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CONSTRAINTS FACTORS TO MAINTENANCE OF GOVERNMENT SENIOR HIGH SCHOOL BUILDINGS IN WA MUNICIPAL

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ABSTRACT

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. Maintenance of public senior high school buildings ensure sustainable management of state property which brings about improve utilization of buildings. However, there seems to be paucity of studies on constraints factors to maintenance of public buildings in general and public senior high school buildings in the Wa Municipal in particular. This research seeks to bridge this knowledge gap by appraising the constraints factors to maintenance of public senior high schools' buildings in the Wa Municipality 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 found out that lack of coordination between authorities responsible, lack of funds from government, poor maintenance culture, embezzlement of funds on the part of management via the inflation of maintenance costs, frequent shortage of maintenance materials, users' attitude and the persistent breakdown of building components through students indiscipline are the constraints factors to public SHS buildings maintenance in the Wa Municipality. The study recommended that there should be corporation between GES, school management and the Assembly (Department of Works and Housing) in the Wa Municipality to ensure good maintenance of their senior high school buildings.

Keywords: Constraints Factors, Maintenance, Building Maintenance, Public Senior High School Buildings, Wa Municipal.

INTRODUCTION

Historical evidence shows that, prior to the industrial revolution of the 1750s, maintenance of school buildings was an issue of concern (Buys, 2013; Mydin, 2014). Maintenance of school buildings of the developed world has been rapidly changing throughout the years. This is due to several factors such as the enhancement of sophisticated technology, good maintenance practices, sustainable resource management practices, globalization and change of economy (Afrane, 1999; Jolaoso, 2012; Buys, 2013; Allotey, 2014). According to Cobbinah (2010) the percentage of the gross value of school buildings maintenance works has increased steadily from 20% in 2000 to 28% in 2004 in Hong Kong. The data further showed that between 1997 and 2017, the value of maintenance works and repair increased from 22.5% to 51.6% in the 20-year period.

According to the International Bank for Reconstruction and Development and the World Bank report (2010) on Africa's infrastructure investment, the cost of addressing Africa's public-school buildings needs is around \$93 billion a year. The report stated that about one-third of this amount, approximately \$31 billion, is required for maintenance of the buildings. However, the report further stated that, in Sub-Saharan Africa, public school buildings financing needs are estimated to be \$39 billion per year, of which \$17 billion is required for maintenance annually. Ghana, a Sub-Saharan African country is equally saddled with huge expenditures for public school buildings development, operation and maintenance. For instance, in 2010, the Government of Ghana (GoG) through the Ghana Education Trust Fund (GET Fund) expended GHC296.42 million on public senior high school buildings maintenance (Monetary Policy Report of Bank of Ghana, 2011).

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) and Njuangang (2012) 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 (Obimpe, 2003; Oladapo, 2006; Wood, 2005; Olanrewaju, 2009; Adesoji, 2011; Nartey, 2012). This has resulted in damages and deterioration to some government senior high school buildings in the

country. It is with this concern that the research was conducted to appraise the constraints factors to maintenance of public senior high schools' buildings in Wa Municipal.

REVIEW OF RELATED LITERATURE

Constraint Factors to Maintenance of Public SHS Buildings

Buildings in general have been acknowledged as one of the most essential necessities of human life and are a major economic asset in every nation (Guha, 2006; Pintelon, 2008; Cobbinah, 2010; Olanrewaju, 2011; Zakaria, 2011; Bala, 2012). Since independence, Ghana has desperately continued to make concerted efforts in the area of quantitative supply of public-school buildings including senior high school buildings. Cobbinah (2010) has observed that the disparity between the price and quality of materials to be used for public senior high school buildings maintenance on one hand and the money available to them to pay these prices on the other constitutes the central problem of public senior high school buildings maintenance in Ghana.

