

**KWAME NKRUMAH UNIVERSITY OF SCIENCE AND
TECHNOLOGY, KUMASI, GHANA**

**Productivity Improvement of Unskilled Labour on Construction Sites: The
Perspective of Skilled Labour at Accra Polytechnic Sites.**

by

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A Thesis submitted to the Department of Building Technology,
College of Art and Built Environment in partial
fulfilment of the requirements for the degree of

MASTER OF SCIENCE

NOVEMBER, 2016

CERTIFICATION

I hereby declare that this submission is my own work towards the MSc. in Construction Management and that, to the best of my knowledge, it contains no material previously published by another person, nor material which has been accepted for the award of any other degree of the University, except where due acknowledgment has been made in the text.



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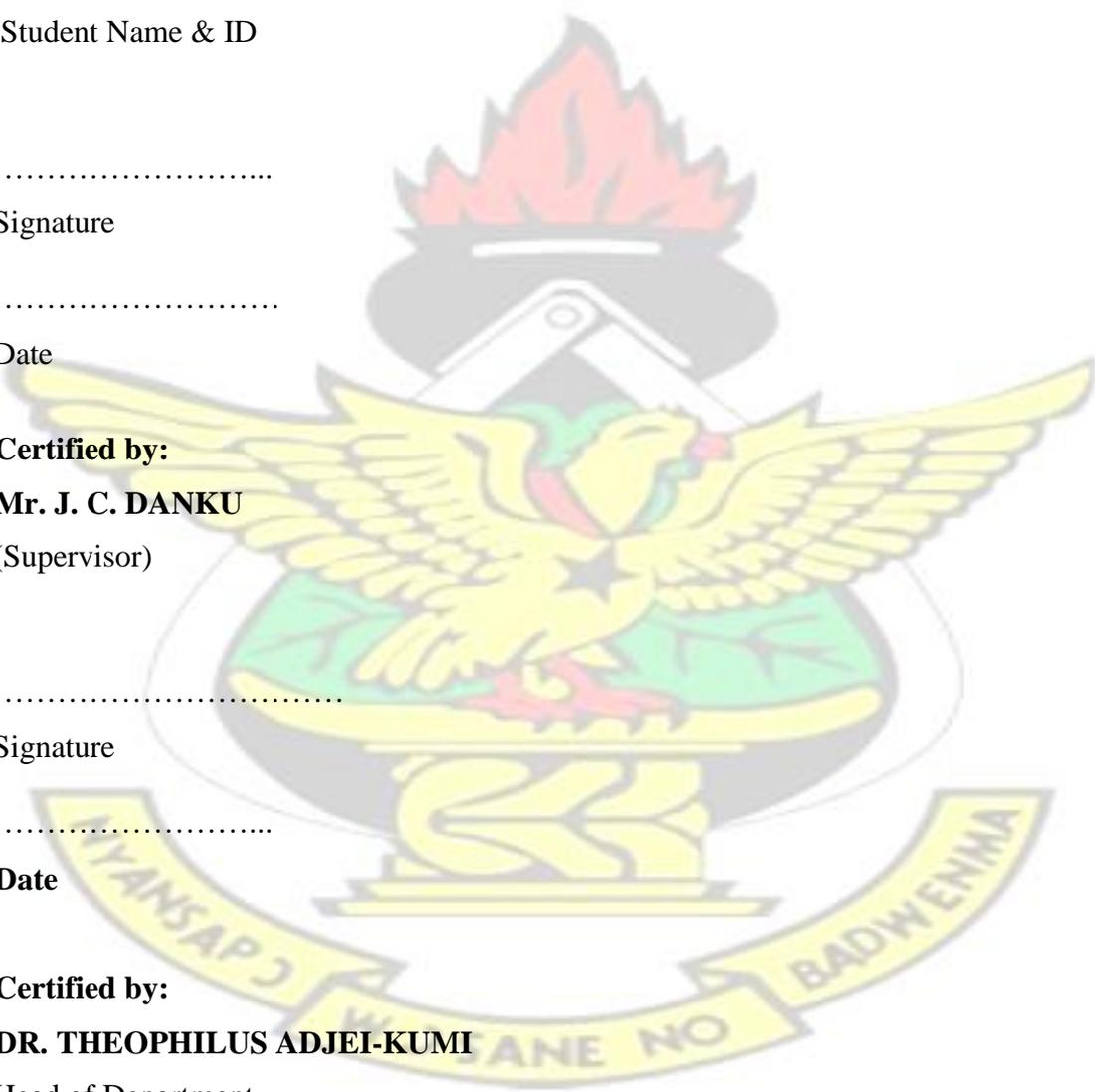
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ABSTRACT

Unskilled labour productivity on construction sites is highly needed and improving their output is a vital performance measure needed to enhance the efficiency and effectiveness of the construction industry. Thus, the study aimed to determine measures for improving unskilled labour productivity on construction sites from the perspective of skilled labourer. A questionnaire survey was conducted among building contractors who were working on Accra Polytechnic sites were selected to solicit information pertaining improvement of unskilled labour productivity. The data collected was analysed quantitatively, using the Relative Importance Index (RII). The findings revealed that, lack of education, poor health of the workers, ignorance of safety precautions and psychological needs were some of the factors affecting their output. Again, employee motivation, employee training, communication and job satisfaction were the key variables to improve unskilled labour productivity on construction sites. It was recommended that, education and training sessions should be organized frequently and job security to enhance the productivity of unskilled labourers on construction sites making them more effective and efficient in terms of productivity improvement.

Keywords: Productivity, Productivity improvement, Unskilled labour, Construction sites

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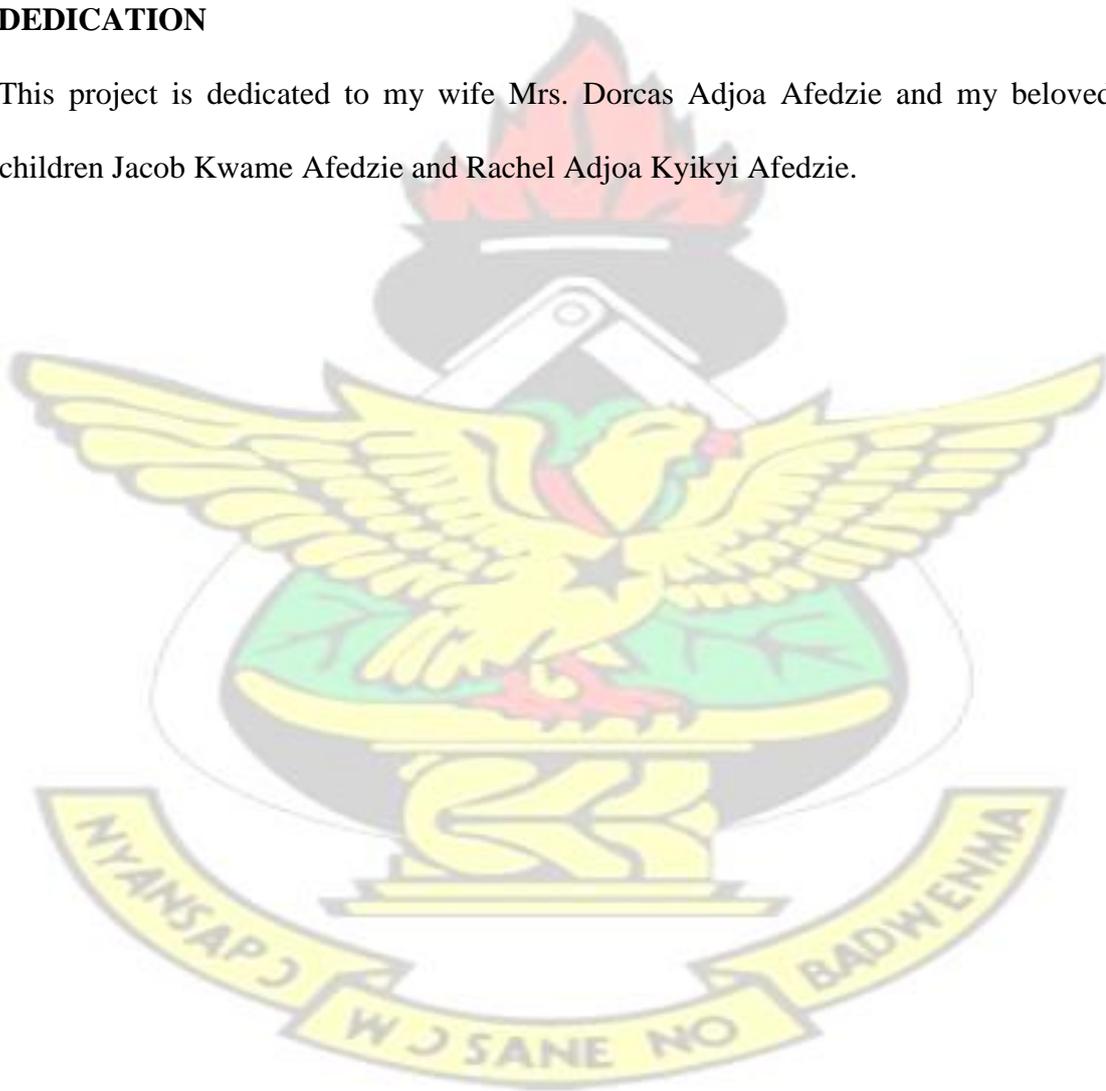


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DEDICATION

This project is dedicated to my wife Mrs. Dorcas Adjoa Afedzie and my beloved children Jacob Kwame Afedzie and Rachel Adjoa Kyikyí Afedzie.



ACKNOWLEDGEMENT

My deepest appreciation goes to my supervisor, Mr. James Cofie Danku for his reviews, critiques, and guidance throughout the research process. His comments and suggestions helped shape this thesis.

My heartfelt gratitude goes to my wife, Mrs. Dorcas Afedzie. Her support from the beginning and throughout my studies has contributed to my success. Thank you for always being my most avid supporter.

I would also like to thank all construction companies' professionals consulted especially Nana Benyi Ansah, Pastor Isaac Ofori, Dr. William Tasiame, Mr. Hope Tasiame, Mr. Simon Mork and Stephen Akunyumu for their immense support. Finally, and most importantly, I wish to acknowledge the tremendous blessing our Lord, Jesus Christ has bestowed on me with the successful completion of this work.



CHAPTER ONE

INTRODUCTION

1.1 Background

Productivity on construction site has been deteriorating due to general labour unrest, which is leading to an undesirable effect on the quality and cost of construction activities (Construction Industry Development Board, 2015). The morale of workers on site and employment of labour in the construction industry is vital, it accounts to employment of 8% in the formal and 17 % in the informal sectors and about 70% of the semi-skilled and unskilled labourers (Construction Industry Development Board, 2005). The construction industry of both the developed and developing countries occupies a very delicate position as it is supposed to play an important role for continuous growth (Ofori, 2000) as cited by Ajagbe (2015). All over the world, the construction industry is one of the most vital activities performed in any economy Ashworth (2010) as cited by Ansah (2014) and usually the construction activities are represented up to about 8% of gross domestic product and employs around 10% of the working population. According to Baines (2010), productivity movement has been around for over 50 years. In this, a number of techniques, procedures and productivity approaches have been advanced. However, the pursuit of improved productivity of unskilled labour still seems an imperfect science and even the term itself seems to be interpreted differently by different countries. Several researchers have quoted that Construction is a vital area of the economy (Thomas and Sudhakumar, 2014) and Hillebrandt (2000) as cited by Ofori (2012) and the activities involved are important due to the efficiency and outcomes .

