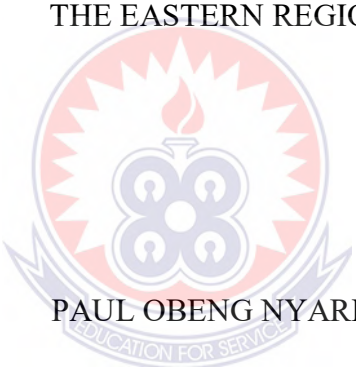
UNIVERSITY OF EDUCATION, WINNEBA

COLLEGE OF TECHNOLOGY EDUCATION, KUMASI

ASSESSING MAINTENANCE CULTURE OF SCHOOL BUILDINGS AND THEIR IMPACT ON TEACHING AND LEARNING IN PUBLIC BASIC SCHOOLS IN GHANA: A CASE STUDY IN DENKYEMBOUR DISTRICT IN THE EASTERN REGION.



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SEPTEMBER, 2018

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SEPTEMBER, 2018

DECLARATION

STUDENT'S DECLARATION

I Nyarko Paul Obeng, declare that this Dissertation, with the exception of quotations and references contained in published works which have all been identified and duly acknowledged, is entirely my own original work, and it has not been submitted, either in part or whole, for another degree elsewhere.

SIGNATURE……

DATE…….....……

SUPERVISOR'S DECLARATION

I hereby declare that the preparation and presentation of this work was supervised in accordance with the guidelines for supervision of Dissertation laid down by the University of Education, Winneba.

NAME OF SUPERVISOR: MR. MICHAEL K. TSORGALI

SIGNATURE:.....…….....

DATE:…….....

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DEDICATION

I dedicate this dissertation first and foremost to the Almighty God for seeing me through my education this far and making this master's program a dream come true. I also dedicate this dissertation to my deceased father Mr. Emmanuel Kwasi Nyarko my wife Theresa Afrah and my children Sylvia, Derrick, Benedicta, Alfredtina and Emmanuella.

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ABSTRACT

Public Basic School buildings are great assets to communities and the nation as a whole, which must be maintained to warrant greater worth. This study assessed maintenance culture of school buildings and their impact on teaching and learning in Public Basic Schools in Ghana, a case study in the Denkyembour District in the Eastern Region. The objectives of the study were to: examine the issues of maintenance culture of Public Basic school buildings, identification of maintenance culture challenges and developing strategies to improve maintenance culture of public basic school buildings in Denkyembour District. A total of 92 respondents were used for the study and was sampled as follows: Sixty (60) teachers, twenty (20) students, six (6) Head teachers and six (6) School Management Committee members of the selected Public basic schools. Questionnaires, interview schedule and observation were used for the data collection. The study revealed that most of the public basic school buildings had cracked and broken walls, wearing off floor screeds and faded paintings, some had leaky roofs whilst some roof partly ripped off. The study concludes that maintenance culture of public basic school buildings has a bearing on teaching and learning, attendance of students to school and retention of experienced teachers in the schools in the District. The study recommends that the Denkyembour District Assembly should invest in public basic school building maintenance since effective maintenance promote heathy and safety environment to make life of students and teachers comfortable and prolong the life span of the school buildings.

CHAPTER ONE

Introduction

This chapter discusses the background to the study, statement of the problem, purpose and objectives of the study, research questions, significance of the study and the scope of the study.

1.1 Background of the Study

Globally, maintenance as a concept has received attention from diverse fields of study. According to Guldenmund (2010), maintenance as a concept has received attention from both researchers and practitioners in current times. Though, it is looked at from the point of machinery. Studies have acknowledged that there have been several contributions in the area which covers safety culture, safety management and types of safety (Guldenmund, 2010; Sharma et al., 2010; Alrabghi & Tiwari, 2016). This is attributed to the fact that maintenance plays a crucial role in businesses. Maintenance contributes to efficiency and effectiveness in an organization. It also helps to sustain profits of firms. Maintenance is conceptualized as a value-added concept in that it promotes reliability in services provision and product manufacturing (Sharma, Yadava & Deshmukh, 2010). According to Sharm et al. (2011), maintenance is an activity which involves repairing at regular intervals aimed at extending the usefulness of the machine.

There are several benefits of maintenance though it also poses challenges as well. For instance, Talib, Ahmad, Zakaria and Sulieman (2014) concluded that maintenance is required because buildings are not able to stand the impacts of weather and age among other factors. Earlier studies like Horner, El-Haram and

Munns (1997) argued that there is pressure on firms to prolong the useful life of a building without compromising the objectives of the maintenance.

It is important to note that school facility, property or building plays an integral part in teaching and learning environment (Abdullahi et al., 2017). Other scholars have argued that numerous factors influence the maintenance culture (Strauch, 2015; Reiman, Oedewald & Rollenhagen, 2005). Nevertheless, few research works have been done in this regard and most of the works done were also conducted from the perspective of developed economies. Also, most of the studies were conducted using descriptive case study and a survey. Therefore, the study fills this gap by adopting a qualitative research approach and a descriptive case study to investigate the issue of non-maintenance of school buildings and its impact on teaching and learning.

1.2 Statement of the Problem

A number of public basic school buildings in the Denkyembour District of the Eastern Region are not maintained and are in a very deplorable state. Visits to these schools reveal an abhorring situation in some of the schools with some of the school buildings showing cracks on the walls, rotten window and door frames, leaking roofs, missing doors and windows, rotten ceilings, floors wearing off, faded and discoloured surface coating (painting).

In some of the schools stray animals use the classrooms after school closes littering the rooms and other recalcitrant people within the communities use the classrooms for other non-accepted deals such as wee smoking, defecate and other social vices.

These unfortunate situations had affected the District as most teachers refused postings to these schools and few who are there, frequently agitate for transfers to other districts which they think they will get decent classroom accommodations. The classrooms have become unattractive to students in these schools therefore has become truant defeating the national policy of Free Compulsory Universal Basic Education policy.

The problem arising out of the present situation as far as maintenance of basic school buildings in the public sector is concerned lowers morale of teachers and student which go a long way to affect teaching and learning and the general performance of the students.

It is therefore imperative for this study to assess the maintenance challenges in the public basic schools and its effect on teaching and learning in the Denkyembour District.

1.3 Purpose of The Study

The aim of the study is to assess the impact of maintenance culture on teaching and learning in selected schools using Denkyembour District in the Eastern Region as a case study

Objectives of the study

1. Examine the issue of maintenance culture of Basic school buildings in Denkyembour District.
2. Identify the challenges as far as maintenance culture of public Basic school buildings are concerned.
3. Devise strategies to improve maintenance culture of public basic school buildings.

1.4 Research Questions

1. What are the issues of maintenance culture of public basic school buildings?
2. What are the challenges in the maintenance culture of public basic school buildings?
3. What are the strategies that can be adopted to improve maintenance culture of Public Basic school buildings?

1.5 Significance of the Study

- The study seeks to inform the Denkyembour District Assembly and other Metropolitan/ Municipal and District Assemblies about the maintenance culture in Public Basic Schools and its corresponding impact on teaching and learning.
- The study will be beneficial to Non-Governmental Organizations who support infrastructure development in Public Basic Schools.
- The study will serve as a source from which future researchers could access information for further studies on the topic.
- The study will assist Government to embark on an education drive on the subject of maintenance culture through schools and the print and electronic media.
- Policy makers will use the study as a guideline for implementing maintenance practices in Public Basic Schools across the country.

1.6 Scope of the Study

The research seeks to examine maintenance culture issues and its impact on teaching and learning, challenges and strategies to improve maintenance culture of public basic school buildings. Additionally, the concept of maintenance, relationship between maintenance of Public basic school buildings and students' achievement as well as retention of teachers in the schools.

The emphasis of the study was on public basic school buildings in the Denkyembour District in the Eastern Region.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The chapter presents related literature review from books, journals, research findings and related materials about the subject. The areas of discussions cover the following themes: Maintenance Theory of Reliability, Building Maintenance Management, Functions of School Buildings, The Concept of Maintenance, Maintenance Strategies, and Types of Maintenance. Additionally, the chapter attempts to examine the benefits of maintenance of buildings, The Current State of Non-maintenance of Public School Buildings, Relationship between School Buildings and Student Achievement, Relationship between School Buildings and Teachers Retention, The Impact of Maintenance Culture on Teaching and Learning.

Finally, the Challenges faced as a result of maintenance culture has been discussed.

2.2 Maintenance Theory of Reliability

This is the survey of useful and practical maintenance models covering replacement, preventive maintenance and inspection. In recent times, reliability theory has produced many innovations in maintenance policy (Nakagawa, 2005). Maintenance theory is rarely known and rarely thought. The theory helps to have a good understanding of the different patterns of failure and the appropriate maintenance tasks that can actually improve reliability of their plant over time. It helps to deliver reliability improvements, cost savings and bottom line benefits.

2.3 Building Management

Building maintenance management is a complex and multi-faceted thought process that involves planning, directing, controlling and organizing resources for the sustenance of the building's functional performance. Empirical evidence suggests that managing buildings is a critical phase of a building's life cycle thus the operational phase. This phase involves several management activities including technical maintenance of a building. This practice is key because if these activities are not implemented, it affects the functionality of the building and further shortens the life cycle of the building. This increases cost (Gajzler, 2013). Building management is a particular economic activity, a set of property maintenance, operation, repair and maintenance (Pukite & Geipele, 2017). They emphasized that it is a legal and technical set of operations required for building maintenance and preservation of usable condition. They identified that the continuous growth of socially responsible building management has raised the need for a more effective management system of the life cycle of the building. Motowa & Almarshad (2013), also stated that building maintenance is an activity that promotes facility management. It is also considered as an integral part of the construction sector which offers improvement and flexibility in the delivery of services of building maintenance. These activities are considered as supportive services or non-core function in an organization.

Earlier works like Shen (1997), concluded that there is an increasing demand for research on maintenance of public buildings and this was to help ensure that all public buildings meet the needs of locals. The same study recommended that maintenance plan that is based on a rational assessment of priorities and adequate knowledge on available resources should be implemented. Taollander, Sauce &

Bonetto (2011), conceptualized that building maintenance is a complex activity. Nonetheless, most facilities management methods and tools find it difficult to find answers on the nature of complexity. Hence, the complexity is ignored and focus is placed solely on the technical aspect of it. Further works like Silva, Ranasinghe & Silva (2012), found that risk factors like life-long environmental factors, the design, the construction and the process of maintenance affects building maintenance cost.

According to Motawa et al. (2013), the decisions made with regards on building maintenance requires integration of various types of information and knowledge created by different members of the construction team. Essentially, current building maintenance systems focus mainly on capturing either information or knowledge on building maintenance in terms of how buildings are deteriorating and how to support preventive or corrective maintenance decisions. Suffian (2013), further concluded that poor and improper building maintenance causes damages and even more if it is not attended to. He added that building maintenance is mostly perceived as mechanical and electrical system repair without looking at civil and structural elements of buildings.

2.4 Functions of School Buildings

School buildings are public places and it represents the communities they are situated in (Maxwell, 2016). Maxwell (2016), further indicated that the school promotes acquisition of knowledge and skills. A building has the functional values of accommodating people and providing space for activities (Teng & Wu, 2012). Teng et al. (2012), argued that there is the need to minimize the environmental impact of building projects as well as to achieve sustainable development.

Another work conducted by Bin & Parker (2012), concluded that there is the need to measure buildings for sustainability. Also, Kayan, Forster & Banfill (2016), concluded in their study that sustainability is best explained with economic, environmental and societal factors.

Therefore, there is the need for green maintenance as green maintenance helps to reduce carbon emissions. Jong & Arkesteijn (2014), also emphasized that investment in sustainability leads to an increase in expenses particularly in the construction sector.

Mithraratne and Vale (2004), and Blengini (2009), also postulated that designers of buildings should concentrate on reducing the impact of building on the environment. There is a growing interest in the use of intelligent technologies in new buildings. This is because of large buildings need substantial manpower for maintenance (Lopez, Perez, Paz & Santana, 2013). However, Hegazy, Ahluwalia & Attalla (2010), argued that sustaining the safety and operability of building is a very complex and difficult undertaking which requires a perpetual cycle involving inspections and renewal fund allocation. This is because inspection is the basis of all decisions taken in sustaining the safety of civil infrastructure asset. Although, it is costly and time consuming.

In addition, Sharma, Saxena, Sethi, Shree & Arun (2011), found that there is the need for some alternative ways to designing buildings for a sustainable future. Sustainability here, focuses on reducing emissions into the environment and consumption of resources. This is due to the fact that building plays a critical role in energy consumption. The World Commission on Environment and Development (1997) defined sustainability as “development that meets the needs

of the present without compromising the ability of future generations to meet their needs".

Gimenez, Tachizawa (2012), and the World Commission on Environment and Development (1987) emphasized that sustainability should be extended to suppliers of materials. In measuring sustainability, measures like the following are used (Ahi, 2015): Quality, Air emissions. Greenhouse gas emission, Energy use and Energy consumption.

Miemczyk et al. (2012), postulated that sustainable criteria such as environment, green, waste, pollution, energy use, recycling, ethics, diversity, social standards, human rights and child labour are used to evaluate activities. In addition, Lehtinen (2012), argued that the influence sustainability has on processes particularly public sector is challenging. He attributed the challenges faced to the increased economic pressure in the public sector. Nevertheless, he suggested that sustainability criteria should be included in every process. They further indicated that the dimensions of sustainability include ecological, economic and social factors. Literature further provides empirical evidence to the fact that factors like transparency, organizational culture and business strategy influence the adoption of the concept of sustainability in the public sector (Preuss, 2009). He admits that leadership style influences the implementation of sustainability.