Cobbinah (2010) further identify the following as constraints factors to maintenance of public senior high school buildings in Ghana:

1. **Inadequate finance:** It is generally acknowledged that inadequate finance is a major constraint on government senior high school buildings maintenance partly because maintenance budgets are the easiest to cut when money is scarce. However, the situation is serious in some public senior high schools in Ghana where damaging effects of poor maintenance are less immediately obvious. Also, in the case of the public senior high school buildings, day-to-day maintenance neglected, but efforts at improvements and rehabilitation are considered lower priority than new construction. This problem of inadequate finance indeed result in rapid deterioration of the existing school buildings resulting in increases in the demand for new buildings because poorly maintained buildings are not only unpopular; but they soon reach the stage where the structure itself deteriorates and rebuilding has to be considered.
2. **Bad management practices:** Refers to the lack of maintenance department, personnel's and maintenance manual in the public senior high schools.
3. **Poor building design:** It is not uncommon to find that public senior high school buildings are inherently expensive to maintain because of inappropriate priorities applied during the design phase (Ali, 2009). Poor detailing and the specification of unsuitable components and materials are common complaints. In addition, construction errors arising from inadequate drawings and specifications, coupled with poor workmanship because of contracts awarded to incompetent contractors are frequent causes of rapid physical deterioration in majority of the public senior high school buildings in Ghana including those in the Wa Municipality of the Upper West Region of Ghana.

Nartey (2012) relates that the decision to carry out maintenance on public senior high school buildings in Ghana is affected by many factors, among which are:

1. **Cost:** Stakeholders responsible for public senior high school buildings maintenance would want to have the most economic method for carrying out maintenance work whether, corrective or preventive, thus they look at actual cost of maintenance of the building to the cost of maintaining similar buildings;

2. Consideration of money spent to achieve acceptable standard at present;
3. Cost of maintaining same standard in future and economies of replacing buildings and amount of work available and priority of work to be executed.
4. Availability of physical resources or lack of funds: The availability or non-availability of physical resources/lack of funds affects decisions in that, when suitable materials for maintenance are not available, it becomes difficult to undertake maintenance. Again even if suitable materials are available but not in adequate quantities and the alternative materials are not available, it will deter management of public senior high schools from undertaking maintenance activities on their buildings. The level of craftsmanship in terms of both skills and efficient numbers can also affect decisions to carry out maintenance in public senior high schools.
5. Urgency of work: This also affects decisions on maintenance in that stakeholders responsible always consider whether delayed work in the short run will require more expensive work at a later stage. This usually takes into account safety of building users and possible damage to structure and finishes used in the building.

Ali (2009) asserted that high cost of building largely affects cost of maintenance. It is obvious that if technical aspect such as bad workmanship, bad quality of spare parts and material (Khalid et al., 2006) and administrative aspect which includes lack of funds, lack of maintenance management department/unit, budget constraints, failure to execute maintenance works at the right time and poor budgetary control are not accorded the necessary concerns, effective and efficiently hence constraints factors to public senior high school buildings maintenance in Ghana (Ali, 2009; Lee & Scott, 2009)

Allotey (2014) summarizes the principal criteria which could influence the decision to carry out maintenance on public senior high school buildings in Ghana briefly as, cost, age and condition of property, availability of adequate resources, urgency, future use and sociological considerations. Maintenance made not only to maintain the building but also for the sake of saving the country's investment in education (Nartey, 2011). Previous studies revealed the effects of numerous factors affecting maintenance and defects of public buildings in Africa. Adejimi (2005) in his study identified twelve relevant factors affecting the maintenance strength of public senior high school buildings in developing countries as lack of funds, design resolution, structural strength, specified materials strength, maintenance manual, safety measures, skill maintenance personnel, maintenance plants, environmental factors, usage factors, quality control factors and post construction prevention strength.

To evaluate the factors affecting building defects, Allotey (2014) concluded that natural factors can be summarized into three group of dampness, movement and chemical and biological change. Errors, oversights, lack of care and fallibility of people that initiate, design, construct and maintain buildings, accentuated by their educational practice are some of the factors affecting defects of public senior high school buildings.