Serveral researchers have defined productivity in many ways. Thiyagu &

Dheenadhayalan (2015) in their report stated that, construction usually, productivity is said to be labour efficiency, and that is, “unit of work placed or produced per manhour”. The unskilled labour is a group of workforces that needs no special expertise and is defined as a method of making a living with little or no degree of safety of income and service, Wahab (1991) as cited by Fagbenle (2011) and they need no or small training and they will accomplish what has been assigned to them on construction sites.

Productivity improvement in the construction site is by performing the activities involved in making it part of the procedures (Cossio *et al.*, 2012). Labour productivity in the construction site is the exclusive prerogative to those who are practicing because project cost and overrun of time of projects is always affected (Kadir, *et al.*, 2005). Unskilled labour productivity on the construction site is highly needed and improving their output is a vital performance measure needed to enhance the efficiency and effectiveness of the construction industry (Chan and Kaka, 2007).

According to Ansah (2014) in Ghana, the construction activities overflow in every corner especially Accra being the capital city. This study aims at how to improve unskilled labour productivity in the construction sites in order to avoid cost overrun and provide value for money, which is an essential part of every construction industry in Ghana.

1.2 Problem statement:

Productivity improvement in the construction industry is paramount in the quest to provide competitive estimates in order to win construction projects in the 21st century. Unskilled labour contributes significantly to the day-to-day work products on many (if not all) construction sites, yet little or no effort has been made to improve their output

and contributions. Therefore, this thesis aims to determine measures to improve unskilled labour productivity on construction sites. There is lack of information on this subject in Ghana.

1.3 Research Questions:

1. What are the key factors involved in the improvement of unskilled labour on construction sites?
2. How can unskilled labour's productivity be improved on construction sites?

1.4 Aims

The aim of this dissertation is to determine measures for improving unskilled labour productivity on construction sites from the perspective of skilled labour.

1.5 Specific objectives

1. To ascertain the factors that affect productivity of unskilled labour on construction sites.
2. To identify the techniques to improve unskilled labour productivity on construction sites.

1.6 Significance of the study:

The unskilled labour in the construction sites plays a major part in the provision of jobs and developments in many countries where Ghana is not an exception. The improvement of productivity will result in billions of dollars saved for the industry (Landau, 2008). A well-structured productivity assessment will contribute significantly to the profit levels of the contractor hence the need for a concrete effort for improvement. Properly planned productive work provides value for money,

reduction in haste on working sites thereby reducing contractor health and safety challenges on construction sites.

1.7 Overview of Methodology:

Relevant literature was reviewed for this study. Data was collected from category D1 & K1 contractors. The close-ended questionnaire approach was used in collecting the data. A set of well-structured questionnaire was distributed to these companies to determine their unskilled labour productivity levels made from purposively sampling the staffs such as artisans, foremen, supervisors, engineers and project managers of the construction companies who are registered with Accra Polytechnic Institute. The statistical tool IBM SPSS (International Business Machines Statistical Package for Social Sciences) version 23.0 was employed for the analysis of this data obtained from the selected contractors.

1.8 Scope of study:

This thesis was limited to selected Ghanaian contractors who are registered with the Ministry of Water Resource, Works and Housing (MWWOH) with a classification type of category 'D1K1'. It was further limited to only three (3) contractors registered with Accra Polytechnic and currently executing projects on campus.

1.9 Organisation of the report

The Chapter one introduces the background of the study. It includes problem statement, research questions, aim and objectives of the study, significance, overview of methodology and scope of the study for this thesis.

The chapter two discusses the literature review on subject under study, the key factors that affect unskilled labour productivity and techniques to improve unskilled labour productivity in the construction industry based on previous studies and work of authors on the field of study in the Ghanaian construction industry.

The chapter three deals with the methodology used for the study such as the research style, research designs, information on required data collection and analysis. The chapter four discussed the various data collected from the survey as statistical methods, tables and information obtained from the analysis.

The final chapter five contains the summary of the findings, conclusion and recommendation.



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews the literature of the topic under study. It gives an overview of productivity in the construction sites; explains labour in general and unskilled labour in the global context which follows up with the Ghanaian construction industry. The three objectives of the research were discussed.

2.2 Construction Industry

Construction industry is one major segment of developing economics which is receiving growing consideration as a possible zone for the growth of better institutional structure (Danso, 2014). Construction is as old as man, which can be sketched to the stone ages thus the hunting stage. People at that level of construction erected by piling up stones, such as Pyramid of Egypt and Castles constructed in the European world, Ritz (1994) as cited by Prempah (2014) and in the world of today, the construction is complex within the industries. During the developed stage of civilization, the Construction Industry came into being when enormous infrastructure began such as transportation systems, skyscrapers and bridges to mention few Levy (2007) as cited by Prempah (2014), where plant and equipment such as concrete technology tools, excavating and earth moving plant, hoisting equipment, handling equipment, and small powered plant, Badu and Owusu-Manu (2011) as cited by Prempah (2014). During this stage of construction, man's contribution was decreasing because of the rate, how efficient and effective plant and equipment was used (Ritz, 1994) as cited by Prempah (2014)

According to Lopes (2012) in every country, the construction industry contributes to the economy for about 5 to 10 percent of the gross domestic product (GDP) been the greater part and employs population working up to 10 percent and correctly, virtually half of the gross fixed capital development.

The activities performed on the construction site are labour-intensive comparatively as reported by (Ofori, 2012) which also creates employment. The construction items are placed at specific location and must be constructed where they are essential. In isolated societies, the construction activities have the ways to generate incomes, hence it is vital to have some reasonably strong construction industries in each district in a fairly big country like Ghana because it relieves poverty.

2.3 Construction Industry in Ghana

The Ghanaian Construction Industry contributes 11.8% GDP to the economy. Without doubt, it can be envisaged that the construction industry in Ghana contributes to the growth of the economy just as other sectors do in Annual Review Report by the Ghana Statistical Service (Ghana Statistical Service, 2014). The construction industries in Ghana as in other parts of the world play a critical role in economic growth. There is construction, no matter what one does, as it cuts across all sectors in the world. The economy of Ghana drives important sectors like mining, manufacturing and agriculture (Infrastructure n.d.). This cannot be overstressed, specifically as the country is one of the liveliest economies in West Africa. It's been well known that an lively construction industry improves the development of the economy as it engages unskilled labour services, from consultants and engineers to artisans and labourers (Infrastructure n.d.).

The construction industry in Ghana is difficult in nature, signifying a variety of stakeholders, Dadzie *et al.* (2012) as cited by Ahmed *et al.* (2014) and the Ministry of Water Resources, Works and Housing (MWRWH), throughout the nation Ghana are responsible for the housing infrastructure and construction. Ofori (2012) cites that, most of the construction projects undertaken in Ghana have a long development period due to their large and complex nature thus planned and unplanned changes response are very slow. Therefore, the construction industry needs to mitigate sustainable challenges by immediately integrating sustainability into its procedures and practices.

2.4 Productivity

Productivity according to Raj and Kothai (2014) remains an interesting topic and a leading subject in the construction industry, “promising cost savings and efficient usage of resources” The word “productivity” in an article by Quesnay in 1766 Jarkas (2012); Soham *et al.* (2013) as cited by Gerges (2015) was first mentioned. The Oxford English dictionary gave a definition of productivity as “the power of being effective, productive and the rate at which goods are produced”(Gerges, 2015). Thomas *et al.* (2004) as cited by Adjei (2009) studied that, workforces in the construction industry account for 40 percent of direct capital cost of huge construction projects and the human resources productivity needed to maximize. More so, whether large or small the one of the greatest significant factor that affect the overall performance of any construction industry is productivity. There are several explanations to productivity and can be measured and well-defined in so many different ways.

Studies have proven that productivity has remained normally definition as the ratio of outputs to inputs. Construction jobs are mostly labour based with basic hand tools and equipment, as labour costs comprise 30 percent to 50 percent of overall projects cost.

Therefore, while several construction labour productivity research studies have been undertaken, only a few have spoken on the subject productivity in developing countries on construction sites. In economics, productivity refers to measures of output from manufacture procedures, per unit of effort. Productivity may be considered as a measure of the engineering or technical efficiency of production, Saari (2006) as cited by Mistry *et al.* (2015).

Productivity in order words is the output a worker, organization or a country makes per unit of labour and capital inputs. Usually measured in terms of sales or 'value added' relative to the amount or cost of contributions and a building-block for wealth creation by (Bryson and Forth, 2007). According to Cossio *et al.*(2012) productivity in the construction sites is nothing but saving in consumption of resources like workforce, building hardware, equipment, space, time, capital etc. It can be articulated as human efforts to produce more with less contributions of resources so that there will be greater distribution of benefits among extreme number of persons.

Productivity means the connection between output and one or all associated inputs (Cossio *et al.*, 2012). The Productivity Council of European states that "Productivity is an attitude of mind. It is a mentality of progress of the constant improvement of that which exists".

Several researchers (Neely *et al.*,1995; Bernolak,1997; Grünberg, 2004; European Association of National Productivity Centres, 2005) as cited by Pekuri *et al.* (2011) defines productivity as "how abundant and how good we make from the resources used," also "how effectively and efficiently products and services are being produced." In this situation, efficiency can be seen as "doing things right" or resources been utilized to achieve desired outcomes. Efficiency, on the other hand, is often described as "doing

the right thing”; it refers to the extent to which customer or a client requirement’ are met therefore, efficiency highlights the importance of reaching a wanted objective, whereas competence emphasizes on the procedure or means involved (Pekuri *et al.*, 2011).

The Over-all definition of productivity is the connection between output produced by a system and amounts of input factors utilized by the system to produce that output. Here, the productivity can be any output of the procedure, whether a service or product, while contribution factors consist of any workforce and physical resources used in a process. More so, in order to increase productivity, the system must either produce better goods from the similar resources. Pekuri differently stated that, improving productivity refers to an increase in the ratio of produced services or goods in relation to amount of resources used (Pekuri *et al.*, 2011).

From the view of a researcher Hachey (1992) as cited by Anon (2015) productivity is concerned with the efficient and effective use of resources in producing or goods services. Labour resource utilization and productivity is defined as input / output (i.e. 1hour/m² for walling operations)

2.5 Labour, Unskilled labour, Skilled labour and Labour productivity

2.5.1 Labour

Wahab (1991) as cited by Fagbenle (2011) defines Labour as a “work that needs the exertion of body and mind or both”. In construction industry, Labour is considered as a vital resource, because it combines all the other resources such as materials, equipments and finance in order to produce the various construction products. As uttered by Wachira (2000) cited by Fagbenle (2011), consultants via specification, materials control, cost of plants, basic prices, profit and overheads are generally controlled by the

competition. (Campbell and Ahmed, 2012) studied on the general knowledge about labour that, is the one of the most essential differences between developed and developing countries and the abundance of labour and the insufficiency of capital in the former. The combination results in inadequate investment and capital buildup combines with a greater labour supply pressures that prevail in developed countries, leading to an insufficiency of productive employment. According to Creches (2011) as cited by Kaur and Mittar (2015) studied that, the second largest employer in India is the construction industry, after agriculture. It constitutes of huge unorganized personnel of about 89 percent, of whom majority three-fourth are unskilled labour. In terms of national investment, construction industry is between 40 to 50 percent of the National Plan outlay. The construction industry contributes to about 20 percent of the gross domestic product (GDP).

In the construction industry in Ghana, there are three forms of workers namely: casual, temporary and permanent workers. According to Labour Act 2003 (Act 651), section 74 and 75, classified casual worker as a worker engaged by the employer for a short period without a written contract and entitled to equal pay for work done, allow access to any medical facilities used by other workers and paid for overtime work done. Whiles, temporary worker is classified as a worker engaged continuously by the employer for a duration of about six months or equivalent to the number of working days under this section treated as a permanent worker.