2.5 The Concept of Maintenance

Maintenance is a logistic organizational function which is typically integrated into a production process (Simoes, Gomes & Yasin, 2011). Martinez-Rocamora, Solis-Guzman & Marrero (2016), argued that there is a poor maintenance of building due to the poor design of buildings. This has led to high cost of maintenance in

terms of economic and environmental cost. They further suggested that this can only be resolved through the development of a cost database within the resources needed to establish and clean as well as maintain buildings are well-estimated and implemented accordingly. Another study indicated that proper maintenance can be done when there is blueprint for recycling and reuse (Marrero, Puerto, Rivero-Camacho, Freire-Guerrero & Solis-Guzman, 2017). The study confirmed that there should be a proper maintenance plan which covers the real needs of in service green roofs to suit the changing climate as well as the requirement for irrigation and cleaning (Silva, Flores-Colen & Coelho, 2015).

Several maintenance policies are developed due to the change in the business environment and the growing of technologies in the past few decades (Ding & Kamaruddin, 2015). Motowa et al. (2013), further explained that maintenance may be preventive or corrective in nature. Thus, the preventive maintenance looks at the routine maintenance plan whereas corrective maintenance is about a reactive maintenance which is in response to a cause or breakdown. They found that decisions for building maintenance require integration of various types of information and knowledge. This information is created by different members of construction team including maintenance records, work orders among others. Ruparathna, Hewage & Sadiq (2018), concluded that public buildings need multi-period maintenance planning.

According to Abdul-Rashid & Ahmad (2011), maintenance is a means of prolonging the lifespan of historical structures. They concluded that most organizations are ill prepared to implement maintenance strategies effectively. He attributed this to the lack of attention to prioritize the issue of maintenance. Macek & Dobias (2014), in a similar study reported that maintenance represent a

significant cost within the life cycle of a built asset. Nzukam, Voisin, Levrat, Sauter & Iung (2017), identified that maintenance comes with a huge cost though its main objective is to reduce corrective maintenance by planning properly. They argued that performing maintenance on individual components is costlier than performing the maintenance activities combine.

In a similar vein, Forster & Kayan (2009), concluded in their study that maintenance is critical to the survival and in-service use of all buildings. They suggested that the best way to protect and maintain buildings is to undertake a combination of proactive and reactive maintenance. Hopland & Kvamsdal (2016), also posited that the optimal maintenance schedule reflects a trade-off between the interest rate and the rate at which the decay accelerates. They added that local governments should focus on maintenance early in the lifespan of the building or let it decay towards replacement.

Pan & Gibb (2009), found that building maintenance account for over 5 percent of the UK gross domestic product. However, there are several uncertainties that affect building maintenance (Lind & Muyingo, 2012).

2.6 Maintenance Strategies

Maintenance strategies are essential to control the stages of degradation and prevent the failure of building elements (Flores-Cohen & Brito, 2010; Garg & Deshmukh, 2006). Zawawi & Kamaruzzaman (2009), stated that an effective maintenance practice aims at increasing the life cycle of the property. It is important to note that the efficiency of maintenance of ordinary buildings is

important in relation to durability and functionality (Silva & Falorca, 2009; Silva, Brito & Gaspar, 2012). Essentially, building maintenance is critical to preserving buildings' appearance and performance (Che-Ghani, Myeda & Ali, 2016). They further added that it prolongs value and the life cycle of buildings.

Pinjala, Pintelon & Vereecke (2006), and Muchiri, Pintelon, Gelders & Martin (2011), in their study confirmed that most businesses choose to compete in the market based on competitive issues like cost, quality, flexibility and others. They further concluded that maintenance is an integral part in ensuring that these competitive priorities are enhanced. Maintenance affects such developments from the tactical level to the strategic level. The same study found that quality competitors have move proactive maintenance policies, better planning and control systems, decentralized maintenance organization structures and an effective maintenance management than the others. They further reports that such firms have maintenance personnel and spend more on maintenance in their budget.

In addition, Cauche, Macek & Abate (2017), and Veldman, Kingenberg, & Wortmann (2011), concluded that a maintenance strategy minimizes total operational costs, cleaning costs and discomfort costs over the long term. Silvestre & Brito (2011), and Lowry (2002), emphasized that maintenance culture ensures an effective contribution to the accurate management of buildings. Sherwin (2000), added that maintenance management should be seen as a major improvement and a contributor to profits rather than a cost or a necessary evil. Faccio, Persona, Sgarbossa & Zanin (2014), and Fouladgar, Yazdani-Chamzini & Lashgari (2012), postulated that maintenance plays a crucial role. Liu &Lv (2015),

concluded that the traditional maintenance scheduling strategies may result in maintenance shortage.

2.7 Types of Maintenance

There are two main types of maintenance namely, corrective maintenance and preventive maintenance. Motowa et al. (2013), further explained that maintenance may be preventive or corrective in nature. Thus, the preventive maintenance looks at the routine maintenance plan whereas corrective maintenance is about a reactive maintenance which is in response to a cause or breakdown. These types of maintenance are discussed in detail below:

2.7.1 Corrective Maintenance

This type of maintenance is the simple type of maintenance strategy used by construction teams where an element in a building is used until it breaks down. Corrective maintenance covers all activities undertaken on buildings including replacement and repair of an element that has failed to a point at which it cannot perform its required function. Tasks undertaken here often take place in an ad hoc manner in response to breakdowns or user requests (Horner et al., 1997). It is said that corrective maintenance is an integral part of maintenance though expensive due to the following:

- The failure of an item can cause a large amount of consequential damage to other elements in the building.
- Failure of an item can occur at a time which is inconvenient to both the user and the maintaining authority.

2.7.2 Preventive Maintenance

Preventive maintenance is the time based maintenance, planned maintenance or cyclic maintenance. Preventive maintenance is introduced to overcome the challenges of corrective maintenance. This is achieved through the reduction of the probability of occurrence of failure and avoiding sudden failure. Preventive maintenance tasks are performed in accordance with a predetermined plan at a regular, fixed interval which may be based on operating time (Horner et al., 1997; Yeung, Cassady & Schneider, 2007; Koutras, Malefaki & Platis, 2017). Advantages of preventive maintenance are:

- Maintenance is planned ahead and performed when it is convenient to the building's user.
- Maintenance costs reduced via the reduction of consequential damage.
- The health and safety of the user can be improved.

Also, literature provides evidence that there are several maintenance approaches used in evaluation and these include fuzzy multiple criteria decision making approach (Al-Najjar & Alsyouf, 2003). This methodology is the most informative approach and it leads to efficiency in that it leads to less planned replacements.

2.8 The Benefits of Maintenance Of Buildings

The benefits that can be derived from maintenance of buildings are enormous, the need for proper maintenance of any facility can never be underestimated, if one wants to compete on the same level with other businesses. In most cases, having a well maintained working area leads to a better working environment for those that work in the building and those that visit for one reason or another. Furthermore, equipment

downtime is decreased and the number of major repairs are reduced. Better conservation of assets and increased life expectancy of assets, thereby eliminating premature replacement. (https://ableserve.com/issue-1/the-benefits-of-preventive-maintenance/)

Other benefit that can be derived from routine maintenance are:

- **A clean working environment.** When facilities are well cleaned and the surrounding areas kept neat, the environment looks inviting and makes it pleasing to the eye.
- **Boosts employee productivity.** Everyone likes working in an area that is clean and smells fresh regardless of the size of the space. When commercial facilities are well maintained, employees get motivated to work and deliver excellent results for the benefit of the entire organization.
- **Make great first impression to parents.** Most parents judge a school's abilities from their premise and so having a well maintained one will be of benefit to the school.

Moreover. There will be Value for money and better investment performance (Abdul-Rashid et al., 2011). Also, maintenance is to maximize the service life of a building, delaying the deterioration, decay and failure (Lateef, 2010). Another study like Horner, El-Haram and Munns (1997), added that the key objective of maintenance is to prolong the useful life of a building, reduction in failures and higher utilization of component life.

Maintenance helps to promote and increase competitive advantage (Lee & Scott, 2009). It further improves comfort in public buildings (Kaklauskas, Zavadskas, Raslanas, Ginevicius, Komka & Malinauskas, 2006).

2.9 The Current State of Non-Maintenance of Public School Buildings

Literature suggests that non-maintenance of public school buildings covers non-maintenance due to roof leaking issues, wall cracks and staining of wall paintings. (Suffian, 2013)

1. Roof leaking issues due to non-maintenance

Water strains that extend across ceilings or run down walls, the cause is a leaky roof. Tracking down the leak is the hard part, the roof leak repair is usually easy.

(https://building.com/article-details/articled/1735)

The consequence of a leaking roof is the damaged rafters, ceiling joist, wall framing and fascia boards and exterior trim can become victims of water intrusion.

Roofing leaks can develop from a variety of reasons like improper roof installation resulting from poor workmanship, roofing members and covering not well nailed. Wind or storm damage due poor anchorage of the roof structure to the wall, and lack of routine maintenance.

Leaky roof is not just a structural problem, but it poses safety and even health risks, constant water intrusion will eventually weaken down the roof space area to the very foundation of the building causing plenty of costly damage.

Damages caused by roof leaks to buildings

Attic and ceiling damage: The initial dangers of roof leaks are damage to the attic area and items stored there. If there is no attic, or the size of the leak is really big, it will damage the interior ceiling. Affected ceiling paint will darken and ceiling plaster may bubble and expand. The leaking water also will damage paint and plaster on nearby walls, ceiling mounted lights and fans.

Interior mould and mildew issues: In the longer term, one of the most serious consequences of a leaking roof is mould and mildew growths. Mould can spread throughout the building structure, vents, carpet and even clothing. Black mould is the most common type resulting from chronic water intrusion. Mould can attack wood framing, ceiling, walls and floor coverings.

Health concerns from mould: Mould and mildew can lead to serious health issues especially for those with high sensitivity, including nasal congestion, rhinitis, inflammations and asthma. Mould spurs continue to be produced once its present and it will lead to allergic reactions, asthmatic symptoms and more serious health problems.

Fire hazard from water damage: If the electrical wiring is present in an attic or ceiling, a leaky roof could pose a fire threat from shorted wires.

Slip and fall hazard: A severely leaking roof can cause water to puddle on the floor. This may not seem like a huge risk but if there are active people especially children who like to run, then there is the need to get that water mopped up to prevent accident.

Compromised structural integrity: The most obvious consequence of a leaking roof is the damaged rafters, ceiling joists wall framing and even fascia boards can

become victims of water intrusion. Chronic roof leaks lead to wood deterioration and weakened, rotten roof framing causes serious problems. Spongy and weak water-damaged wood can end in peeling paint, damaged ceiling and buckled wall coverings. Structural damage is inevitable if there is a serious and long standing roof leaks. The roof can cave in when people and other properties are under it.

2. Cracks in walls due to non-maintenance.

Cracks are signs of structural movement, during and after construction. Such movement occurs all the time, and usually its magnitude is so small that it passes unnoticed (Richardson 1996). Most buildings crack at some time during their service lives. The appearance of cracks is a symptom of distress within the fabric of the building. According to Jiya E. A., Anwar N. S. N., and Abdullah M. Z. (2016), crack is an evidence of gradual deterioration and damage to structures. Often the cracking is of little consequence and once it is established as static, simple repair by filling or re-pointing is all that is required. However, a crack may be the first sign of a serious defect which may affect the serviceability or the stability of the building (Johnson, Roger W. 2001).

Crack is a structural defect consisting of complete or incomplete separation within a single element or between contiguous elements of construction. It can also be defined as a line along which a material is broken into parts. Every crack is an indication that the building is becoming unsafe, though the factor of safety for structural walling is high and the relative importance of many cracks is low (Bohnhoff, D. R. 2001).

Rarely does a building collapse soon after the appearance of a crack, even if the crack is large, nevertheless, it is important to note this in order to prevent any

undesired loss of life or property. Therefore, correctly assessing the significance of cracks is essential. Many cracks have similar appearance, though their causes are different (Roberts, C. C 2012).

An engineer should have a sound knowledge of causes, effect and types of cracks likely to occur from the behavior of construction materials and construction techniques, which will enable him, offer the appropriate prevention and remedial measures.

Classification of cracks

According to Aggarwal, R. (2000) Cracks are classified as structural or non-structural.

Non-structural cracks develop due to the inducement of internal stresses in the building materials and their depth is less, only a few millimetres that is they exist on the surface only. Typically, causes of these cracks are poor workmanship, inappropriate joint detailing, and higher shrinkage of concrete.

Structural cracks develop due to the following causes; design deficiency, construction deficiency, settlement of foundation, reinforcement corrosion, and effect of temperature variation, overloading, swelling of soil below the foundation of the structure.

The nature of cracks according to Gupta, B.L and Gupta, A. (1995) can be classified as active crack which is still in progress, that is, the crack is still developing, and dormant cracks, in which the development is not observed during a considerable period of time, and then this crack is known as dormant crack. It is also important to assess causes of cracks through measurement of cracks' characteristics, which are location, nature, direction, width, depth, position and

extent of cracks, and how to repair them. Cracks may appreciably vary in width from very thin hair cracks barely visible to naked eye (about 0.01 mm in width) to gaping cracks 5 mm or more in width.

A commonly known classification' of cracks, based on their width is: (a) thin - less than1 mm in width, (b) medium- 1 to 2mm in width, and (c) wide- more than 2 mm in width.

Current problems faced in public school buildings are cracks. A typical crack of buildings covers non-structural type thus shrinkages cracks, joints. Other problems include the cracked walls and foundations, sagging roof lines and uneven or tilting floors can be symptoms of major structural problems. Two common causes for structural problem are Differential Settlement (when the building foundation settles unequally) and Poor Renovations (when changes are made to the structure of a building without proper support), which put great stress on the foundation, walls, floors, ceilings and roof of the building.

3. Staining of wall surface paintings due to non-maintenance

Staining on paintings on wall surfaces are caused by the blistering exposure to sun, frequent soakings by rain, and radical temperature shifts. Sometimes staining are caused by slow buildup of dust, soot, and mould. There are several root causes behind the buildup cold spots on walls and ceilings get damp from condensation, and airborne dust clings to the dampness. Modern paint chemistry require that wall surfaces required painting every two or three years but now sometimes go a decade or more before they are repainted (https://www.bca.gov.sg)

Staining is one of the problems faced in public basic schools in the Denkyembour District. It covers problems like water mark, existence of moss, fungus and algae attacks. This occurs after years after painting.