According to Cobinnah (2010) stakeholders (internal and external) must frequently endeavor to keep maintenance expenditure to a minimum, ignoring or misunderstanding the adverse long-term effects of such a policy. Neglect of public senior high school buildings maintenance has accumulative results with rapidly increasing deterioration of the fabric and finishes of the school buildings accompanied by harmful effects on the contents and occupants. The usage of

a school building results in wear and tear; and exposure to natural forces cause deterioration of building. Human activities responsible for the deterioration/ decay of senior high school buildings are: failure to clean and carry out routine maintenance, ignorance of the causes of deterioration and decay, failure to promote awareness of maintenance needs by all who use the building and adopting a negative attitude of waiting until emergency measures are required (Nartey, 2011).

Cobbinah (2010) identified many constraints factors to maintenance of public-school buildings (including senior high school buildings) such as design and proper workmanship, materials specifications, detailing of working drawings, construction supervision, cash flow analysis, environmental factors, users' activities, shifting values and modernization, accidents and solar radiation. Other factors may include ageing, wear and tear, preservation of historic buildings, value of buildings, alteration and modifications, inadequate housing stock, low quality of original construction, harsh climatic effects, mixed and changing patterns of building uses, declining quality of building materials and social. This is why Allotey (2014) stressed the need for the development of appropriate policies especially in the context of national development to place more priority on public senior high school buildings maintenance in developing countries.

The success in public senior high school buildings maintenance is influencing by various factors with varying degrees (Sherwin, 2012). According to Allotey (2014), lack of maintenance by authorities responsible and occupants of the public senior high school buildings in Ghana often leads to reduced lifespan of the school buildings. According to Arazi et al (2009) many stakeholders failed to actively involve themselves in maintenance of public senior high school buildings by providing the needed resources, materials and personnel for maintenance works on public senior high schools buildings.

From the review of literature, it is very clear that a number of studies have been conducted worldwide on constraints factors to maintenance of public senior high school buildings. These studies, most of which are current point to the urgent need which researchers have given to the problem. In Wa Municipality of the Upper West Region of Ghana little is known when it comes to government senior high school buildings. This study sought to fill this knowledge gap.

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 constraints factors to public senior high schools buildings maintenance practices. 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 2.