2.5.2 Unskilled Labour

The unskilled labour is a group of workforce that needs no special skills to work and defines as ‘a way of making a living with little or no degree of safety of salary and employment’ and they need little or no training at all to make them accomplish their

task, Wahab (1991) as cited by Fagbenle (2011). They are men and women having a strong healthy body as their major asset to perform manual duties. According to Investopedia definition “Unskilled labour is a segment of the work force associated with a low skill level or a limited economic value for the work performed (human capital). Unskilled labour is usually considered by little education levels and small salaries. Work that requires no specific education or skill is often available to unskilled workforce” in this study, unskilled labourers are considered as general labourers such as messengers, profile peg men and earthwork diggers, artisans’ helpers, etc. Gerges (2015) added that, the input resources are labour, material, equipment, plant, energy and capital, but they are not limited to only these sources.

The construction industry is labour-intensive (Jarkas, 2010) and it can be contended that workforce is the dominant productive resource which makes the productivity on construction sites mainly dependent on human effort and performance. Poor unskilled labour output is as a result of improper supervision, personal shortages, missing materials, poor operating systems, climate weather conditions, lack of experience of workforce, low educational levels, delay of salaries, incomplete design documents, poor communications are all managerial related challenges (Ritz, 1994) as cited by Prempah (2014).

2.5.3 Skilled labour

In the construction industry, Medugu *et al.* (2011) stated that the vital role to the survival and development of the industry are based on skilled labour which has a direct involvement in the construction processes. On the other hand, skilled labour or skilled worker, according to Wikipedia definition are any workforce who has a special training,

specialization, idea, and quality of being able to perform on their job. Skilled labour are classified as those who have advanced education such as university, college and technical school, sometimes they obtained their skills and knowledge on the work (<https://en.wikipedia.org/wiki/Skilled.worker>). For the purpose of this study, skilled labourers are classified as artisans, foremen, supervisors, engineers and construction managers.

Several literature has been reported that the availability of skilled labour on construction sites has an influence on quality project delivery within cost and time schedule, Olomolaiye and Ogunlana (1989) as cited by Ajagbe (2015). The involvement of more skilled labour on construction sites cannot be undermined since they contributes in doing away with inefficiencies that may arise from poor project delivery. It has been established that the value and accessibility of skilled labour are deemed to be a vital factor in the usefulness of the construction industry, Bustani (2000) cited by Ajagbe (2015).

2.5.4 Labour Productivity

Dozzi *et al.* (1993) as cited by Gerges (2015) defined labour productivity in construction as “the physical progress achieved per hour”. For example, how many cubic metres of concrete were poured per hour. This definition measures the labour moneys expected to produce a metre square of living area, or the labour in cost of providing one bed in hospital. Over-all, productivity indicates the measurement of how well a separate entity uses its resources to produce yields from contributions.

In Ghana, rapidly increasing labour force will need marginal labour output to increase just high enough to provide employment at a constant real wage according to World

Bank (1984) as cited by Gyan-baffour and Betsey (2001). Extra increase in the real salary, which would improve the purchasing power of the people, will require a further increase in the marginal output of labour.

The estimates of labour productivity in Ghana are generally hard to come by. Nevertheless, recently, three African countries measures labour output in selected manufacturing industries including Ghana, indicates that most of the African companies, particularly those in Ghana, are generally poor performers as compared to the most effective organizations within these countries (Gyan-baffour and Betsey 2001).

2.6 Significance of improving unskilled labour productivity

Unskilled Labour productivity is one of the most thoughtful factors that affect the physical development of any construction job (Durdyen and Mbachu, 2011). In order for any construction industry to keep improving project success, it first needs to improve the standard of unskilled labour productivity to reduce the cost of any construction project. A “10 percent increase in labour productivity can save an economy billion”. The Asian Productivity Organization has argued that “improvements in unskilled labour construction productivity would make a substantial benefit to the national economy” (Intergraph, 2012). According to Hammad *et al.* (2011) “an increase in labour productivity may result in extra growth and a positive effect on the society”. For example, Orascom Construction Industries, one of the Construction companies in Egypt, was due to finish 5,000 affordable houses by 2015. An increase in labour productivity may reduce the overall cost of the project, which can result in more affordable houses under construction.

Every contractor, subcontractor and employer has to agree to a contract for the project to start. These contracts have a start date, plan, budget, work scope, duration, finish date and other important factors for any project. This agrees with Hammad *et al.* (2011) that “Every year companies and contractors are hit with billions of dollars in construction claims as a result of lack of labour productivity”.

Improving unskilled labour productivity in construction projects will, not only result in project success, but will also result in a significant impact on improving the gross domestic product, which affects the economy and standing of any country. In countries where wealth and skills are not enough, and unskilled labour are abundant they are poorly paid; it is especially significant that higher output needs looking into for the growth of productivity per machine or piece of plant or per unskilled workforce. Productivity improvement in other words means increasing or raising output with the aid of using the same quantity of machine time, building materials, land, technology or labour (Cossio *et al.*, 2012).

2.7 Some Factors that affect unskilled labour productivity

Numerous studies were carried out on the determination of factors that affect productivity of unskilled labour on construction sites. According to Kadir *et al.* (2005) and Sangole and Ranit (2015) productivity of unskilled labour is of unlimited interest to consultants and academics because it affects time overrun and project cost since each project has its own weather, technology, resources, budget, designs etc. Unskilled labour productivity in every construction project depends on a number of factors by so many reasons. To achieve the income expected from any construction project and make sure the project is successful, it is significant to have a good control of the productivity factors that can affect the human resource (Gerges, 2015). This agrees with Soham and

Rajiv (2013) that solving factors that affect unskilled labour productivity can have a direct consequence on the project achievement, and can save time and cost. Attar *et al.*, 2012 shows that identification and study factors affecting labour productivity on construction projects has become a major issue facing both project managers and contractors in growing unskilled labour productivity.

From the view of Enshassi *et al.* (2007) in order to improve productivity, a study of the factors affecting it, whether positively or negatively, is necessary. Making use of those factors that positively affect output and eliminate (or control) factors that have a negative effect on, will ultimately improve output.

According to Ailabouni *et al.* (2009); Shehata and El-Gohary (2011); Enshassi *et al.* (2013) the factors that affect employee output were considered as an environmental, group, individual and organizational factors. The environmental factors consist of labour market features, economic situation, safety and job security, climate and weather conditions, organizational site layout, and political condition. The group factors consist of structure or composition, overall skills of the group, culture difference, language barriers, and frequency of changes. The individual factors consist of motivation and morale, level of academic experience, trainings in the past, nonattendance, overall project fulfillment, overall gratitude, past experience and age. The organizational factors consist of work timing/working hours, construction work complexity, interruption of work, level of communication, and management involvement, (Enshassi *et al.*, 2013). “Quality of work is good and must maintained in construction firm, adequate crew size should be employed by the organization for accomplishing the task, accommodation and food should be maintained in a better manner by the management of the firm” (Enshassi *et al.*, 2007; Gupta and Kansal,

2014).

Table 2.1: Factors affecting labour productivity to be adopted for the study

S/No	Factors that affect labour productivity
1	Lack of labour experience
2	High workforce absenteeism
3	Labour dissatisfaction
4	Increase of labour age
5	Poor health of the workers
6	Labour disloyalty
7	Lack of empowerment (training and resourcing)
8	Leadership and competency of construction management
9	Poor relations between labour and supervisors
10	Lack of labour observation
11	Lack of periodic meeting with labour
12	Unavailability of safety engineer on site
13	Ignore safety precaution
14	Inadequate lighting
15	Accident
16	Pollution and noise
17	Dangerous working condition
18	Inadequate safety plan
19	Payment delay
20	Low amount of pay
21	Lack of financial motivational system
22	Poor condition of camping
23	Lack of training sessions
24	Lack of place for eating and relaxation
25	Working 7 days per week without taking a holiday
26	Work overtime
27	Misuse of time schedule
28	Increasing number of labour in order to accelerate work
29	Rest time(s) during the work day
30	Material shortages
31	Unsuitable material storage location
32	Tool and equipment shortages
33	Drawings and specifications alteration during execution
34	Changing order
35	Incomplete/revise drawing
36	Inspection delay
37	Rework
38	Low quality of raw materials
39	Inefficiency of equipment
40	High quality of required works
41	Working within a confined space
42	Interference
43	Construction method
44	Bad weather condition
45	Labour fatigue

Enshassi *et al.* (2007)

According to table 2.1, Raj and Kothai, (2014); Enshassi *et al.*, (2007); Herbsman *et al.*, (1990) as cited by Tahir *et al.* (2015) gave a summary literature review for several factors having direct and indirect effect on skilled and unskilled labour productivity in the construction sites, which agrees with Halwatura (2015).

Findings from Enshassi *et al.* 2007) reveals that, these factors emerged from a broader perspective, as it may result from, business environment factors, financial factors, managerial factors, business growth factors, as well as political factors. On a broader note, labour productivity was affected by internal and external factors, in lieu of those beyond the control of the company's management and others having their source from the company respectively.

The most important factors noted in the study were: shortage of materials, labour inexperience, lack of labour observation, misunderstanding between workforce and supervisors, inspection delay, changes in drawings and specification during execution of project, salary delay, disloyalty of labourer, working seven days per week without leave, and tool/equipment shortages. Six key factors were identified in Thailand as factors affecting productivity. They were as follows: absence of materials, delay in supervision (instruction time), rework, absence of tools and equipment, absenteeism, and interference (Makulsawatudom and Emsley, 2001). In a study of craftsman productivity in Indonesia, absenteeism, lack of materials, rework, interference due to work mismanagement as well as lack of equipment and tools were identified as the key factors that affect labour productivity (Kaming *et al.*, 1997). Further, a study conducted in Nigeria by Olomolaiye *et al.* (1987) brought to book the following factors affecting labour productivity in order of rank: 'lack of materials, lack of tools, duplicated efforts (repeated work), instruction delays, inspection delays, absenteeism, incompetency of

supervisor, and changing crew members'. According to Adamu *et al.* (2011) a later study also showed in Nigeria factors that affect labour productivity and it discovered that low salaries graded top closely followed by lack of materials and unfavorable working atmosphere, late coming of materials or late coming of workforce, machines break-downs, bad layout of work plan, and lack of skill to provide evidence led to unproductive (Mojahed, 2005).

In 21st century about 70 percent of the industry as employed some degree of empowerment initiative for at least part of their workers on construction sites (Demirci and Erbag, 2010). That said, lack of empowerment can have effect on productivity from the perspective of the skilled labour. Therefore, empowerment as a tool must be used to inspire workforce at the workplace, so that empowered with the right information, can attend to the needs and make right choices when problems arise at construction sites (Demirci and Erbag, 2010). The construction industry is labour-intensive (Prempah, 2014). It can be argued that manpower is the leading useful resource which makes the construction sites output mostly in need of human effort and performance. It has been studied that 'poor unskilled labour productivity is the result of improper supervision, personal shortages, missing materials, poor operating systems, incomplete design documents, poor communications' are all managerial related challenges as studied by Ritz (1994) and cited by Prempah (2014). There may be inconsistencies in the factors because several researchers or criteria for classification of the factors are attributed to the topics treated by the various productivity researchers. From an analytical point of view, the factors can be classified under one big umbrella because whether it is worker motivation, communication, information, supervision they all come back to management practices. Many construction projects result in cost overrun,

delays because management at times compromises some of the projects performance such as time, cost and quality.