Common causes of Staining in wall paintings

The common causes of staining in paintings are: Blistering, Alligatoring, efflorescence and chalking (Suffian, 2013). Common-defects found in paint-work.

- **Blistering paint** is identified by small- to medium-sized bubbles or blisters under the paint film. It is most commonly seen on wood siding and trim. Some of the causes of blistering are when the Paint was applied when the wood was damp, causing trapped moisture to expand the paint film and house moisture escaping through the walls due to improper house ventilation.
  To prevent blistering scrape away blistered paint, and sand to bare wood then let wood completely dry before painting. If the blistering is due to lack of home ventilation, corrective repairs must be made to properly ventilate the walls, roof, and eaves, bathrooms, etc. (Jones, Axelrad & Wattigney, 2007) common-defects found in paint-work)
- **Alligatoring** is a type of paint film failure in which the surface develops cracked pattern with deep relief, resembling a reptile's skin, it is less severe and is characterized by long, fairly evenly spaced cracks in the paint film, having shallow relief or depth. Occasionally, may become severe in some areas, leading to a deeper crack or split in the paint.
  Alligatoring occurs when, the second coat of paint was applied over the first coat of primer or paint base coat that had not yet fully dried, or second coat on incompatible paint, such as a glossy paint or a hard oil enamel over a latex-based

paint and also an oil-based paint that has naturally aged and lost its elasticity, leading to cracks caused by fluctuations in temperature. (Tabib, Ahmad, Zakaria, & Suleman, 2014) common-defects found in paint-work.

- **Efflorescence** is a problem of painted masonry construction, efflorescence is identified by crusty white salt deposits bubbling through the paint film from an underlying masonry structure. It is caused by salts in the brick or concrete dissolving with water and then leaching to the surface as the water evaporates. Among the possible causes of efflorescence are when heavy moisture migrated through exterior masonry walls from inside the building, masonry painted before the concrete or mortar had adequately cured and dried out. Moreover, when cracks in the masonry wall or poor tuck pointing have allowed water to get behind masonry wall leads to efflorescence. In order to avoid efflorescence, the moisture that is getting into the masonry wall, eliminate the source of moisture by properly tuck pointing any cracks or missing mortar in the wall or patching concrete with a latex concrete patch; clean out gutters and downspouts, and caulk joints around windows and doors with a butyl rubber seal. (Uline, Tschennen-Moran & Devare Wolsey, 2009). Common-defects found in paint-work.
- **Chalking** is identified by the fine chalky powder that forms on the surface of a paint film. Although some chalking is a normal way in which paints self-clean when exposed to the sun and rain, excessive chalking can indicate paint failure. In dry arid climates where there is little rain, chalking can become excessive. Chalking is actually the paint pigment released by the paint binders that have been broken down by exposure to the weather. Chalking is especially common with very light-coloured paints, especially lesser quality oil-based paints containing high levels of pigment extenders. When chalking gets severe, it may run off and stain

the surrounding construction. The possible causes of chalking are the use of cheaper-quality exterior paint which contain high levels of pigment extenders also when the paint is over-thinned before it is applied and when porous surfaces are not properly sealed before painting. (https://civilblog.org205/08/21/10 common-defects found in paint-work)

2.10 Relationship between School Buildings And Student Achievement

There is a relationship between the nature of school buildings and student's achievements. A good school building with some clean surroundings looks inviting and pleasing to the eye. Everyone likes to work in beautiful environment, teachers and students get motivated to work and deliver excellent results.

Uline & Tschannen-Moran (2008), found that there is a growing body of research on quality of school facilities and students' performance. This is due to the fact that little is known in that area of study. The findings of the same study show that there is a relationship between the quality of school facilities and student achievement in English and Mathematics. They further found that quality school facilities are positively and significantly linked to proper resource support, student achievement and performance.

Studies on the relationship between school buildings and student achievement recognized the fact that it affects the performance and behaviour of users thus students. For instance, authors like Earthman (1996), found that school building age, colour and interior painting, windowless facilities and building maintenance, and student achievement and student behaviour have a considerable degree of relationship. Another study conducted by Earthman (2002), postulated a strong

positive relationship between overall building conditions and student achievement.

In a similar study by Green & Turrell (2005), they indicated that there are no direct benefits to measure accurately but the school can observe great benefits in students' attainment, motivation and students behavior. The study further recommends that all stakeholders who have interest in education should provide support for the government investment taking place in schools. This demonstrates that there are indeed benefits associated with school building and student achievement.

Hopland & Nyhus (2015), also found that there is a significant relationship between satisfaction with the school facilities and examinations results. Tanner (2009), in a similar study found that there is a significant relationship between school design and student achievement in terms of reading vocabulary, reading comprehension, language arts, Mathematics and Science. This study discusses the influence of school architecture on academic achievement.

Moreover, Uline, Tschannen-Moran & Wolsey (2009), found that school climate plays a mediating role in the relationship between school building quality and student outcome. They argued that there is an interaction between certain building conditions and design features as well as how these reinforces and enhance the social environment of the school. It further promotes a sense of belonging within a place, a sense of control, competence, a sense of commitment to the place and its purpose.

Crampton (2009), also found that investment in human, social and physical capital accounts for about 77.2 percent of the variation in student achievement in both

reading and Mathematics. They added that investment in human capital is the largest influence on student achievement. Again, Dorman, Fraser & McRobbie (1997), added that there is a relationship between school facilities and performance of students.

2.11 Relationship Between School Buildings And Teachers Retention

There is a great relationship between good school buildings and retention of teachers in a particular school. Retention of teachers in a school is influenced by the quality of the school building, students learning and teacher's performance also depend on having well designed classrooms, sanitation facilities, access to adequate clean drinking water, and electricity will make students and teachers feel comfortable to stay in the school to retain good and experienced teachers.

Researchers state that there is the need for quality educational infrastructure because it impacts on the student achievement, behavior and attitudes as well as that of the teachers (Uline, Tschannen-Moran & DeVere Wolsey, 2009). Again, a research conducted in Nigeria indicated that school buildings and the condition of the environment affects the emotional, intelligence and self-efficacy of teachers to work (Salami, 2007).

Furthermore, another study found that as society focuses on student achievement, the physical environment of schools should be looked at as it impacts on both student and teacher outcome (Jones, Axelrad & Wattigney, 2007). Also, a study by Buckley, Schneider & Shang (2004), posited that the quality of school facilities affects the decision of teachers to leave their current position. They further added that this contribute largely to the attrition of both new and experienced teachers.

According to Earthman & Lemasters (2009), and Johnson (2006), the condition of the classrooms affects teacher's attitude to work and the high rate of attrition among teachers. In addition, Johnson (2006), concluded that workplace matters, and it affects teacher quality, retention and effectiveness. He suggested that greater numbers of talented teachers can be retained through improvements. Furthermore, Tickle, Chang & Kim (2011), and Collie, Shapka & Perry (2012), found that the effect of administrative support on the job satisfaction of teachers. Green et al. (2005), further posited that there is a relationship between school buildings and teachers' retention levels in the school in that they concluded that school maintenance offers better environments that improve teacher's morale and motivation.

2.12 The Impact of Maintenance Culture on Teaching and Learning

Maintenance culture has a positive impact on teaching and learning. A decent and well maintained school building with some clean surroundings looks appealing and attractive. Experienced teachers are attracted to work in gorgeous environment, teachers and students get motivated to work and deliver excellent results.

Literature suggests that adequate investment in school infrastructure is a way government develops physical capital in an economy. They further indicated that a larger part of education expenditure is on school construction, land and building construction. Hence, several scholars have aimed at investigating the impact of maintenance culture on teaching and learning. For instance, Neilson & Zimmerman (2014), found that it increases reading and mathematics scores. It also increases public school enrollment. Park, Stone & Holloway (2017), found

that cleaning a building impact on achievement of the students. A similar study postulated that the local climate change affects people and buildings and this affects teaching and learning in the classroom (Puteh, Adnan, Ibrahim, Noh, Nidzam & Ahmad, 2014).

Another study like Duran-Narucki (2008), concluded that little is known about how the conditions of school facilities affect academic outcomes. They acknowledged that students abstain from school when their building needs repairs and hence, they have lower grades in English and Mathematics. Although, they suggested that school is the next important setting after home in the development of children, hence, the effects of the school environment on the child is massive. This shows that there is a positive relationship between school building conditions, school attendance and academic achievement. Though, they attributed this phenomenon to social justices.

Maxwell (2016), also found that academic achievement is linked to building condition mediated by the social climate and school attendance. Schwartz, Stiefel & Wiswall (2016), posited that this relationship is mediated by the size of the school. Furthermore, Nessipbayeva & Egger (2015), concluded that teaching style and infrastructure of learning leads to increase students' motivation. This affects achievement because it provides an effective learning experience.

2.13 Challenges of Maintenance Culture of Public Basic School Buildings

Ajayi, (2014) in his recent work admitted that there are several challenges faced in ensuring maintenance of public buildings. These are lack of maintenance culture in the country, absence of planned maintenance programme, lack of skilled

personnel and insufficient funding for the maintenance projects. Other scholars like Issahaku (2013), concluded that negative attitude of users of the building, lack of discernable maintenance culture; poor maintenance management practices and inadequate funding are the main challenges of building maintenance.

Maintenance is often observed as a non-lucrative option. Maintenance is also seen as low status professional activity (Abdul-Rashid et al., 2011). In a similar vein, Talib, Ahmad, Zakaria & Sulieman (2014), admitted that there are several factors that affect maintenance of public buildings. It includes:

- Lack of preventive maintenance
- Insufficient funds to maintain the buildings
- Lack of building maintenance standards
- Non-availability of replacement parts and components.

Also, an earlier study conducted by Al-Hammad, Assaf and Al-Shihah (1997), emphasized that there are defects and faults that occur at the design stage which affects building maintenance. These faculty includes the choice of structural system and selection of materials, ignorance of the basic physical properties of the materials, the use of new materials or innovative forms of construction which have not been tested, misjudgment of climatic conditions under which the materials have to perform and poor communication between members of the design and construction teams.

Another challenge identified in literature is the problem of scheduling with multiple maintenance activities (Sun & Li, 2010). Ghirado (2010), emphasized that maintenance performance and its strategies are influenced by context. Another study found that the role of maintenance is not duly recognized in

institutions help affecting the effectiveness of the concept (Alsyouf, 2009). Ismail (2017), admitted in a study that there are several challenges that are faced which includes poor service delivery, less-competent contractors and defect repetition. Yik, Lai, Chau, Lee & Chan (2010), found that few people know about building services and this impacts largely on maintenance problems.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter presents the research methodology adopted in gathering data for the study. It specifically deals with the study area, research design, population, sampling techniques and sample size, data collection instrument and data analysis and finally ethical considerations.

3.2 Study Area

Denkyembour District was selected for the study. The district was carved out of the existing Kwaebibirem District in the year 2012. The District lacks a lot of infrastructural development notable among then is Public Basic School Buildings which are in deplorable state. The state of the school buildings has affected teaching and learning in the Public Basic schools, therefore students' academic performance has been affected negatively.

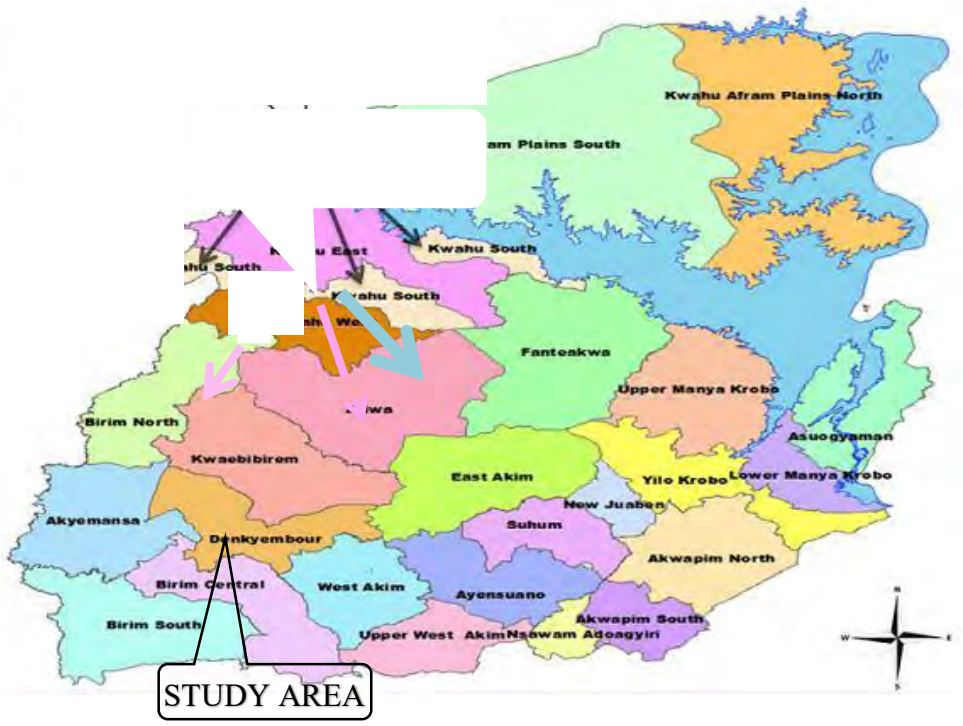

Figure 3.1Map of Eastern Region of Ghana showing the 26 districts. The insert depicts the Denkyembour District the location of the study area.

Scale 1:250000

3.3 Research Design

The study adopted descriptive case study approach as the research design. The study is to collect information so that a description of what is pertaining can be ascertained.

This study design entails the collection of data on more than one case out of a population, usually, enough cases that are representative of the population, and data collected at a single point in time as a snapshot of the ideas, information, or opinions (Neuman, 2007). Map of Eastern Region

The need of case study is to probe deeply and to scrutinise intensively the multifaceted occurrences that produce the life of the group with the opinion of forming generalisation about the greater population that belongs to the group.

The descriptive case study design approach was adopted for this research in order to assess the maintenance culture in Public Basic Schools in Ghana with particular reference to Public basic schools in the Denkyembour District in the Eastern Region of Ghana.