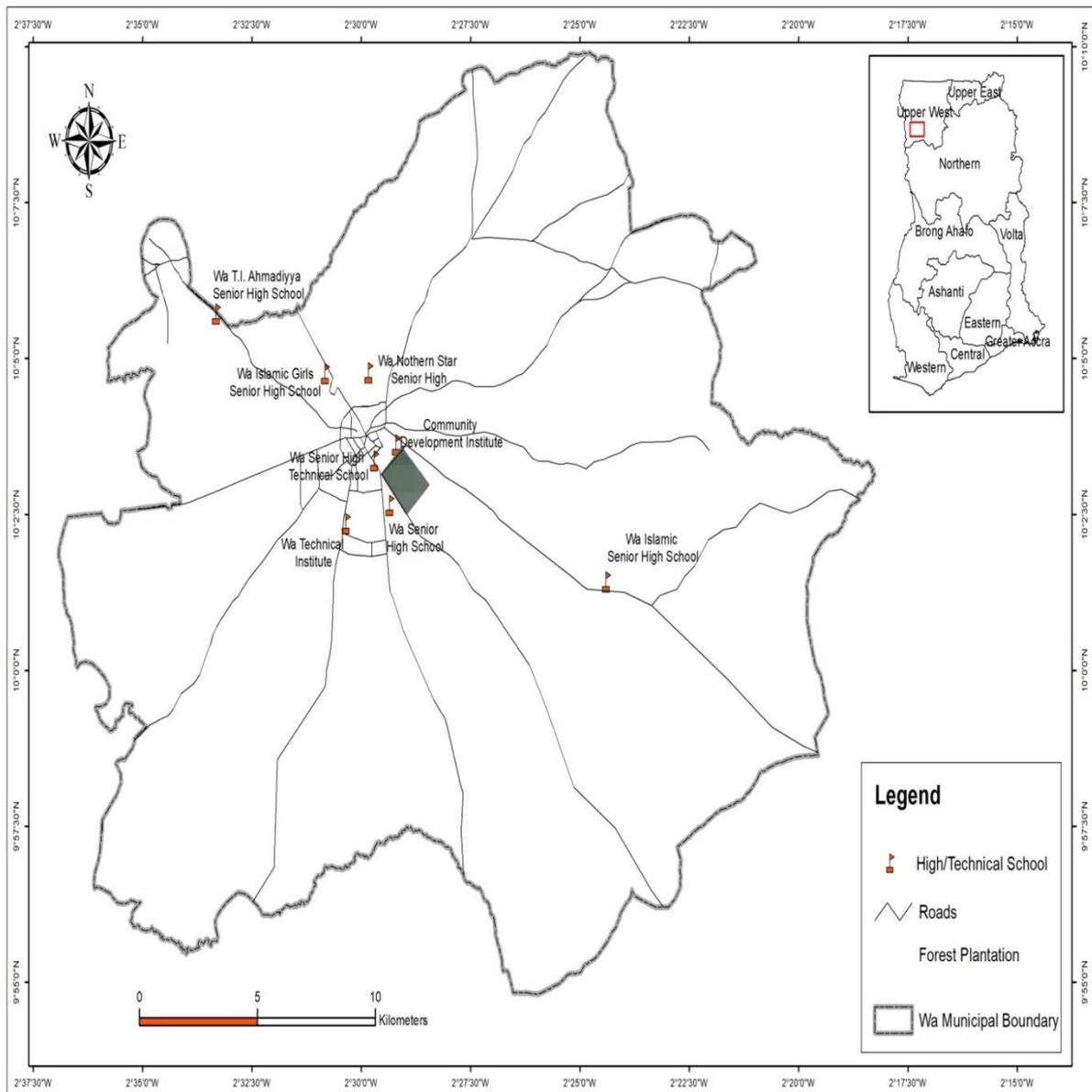
Research Design

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 the constraints factors to maintenance of public senior high schools buildings in Wa Municipal. 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



. Figure 2: Map of Public Senior High/Technical schools in Wa Municipality
Source: Field Survey (2017)

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

SENIOR HIGH SCHOOL	STUDENTS POULATION		
	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

SENIOR HIGH SCHOOL	TEACHERS POPULATION		
	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

SENIOR HIGH SCHOOL	SCHOOL MANAGEMENT POPULATION		
	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:

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

Where: n= required sample size, 1= constant, N= sample frame, α = 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 and whose responsibilities are the maintenance 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 constraints factors to maintenance of public senior high schools buildings 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 constraints factors to maintenance of public senior high schools buildings in the Wa Municipality. Through interviews and focus group discussions the researcher was able to obtain the stakeholders awareness level, opinions, points of view, values, feelings, attitudes, and perceptions regarding the constraints factors to maintenance of public senior high schools buildings. Through observation, the researcher saw the current state of the school buildings hence enabling the researcher to obtain a deep understanding of the constraints factors to maintenance of public senior high schools buildings.

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.

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 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)

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.

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)

Building Types in Senior High Schools in Wa Municipal

To appraise the constraints factors to maintenance of public senior high school buildings in Wa Municipal, 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 BUILDINGS	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)

Major Challenges to Maintenance of Public Senior High School Buildings in Wa Municipal