2.8 Techniques to improve unskilled labour productivity

Several researchers have studied various techniques that can be used to improve unskilled labour productivity in the construction industries. Under this thesis, the following methods were used as listed and expanded below:

2.8.1 Employee Training

There are several definitions on training, Noe (2010) defines training has a company's planning effort on how to alleviate workers' learning on the associated competencies such as skills, knowledge and behaviours that are vital for a productive work performance. Another view defines training as "the formal, ongoing efforts that are made within the firm to improve the performance of its staffs" (Qureshi, 2016) can also be defined as 'an educational procedure which involves the improving of skills, ideas, changing of mental attitude and acquisition more skills to enhance the performance of workers'. According to Olaniyan and Ojo (2008) it is vital to train workers both physically, socially, mentally and intellectually and not only their degree of efficiency but also developing the staffs in the company. The important assets for any organization are mostly human resources and the efficiency and achievement of the company lies on them who form part of the activities performed in the organization.

There is so much impact of training on every organizational performance (Khan *et al.*, 2011), in twenty first century, training has been the vital factor in the business world because organization and the workers effectiveness and efficiency are been increased by training which agrees with Kazaz *et al.* (2008) and De Grip and Sauermann

(2011). Aguinis and Kraiger (2009) cites that ‘training activities have a positive impact on the performance of individuals and teams’ Jordan (2006) as cited by Kuykendall (2007) stated that the benefit of training employee are been underestimated. According to the US Department of Labour, inverting a dollar in training of workers provides returns to the company. Even though, there is much profit made on training of workmen, it is very difficult for contractors to send out their workers off the work and set time for them to be under good training. Furthermore, contractors are strongly against money spent on training. Only 1.83 percent of contractor’s payroll is spent on training and overall 2 percent spent by industries. This researcher cited a study carried out by the University of Florida (school of building construction) that 42 percent increase in productivity is the outcome of training therefore, providing training programs sessions for workers will provide increase in output and minimize costs affected by loss of time and rework Cox *et al.*(1998) as cited by Kuykendall (2007).

2.8.2 Communications

Nelson and Economy (2005) as cited by Prempah (2014) The Concise Oxford English Dictionary (Eleventh Edition) defines communication as “the means of sending or receiving information” explained the communication as the lifeblood of every construction industry. According to Keyton (2011) defines communication, which agrees with the Oxford English Dictionary as the procedure of conveying information and common understanding from one worker to another and this definition emphasizes the fact that, there is no communication unless result from the exchange of information is commonly understood. Figure 2.1 indicates the definition and the vital elements of the communication procedures (Cheney, 2011)

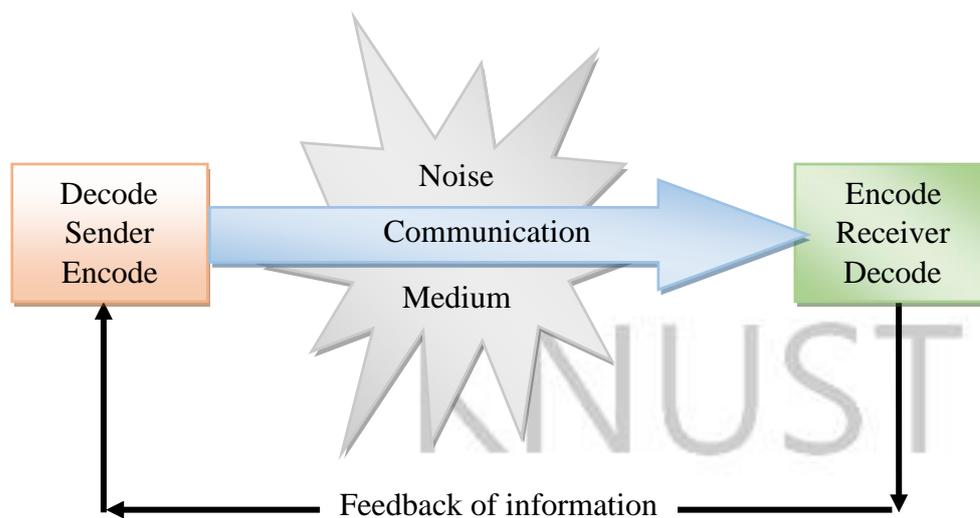


Figure 2.1: *The communication procedure* (Cheney, 2011)

Lunenburg (2010) cites that, in every communication, there are two common exchange elements, sender and the receiver. These elements determine the quality of the communication on construction sites. Any problem raised from any of the elements can lead to ineffectiveness of the communication. From the view of Dainty *et al.* (2006) construction industry communication, within the context of an organization, is to send an information or instruction to impact the actions or the behaviours of other people in the organization or during a construction, there may be a request or information exchange on construction sites. According to Hoezen (2011) every communication on construction sites is important because the effectiveness and the efficiency of the construction procedure depend strongly on the excellence of communication. According to literatures, there are four (4) reasons why communication on construction sites needed improvement. First, the communication between the constructions teams, workers and the supervisors, between project manager and the contractor and all the project teams must improve to reduce failure.

Secondly, better technical solutions will lead to clear and open communication at all levels that could lead to new ideas and innovations. Thirdly, better decision making will

make up during the briefing stage and finally, the project early stages would be influenced positively on quality when communication is improved. Ritz (1994) as cited by Prempah (2014) also clarified that, unless effective communication system is employed in construction sites it would be impossible for a project to be carried out successfully. Communication would be effective on construction sites when there is achievement to established, relationship between management and the workers, logical reasoning by all members of the organization. Systems like audio-visual can be implemented in order to transmit information effectively to the workmen. Therefore in order to improve unskilled labour productivity in the construction industry in Ghana, is to actively work on the communication skills on construction sites (Amoah *et al.*, 2007).

2.8.3 Job Satisfaction

The word job satisfaction does not have an ultimate definition on what job represents and it has been defined by different authors and researchers. According to Hoppock (1935) as cited by Aziri (2011) job satisfaction referred to an employee truthfully saying he is satisfied with the work he is doing been caused by the combination of physiological, psychological and environmental circumstances. Thiyagu and Dheenadhayalan (2015) states that unskilled labour efficiency have been identified and are grouped into means of satisfying the workforces elementary requirements as to food, according to their characteristics fifteen categories were considered, namely; clothing and shelter, work fulfillment is attained when the higher psychological needs of the worker are met, such as personal dignity and self-respect (Thiyagu and Dheenadhayalan, 2015). Every worker has a need to belong and for their worth to be obvious. Job satisfaction is obtained through a sense of attainment as to quality, productivity or other contributions, particularly if that attainment is recognized and

accepted. Pride in craft and skill and a sense of duty are to be encouraged, and rewarded with chances for promotion and development. Bad aspects which diminish from work morale and satisfaction, which thus affect output, are to be avoided. Generally, these aspects imply that the employee is held in little regard by company management that includes poor working circumstances and environment, terms of service and poor or submissive relationships with supervisors and other superintendents. (Thiyagu and Dheenadhayalan, 2015)

2.8.4 Employee Motivation

Seniwoliba and Nchorbono (2013) established their suggestions that motivation is critical for every construction industry to function well, workers will not involve themselves and perform to expectation leading to less output performance when they are not motivated.

From the view of Cooper (2004) as cited by Kuykendall (2007) defines motivation as “the process that directs your people’s work energy. It is the drive behind your own and your people’s wish to content ‘construction sites’ wants and needs.” Recognition, self-esteem and praises are considered by great leaders has a motivational factors and every employees’ attitude is been affected by motivating them which increases morale at the workplace. Some guidelines for increasing motivation within the construction sites include: Providing a safety working environment, good behaviours are recognized, appreciations are shown at workplace, executable goals are set, development of fairly payment systems, and also providing adequately training programs were some of the steps needed to increase motivation at the construction sites, Cooper (2004) as cited by Forson (2012).

Lam and Tang (2003) as cited by Forson (2012) Motivational theories are used on construction sites to increase productivity such as Maslow's Hierarchy of Needs, Herzberg's Two Factor Theory, and McGregor's Theory X and Theory Y In order to maximize output, it is necessary to enlist motivational schemes to maximize each worker's potential on construction sites (Forson, 2012).

For the purpose of this study, a brief explanation on Maslow's Hierarchy of need would be employed to improve unskilled labour productivity on construction sites. Maslow (1943) as cited by Adjei (2009) stated that, the proposition that people are wanting beings was based on how people are searching for extra wants, more so, what the workers want is depending on what they had already. According to Boeree (2006) peoples need are organized in a series of levels based on the hierarchy of importance. Boeree listed the five broader layers in ascending order from deficit needs to being needs such as physiological needs, safety needs, belonging needs, esteem needs and self-actualization.

Physiological needs: They are the basic requirements in life. It consists of water, salt, oxygen, sugar, calcium, and other vitamins and minerals.

The safety and security needs: When you have taken care of the physiological needs, safety and security will be the second layer such as stability, protection, freedom from pain of physical attack.

The love and belonging needs: When you have taken care of the safety and security needs, the next level is love and belonging needs, this includes; friendship, sense of belonging, affectionate relationships in general and social activities.

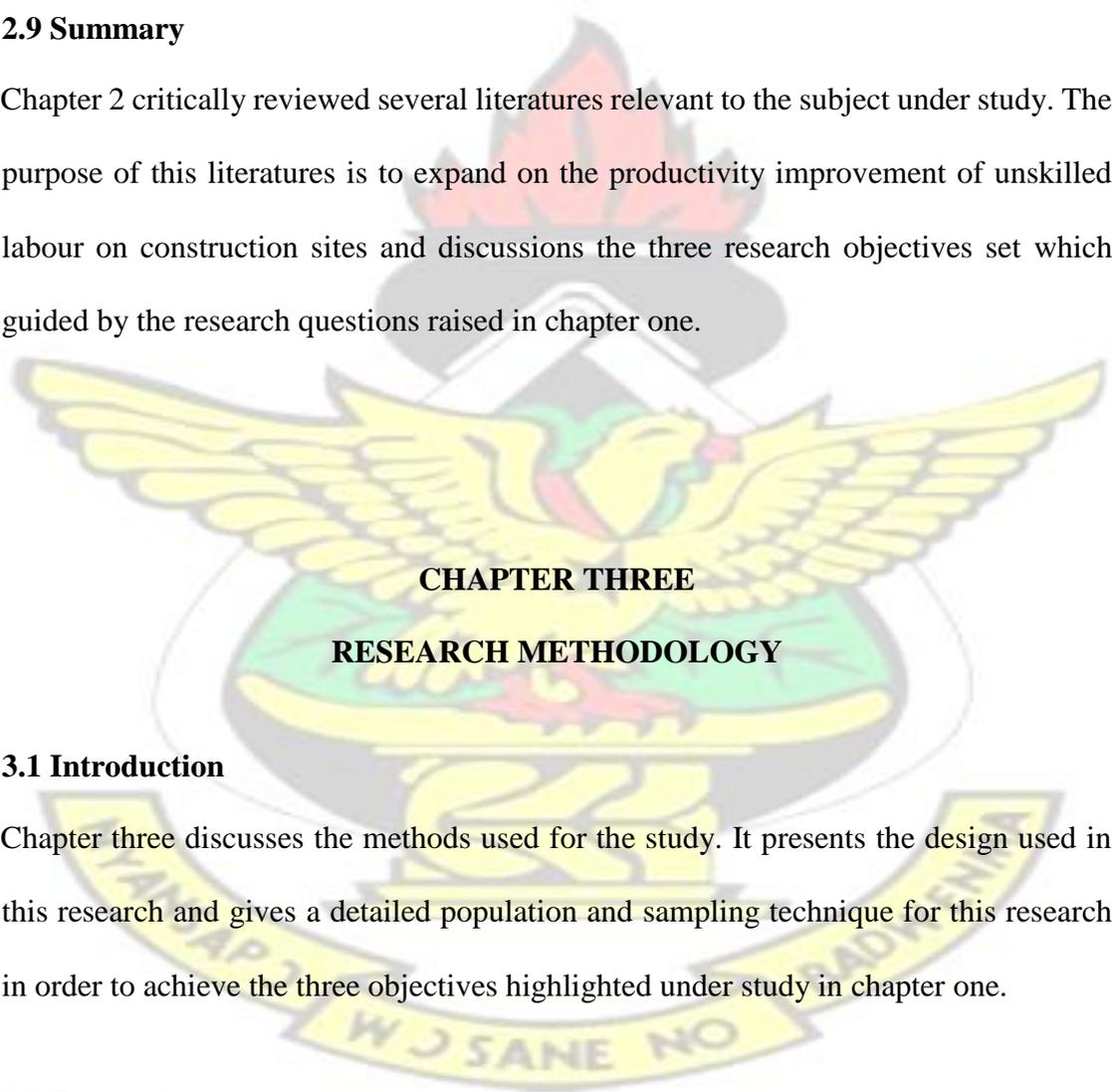
The esteem needs: When you have taken care of the safety and security needs, esteem needs are the next layer, which sometimes referred as "ego" such as freedom and

independent, recognition, status, prestige, strength, confidence, appreciation and attention.