3.4 Population

The targeted population of the study involved students, teachers, head teachers and School Management Committee (SMC) members from 6 selected public basic schools in Denkyembour District.

3.5 Sampling Technique and Sample Size

Purposive sampling technique was adopted to select the six Public Basic Schools in the Denkyembour District namely Akenkanor D/A Basic School, Kusi Methodist Basic School, Takrowase R/C Basic School, Topremang Salvation Army primary, Addaekrom D/A Basic school and Akim Wenchi Methodist Basic School.

Furthermore, purposive sampling was used to select head teachers and School Management Committee (SMC) members of the six selected Public Basic Schools in the District. This technique was adopted based on the objective of the study, furthermore the head teachers and the School Management committee members are from the selected schools and that can give the required information about their various schools.

Simple random sampling technique was adopted to select the teachers and students in the selected six (6) Public Basic Schools in the Denkyembour District. This technique of sampling was used to enable every individual member of the population to have an equal and independent opportunity of being selected to be member of the sample size. The sample size used for the study was ninety-two (92), comprising sixty (60) teachers, twenty (20) students, six (6) head teachers and six (6) School Management Committee members as indicated on Table 3.1.

Table 3.1: Sample size

Unit	Sample size
Teachers	60
Students	20
Head teachers	6
School Management Committee (SMC) Members	6
Total	92

Source Field work by Paul Obeng Nyarko, 2018

3.6 Data Collection Instrument

The data collection instrument adopted by the researcher for this study were questionnaires, interviews and Observation. The main reason that the following methods is adopted is in two-fold. The world outside there has a huge amount of limitations neededily available on the subject.

I believe also that the cultural factors have not been examined prior to the study so, any qualitative study would lead to more effective detailing of attributes that obstruct and cultural specific. Though there exist qualification aspect in studying concepts, the

qualitative aspect in studying concepts, relating to this subject will look its essence if a quantitative methodology is adopted.

3.6.1 Questionnaire

The questionnaire was administered personally by the researcher to the respondents (Teachers and Students of the six selected Public Basic Schools in the Denkyembour District). The questionnaire was developed in simple language devoid of technical terms, then it was designed such that it would be appealing to respondents, easy to read and understood.

The issues involved in the questionnaire involved maintenance issues of Public Basic School buildings, impact of maintenance culture on teaching and learning, challenges in the maintenance culture of Public Basic School buildings and strategies to ensure proper maintenance culture in Public Basic School buildings. Additionally, the questionnaire was structured to capture information such as the demographic background of the respondents.

3.6.2 Interviews

Researcher interviewed head teachers and School Management Committee (SMC) members, of the six selected Public Basic Schools in the Denkyembour District. The Interview was to enable the researcher obtain information from respondents about maintenance activities in public Basic Schools, effects of lack of maintenance culture, funding of maintenance activities and the role users play in the maintenance of Public Basic School buildings. Additionally, the challenges involve in maintenance culture prevailing at the public basic schools and strategies that can be adopted to improve maintenance culture in Public Basic Schools in the Denkyembour District.

3.6.3 Observations

The researcher made field observation of defects on six (6) selected Public Basic Schools buildings in the Demkyembour District as follows:

At Akenkanor D/A Basic School, the researcher observed broken down walls and badly damaged roof coverings. Exposed foundations due to erosion and cracked corner column was observed at Kusi Methodist Basic school.

During the field visit to Takrowase R/C Basic School, wearing off floor and dirty wall paintings were seen, whilst at Topremang Salvation Army Primary school badly damaged roofing and poor condition of windows and doors were observed.

The researcher observed a deep crack at the corner of the basic six classroom and peeled off concrete floor were observed at Addaekrom D/A Basic School, whereas at Akim Wenchi Methodist Basic School collapsed walls and peeled off floor were observed.

3.7 Data Analysis

Data analysis is a practice in which raw data is ordered and organized so that useful information can be extracted from it. Analysis of the data was done using both qualitative and quantitative analytical techniques. Tables, charts, percentages and textual write-ups of the data gathered among others were used, in the case of the quantitative technique, whilst descriptions and pictures were used in the case of the qualitative analysis. It is important to note that the researcher handled data by organizing, recording and analyzing the information collected from respondents.

3.8 Ethical Considerations

As the study required the participation of human response certain ethical consideration were addressed. Permission was sort from the Denkyembour District Education Office before the field work begun. The researcher before administering the questionnaire introduced himself to the respondents to avoid impersonation. Accordingly, the purpose of the study was made known to the respondents. Participation in the study was not compulsory but based on the willingness of respondents. Anonymity of respondents was highly esteemed. During the field work, all forms of identification including names, addresses and telephone numbers of respondents were avoided only relevant details that helped in answering the research questions were included.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the results and discussions of the study obtained from questionnaires, interviews and observations.

4.2 Results and Discussion of Questionnaires

Under this section, the researcher used questionnaires to obtain age, gender and educational background of the participants and number of years they have spent in their respective schools.

Demographic Information of Respondents (Teachers)

Gender of Respondents

From Fig. 4.1, Out of the 60 respondents, 18 of them representing 30% are females while the remaining 42 representing 70% are males. This result indicated that there were more males who responded to the questionnaire as compared to females.

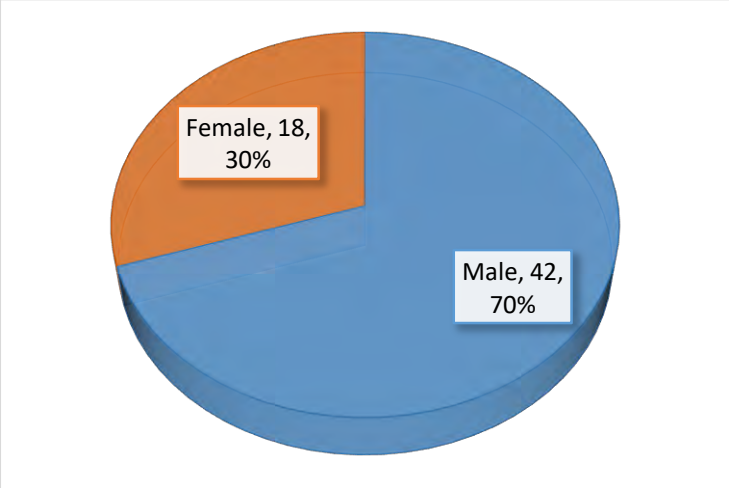

Figure 4.1: Gender of Respondents

Source: Field Survey by Paul Obeng Nyarko, 2018

Age of respondents

The range of the ages of the respondents were determined, eight (8) of them representing 13% of the respondents fall within the ages of 20 and 29, whiles 30 of them representing 50% of them fall within the age 30 and 39. Fifteen (15) of the respondents representing 25% of the respondents fall within the ages of 40-49 whereas 7 representing 12% were within ages 50 and 59. This result indicated that majority of those who responded to the questionnaire were within ages 30 – 39 as indicated in figure 4.2.

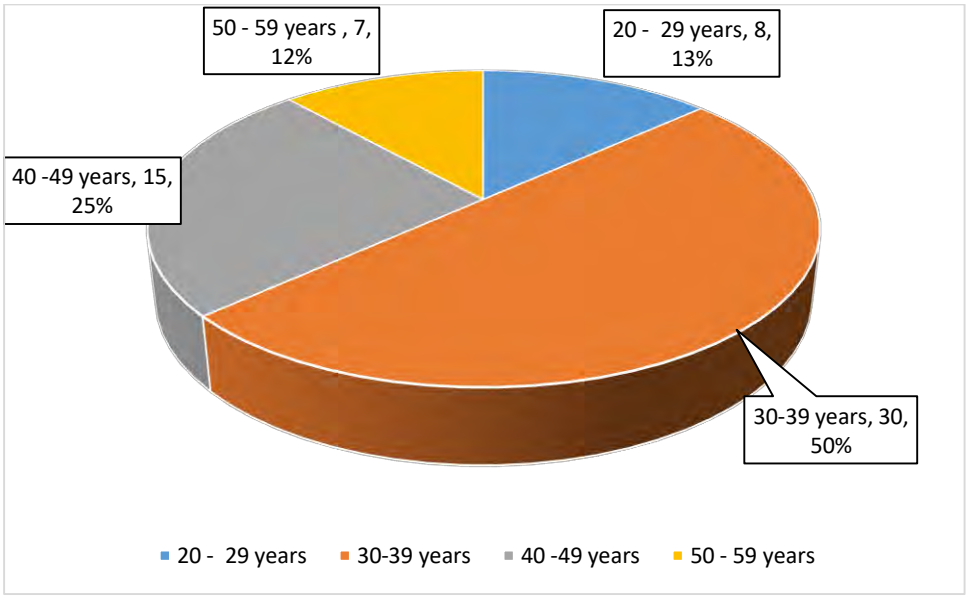

Figure 4.2: Age of Respondents

Source: Field Survey by Paul Obeng Nyarko, 2018

Number of years in the school

The number of years the respondents have spend in their various schools shown on table 4.1 indicates that 36 of them representing 60% have been in their schools for 1-2 years, whiles 12 respondents representing 20% indicated that they have been in their schools for 3-5 years, 8 respondents representing 13.33% stated that they have been in their school for 6-8 years whereas 4 respondents representing 6.67% also indicated that they have been in their schools over 9 years.

This result shows that, majority of the respondents constituting 60% have worked in their respective schools for 1 to 2 years.

Table 4.1: Number of years in the School

Year	Frequency (f)	Percentage (%)
1-2 years	36	60
3-5 years	12	20
6-8 years	8	13.33
Above 9 years	4	6.67
Total	60	100

Source: Field Survey by Paul Obeng Nyarko, 2018

Educational Level of Respondents

The level of Education of the respondent is indicated on Fig. 4.3, it can be observed that 10% of the respondents hold second degree whiles 20% of them hold Diploma in Education. The rest of the respondents representing 70% hold First degree. This portrays that the majority of the respondents were first degree holders.

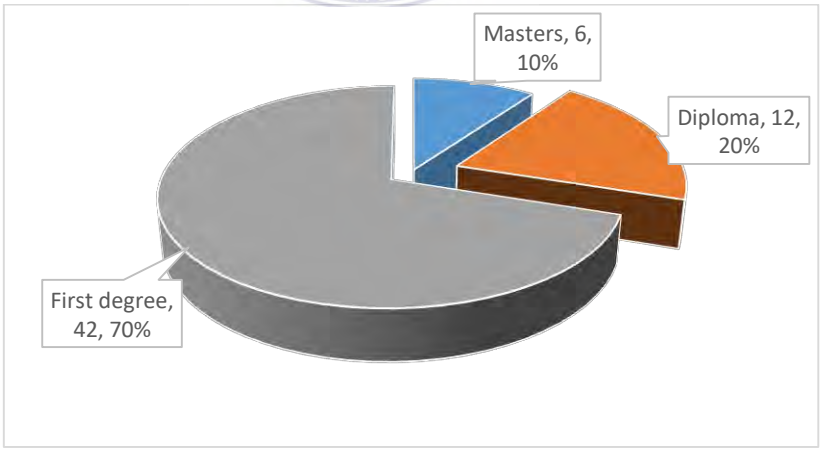

Figure 4.3: Educational Level of Respondents

Source: Field Survey by Paul Obeng Nyarko, 2018

Current maintenance culture practices of Public Basic School buildings

Figure 4.4, outlined the current maintenance practices in Public Basic School buildings, it was realized that 37 of the respondents representing 61.67% indicated that they engage in painting of buildings whiles 13 of them representing 21.67% engage in hipping sand around the foundations of the buildings. 10 of them representing 16.67% also engage in repairing the roof leakages of the schools. This demonstrates that painting of the schools, hipping of sand around the foundation and repairing of roof leakages of the schools were the current maintenance practices in the public basic schools at Denkyembour District. Nevertheless, most of the public basic schools engage in painting of the schools as major maintenance practices in public basic schools in the District.

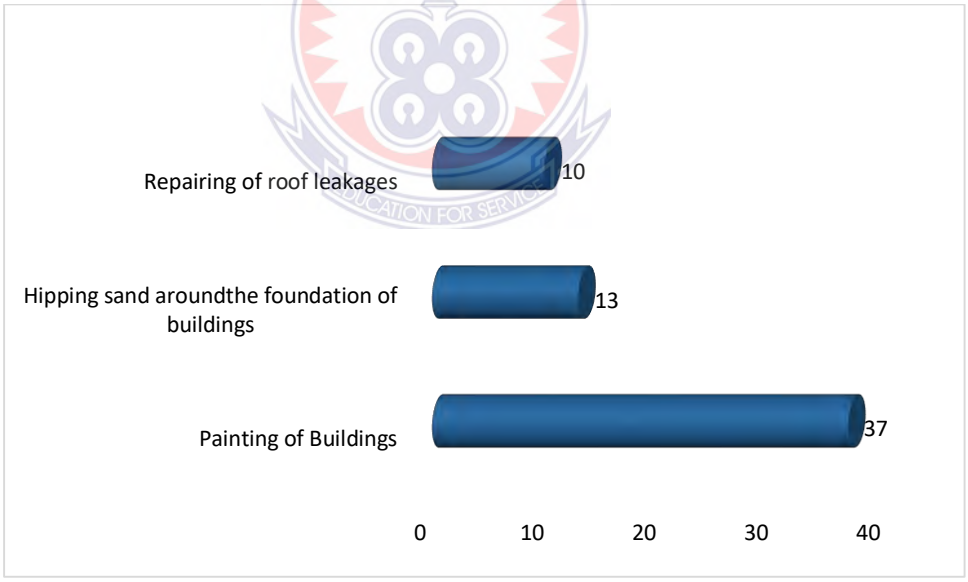

Figure 4.4: Current Maintenance Practices in Public Basic Schools

Source: Field Survey by Paul Obeng Nyarko, 2018

Maintenance culture Issues of Public Basic Schools (Teachers)

The institutions responsible for maintenance of Public Basic School buildings in Denkyembour District are outlined in table 4.2, six (6) of the respondents representing 10% indicated that the school is responsible for maintenance, 8 respondents consisting of 13.33% stated that Public Basic School building maintenance is the responsibility of the Management Unit, while 41 of the respondents representing 68.33% endorsed that it is the responsibility of the District Assembly to maintain Public Basic School Buildings. 3 respondents representing 5% of the respondents maintain that it is the responsibility of School Management Committee whereas out of the 60 respondents 2 representing 3.33% don't know the institution responsible for Public School Building maintenance. This result showed that majority of the respondents agreed that it is the responsibility of the District Assembly to maintaining Public Basic School buildings.