In this section the study attempted to investigate the factors that undermined the effective implementation of the maintenance culture and practice among the selected government senior high schools in the Wa Municipality. As depicted on Table 11, the students reported that the major factors that constrained the effective implementation of the maintenance practice are the frequent shortage of maintenance materials (mean = 3.541), inflation of the cost of maintenance by management (mean = 3.546) and the attitude of users (mean = 3.102). The teachers noted that two key factors limit the progress of maintenance works in the public schools. These include the persistent breakdown of building components such as windows and doors through indiscipline (mean = 2.857) and the attitude of users (mean = 2.857). The implication is that both the teachers and students recognized the fact that the attitude of users is a major challenge to the maintenance of school buildings. While the study did not investigate the reasons why these factors pose as challenges, but it can be identified that the behavior of users influences the way they use facilities especially facilities they consider as public goods and their misuse does not entail any direct cost to them. Thus, if the attitude of users is good, they will be more willing to keep up with the maintenance culture and practice of the school by using the facilities in tenable manner that will sustain the life span of the building's while ensuring that other third-party users are also responsible.

Meanwhile, the school management also identified that the key challenges of the maintenance of school buildings in the Municipality are frequent shortage of maintenance materials (mean= 4.186) and the misuse of building (mean= 3.643).

Table 11

Constraining Factors to Maintenance Practice

Factors	TEACHERS		STUDENT		MANAGEMENT		OVERALL	
	Mean	RII	Mean	RII	Mean	RII	Mean	RII
Inspection of building defects	1.286	25.71	1.209	24.06	1.536	30.71	1.280	25.60
Facility managers at design and construction stages	2.071	41.43	2.490	49.54	2.179	43.57	2.290	45.80
Attitude of users	2.857	57.14	3.102	61.73	3.464	69.29	3.059	61.17
Misuse of building	2.286	45.71	2.929	58.27	3.643	72.86	2.794	55.88
Persistent breakdown through indiscipline	2.857	57.14	2.980	59.29	3.536	70.71	3.008	60.15
Ignorance factors of building users	2.500	50.00	2.745	54.62	3.000	60.00	2.687	53.74

Insufficient funds for maintenance work	2.000	40.00	2.010	40.00	2.000	40.00	2.000	40.00
Natural deterioration due to age and environment	2.000	40.00	2.010	40.00	2.000	40.00	2.000	40.00
Inventory system	2.286	45.71	2.796	55.63	2.179	43.57	2.519	50.38
Skilled personnel in the maintenance department	2.143	42.86	2.556	50.86	2.250	45.00	2.359	47.18
Training and development of personnel	2.000	40.00	2.148	42.74	2.000	40.00	2.069	41.37
Procurement of building materials	2.571	51.43	3.000	59.70	2.821	56.43	2.814	56.28
Inflation of the cost of maintenance by management	2.571	51.43	3.546	70.56	3.286	65.71	3.153	63.05
Skilled manpower for maintenance works	2.286	45.71	2.796	55.63	2.286	45.71	2.534	50.69
Frequent shortage of maintenance materials	2.000	40.00	3.541	70.46	4.286	85.71	3.089	61.78
Willingness to maintain building	2.000	40.00	1.429	28.43	1.000	20.00	1.710	34.20
Response to building defects	1.714	34.29	1.653	32.89	2.679	53.57	1.690	33.79
Need assessment of building condition	2.143	42.86	2.214	44.06	3.000	60.00	2.295	45.90
Discernable maintenance culture of the country	2.357	47.14	2.454	48.83	1.893	37.86	2.476	49.52

Source: Field Survey (2017)

Note: RII – Relative Importance Index

Other prime challenges identified by the management include the persistent breakdown through indiscipline (mean = 3.536, RII = 70.71%), inflation of the cost of maintenance by management (mean = 3.286, RII = 65.71%), attitude of users (mean = 3.464, RII = 69.29%) and need assessment of building conditions (mean = 3.000, RII = 60.00%).

From the reports of both the teachers, students and school management; four factors were widely identified as key challenges. It is noted that overall, the attitude of users (mean = 3.059, RII = 61.17%), the inflation of the cost of maintenance by management (mean = 3.153, RII = 63.05%), frequent shortage in the maintenance materials (mean = 3.089, RII = 61.78%) and the persistent breakdown of building components through indiscipline (mean = 3.008, RII = 60.15%) are the principal challenges affecting maintenance of public school buildings in the Wa Municipality.