The self-actualization needs: When you have taken care of the esteem needs, self-actualization becomes the next layer the last and sometimes called growth motivation which includes; need for developing skills and potentialities, what one is capable to become.

2.9 Summary

Chapter 2 critically reviewed several literatures relevant to the subject under study. The purpose of this literatures is to expand on the productivity improvement of unskilled labour on construction sites and discussions the three research objectives set which guided by the research questions raised in chapter one.



CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

Chapter three discusses the methods used for the study. It presents the design used in this research and gives a detailed population and sampling technique for this research in order to achieve the three objectives highlighted under study in chapter one.

3.2 Research strategy

Naoum (1998) as cited by Prempah (2014) defines research strategy as ‘the enquiry of research objectives’ Baiden (2006) stated that, there are three (3) main types of research strategies namely: quantitative, qualitative and triangulation, however, this research

adapted a quantitative strategy. The choice of this strategy was based on the type, the importance of the study and the availability of information for this thesis. The data collection was largely questionnaires, which restricted all respondents to response to the same questions administered to them, and survey was the main data collection research style.

3.3 Research design

According to Saunders *et al.* (2012) research design as a general plan, guides or rules about how research questions should be answered. The deal with data collection and analysis structures that certifies that the suggestions acquired enables you to effectively report the research problem logically and as explicitly as possible. This research adopted a questionnaire survey in the quest to determine on how unskilled labour productivity can be improved on construction sites. The importance of using questionnaire survey method is to “questioning individuals on a topic or topics and then describing their responses” (Jackson, 2011). According to Oppenheim (2003) cited by Prempah (2014) ‘questionnaire survey enhances consistency of observations and improves replication due to its inherent standardized measurement and sampling techniques.

3.4 Data Required

The sources of data required were secondary and primary data. The secondary data was obtained from reports, newspapers, books, journals and other materials related to the productivity improvement on construction companies. The primary data was obtained from three (3) Ghanaian contractors registered with Accra Polytechnic using a well-structured close-ended questionnaire.

3.5 Sampling techniques and Sample size selection

Jackson (2011) and Saunders *et al.* (2012) stated that in primary data collection, there are two (2) types of sampling methods namely: probability and non-probability sampling. This study uses non-probability sampling method, due to the fact that sampling group members are selected on non-random basis, therefore not every member of the population has a chance to participate in the study. Convenience and purposive are examples of non-probability sampling techniques adopted for this research.

Three (3) Ghanaian contractors with the classification category of D1&K1 and currently executing projects on Accra Polytechnic campus were conveniently sampled for the study. According to Saunders *et al.* (2012) as cited by Prempah (2014) Convenience sampling also known as availability sampling method depend on data collection from population members who are conveniently accessible to partake in a research where the first obtainable primary data source will be used for the study without extra demands (Saunders *et al.*, 2012)

Jackson (2011) stated that Purposive sampling also known as selective, judgment, or subjective sampling is a sampling technique or method in which researcher depend on his or her own judgement when selecting members of population to partake in the research. The key respondents such as artisans, foremen, supervisors, engineers and project managers were identified using purposive sampling. The reason being that the researcher needed certain groups of respondents who are skilled and are involved in a large number of construction jobs so that they will provide vital evidence and contribute immensely to the study (Adjei, 2009).

Sixty (60) questionnaires were given out to 60 respondents, 20 questionnaires were administered to each construction site in Accra Polytechnic campus.

3.6 Distribution and collection of data

To achieve the aim and the objectives of this study, a well-structured close-ended questionnaire was used to gather primary data from Building Contractors with D1&K1 category who are registered with Accra Polytechnic and based in Greater Accra Region. Closed-ended questionnaires were used because Glasgow (2005) as cited by Amarah (2014) that they are easy for recipients to respond and aid the researcher to analyse data easily. There was a covering letter that explained the purpose, method of responding, aim and security of the information encourage better response. Amarah (2014) stated that researchers should avoid questions that ask the respondent for data they do not have, like including personal questions that assume the respondents have knowledge about and avoidance of questions that require problematic calculations. The distribution of the questionnaires and the process of retrieving them from the staffs of the construction companies were based on two reasons, that is to make sure that the questionnaires get to the right respondents and also aid to improve the response rate (Ahadzie, 2007).

3.6.1 Questionnaires content

The questionnaire structure was based on five parts:

Part A reported the background of the respondent (i.e. position, years in organisation, working experience and qualification). Part B reported the background of the company, including years of existence, the number of staff, unskilled labour on contract, permanent skilled labour and casual unskilled labour. Part D reported the methods to improve the productivity of unskilled labour on construction sites using 5point Likert scales to answer a set of questions asking construction workers and staffs to identify the

degree of importance on the importance of improving unskilled labour productivity and methods to improve it.

In relation to importance and methods to improve the unskilled production, “1” signified not very important, “2” signified not important, “3” signified Neutral, “4” signified important and “5” signified very important. The staffs and the workers of the construction companies were asked to tick where appropriate to the degree of importance based on individual perceptions and opinion. Part C reported the factors that affect their productivity where, “1” indicated strongly disagree, “2” indicated disagree, “3” indicated Neutral, “4” indicated agree and “5” indicated strongly agree and were asked to tick where appropriate on the degree of agreement based on individual perceptions and opinion. The purpose of this questionnaire is to empirically determine on how unskilled labour productivity can be improved on construction sites.

3.6.2 Respondents

The method adopted for the selection of respondents to respond to the questionnaire was based on purposive sampling. This non-probability sampling technique was used for this study because, it permits the researcher to deal with individuals who have knowledge on the topic under study Erbil *et al.* (2010) as cited by Amarah, (2014).

3.7 Data analysis

To address the goals of this research, assortment of statistical tools was used. The data obtained from the respondents from Likert scale questions was analysed using statistical tool IBM SPSS (International Business Machines Statistical Package for Social Sciences) version 23.0 to obtain the descriptive statistics such as mean score and standard deviation and Relative Importance Index (RII). The use of the Relative

Importance Index was to help in ranking the various factors according to their importance of unskilled labour productivity improvement on construction sites. The data were analysed and presented in a form of texts, tables and charts. According to Enshassi *et al.* (2007) explained the RII formulae shown below:

$$\text{Relative Importance Index (RII)} = \frac{5n^1 + 4n^2 + 3n^3 + 2n^4 + n^5}{5(n_1 + n_2 + n_3 + n_4 + n_5)}$$

Where:

n_1 : No. of respondents who responded “Not very important”

n_2 : No. of respondents who responded “Not important” n_3 :

No. of respondents who responded “Neutral” n_4 : No.

of respondents who responded “Important” n_5 : No. of

respondents who responded “Very important”

It is valuable to understand that the closer the value of Related Importance Index of the known factor is unity (1) or 100 percent, the more important it is the greater influence on the remaining variables.

3.8 Ethical Concerns

The confidentiality of the respondents of this study will be protected to keep in secret the information collecting. Dishonesty will be avoided by informing construction companies about the purpose of this thesis and its consequences on the respondents. This will help the respondents to make informal decisions with respect to the questions asked. Respondents willingly will participate in the research without any form of pressure or influence. All sources of information will be duly recognised.

3.9 Summary

Chapter three addresses the various methodologies obtainable for this research and the aim for the adoption of the methodology used for this research. Structured questionnaires were used in collating data from the respondents.

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CHAPTER FOUR

ANALYSIS AND DISCUSSION OF RESULTS

4.1 Introduction

Chapter four covers the analysis of data collected from the survey and discusses the research findings that relate to the research questions that guided the study. Data were analyzed. The questionnaire consists of four (4) parts namely; the background of respondents, background of construction company, key factors that affect productivity of unskilled labour and the method to improve unskilled labour productivity on construction sites.

4.2 Method of data analysis

With the aid of statistical tool IBM Statistical Package for the Social Sciences (SPSS) version 23.0 and Microsoft Excel 2016 version, descriptive statistics analysis was used to generate frequencies and percentages to answer the first two parts of the questions in the questionnaire. Whereas relative importance index, mean scores and standard deviations were used to determine the last two part of the questions in the questionnaires and ranked according to importance and level of agreement.

4.3 Response rate

Table 4.1 indicates a response rate of 22, 14, 11, 10 and 3 representing 36.7%, 23.3%, 18.3%, 16.7% and 5.0% were retrieved from Artisans, Foremen, Supervisors, Engineers and Project Managers respectively. Table 4.1 shows the response rate of 100% of the questionnaires retrieved for the respondents.

Table 4. 1: Number of questionnaires distributed and retrieved

Staffs/Workers	Questions distributed	Questions retrieved	Percent	Cumulative Percent
Artisans	22	22	36.7	36.7
Foreman	14	14	23.3	60.0
Supervisor	11	11	18.3	78.3
Engineer	10	10	16.7	95.0
Project Manager	3	3	5.0	100.0
Total	60	60	100	

4.4 Background of respondents

4.4.1 Position in Company

Respondents were asked in this section to indicate their positions within their various construction sites. This was to determine the respondent's eligibility to take part in the research. Figure 4.1 below, shows that out of 60 respondents, 22 of them were artisans representing 36.7 percent, 23.3 percent were foremen and the least were project managers with 5 percent.