Table 4.2: Institution responsible for maintenance of Public Basic School in the District

Options	Frequency (f)	Percentage (%)
The school	6	10
Management Unit	8	13.33
District Assembly	41	68.33
School Management Committee	3	5
Not Known	2	3.33
Total	60	100

Source Field work by Paul Obeng Nyarko, 2018

Factors that make maintenance necessary

The respondents' views were sought on the factors that make maintenance necessary. Twenty-eight (28) of them representing 46.67% of the respondents agree with all the factors stated that they all necessitate maintenance. 14 respondents representing 23.33% indicated that it is the environmental conditions that necessitate maintenance whiles 8 of the respondents representing 13.33% think that poor workmanship necessitate maintenance whereas 10 of the respondent representing 16.67% of the respondents indicated that poor design necessitates maintenance. The results indicated that majority of the respondents were of the view that all the factors stated necessitate maintenance.

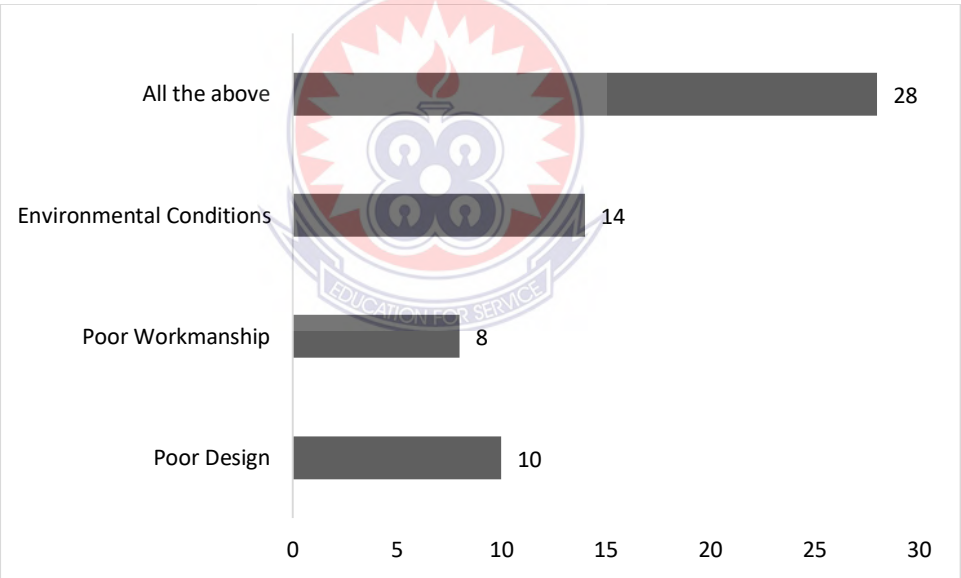

Figure 4.5: Factor that make maintenance necessary

Source Field work by Paul Obeng Nyarko, 2018

State of foundations of Public Basic School buildings

On the state of foundations of Public Basic School buildings indicated in figure 4.6, 10 of the respondents representing 17% of the respondents stated that the foundations of their schools has no defect, 14 respondents representing 23% have the foundations of their schools damaged, whereas 36 representing 60% of the respondents have the foundations of their school building exposed due to erosion. The results indicated that majority of the respondents have the foundations of their school buildings exposed due to erosion.

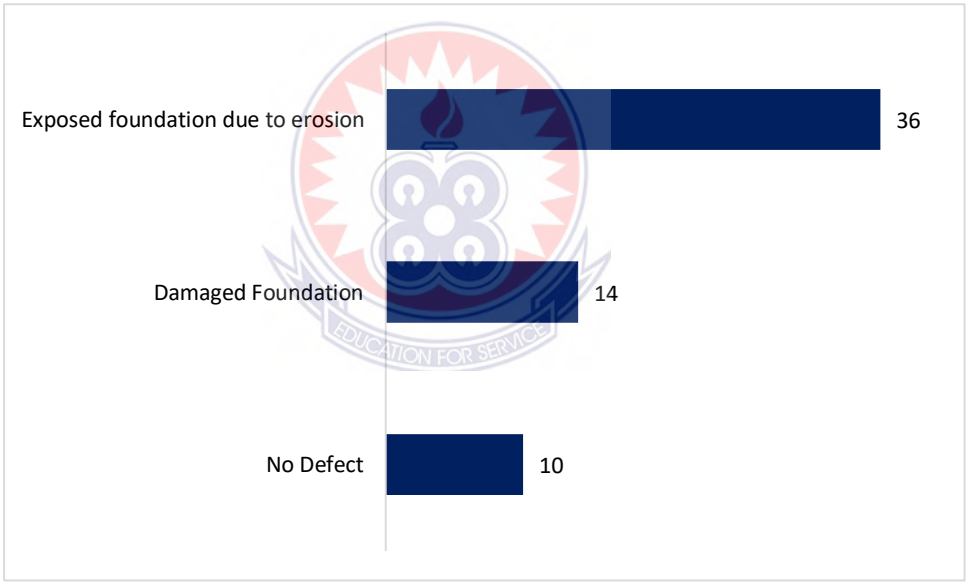

Figure 4.6: State of foundations of Public Basic School buildings

Source: Field Survey by Paul Obeng Nyarko, 2018

Description of floor of Public Basic Schools

The results of description of floors in Public Basic Schools in the Denkyembour District by the respondents indicated that 36.67% of the respondents said their schools had cracked floors, whilst 40% said their school building floors were wearing off.

Those who indicated that their floors have no defect represents 13.33%, then 10% of the respondent indicated that the school building had no floors. According to the results from the respondents, majority of the Public Basic School buildings had wearing off floors as shown in table 4.3.

Table 4.3: Description of floors

Option	Frequency	Percentage (%)
Cracked floor	22	36.67
Wearing off floor	24	40
No defect	8	13.33
Not floored	6	10
Total	60	100.0

Source: Field Survey by Paul Obeng Nyarko, 2018

Description of walls of Public Basic School Buildings

The respondents gave their opinion as to the condition of the walls of their school buildings.12 of the respondents representing 20% of the respondents said the walls of their school buildings has broken down. 16 of the respondents representing 26.67% also said the walls of the school building show cracks, whiles 14 of the respondents representing 23.33% had dilapidated walls, whereas 18 of the respondents representing 30% also said their buildings had no walls as indicated on table 4.4. The result shows that most of the Public Basic schools in the District had no walls.

Table 4.4 Description of walls

Option	Frequency	Percentage (%)
Broken down	12	20
Cracked wall	16	26.67
Dilapidated	14	23.33
No wall	18	30
Total	60	100.0

Source: Field Survey by Paul Obeng Nyarko, 2018

Condition of Painting

The description of the condition paintings in the schools as described by the respondents as indicated in figure 4.7, shows that 5 out of the 60 respondents representing 8% describe the painting of their school building as washing off, 6 representing 10% of the respondents describe the painting on their school building as peeling off whiles 18 of the respondents representing 30% saw the painting of their buildings as dirty, whereas 31 out of the respondents resenting 52% indicated that their school building has no painting. The results indicate that most of the public basic schools in the Denkyembour District has no paint.

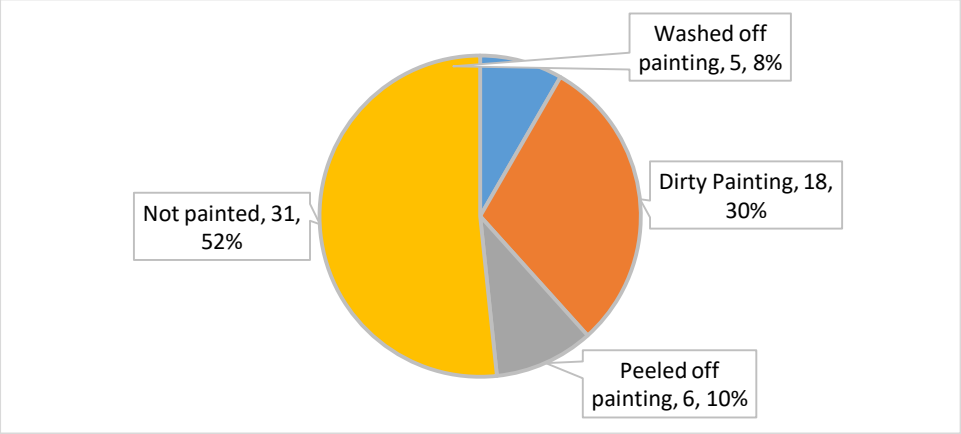

Figure 4.7: Condition of paintings of Public Basic School buildings

Source: Field Survey by Paul Obeng Nyarko, 2018

Condition of Roof

The condition of roof of Public Basic School buildings was described by the respondents as indicated in figure 4.8, it was realized that 63.33% of the respondents indicated that the roof of their school buildings suffer leakage, whiles 20% of the respondents said their school buildings have rusted roofing sheet. Those who indicated that their school's buildings has tatted roofing materials was represented by 16.67% whereas there was no school which has no problem with the roof. This demonstrates that majority of the Public Basic schools in the District suffer from roof leakages.

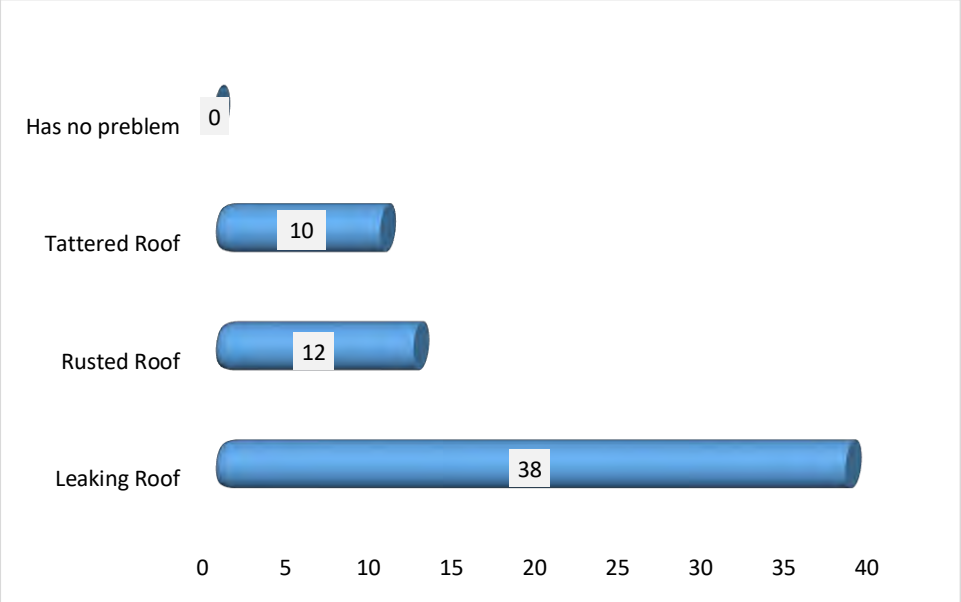

Figure 4.8: Condition of roofs of Public Basic School buildings

Source: Field Survey by Paul Obeng Nyarko, 2018

Condition of Doors and Windows

The participants gave their views on the condition of doors and windows in Public Basic school buildings. Those who said their school buildings have no problem with the doors and windows was represented by 20%, those indicating broken down doors and windows was also represented by 33%, whiles 47% of the respondents said the doors and windows of their buildings has no windows and doors.

The result as indicated in figure 4.9 shows that most of the participants observed that their school buildings has problem with the windows and doors, however majority of the schools has no doors and windows.

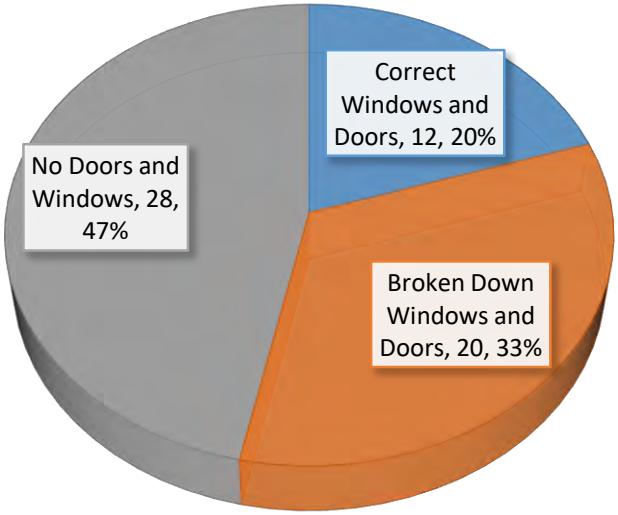

Figure 4.9: Condition doors and Windows of Public Basic School buildings

Source: Field Survey by Paul Obeng Nyarko, 2018

Challenges in the Maintenance of Public Basic School Buildings

From Table 4.5 respondents gave their views on the challenges in the maintenance of Public Basic School buildings, the results indicated that, 12 of respondents representing 20% indicated lack of finance as a challenge to maintenance of public basic schools, respondents representing 6.67% saw lack of qualified personnel to carry out maintenance activities as the challenge, with regards to irresponsible attitude of users, 16.67% supported that as a challenge whilst 56.66% of the respondents indicated that all the above variable pose challenge to maintenance of Public Basic School buildings.

This result showed that most respondents were of the view that all the variable were factors that go against maintenance of Public Basic School buildings, followed by

those who accept that it is finance that pose challenge to Public Basic school building maintenance.

