (2013) who stressed that, most public senior high school buildings in most developing countries need maintenance. According to Kindred (2004) senior high school buildings which lack maintenance affect the comfort of the users (students, teachers, management and visitors) who

live or work in such buildings and this does not ensure sustainable built environment as well as resource management hence the need for maintenance of the school buildings (Njuangang & Liyanage, 2012).

The findings of this study also confirms to the findings of the study by Marshall *et al.* (2009) and Sherwin (2012) who identified cracks in walls, bulging/bowing of walls, rising dampness, uneven ground floor slabs, movement in upper floors, damp penetration of roofs, cracks to renders, loose/hollow render, condensation, faulty heating, plumbing and electrical, and blockages/leaks to drainage as a defects found on dormitories, classrooms and teachers bungalows on most public senior high school buildings in Ghana. The findings of this study also confirm to the study conducted by Pan and Thomas (2013) who shows that peeling of paints, staining/discoloring of walls, faulty doors, damaged windows, cracking of floors, cracked walls and electrical defects etc are defects found on most public senior high school buildings in developing countries.

## SUMMARY OF MAJOR FINDINGS

The main objective of this study was to examine the current state of government buildings in senior high schools.

The research adopted a mixed study strategy focusing on a sample of 393 participants in eight government senior high schools in Wa Municipality. The use of questionnaires, interviews, observation and focus group discussions were employed to obtain the relevant information for this work.

According to the findings of this work, the current state of all the public senior high school buildings in the Wa Municipality is satisfactory for academic work; albeit poorly maintained with some buildings in a bad state. The study identified that the major defects on some of the school buildings are related to the state of services (students mean = 2.523, teachers mean = 2.321, school management mean = 2.464), fittings and furniture (students mean = 2.457, teachers mean = 2.500, school management mean = 1.982), as well as the finishes and windows (students mean = 2.609, teachers mean = 2.429, school management mean = 1.804). The school buildings which were highly affected were detected to be school dormitories, and teachers' bungalows; whereas the school administration block and the school laboratory were found to be relatively in good state with reference to the number of defects.

## CONCLUSIONS

Based on the findings of this study, it can be concluded that the current state of the public senior high school buildings in the Wa Municipality is satisfactory for academic work but not meeting best standard. Maintenance works have been largely unplanned and proceeded due to emergency situations. This has led to a lot of public senior high school buildings in the Wa Municipality in a deplorable current state although still useful for academic work. Worse affected buildings were observed to the school dormitories, classroom blocks and staff and teachers' bungalows.

### Recommendations

Based on the study results, the following recommendations have been made for the first objective.

1. There is an urgent need for maintenance works to be carried out on public senior high school buildings in the Wa Municipality.
2. There should be a conscious effort to include maintenance activities in the budget both at the Assembly level and the school level in the Wa Municipality to ensure regular maintenance of their senior high school buildings.

**Conflict of Interest Statement**
No conflict of interest has been declared by the authors.

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