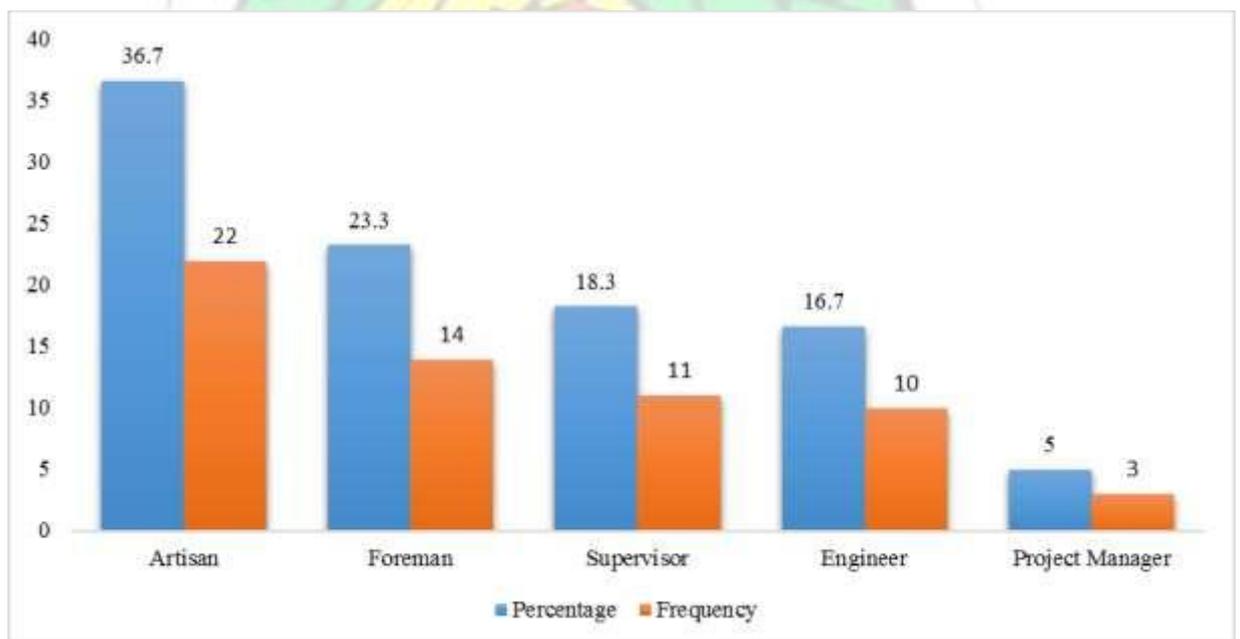


Figure 4. 1: Position of Respondents in the Company

4.4.2 Number of years spent in the organization

Respondent were to indicate the number of years they have spent in the organization. As shown in Figure 4.2 below, workers with less than 3 and 5 years scored the highest percentage of 28 while the least was for less than a year representing 2%. This implies that, the respondents have a certain level of understanding about the research topic.

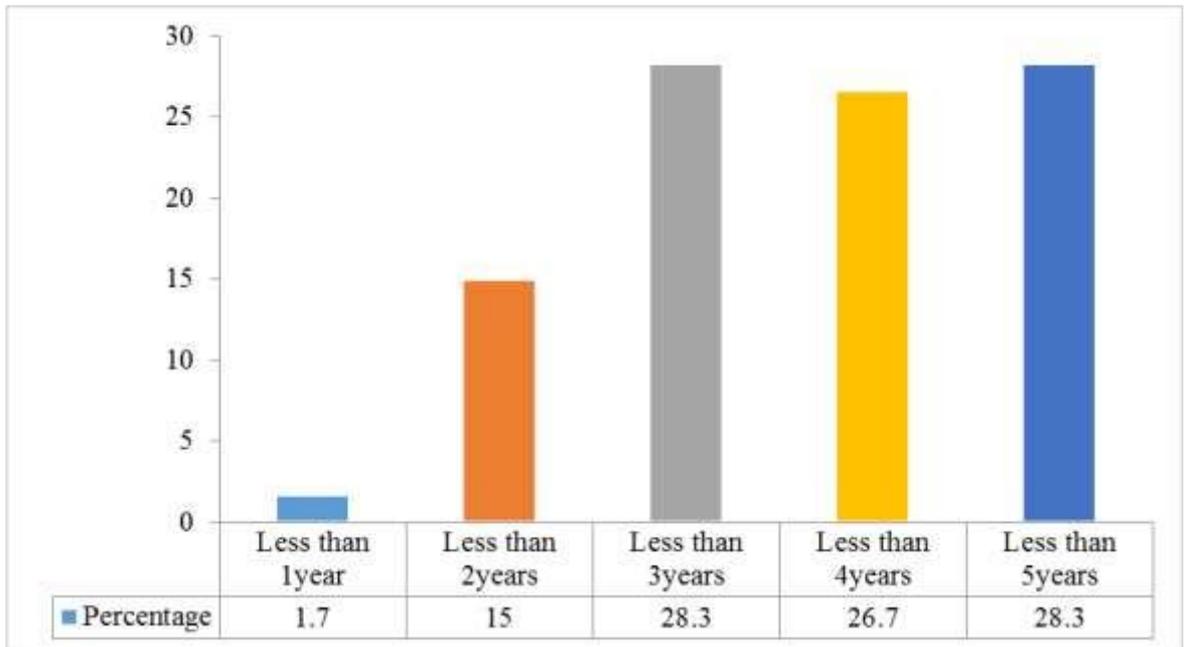


Figure 4. 2:Number of Years Spent in the Organisation

4.4.3 Respondents working experience

As indicated in Figure 4.3 below, the working experience of majority of the respondents were between 5-10 years and 11- 15 years, both counting 16 respondents each, representing 26.7 percent. Moreover, 15 respondents, representing 25 percent had less than 5 years working experience, again. 11 respondents and 2 respondents with 16-20 years and above 20 years working experience had 18.3 and 3.3 percent respectively This

implies that they had years of working experience in the Ghanaian construction industry for over a period of time.

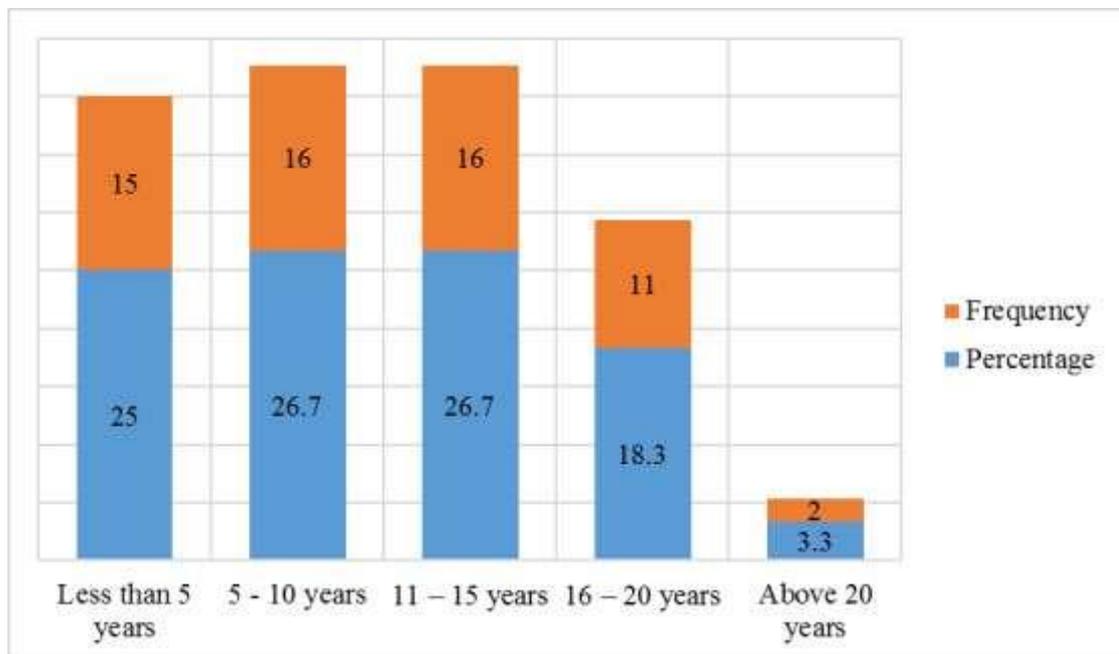


Figure 4. 3: Working Experience of the Respondents

4.4.4 Qualification of respondents

Figure 4.4 below, shows the qualification of the respondents. Out of 60 respondents, five (5) of them, representing 8.3 percent were MSc holders, whereas 15 respondents, representing 25 percent were also BSc holders. More so, 18 respondents, representing 30 percent were HND holders while 13 respondents, representing 21.7 percent were C.T.C holders. The remaining nine (9) respondents, representing 15 percent were N.V.T.I holders. This indicates that, all the respondents had a level of education in the construction industry. This attests to the fact that respondents had knowledge to answer questions related to the topics in the questionnaire.

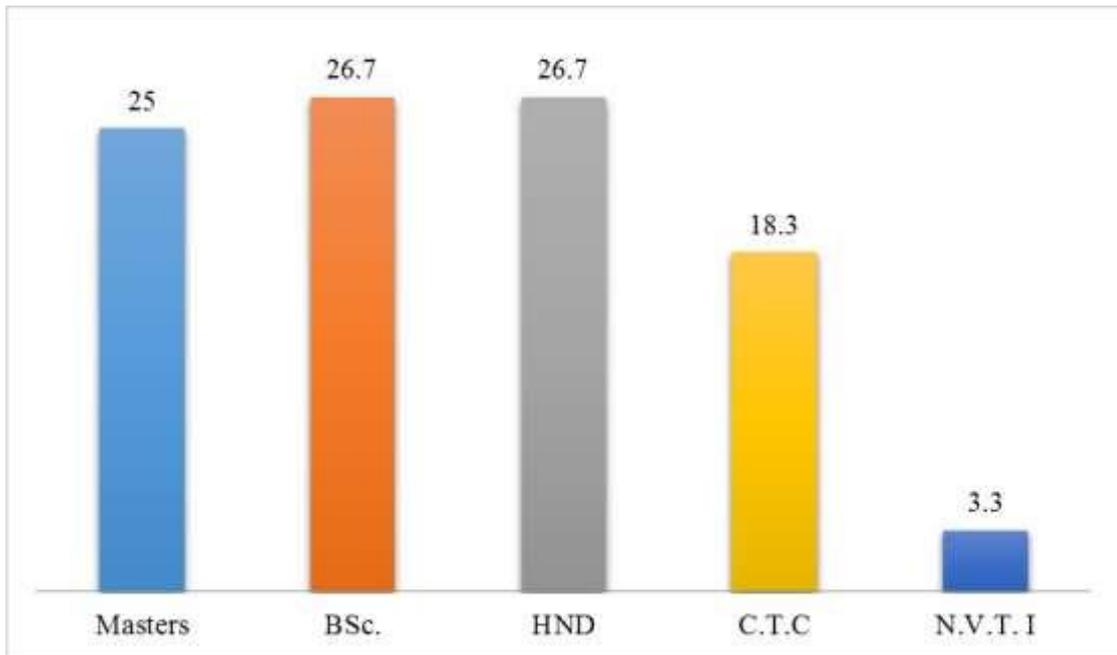


Figure 4. 4: *Qualification of Respondents*

4.5 Background of company

4.5.1 Company's year of existence

Table 4.2 below shows the company's year of existence in the construction industry. Out of 60 respondents, four (4), representing 6.7 percent said that their companies' year of existence was less than five (5) years, whereas, 14 respondents, representing 23.3 percent said that their companies' year of existence was from 5 to 10 years. More so, 23 respondents, representing 38.3 percent said that their companies' year of existence is from 11 to 15 years and 16 respondents, representing 26.7 percent said that their companies' year of existence is from 16 to 20 years. The remaining three (3) respondents, representing five (5) percent said that their companies' year of existence is above 20 years. This implies that, the three construction companies had existed in the Ghanaian construction industry for a very longtime with both skilled and unskilled labourers as staffs

Table 4. 2: Company's Years of Existence

Years	Frequency	Percent	Cumulative Percent
Less than 5years	4	6.7	6.7
5 - 10years	14	23.3	30.0
11 - 15years	23	38.3	68.3
16 - 20years	16	26.7	95.0
Above 20years	3	5.0	100.0
Total	60	100.0	

4.5.2 Number of staff in the company

As indicated in table 4.3 below, out of 60 respondents, 21 respondents, representing 35 percent said that they had less than 50 staff in their companies. what is more, 13 respondents representing 21.7 percent said that had employed between 51 and 100 staff in their companies. Again, 18 respondents representing 30 percent had between 101 to 150 staff in their companies, whereas four (4) respondents representing 6.7 percent said that they had between 151 to 200 as staffs in their companies. The remaining four (4) respondents representing 6.7 percent said that, they had more than 200 staffs in their companies. This indicates that, construction companies can have staffing strength between 50 to 150.