Table 4.5 Challenges faced in the Maintenance of Public Basic School Buildings

Option	Frequency	Percentage (%)
Lack of finance	12	20
Lack of qualified personnel	4	6.67
Irresponsible attitude of users	10	16.67
All of these	34	56.66
Total	60	100.0

Source: Field Survey by Paul Obeng Nyarko, 2018

Funding of maintenance activities

The views of respondents on how maintenance activities were financed in the District were solicited. Thirty-eight (38) of the respondents representing 63.33% were of the view that maintenance activities in the schools were financed through Capitation Grant, 14 out of the respondents representing 23.33% said that maintenance activities were funded through Government support, 5 respondents representing 8.33% were of the view that maintenance activities were financed through internally generated fund, whilst 3 respondents representing 5% were of the view that maintenance activities were financed through donations.

Considering the respondent's opinion indicated in fig 4.10, it shows that maintenance activities in the schools were financed through Capitation Grant, followed by support from the government.

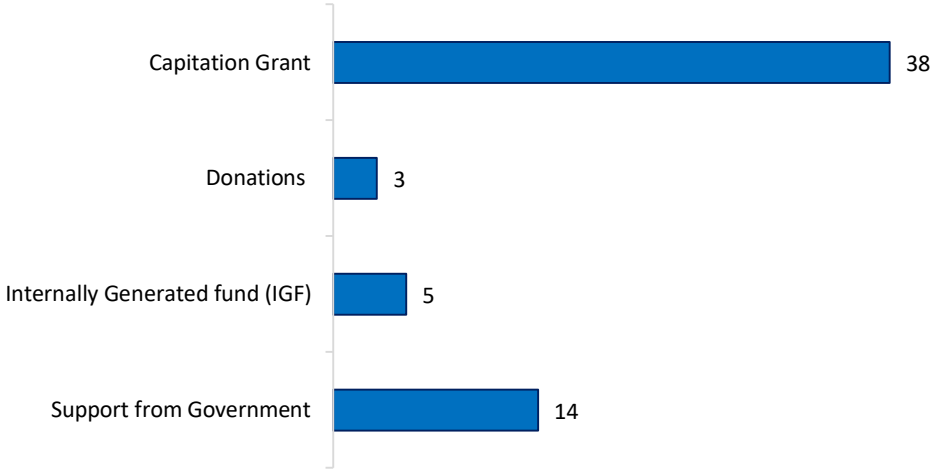

Figure 4.10: Funding of maintenance activities

Source: Field Survey by Paul Obeng Nyarko, 2018

Strategies to ensure Proper Maintenance Culture in Public Basic School Buildings.

Respondent's opinions were sought for in table 4.5 on whether maintenance is done every year in Public Basic School buildings. Thirty-seven (37) participants representing 61.67% of the respondents disagree that maintenance is done annually on public basic school buildings while 8 respondents (13.33%) said they were neutral; 15 respondents representing 25% strongly agreed to the statement.

On the statement of whether maintenance done by competent personnel are involved in carrying out maintenance work on public basic school buildings, 21 respondents representing 35% of the respondents disagree that competent personnel were involved in carrying out maintenance work in public basic school buildings, with 14 respondents consisting 23.33% agreed that competent personnel are involved in carrying out maintenance work on public basic school buildings, while 19 of them

consisting 31.67% said they were neutral to the statement and 6 of the respondents consisting 10% strongly disagreed to the statement.

In responding to the question on whether maintenance is done through regular maintenance inspection and monitoring, 44 respondents representing 73.33% of the total number of respondents disagreed that, regular maintenance inspection was done and 16 respondents representing 26.67% agreed to the statement.

The views of respondents were sought on whether report on condition of building sent to the authorities concern, 40 representing 66.67% of the respondents agreed that this was the rule that condition of public basic school buildings were reported to the appropriate authorities concern. 5 of them representing 8.33% said they were neutral, while 11 of the respondents consisting 18.33% strongly agreed to the statement and 4 of the respondents representing 6.67% disagreed to that notion.

Finally, on whether maintenance plan and schedule were followed, 41 of the respondents representing 68.33% stated that they disagree, 7 of them consisting 11.67% strongly disagree whiles 12 participants representing 20% remained neutral about the assertion that maintenance plan and schedule were followed in the maintenance of Public Basic School Buildings.

The results from table 4.5 shows that generally, respondents disagreed that maintenance was not done yearly on public basic school buildings, there were no competent personnel involved in carrying out maintenance work on public basic school buildings and regular maintenance inspection of public basic school buildings. Respondents also agreed on the assertion that condition of public basic school buildings were being reported to the appropriate authority, however, maintenance plan and schedules were not followed in the maintenance of public basic school buildings.

Table 4.5: Strategies to ensure Proper Maintenance Culture in Public Basic School Buildings.

Procedures	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Maintenance is Done every year	------	------	8(13.33%)	37(61.67%)	15(25%)
Maintenance done by competent personnel	-------	14(23.33%)	19(31.67%)	21(35%)	6(10%)
Regular maintenance inspection done.	-------	-------	16(26.67%)	44(73.33%)	-------
Report on Condition of building sent to the authorities concern.	11(18.33%)	40(66.67%)	5(8.33%)	4(6.67%)	------
Maintenance Plan and Schedule followed.	-------	-------	12(20%)	41(68.33%)	7(11.67%)

Source: Field Survey by Paul Obeng Nyarko, 2018

The assessment of respondents' view on the impact of maintenance culture on teaching and learning is displayed on Table 4.6. Soliciting the views of respondents whether maintenance culture increases reading and mathematics performance, thirty-two (32) of the respondents signifying 53.33% agreed to the statement, whiles 14 respondents representing 23.33% strongly agreed to the statement, 8 respondents representing 13.33% were neutral, whereas 6 respondents representing 10% disagree to the statement.

With regards to the statement that maintenance culture increases reading vocabulary, comprehension and language art 25 respondents representing 41.67% agreed to the statement, 11 respondents representing 18.33% strongly agree., 9 respondents representing 15% were neutral, whiles 12 respondents indicating 20% disagreed to the statement whereas 3 respondents signifying 5% of the respondents strongly disagreed.

On the assertion that maintenance culture improves teachers' retention in schools, divergent views were solicited 22 out of the 60 respondents representing 36.67% agree to the statement, 18 of the respondents representing 30% strongly agree to the statement, whiles 6 of the respondents representing 10% and 14 of the respondents representing 23.33% disagree and strongly disagree to the assertion respectively.

Considering the statement maintenance culture increases student's motivation, 35 of the respondents representing 58.33% strongly agree to the statement, 12 respondents representing 20% also agree to the statement, whiles 5 of the respondents representing 8.33% remained neutral, whereas 8 respondents representing 13.33% disagree to the statement.

On the opinion that maintenance culture increases students' attendance to school 37 of the respondents representing 61.67% agree to that assertion whiles 18 respondents representing 30% strongly agree to the assertion, whereas 5 respondents representing 8.33% disagree to the assertion.

Findings from the discussion shows that the respondents agree that that maintenance culture increases reading and mathematics scores, reading vocabulary, comprehension and language art. Respondents also agree that maintenance culture increases the retention of teachers in the schools, it increases students' motivation and also increases students' attendance to school.

Moreover, the study's results confirm scholars like Park, Stone & Holloway (2017), Neilson & Zimmerman (2014) and Maxwell (2016) who concluded that increased reading and mathematics scores; increased reading vocabulary, reading comprehension and language arts; improved teachers' retention; increased students' motivation and increased students' attendance as the impact of maintenance culture on teaching and learning.

Table 4.6: Impact of Maintenance on Teaching and Learning.

Procedures	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Maintenance culture increases reading and mathematics scores	14(23.33%)	32(53.33%)	8(13.33%)	6(10%)	-------
Maintenance culture increases reading vocabulary, comprehension and language art.	11(18.33%)	25(41.67%)	9(15%)	12(20 %)	3(5%)
Maintenance culture improves teacher's retention in schools.	18(30%)	22(36.67%)	6(10%)	14(23.33%)	------
Maintenance culture increases student's motivation.	35(58.33%)	12(20%)	5(8.33%)	8(13.33%)	------
Maintenance culture increases student's attendance to school.	18(30%)	37(61.67%)	------	5(8.33%)	------

Source: Field Survey by Paul Obeng Nyarko, 2018

4.2.2 Results Of Questionnaire From Students

Maintenance culture Issues of Public Basic School buildings

The maintenance culture issues that pertains to public basic school buildings were in the area of walls, floors, wall paintings and roofing condition.

Condition of Floors

The respondents were asked to give their opinion on the condition of the floors of their school buildings, it was observed that 30% of the students stated that their school building has cracked floors, whilst 25% indicated that the floor of their school building were wearing off, whereas 45% indicated that the floors of their school buildings were not cemented or floored.

As indicated in figure 4.11, it shows that all the Public Basic schools in the district have defect floors, particularly those that were not cemented were the majority.

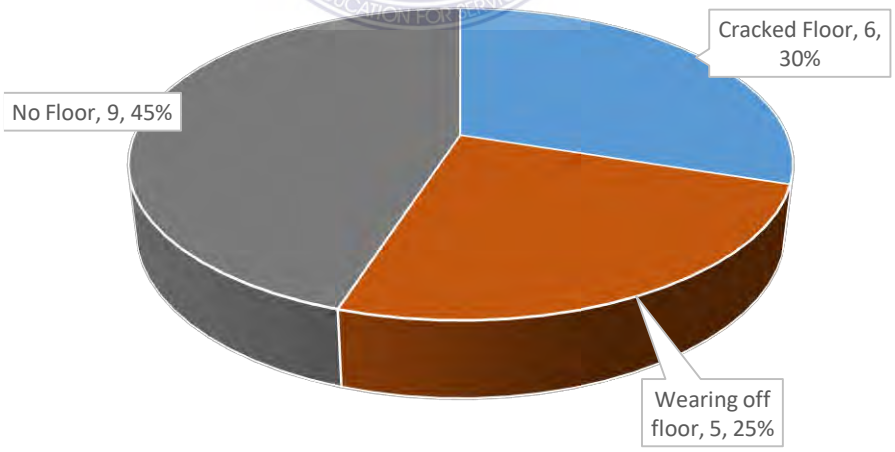

Figure 4.11: Condition Floors

Source: Field Survey by Paul Obeng Nyarko, 2018

Condition of Walls

The conditions of Public Basic School walls as described by the respondents is indicated in figure 4.12. Thirteen (13) of the respondents representing 65% said there were no wall, four (4) representing 20% indicated that they have cracked walls, whilst 3 0f the respondent representing 15% indicated broken walls. From the results, most of the respondent indicated that their schools have no walls.

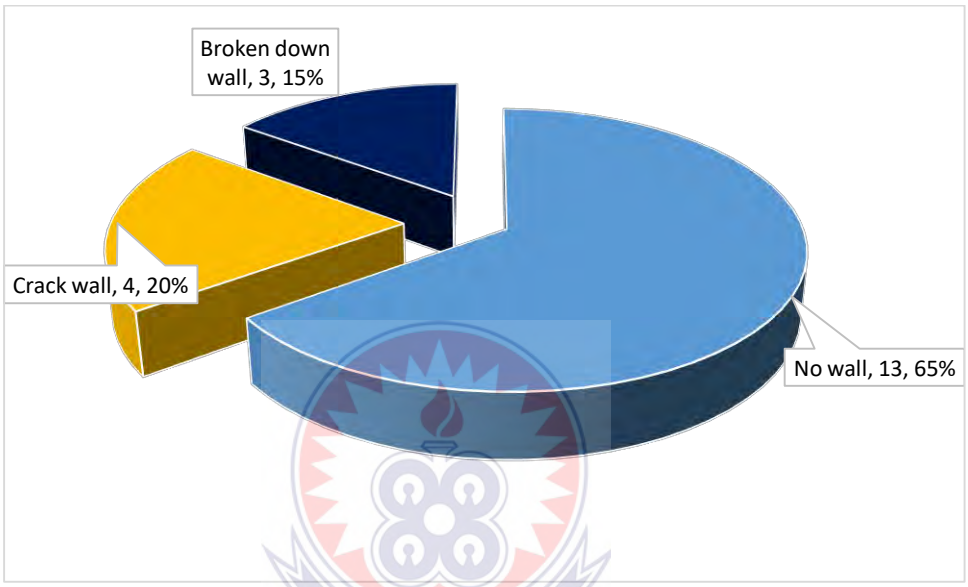

Figure 4.12: Condition of Walls

Source: Field Survey by Paul Obeng Nyarko, 2018

Condition of Windows

Figure. 4.13 displayed the condition of public basic schools' windows. Respondents who constitute 70% of the total respondents indicated that there were no windows in their Schools, whilst 20% of them stated that their schools have broken down windows. The rest of the respondents representing10% mentioned that their schools have partly broken windows. This indicates that most of the respondents specified that their schools have no windows.

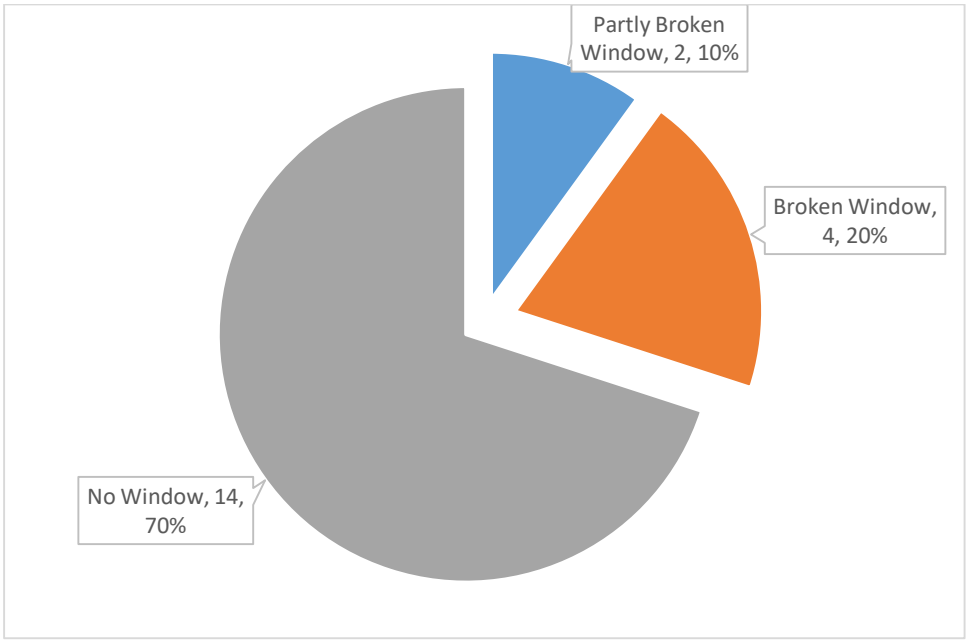

Figure 4.13: Condition of windows

Source: Field Survey by Paul Obeng Nyarko, 2018

Condition of Painting

The conditions of paintings on the school buildings were solicited from the respondents. Respondents representing 5% indicated that their school building painting was washed off. Those respondents who indicated that the painting to their school building was dirty represent 10%, respondents representing 5% said the painting to the walls were peeled off, whereas 80% of the respondent indicated that their school buildings have no painting.