As explained earlier, the attitude of users may pose as a challenge due to the fact that any unruly behavior on the part of users such as carelessly handling or stealing of items may result in damage to the school facilities. Users may also be reluctant to conduct their responsibilities for ensuring that the school buildings and general facilities are maintained properly. Meanwhile the frequent shortage in the maintenance materials may also pose as a challenge due to the fact that the purchase or acquisition of such materials might be difficult due to bureaucratic procedures.

Delays in acquisition of funds from government and from the PTA could also lead to the purchase of small quantities of maintenance materials, thereby posing a challenge. Moreover, it is also clear that some of these materials may be unaccounted for thereby exacerbating the frequent shortages in materials. This leads to delays in maintenance works and prolonged duration in the completeness of projects. Lastly the persistent breakdown of building components due to indiscipline was also found as a major challenge due to the possible effect on the lifespan of the project; and since funds and materials are not easily accessible, such building components may take a long time to be repaired. Even when they are repaired on time the funds could have been used for other important projects.

A number of inhibiting factors through the qualitative data gathered were identified by the study participants as responsible for the deplorable state of buildings and the lack of maintenance culture. Majority of the factors were detected to have occurred due to the ill-

functioning of the key stakeholders; resulting in the damage to facilities or incompleteness of projects. A number of factors were mentioned by the participants, however, the most commonly mentioned constraints included the lack of reporting of buildings defects to the GES by school authorities; lack of cooperation between GES, Assembly and School Management on maintenance issues, the lack of maintenance unit in the schools, poor maintenance culture of the schools and the lack of funds from government.

In the focused group discussion, all the participants noted that:

“There is going to be a wanton reduction in the already meagre contribution from PTA for maintenance works especially now that FREE SHS programme is running, that means maintenance works will only come from government. Unfortunately funds from government is always not adequate and it does not come in a timely useful for an appropriate maintenance activities in the school.”

The Wa Municipal Education Directorate also indicated that the frameworks and modalities for the effective maintenance works are not strongly in place. As a result, little attention is paid to maintenance works in public senior high schools in the Municipality. The lack of proper maintenance of school buildings is also attributed to the absence of an effective or operational maintenance department/unit in the schools or in the region. The Wa Municipal Education Directorate stated that:

“There are no materials at the GES office for maintenance works unless we request from Ministry of Education or Government through the Assembly and this can take several years before it comes. Unless the situation is an emergency one and media people come into it before action is taking immediately. This clearly tells you that in Ghana we pay little attention to resource management (public school buildings maintenance).”

The officer at the maintenance department of the Wa Municipal Assembly also concurred to the lack of coordination among key stakeholders when he remarked that:

“Because GES and the public secondary schools are autonomous, they do it on their own but we have sufficient training and skills to maintain these dilapidated buildings. Therefore, to make sure that this objective is realized, there should be good relationship and linkage between the schools and the Department of Works and Housing so that we can even establish maintenance department in their schools to help in their buildings maintenance.”

DISCUSSION OF FINDINGS

From both the qualitative data analysis results, a number of factors were noted as constraints to the maintenance of government senior high school buildings. These include the attitude of users, (mean= 3.059), inflation of maintenance cost by management (mean= 3.153), frequent

shortage of maintenance materials (mean= 3.089) and persistent breakdown of building components through indiscipline (mean= 3.008). Others include lack of reporting of buildings defects to GES by school authorities; lack of cooperation between GES, Assembly and School Management on maintenance issues, lack of maintenance unit in the schools, poor maintenance culture of the schools and the lack of funds from government. All these factors were found to have resulted due to the ill-functioning of the key stakeholders; resulting in the damage to facilities or incompleteness of projects.