Table 4. 3: Number of staff in the company

Staffs	Frequency	Percent	Cumulative Percent
Less than 50 staffs	21	35.0	35.0
51 - 100 staffs	13	21.7	56.7
101 - 150 staffs	18	30.0	86.7
151 - 200 staffs	4	6.7	93.3
Above 200 staffs	4	6.7	100.0
Total	60	100.0	

4.5.3 Number of temporary unskilled labour

Table 4.4, shows the number of temporary unskilled labour that the construction companies employed. Out of 60, 19 respondents representing, 31.7 percent indicates that they had less than 10 temporary unskilled labourers staffs in the company. More so, 20 respondents representing 33.3 percent said that, between 11 to 20 unskilled labourers are working as a temporary staff. Whereas, 15 respondents representing 25 percent, indicated that, between 21- 30 temporary unskilled labourers are in their companies. The remaining respondents, with the following counts (4) and (2) representing 6.7 and 3.3 percent respectively had employed between 31 to 40 and above 40 unskilled labourers as temporary staffs., this implies that, few unskilled labourers are employed temporary into the Ghanaian construction industry.

Table 4. 4: Temporary Unskilled Labour

Number	Frequency	Percent	Cumulative Percent
Less than 10	19	31.7	31.7
11 – 20	20	33.3	65.0
21 – 30	15	25.0	90.0
31 – 40	4	6.7	96.7
Above 40	2	3.3	100.0
Total	60	100.0	

4.5.4 Number of permanent unskilled labour

Table 4.5, shows the number of permanent unskilled labour employed and on monthly salary in the construction companies. Out of 60 respondents, 27 of them representing

45.0 percent indicated that, less than 10 unskilled labourers are employed as permanent workers, more so, 20 respondents representing 33.3 percent said that, they had between 11 to 20 unskilled labourers as a permanent worker. Whereas, 10 respondents representing 16.7 percent also indicated that, between 21- 30 unskilled labourers are employed permanently are in the respective companies. The remaining respondents, with the following count (1) and (2) representing 1.7 and 3.3 percent respectively, said that, between 31 to 40 and above 40 unskilled labourers e are employed permanently, this implies that, few permanent unskilled labourers are employed into the Ghanaian construction industry.

Table 4. 5: Permanent Unskilled Labour

Number	Frequency	Percent	Cumulative Percent
Less than 10	27	45.0	45.0
11 – 20	20	33.3	78.3
21 – 30	10	16.7	95.0
31 – 40	1	1.7	96.7
Above 40	2	3.3	100.0
Total	60	100.0	

4.5.5 Number of casual unskilled labour

Table 4.6, presents the number of casual unskilled labourers employed only when the occasion demands their services. Out of 60 respondents, 35 of them representing 58.3 percent indicated that, less than 10 unskilled labourers are employed on casual basis.

More so, 17 respondents representing 28.3 percent said that, they had also employed between 11 to 20 unskilled labourers casually into the firm. What is more, 5 respondents representing 8.3 percent indicated that, between 21- 30 unskilled labourers are employed on casual basis. Again 3 respondents representing 5.0 percent said that, between 31 to 40 were casual workers. This implies that, majority of the causal unskilled labourers that fall within 11-20 are employed into the Ghanaian construction industry.

Table 4. 6: Casual Unskilled Labour

Number	Frequency	Percent	Cumulative Percent
Less than 10	35	58.3	58.3
11 – 20	17	28.3	86.7
21 – 30	5	8.3	95.0
31 – 40	3	5.0	100.0
Above 40	0	0	100.0
Total	60	100.0	

4.6 Analysis of reliability

Reliability statistics was used to analyze the scale variables. Swanlund (2013) stated that, reliability testing confirms the study produces the same outcomes across repetitive measures inside the same population by using Cronbach Alpha coefficient to determine the reliability. From the analysis indicated in table 4.7, the size was reliable with coefficients of 0.928 which is more than an alpha value of 0.70 cited by Swanlund could be enormously regarded by the researcher as depicted in the reliability analysis table.

Table 4. 7: Reliability

Cronbach's Alpha	Cronbach's Alpha based on standardized items	No of items
0.928	0.930	65

4.7 Factors that affect productivity of unskilled labour

In this section, factors that affect the productivity of unskilled labour on construction sites as it relates to the second objective of the research is discussed.

On a likert score of 1 to 5, descriptive statistics was used to determine the standard deviations and the mean score of the variables, where, scale “1” represent strongly disagree, “2” representing disagree, “3” representing neutral, “4” representing agree and “5” representing strongly agree.

Stevens & Edwards (1996) indicates the degree of agreement among the respondents to be more consistence when the standard deviation variables are less than 1.00. Based on the five (5) likert scale the relative importance index produces a ranging value from 0.2 up to 1.0 and mean score are considered vital when the variable is greater than 3.50. When two or more variables have the same mean, the one with lowest deviation is allocated the highest significance ranking (Ahadzie, 2007).

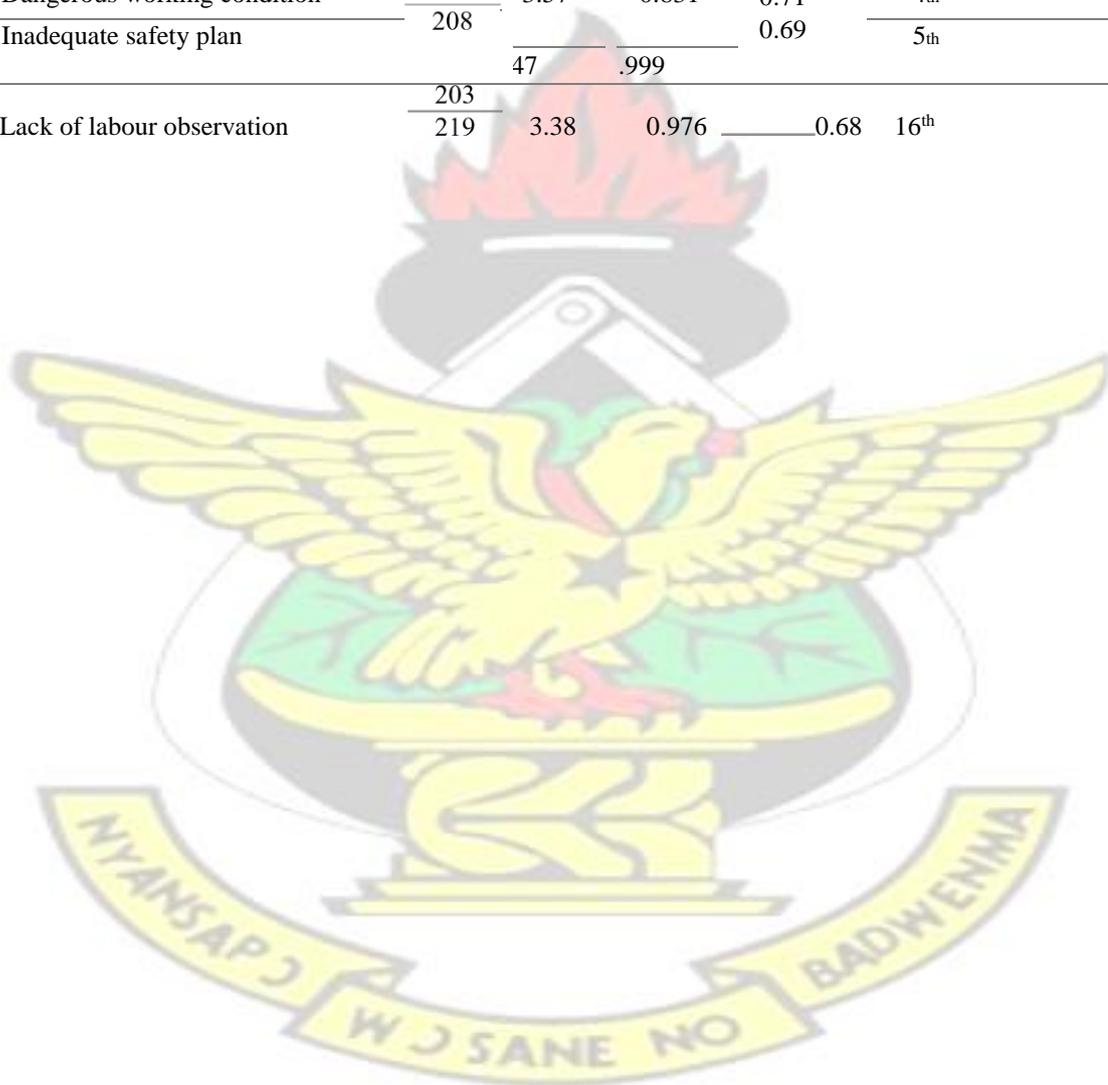
The factors are grouped under four (4) sub-headings namely: education and training, human resource management, health and safety and quality management. The table 4.8 depicts the results obtained from the respondents indicating their degree of agreement or disagreement on factors affect unskilled labour productivity on construction sites in Ghana.

Table 4.8: Factors affecting labour productivity (n=60)

Factors	ΣW	Mean	Std. Dev.	RII	Individual Ranking	Overall Ranking
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Education and Training		3.57	1.02	0.71	1st
Lack of labour experience	240	4.00	0.902	0.81	1 st
Lack of Empowerment	235	3.92	0.907	0.78	2 nd
Leadership and competency of construction management	214	3.57	1.015	0.71	5 th
Misuse of time schedule		3.72	0.922	0.74	3 rd
Material shortages	193	3.22	1.236	0.64	8 th
Tool and equipment shortages	192			0.64	9 th
Interference	199	3.32	0.965	0.66	7 th
Construction method	213			0.71	6 th
		55	0.964		
Human resource management		3.57	0.95	0.71	2nd
High workforce absenteeism	234	3.90	0.796	0.78	3 rd
Labour dissatisfaction	232	3.87	0.812	0.77	4 th
Lack of training sessions	217				
	223	3.62	1.075	0.72	4 th
Increase of labourer age	213				
	223	3.55	0.946	0.71	11 th
Labour disloyalty		3.72	0.846	0.74	7 th
Poor relations between labour and supervisors				0.76	
Lack of periodic meeting with labour	227	3.78	0.825		5 th
		3.65	0.880	0.73	8 th
Payment delay	237	3.95	0.946	0.79	2 nd
Low amount of pay	239	3.98	1.000	0.80	1 st
Lack of financial motivational system	215	3.58	1.094	0.72	10 th
Poor condition of camping	206	3.43	1.095	0.69	15 th
Working 7 days per week without taking a holiday	212	3.53	0.965	0.71	13 th
Work overtime	212	3.53	1.065	0.71	12 th
Increase number of labour in order to accelerate work	207	3.45	0.928	0.69	14 th
Rest time(s) during the work day	124	2.07	0.972	0.41	17 th
Labour fatigue	216	3.60	1.045	0.72	9 th

Poor relations among workers	223	3.72	0.976	0.74	6 th
Health and Safety		3.32	0.92	0.70	3rd
Poor health of the workers	233	3.88	0.958	0.78	1 st
Unavailability of safety engineer on site	200	3.33	0.857	0.67	8 th
Ignore safety precaution	224	3.73	0.899	0.75	3 rd
Inadequate lighting	205			0.68	6 th
	42		.962		
Accident	230	3.83	0.867	0.77	2 nd
Pollution and noise	204			0.68	7 th
	40		.785		
Dangerous working condition	214	3.57	0.831	0.71	4 th
Inadequate safety plan	208			0.69	5 th
	47		.999		
	203				
Lack of labour observation	219	3.38	0.976	0.68	16 th



Lack of place for eating and relaxation	194	3.23	1.015	0.65	10 th
Working within a confined space	199	3.32	0.983	0.66	9 th
Quality Management		2.74	1.10	0.55	4th
Bad weather condition	143	2.38	0.993	0.63	1 st
Changing order	159	2.65	1.102	0.60	2 nd
Incomplete / revise drawing	157	2.62	1.075	0.56	3 rd
Inspection delay	155	2.58	1.124	0.54	5 th
Rework	165	2.75	1.099	0.55	4 th
Low quality of raw materials	161	2.68	1.017	0.52	8 th
Inefficiency of equipment	168	2.80	1.162	0.52	7 th
High quality of required works	179	2.98	1.214	0.53	6 th
Drawings and specifications alteration during execution	190	3.17	1.137	0.48	9 th

Touching on the table 4.8 shows the results obtained from the skilled workers perspective on factors that affect unskilled labour productivity on construction sites. In order of agreement, education and training was ranked first based on the average mean of 3.57 with an average standard deviation of 1.02 (RII = 0.71), human resource management with average mean value of 3.57 and a standard deviation of 0.95 (RII = 0.71), followed by health and safety (RII = 0.70) and quality management (RII = 0.55) ranked third and fourth with a mean value of 3.32 and 2.74 respectively.