From the results from table 4.7 it demonstrates that most of the respondents indicated that their schools have no painting to their school buildings.

Table 4.7 Condition of painting of Public Basic School Buildings

Option	Frequency	Percentage (%)
Washed off painting	1	5
Painting has become dirty	2	10
Peeled off painting	1	5
No painting	16	80
Total	20	100

Source: Field Survey by Paul Obeng Nyarko, 2018

Condition of Roofing

From the illustrations in Figure 4.14, 3 out of the 20 respondents representing 15% said the roof to their school buildings were tattered, 3 of the respondents representing 15% also indicated that the roof of their school building has rusted roof covering. Fourteen (14) out of the 20 respondents representing 70% of the respondents said their school building has leaking roof, whereas none of the respondents indicated that their roof has no problem.

The response shows that most of the Public Basic schools have leaked roof.

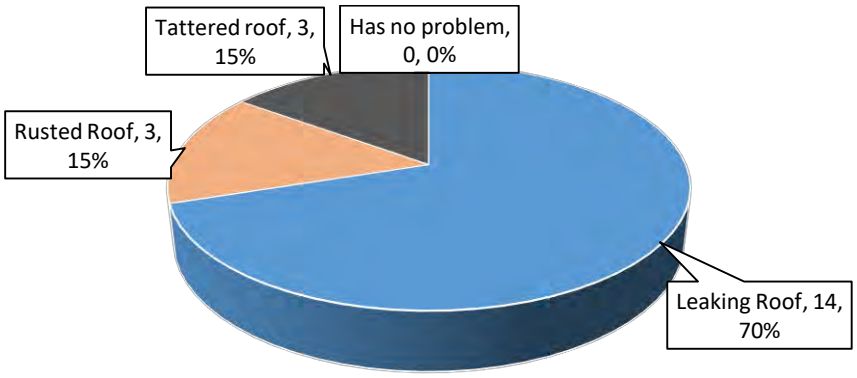

Figure 4.14: Condition of roofing

Source: Field Survey by Paul Obeng Nyarko, 2018

Condition of Doors

The respondents were asked how they describe the condition of doors to their school buildings. The respondents who indicated that they have correct doors to their school building constitute 5%, 30% said the doors to their school building has broken down, whilst 65% of the respondents said their school buildings have to doors.

Considering the results from table 4.8 it means that most of the public basic school in the district has no doors.

Table 4.8 Condition of doors of Public Basic School Buildings

Option	Frequency	Percentage (%)
Correct Doors	1	5
Broken down doors	6	30
No doors	13	65
Total	20	100

Source: Field Survey by Paul Obeng Nyarko, 2018

4.3 Results Of Interview

4.3.1 Results of interview from head teachers

Number of years in the school

The researcher interviewed a total of six (6) head teachers from the six (6) selected Public Basic Schools within the Denkyembour district. On how long they have been in the school, one (1) of the respondents indicated 5 years, two (2) of them two (2) years and three (3) of them have been in their various schools for one (1) year in their various Basic schools.

Maintenance culture issues of Public basic school building

On the maintenance culture issues of Public Basic school building foundations, 3 of the respondents said the foundations of their school buildings were bad, and were also weak, the remaining respondent indicated that, their school building foundation were good. On the roofs, those interviewed specified that, most of their school building roofs have rusted, others had leakages and while some are partly ripped off due to rain storm.

The opinions of all the 6 participants interviewed shows that most of the public basic school buildings floors has developed bad cracks including the walls, some walls were partly broken down.

On the painting standing of public basic school buildings, four of the participants quizzed indicated that, their basic school buildings had faded painting; two of them also stated that, the buildings had dirty paintings. The result shows that most of the public basic school buildings had their paintings in bad state.

When the researcher interviewed respondents on the state of public basic school building windows and doors it was revealed by majority of the respondents that the public basic school building windows/doors frames were rotten whilst some schools has no window/door.

The result of the interview shows that, respondents indicated their window/door frames was considered to be in bad condition and some doors and window not available. Touching on the ages of their school buildings, the respondents stated that ages of their school building ranges from 25 to 55 years. The result indicates that the ages of public basic schools in the district were very old.

Challenges in the Maintenance of Public Basic School buildings

The interviewer soliciting the views of the respondents on whether their schools have maintenance budget, all the participants interviewed were not even aware of any maintenance budget, they only prepare for minor maintenance in the Schools Performance Improvement Plan (SPIP) when they are assessing the schools Capitation Grant.

As to regular maintenance inspection done on their school buildings, all the respondents said they have not seen any move by any department in that direction. The opinion of the interviewers was solicited on the statement that maintenance plan and schedule followed, all of them said there were nothing like maintenance plan for their school buildings.

Strategies that can be adopted to improve maintenance of public basic school buildings.

Some of the strategies that was suggested by the head teachers were: the school should have maintenance plan and maintenance budget. Appeal should also be made to Parent Teacher Associations, the Government, District Assembly, other development partners and Non-governmental organisations to assist in the maintenance of Public basic school buildings. A question was posed to the respondents as to the attitude of users towards the maintenance culture of Public Basic school buildings, the response was that users are all care free, they do not care about what happens to the school buildings.

As to whether their schools have maintenance plan and schedule and also maintenance budget they all answered in the negative.

4.3.2 Results of interview from School Management Committee (SMC)

Background information

A total of 6 School Management Committee (SMC) members were involve in the interview. 2 out of the 6 participants stated that they have been Management committee members of their schools for 4 years whiles the remaining 4 have been members in their schools for 2 years.

Maintenance issues of public basic school buildings

On the condition of foundations of public basic school buildings, 4 out of the 6 respondents indicated that the foundations of their school buildings were exposed due to erosion, whilst 2 out of the 6 respondents said the foundation to their school building had developed cracks due to unequal settlement of the ground.

Concerning the condition of public basic schools building roofs, 5 out of the 6 participants said their building roofs had leakages, rusted, partly ripped off then also rotten rafters and purlins. One (1) of the respondents indicated that their building roofs were in good condition. Seeking the views of the School Management Committee Members on the condition of the public basic school building floors screeds, 3 of the participants said that, the building floor screeds had peeled off and need serious maintenance, 2 out of the 6 respondents confirmed the floor screeds need minor repairs works. The remaining one respondent said there were no floor screed in the school building.

Looking at the state of walls, 4 respondents said the public basic school buildings walls were in bad state, there were serious cracks on most of the walls. One person confirmed that the walls of the school building were partly collapsed, whiles one of them said there were no walls. On the issue of painting of public basic school

buildings, 3 of the respondents confirmed that most of their buildings had faded paintings therefore look unpleasant, 3 out of the 6 respondents said there were no paintings.

The opinions of participants were sought for on condition of window/door frames, 2 of the interviewees agreed that the condition of windows//doors frames were partly broken and rotten, whiles the remaining other 4 respondents indicated that there were no windows and door frames.

Considering the ages of the public basic school buildings in the study area, all the respondents agreed that the school building were very old, ages ranges from 20 to 60 years. The result discovered that the public basic school buildings in the area of study had serious maintenance works to execute to avert further deterioration of the buildings.

Challenges in the Maintenance of Public Basic School buildings

Participants were asked whether institutions have maintenance budget, All the 6 respondents said they do not have maintenance budget.

The opinions that whether maintenance department under take regular inspection of Public Basic School buildings. The respondents all agreed that, maintenance departments do not undertake regular inspection of school buildings but rather they wait till when there is a massive disaster before funds are made available for maintenance activities. The enquiry exposed that no maintenance works were done on public basic school buildings in addition there is no regular inspection of public basic school buildings done, which usually lead to simple situations to more complex ones.

The researcher further quizzed respondents to ascertain whether maintenance works on public basic school buildings were done without request. All the six (6) respondents answered in the negative.

Strategies that can be adopted to improve maintenance of public basic school buildings.

Touching on whether the Public Basic Schools have maintenance policy, all the 6 respondents said they do not have any maintenance policy, but they were quick to add that the schools adopt emergency and unplanned maintenance strategies.

The participants were asked if maintenance of school buildings was important. All the respondents indicated that maintenance of school buildings was necessary as far as public basic schools were concerned. To support their view, they said maintenance of public basic school buildings can provide comfort and safety to the users, good environment, prolong the life span of the buildings and cut government spending on constructing new school buildings.

The observations of the respondents were asked on the attitude of the users towards the maintenance of public basic school buildings in the Denkyembour District. The interviewees confirmed that generally users and occupants of public school buildings have unwilling attitude in maintaining public school buildings with the reason that, there is no money and that the school buildings belong to the government and therefore their maintenance should be handled by the government.

On the issue of how maintenance was funded, all the respondents indicated that minor repair works were funded through Capitation Grant allocated to the school.

The result discovered that, maintenance of public basic school buildings is funded through Capitation Grant allocation. The interviewees stated that due to the small nature of the money and the delay in releasing the funds, some small maintenance hitches grow from bad to worst making affected public basic school buildings more deteriorating.

4.4 Results of Observations

The researcher under took field observation of the state of condition of the six (6) selected Public Basic School buildings in the Denkyembour District namely: Akenkanor D/A Basic School, Kusi Methodist Basic School, Takrowase R/C Basic School, Topremang Salvation Army primary, Addaekrom D/A Basic school and Akim Wenchi Methodist Basic School.

4.4.1 Results Of Observation At Akenkanor D/ A Basic School

The researcher undertook field observation of the state of condition of the Basic school building elements of Akenkanor D/A Basic School and the following observations were made:

The researcher observed that the school building was built with land create blocks. The internal partition was up the wall plate. The external part of the building was also cladded with land create dwarf wall of which part of the wall has broken down as shown in figure 4.5. The building was not completed before it was put into use, the walls were not rendered to receive paint, the walls were at the mercy of the environment which has caused the walls to deteriorate very fast. The veranda around the building was not floored rendering the whole place dusty.

Figure 4.15 Broken down walls at Akenkanor D/A Basic School

Field observation picture taken by Paul Obeng Nyarko on 7th September, 2018

It was also observed that some of the roof covering of the school building has removed due to rain storm rendering some of the rafters and purlins rotten. This has made the roof to be in tatters, hence when it rains the water leaks into the floor making the classrooms not fit for human habitation. Figure 4.16 illustrate the badly damaged roof of the Akenkanor D/A Basic School.

Figure 4.16 Badly damaged roof covering of Akenkanor D/A Basic School

Field observation picture taken by Paul Obeng Nyarko on 7th September, 2018

4.4.2 Results Of Observation At Kusi Methodist Basic School

Observation visit was made to Kusi Methodist Basic School and the following observations were made: Exposed Foundation due to erosion and Cracked Column due to poor workmanship. The researcher observed that the foundation of the School was exposed making the building not safe for habitation due to cracks that was seen and mortar patches that has been given to the foundation as it is indicated in figure 4.17. This was caused by poor drainage and soil erosion around the building.

It was observed that the building was not completed before it was used by the students and teachers, the walls of the buildings was not rendered to receive painting. A careful observation of the sand create block wall shows that the weather is having a toll on the wall, it is being eaten away because the walls are not protected by hard surface rendering.

Figure 4.17 Exposed foundation and uncompleted sand Crete wall being eaten away by the weather at Kusi Methodist Basic School

Field observation picture taken by Paul Obeng Nyarko on 10th October, 2018

Another observation was also made where cracks were seen at the corner column from the top to the base exposing the reinforcement as indicated in figure 4.18. The reinforcement was seen rusting reducing the strength and the purpose for which it was put there. A close look indicated that the mix proportion of the aggregates were not to required standard.

Figure 4.18 Cracked corner column of Kusi Methodist Basic School exposing the reinforcement.

Field observation picture taken by Paul Obeng Nyarko on 7th September, 2018

4.4.3. Results of Observation at Takrowase R/C Basic School

The researcher undertook an observation visit to Takrowase R/C Basic School and the following were what was observed, Wearing off floor due to poor concrete mix proportion and Dirty wall paintings.

The floor of Takrorase R/C Basic school building was observed, cracks were seen on the floor, part were wearing off which was due to poor material ratio, poor

construction and workmanship again lack of regular maintenance has contributed to this condition. The photograph of figure 4.19 indicate the condition of the floor.

A careful observation of the wearing off of the floor also indicated that the quantity of cement used in the mix did not satisfy the mix ratio, hence the quality of the floor.

Figure 4.19 Wearing off floor at Takrowase R/C Basic School

Field observation picture taken by Paul Obeng Nyarko on 12th September, 2018

Another close observation of the walls of the School indicated that since the construction of the school building that was painted it has not seen any painting since then. The wall was so dirty that it has destroyed the aesthetics of the building. It is all due to the fact that the wall absorb moisture from the ground during rainy season, again painting is not done regularly. The dirty wall painting is shown in figure 4.20.

Figure 4.20 Wall Painting dirty at Takrowase R/C Basic School

Field observation picture taken by Paul Obeng Nyarko on 12th September, 2018

4.4.4 Results Of Observations At Topremang Salvation Army Primary

The following observation was made when Topremang Salvation Army Primary school was visited, Damaged roof due to rain storm and condition of windows and doors.