Also, from the qualitative data analysis results, a number of challenges were identified including misuse of property, lack of coordination among stakeholders, misappropriation of funds by authorities, lack of maintenance department, embezzlement of funds by authorities and poor maintenance culture. However, it is clear that these factors would have been critical should the actors have played their roles effectively. For instance, those whose role is to supervise or inspect the school buildings conferred that they have not been able to visit the SHS's within the Wa Municipality and therefore cannot provide an inventory of the current state of affairs. This is interesting given the fact that participants reported that even when maintenance is requested, there seem to be unusual delay in granting of requests due to bureaucracies.

The findings of the fourth objective of this study confirms with the study by Cobbinah (2010) who identified lack of reporting of buildings defects; lack of cooperation between authorities responsible for maintenance issues, lack of maintenance unit, poor maintenance culture and the lack of funds from government as a constraints factors to public buildings maintenance. The findings of the fourth objective of this study found out that lack of reporting of buildings defects to GES by school authorities; lack of cooperation between GES, Assembly and School Management on maintenance issues, lack of maintenance unit in the schools, poor maintenance culture of the schools and the lack of funds from government are the constraints factors to maintenance of public SHS buildings in the Wa Municipality.

In addition, the findings of the fourth objective of this study also agrees with the study by Nartey (2012) who asserted that lack of resources/funds is a constraint factor to maintenance of public senior high school buildings. This is true because the study found out that lack of funds from government is a constraint factor to maintenance of public SHS buildings in the Wa Municipality.

The results of the fourth objective of this study also confirms the study by Ali (2009) who asserted that high cost of building materials, lack of funds, lack of maintenance department, budget constraints, failure to execute maintenance works at the right time and poor budgetary control are the constraints factors to maintenance of public school buildings in Ghana. This study agrees the study conducted by Allotey (2014) who summarizes the principal criteria which could influence the decision to carry out maintenance on public senior high school buildings in Ghana briefly as high cost of maintenance and availability of adequate funds.

Maintenance of public senior high school buildings is made not only to maintain the building but also for the sake of saving the country's investment in education. The findings of the fourth objective of this study also agree to the study by Adejimi (2005) and Akasah (2010) who identified twelve relevant factors affecting the maintenance strength of public senior high school buildings in developing countries as lack of funds, design resolution, structural

strength, specified materials strength, maintenance manual, safety measures, skill maintenance personnel, maintenance plants, environmental factors, lack of maintenance unit, usage factors, quality control factors and post construction prevention strength. It can be inferred from the findings of the fourth objective of this study that the constraints factors to public senior high school buildings maintenance has accumulative results with rapidly increasing deterioration of the fabric and finishes of the school buildings accompanied by harmful effects on the contents and occupants.

SUMMARY OF MAJOR FINDINGS

The fourth research objective was to assess the constraints factors to maintenance of government senior high school buildings in the Wa Municipality. 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, and focus group discussions were employed to obtain the relevant information for this work.

The study found out that lack of reporting of buildings defects to GES by school authorities, lack of cooperation between GES, Assembly and School Management on maintenance issues, lack of maintenance unit in the schools, poor maintenance culture of the schools, lack of funds from government and inadequate contribution from PTA are some of the constraints factors to maintenance of public buildings in senior high schools in the Wa Municipality.

CONCLUSIONS

Based on the findings of the fourth study, it can be concluded that several challenges have been identified as constraints factors to public SHS buildings maintenance in the Wa Municipality which include lack of coordination between authorities responsible, lack of funds from government, poor maintenance culture, embezzlement of funds on the part of management via the inflation of maintenance costs, frequent shortage of maintenance materials, users' attitude and the persistent breakdown of building components through students indiscipline.

Recommendations

Based on the fourth objective results, the study recommends that:

1. There should be corporation between GES, school management and the Assembly (Department of Works and Housing) in the Wa Municipality to ensure good maintenance of their senior high school buildings
2. Due to the lack of funds for public senior high school buildings maintenance in the Wa Municipality coupled with the delay in the release of funds from government, school authorities should establish a maintenance funds that will help in maintaining the school buildings without depending solely on government.

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