The roof of the Topremang Salvation Army Primary School was critically observed, the roof covering was badly damaged, leaking profusely making the use of the classrooms during rainy season impossible. The rafters and purlins of the roofing are all destroyed due to rain, the nature of the roofing poses danger to the students and teachers. The badly damaged roof is illustrated in figure 4.21, what is pertaining is as a result of lack of maintenance culture.

Figure 4.21 Damaged roofing of Topremang Salvation Army Primary School

Field observation picture taken by Paul Obeng Nyarko on 20th September, 2018

Another observation that was made on the school building was that the external walls are made up of dwarf walls, above the wall were no windows. Boards and planks has been used as fencing above the dwarf wall.

The doors available are almost rotten due the roof leakage. The roofing structure and covering are all in tatters, rain enters the rooms from the roof making the building not fit for human habitation. Due to the rain water which enters the room the wall has absorbed the water disfiguring the wall surface shown in figure 4.22. The condition of the building does not motivate the students to attend school especially during the rainy season. This condition has affected teaching and learning in the school.

Figure 4.22 Topremang Salvation Army Primary School made up of dwarf wall and wooden fencing with tattered roof.

Field observation picture taken by Paul Obeng Nyarko on 20th September, 2018

4.4.5 Results Of Observations At Addaekrom D/A Basic School

Addaekrom D /A Basic School was visited by the researcher, the following were the observation made, Cracks on walls due to poor workmanship and Peeled off floor due to poor concrete material proportion

The researcher identified a deep crack at the corner of the Basic 6 classroom which poses danger to the students and the teachers. The two adjoining walls has been separated by very deep crack. Figure 4.23 indicate a deep crack at the corner of the building. The situation was due to poor construction procedure and workmanship; the corner should have a column to join the two adjacent walls together.

It was detected that the building was not completed before it was used no smooth plastering was given to the walls. The teachers and the students were not motivated to attend school, therefore affecting teaching and learning. Again, this condition has arisen due to lack of routine inspection, maintenance culture and apathetic attitude of the authority concern.

Figure 4.23 Deep crack on wall at Addaekrom D/A Basic School which has separated the two adjacent walls.

Field observation picture taken by Paul Obeng Nyarko on 2nd October, 2018

Another observation of the floors of the classrooms made by the researcher identify that the floors of the classrooms were peeled off making the class rooms dusty. This situation came about due to poor workmanship and poor batching of the materials. The badly damaged floor is shown in figure 4.24

Figure 4.24 Peeled off screed and wearing off floor at Addaekrom D/A Basic School

Field observation picture taken by Paul Obeng Nyarko on 2nd October, 2018

4.4.6 Results of Observations At Akim Wenchi Methodist Basic School

Akim Wenchi Methodist Basic School was also visited and the following were observed,

Broken walls due to uncompleted construction works and Peeled off floors due to lack of maintenance.

During the visit the researcher saw that the walls around the classroom block were all collapsed due to uncompleted construction of the walls. There were no doors or windows. Due to these stray animals use the classrooms as their domicile. During harsh weather conditions it affect the students class attendance, therefore affect teaching and learning. The situation is as indicated in figure 4.25, the school building was not completed before it was used by the students and the teachers.

Figure 4.25 Collapsed walls of Akim Wenchi Methodist Basic School

Field observation picture taken by Paul Obeng Nyarko on 20th October, 2018

Another observation that was made by the researcher was the floor of the classroom which has peeled off. There were deep holes on the floor of the classroom which was being used by the students. The badly damaged floor of the school is as shown in figure 2.26, the situation was due to the fact that workmanship was very poor and the required mix ratio was not used. Again the situation came about as a result of poor maintenance culture on the part of the authorities concern.

Figure 4.26 Peeled off floor of Akim Wenchi Methodist Basic School

Field observation picture taken by Paul Obeng Nyarko on 20th October, 2018

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the findings of the study, conclusion and recommendations of the study and suggestion for further research.

5.2 Summary of Findings

The following are the findings of the study:

- The study revealed that, most Public Basic School buildings in Denkyembour District have wearing off floor screed, badly leaking of roofs and some partly ripped off due to lack of maintenance in the Public Basic Schools.
- The study indicated that, most of the Public Basic School buildings have no walls others have cracks due to non-maintenance and exposed foundations due to erosion.
- The study indicated that Public Basic Schools in the District do not have maintenance budget, therefore, no maintenance program to monitor the duration periods of Public Basic School buildings in the District after construction.
- The study has also shown that most of the Public Basic School buildings in Denkyembour District deteriorate very fast due to the use of inferior materials and poor workmanship by some contractors based on the fact that there were

no effective supervision and monitoring during the construction period by the body assigned to do so.

- The study confirm that decent school environment and school buildings has a positive influence on teaching and learning, student's attendance to school, also retain experienced teachers in the schools for a long period of time.
- Lastly, the study discovered that negligent attitude of the users, both teachers and students contribute immensely to the destruction of the various building elements, additionally the absence of the sense of ownership of the school buildings by the users affect the timely maintenance.

Conclusion

The study concludes that there is poor maintenance culture among public basic schools in the Denkyembour District. The public basic schools are currently in deplorable state of maintenance with various degree of roof leakages, cracks in wall, peeled off floor screeds, exposed foundation, and faded painting among others.

The study further concludes that there is lack of finance, no maintenance schedule and irresponsible attitude of users of the school buildings are the challenges pose to maintenance culture of Public Basic School buildings.

Furthermore, the study concludes that good maintenance culture has positive influence on teaching and learning, punctuality and regularity of student's attendance and retention of experienced teachers in the schools.

Finally, the study conclude that public basic school deteriorates very fast due to inferior quality materials poor workmanship and poor supervision and monitoring during the process of construction.

Recommendations

Based on the aforementioned findings, the following are the recommendations of the study:

- Denkyembour District Assembly should invest in the regular maintenance of all public basic schools in order to make the school buildings last longer.
- The government should allocate funds to the Public Basic Schools in the District to enable the schools carry out preventive maintenance works on cracked walls and exposed foundations of the school buildings when defect occur.
- The study recommends that the schools should be encouraged to prepare maintenance budgets and schedules or programs to allow for easy maintenance inspections.
- The study recommends that the building inspectorate and works department should be resourced by the Denkyembour District Assembly to do effective supervision and monitoring of school building projects within the catchment areas of the District.
- The central government should empower the Denkyembour District Assembly in terms of resources to undertake maintenance activities in the district, since effective maintenance promote heathy and safety environment to influence teaching and learning, to encourage students' attendance to school and also to retain experienced teachers in the schools.
- Finally, the government, Non-governmental Organizations and other stakeholders in education sector are to organize sensitization seminars and workshops for users of the Public Basic School buildings on maintenance culture and sense of ownership of the school buildings in the District.

Furthermore, both teachers and students are to be sensitized to report all forms of defects to the authority concern for prompt action to be taken.

Suggestion for Future Research

I suggest that, in future the research should cover all public basic schools in the Eastern Region of Ghana. The population of the current study was limited to students and teachers head teachers and School Management Committee (SMC) members. In future study the population should include Parent Teacher Association (P.T.A.), District Education officials (Circuit Supervisors, Building Engineers at the district assemblies and other stakeholders in the Education sector. Additionally, the sample size should be increased to 200 respondents. This will enable us to make a conclusive general statement on the issues on Public Basic School Buildings.

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APPENDIX I

UNIVERSITY OF EDUCATION, WINNEBA KUMASI CAMPUS

DEPARTMENT OF WOOD AND CONTRUCTION TECHNOLOGY

QUESTIONNAIRE FOR TEACHERS

PROJECT TOPIC: Assessing maintenance culture of school buildings and their impact on teaching and learning in public basic schools in Ghana: a case study in Denkyembour District in the Eastern Region.

The attached questionnaire is to help me in writing up the project. I am kindly asking you to give some information about the topic. This series of questions in the questionnaire is intended for only academic work. All information collected will be treated confidentially, utilized solely for the purpose of this study and therefore Safely Discarded. Thank you.

Please tick [√] the appropriate box

Section A: Background Information

1. Sex [ ] Male [ ] Female
2. Age: 20-29 years [ ] 30-39 years [ ] 40-49 years [ ] 50 years and above [ ]
3. How long have you been in this school [ ] 1-2 years [ ] 3-5 years [ ] 6-8 years [ ] above 9years
4. Qualification [ ] Diploma [ ] 1st Degree [ ] Masters [ ] Others…….

Section B: Maintenance issues of public basic school buildings

5. Which institution is responsible for maintenance of public school buildings in the District? The school [ ] Management unit [ ] District Assembly [ ] School Management Committee [ ] Not known [ ]
6. In your opinion what makes maintenance a necessity? Poor design [ ] Poor workmanship [ ] Environmental conditions [ ] All the above [ ]
7. What is the state of the foundation of the school building? Foundation damaged [ ] Foundation exposed due to erosion [ ] has no defect [ ]
8. How will you describe the floors? Cracked floor [ ] wearing off [ ] no defect [ ] not floored [ ]
9. How will you describe the walls? Broken down [ ] cracks in wall [ ] dilapidated wall [ ] no wall [ ]
10. How will you describe the current painting condition? Washed off Painting [ ] painting has become dirty [ ] peeled off painting [ ] Not painted [ ]
11. What is the condition of the roof? Leaking roof [ ] rusted roof [ ] tattered roof [ ] has no problem [ ]
12. How will you describe the current condition of windows and doors? Correct doors [ ] broken down [ ] no doors [ ]

Section C: Challenges in the maintenance of public basic school buildings

13. What challenge do you face in maintaining your school building? Lack of Finance [ ] Lack of qualified personnel [ ] Irresponsible attitude [ ] All of these [ ]
14. How do maintenance activities in your school financed? Support from government [ ] internally generated fund (IGF) [ ] Donations [ ] Capitation grant [ ]

Section D: Strategies that can be adopted to improve maintenance of Public Basic school buildings.

From the statement below, please indicate your level of agreement or disagreement to the strategies for improving maintenance culture of Public Basic Schools using the scale below. Please tick [√] appropriately.

	PROCEDURES	**RESPONSES**				
		STRONGLY AGREE	**AGREE**	**NEUTRAL**	**DISAGREE**	**STRONGLY DISAGREE**
15.	Maintenance is done each year.					
16.	Maintenance done by competent personnel.					
17.	Regular maintenance inspection done.					
18.	Report on condition of					

	building sent to authorities concern periodically.					
19.	Maintenance plan and schedule followed.					

The Impact of Maintenance Culture on Teaching and Learning

20.	Increases reading and mathematics scores					
21.	Increases reading vocabulary, reading comprehension and language arts					
22.	Improves teachers' retention					
23.	Increase students' motivation					
24.	Increases students' attendance					

Thank you.

APPENDIX II

UNIVERSITY OF EDUCATION, WINNEBA KUMASI CAMPUS

DEPARTMENT OF WOOD AND CONTRUCTION TECHNOLOGY

QUESTIONNAIRE FOR STUDENTS

PROJECT TOPIC: Assessing maintenance culture of school buildings and their impact on teaching and learning in public basic schools in Ghana: a case study in Denkyembour District in the Eastern Region.

The attached questionnaire is to help me in writing up the project. I am kindly asking you to give some information about the topic. This series of questions in the questionnaire is intended for only academic work. All information collected will be treated confidentially, utilized solely for the purpose of this study and therefore Safely Discarded. Thank you.

Please tick [√] the appropriate box

Background Information

1. Sex [ ] Male [ ] Female
2. How long have you been in this school [ ] 1-2 years [ ] 3-4 years [ ] 5-6 years [ ] above 7years

Maintenance issues of public basic school buildings

4. Do you see the following on the floors?

   Cracked floor [ ] wearing off [ ] no defect [ ] not floored [ ]

5. Do you see the following on the walls?

Broken down wall [ ] cracks in wall [ ] dilapidated wall [ ] no wall [ ]

6. Do you see the following on the windows? Cracked window [ ] Broken windows [ ] No windows [ ]
7. Do you see the following on the current painting condition? Washed off Painting [ ] painting has become dirty [ ] peeled off painting [ ] No painting [ ]
8. What is the condition of the roof? Leaking roof [ ] rusted roof [ ] tattered roof [ ] has no problem [ ]
9. How will you describe the current condition of doors?

Correct doors [ ] broken down [ ] no doors [ ]

THANK YOU

APPENDIX III

UNIVERSITY OF EDUCATION, WINNEBA KUMASI CAMPUS

DEPARTMENT OF WOOD AND CONTRUCTION TECHNOLOGY

INTERVIEW SCHEDULE FOR HEADTEACHERS AND SCHOOL MANAGEMENT COMMITTEE (SMC) MEMBERS

PROJECT TOPIC: Assessing maintenance culture of school buildings and their impact on teaching and learning in public basic schools in Ghana: A case study in Denkyembour District in the Eastern Region.

The series of questions in the questionnaire are designed to obtain responses on Assessing maintenance culture of school buildings and their impact on teaching and learning in public basic schools Please, answer the questions that follow by ticking the appropriate option (if provided) or writing for open-ended questions. Please, feel unrestricted to respond to the issues. The information is for academic purposes only and will be treated with the strictest confidentiality.

Information about respondent

1. How long have you been in this school?

   .....

   ...

Maintenance culture Issues of Public Basic School buildings

BUILDING ELEMENT	CURRENT STATE			
	Good	Bad	Better	Worst
Foundation				
Roof				

Floor Screed				
Walls				
Painting				
Window/door frames				

2. How will you consider the current state of the public basic school buildings in terms of the following elements and facilities?

3. What are the ages of your buildings? .....

.....

Challenges in the Maintenance of Public Basic School buildings

4. Do you have maintenance budget?
5. Does regular maintenance inspection of school building done?
6. Does maintenance work on the school building done without request?

Strategies to ensure proper maintenance culture in Public Basic School Buildings.

7. Does your school have a maintenance policy?

If yes, who developed it? .....

.....

8. Is maintenance of school buildings in your opinion important?

Please, give reason to your answer .....

.....

9. What is the attitude of the users towards the maintenance of public basic school buildings.....
10. How is maintenance funded in your school?.....

THANK YOU