In respect to order of agreement listed above further discussions were made on some of the vital factors that affect unskilled labour output.

4.7.1 Education and training

Lack of labour experience

A ranking of the variables, lack of labour experience was ranked first (1st) (RII = 0.81) with a mean value of 4.00. From the perspective of skilled labour this means that, the experience of unskilled labourers on construction sites is a very vital aspect of every

construction company in Ghana. The unskilled workforce must be trained and at least have a little education to attain a certain level of productivity on construction sites. It is vital to train workers both, physically, socially, mentally and intellectually and not only their degree of efficiency, but also developing the staffs in the company, (Olaniyan and Ojo, 2008). When unskilled labourers are trained, they contribute to the success of the company and perform activities assigned in accordance with the construction standards of practice. Moreover, experienced unskilled labourers will add to an improved excellence of work without or with little supervision and high productivity will be achieved (Construction Industry Development Board, 2015).

According to Gerges (2015), the impact of education, training and human resources for the workers on the sites are essential and improving the workers may lead to achieve the income expected from any construction project.

Lack of empowerment

Lack of empowerment was ranked second (2nd) (RII = 0.78) with a standard deviation of 0.907 and a mean value of 3.92. That said, lack of empowerment can have an effect on productivity from the perspective of the skilled labour. Therefore, empowerment as a tool must be used to inspire workforce at the workplace, so that empowered with the right information, can attend to the needs and make right choices when problems arise at construction sites (Demgrecg and Erbag, 2010). In 21st century about 70 percent of the industry as employed some degree of empowerment initiative for at least part of their workers on construction sites (Demgrecg and Erbag, 2010).

Lack of training sessions

Lack of training sessions was ranked fourth (4th) (RII = 0.72) with a mean value of 3.62 which contributes to factors that affect unskilled labour output. From the perspective of the skilled labour, which agrees with Olaniyan and Ojo (2008) that it is vital to train unskilled labour both, physically, socially, mentally and intellectually and not only their degree of efficiency but also the growth of workers in the construction industry. There is so much impact of training on every organizational performance (Khan *et al.*, 2011), in twenty first century, training has been the vital factor in the business world because the organization and the workers' effectiveness and efficiency are been increased by training which agrees with Kazaz *et al.* (2008).

4.7.2 Human resource management

Judging from the table 4.8, for the individual ranking, low amount of pay was ranked first (1st) (RII = 0.80) with a mean value of 3.98, payment delay was ranked second (2nd) with a mean value of 0.97, high workforce absenteeism was ranked third (3rd) with a mean value of 0.78 and labour dissatisfaction was ranked fourth (4th) with a mean value of 0.77. Followed by poor relation between labourers and supervisors ranked fifth (5th) with a mean value of 3.78, and poor relations among workers was ranked sixth (6th) with a mean value of 0.72.

From the perspective of the skilled labour it implies that, absenteeism of labourers, dissatisfaction in terms of delay of salaries, tidiness, low amount of salaries and improper relation between the workers can affect the unskilled labour efficiency, as cited by Kadir *et al.* (2005). This reflects to the study carried out in Nigeria that low salary earners were graded first (Adamu *et al.*, 2011) Again, project cost and time overrun can also be affected since each project has its own resources and technology.

For unskilled labour to cater for themselves, they need a reasonable wage in order to meet their demands. Human resource on construction sites are the most worthwhile assets of any construction company because with money, materials and machines and without the presence of man-power nothing gets done (Adamu *et al.*, 2011)

Thiyagu and Dheenadhayalan (2015) states that unskilled labour efficiency have been identified and are grouped into a means of satisfying the workforce elementary requirements as to food, clothing and shelter. All these factors under the human resource management can have an adverse effect on productivity and must be eliminated or controlled to ultimately improve productivity on construction sites.

(Enshassi *et al.*, 2007).

4.7.3 Health and safety

From the table 4.8, poor health of the workers was ranked first (1st) (RII = 0.78) with a mean value of 3.88. The second (2nd) (RII = 0.77) ranked was accident with a mean value of 3.83 and ignore safety precaution was ranked (3rd) (RII = 0.75) with a mean value of 3.73.

According to Tahir *et al.* (2015), the identified factors are valid factors that can affect productivity of unskilled labour, from the survey a greater respondents agreed to the fact that health and safety plays a greater role on construction sites, Enshassi *et al.* (2013) considered these has an environmental factors. Therefore, health and safety on construction sites cannot be undermined, thus, it should be given proper attention.

4.7.4 Quality management

Table 4.8 indicates quality management as another factor that affect unskilled labour productivity on construction sites. It tells from the table that all the factors mean scores under the quality management column were less than 3.50.

From the perspective of the skilled labour it implies that, the identified factors are not valid factors that affect productivity of unskilled labour in the construction sites. In terms of quality management, a greater respondent disagreed with it being a significant factor that affects productivity of unskilled labourers. On the contrary, Ailabouni *et al.* (2009) ; Shehata and El-Gohary (2011); Enshassi *et al.* (2013) considered climate and the weather conditions as one of the management factors that can have an impact on unskilled labour productivity on construction sites.

4.8 Method to improve unskilled labour productivity

This section discusses the methods to improve unskilled labour productivity on construction sites as it relates to the second objective of the research.

On a Likert score of 1 to 5, descriptive statistics were used to determine the standard deviations and the mean score of the variables, where, “1” represents very important, “2” representing important, “3” representing neutral, “4” not important and “5” representing not very important. The factors are grouped under four (4) sub-headings, namely: employee training, communication, employee motivation and job satisfaction. As illustrated in table 4.9 the results obtained from the respondents in line with the degree of importance, be it very important or not very important.

Table 4. 9: Methods of improving unskilled labour productivity (n=60)

Methods of improvement	ΣW	Mean	Std. Dev.	RII	Individual ranking	Overall ranking
Employee training		4.14	0.86	0.37		2nd
Training on job	97	4.38	0.715	0.32	4 th	
Development of training policy for unskilled labour	118	4.03	0.802	0.39	2 nd	
Introduction of modern technology	119	4.02	1.017	0.40	1 st	
Attending workshop	113	4.12	0.922	0.38	3 rd	
Communication		4.22	0.87	0.36		3rd
Clear communication	102	4.30	0.889	0.34	4 th	
Oral communication	98	4.37	0.688	0.33	5 th	
Written communication	112	4.13	0.812	0.37	2 nd	
Effective communication	114	4.10	0.896	0.38	1 st	
Interpersonal communication	108	4.22	1.043	0.36	3 rd	
Employee motivation		3.99	0.97	0.40		1st
Receiving credit for work done	99	4.35	0.755	0.33	6 th	
Monetary rewards	108	4.20	0.819	0.36	5 th	
Well motivated staff has positive attitude towards work	125	3.92	0.944	0.42	2 nd	
Workers will still perform well even if their salary is delayed	156	3.40	1.278	0.52	1 st	
Workers put in their best when they are given incentive	117	4.03	1.032	0.39	3 rd	
Motivation by management	118	4.03	0.956	0.39	4 th	
Job satisfaction		4.21	0.75	0.36		4th
Excellence manager-subordinate relationship	111	4.15	0.755	0.37	2 nd	
Supervisor verses unskilled labour relationship	108	4.20	0.605	0.36	3 rd	
Good safety working environment	108	4.18	0.746	0.36	4 th	
Company prestige	113	4.12	0.846	0.38	1 st	
Work security	96	4.40	0.785	0.32	5 th	

4.8.1 Employee motivation

As shown in table 4.9, employee motivation was ranked first (1st) (RII = 0.40) with an average mean value of 3.99 and an average standard deviation of 0.97. From the perspective of skilled labour it shows that employee motivation is much needed on construction sites. This agrees with Forson (2012) that for every construction industry to perform well, motivation should be a key aspect in terms of unskilled labour productivity. Because without it, workers will not involve themselves in the work to meet an expected target, this will eventually contribute to poor performance. To increase unskilled labour output, there must be a safety working environment, recognition of good behaviours, appreciations are shown, and development of fairly payment systems. (Forson, 2012). There are various motivational system or methods stated in the literatures sourced from researchers for this matter, Maslow's Hierarchy of needs (1954) would be much more vital as a motivational tool to improve unskilled labour productivity because it will maximize each worker's potential on construction sites. This indicates that if management of the construction companies motivates their unskilled labour, there will be an increase in productivity and contractor's estimates will not be affected.

4.8.2 Employee training

From table 4.9, employee training was ranked second (2nd) (RII = 0.37) with an average mean value of 4.14 and an average standard deviation of 0.86. From the perspective of skilled labour it shows that employee training is vital to any construction company. This has become an important aspect for all construction companies as a method to improve their unskilled labour productivity. According to Olaniyan and Ojo (2008) It is vital to train workers both, physically, socially, mentally and intellectually and not only their

degree of efficiency but also developing the staffs in the company. The worthwhile assets for any organization is mostly human resources and the efficiency and achievement of the company lie on them who form part of the activities performed in the organization. Though, training of unskilled labour are being underestimated, according to the US Department of Labour, investing a dollar in training of workers provides a return to the company and investing in training can lead to forty-two (42) percent increment in unskilled labour productivity on construction sites. Cox *et al.*(1998) as cited by Kuykendall (2007). This indicates that if construction companies trained their workforce, there will be an increase in productivity on sites which will go a long way to provide competitive estimates in order to win construction projects.

4.8.3 Communication

Judging from Table 4.9, Communication was ranked third (3rd) (RII = 0.36) with an average mean value of 4.22 with an average standard deviation of 0.87. Keyton (2011), explains the communication as the process of transferring messages or information from one worker to another and for communication to be decoded there must be a clear understanding for exchange of information.

Dainty *et al.* (2006) stated that, communication within the context of an organization, is to send an information or instruction to impact the actions or the behaviours of other people in the organization or during a construction activities, there may be a request or information exchange on construction sites. Therefore, communication between the construction teams, workers (skilled and unskilled labourers) and the supervisors on construction sites must improve to reduce failure and better technical solutions leading to clear and open communication at all levels that could lead to new ideas and innovations, (Hoezen, 2011). This agrees with Ritz (1994) as cited by Prempah (2014)

that, unless the effective communication system is introduced, it would be impossible for a project to carry out successfully as planned.

Communication would be effective on construction sites when there is achievement to established, relationship between management and the workers, logical reasoning by all members of the organization.

4.8.4 Job satisfaction

Job satisfaction was ranked fourth (4th) (RII = 0.36) with an average mean value of 4.21 and average standard deviation of 0.75. According to Hoppock (1935) as cited by Aziri (2011) job satisfaction referred to an employee truthfully saying that he is satisfied with the work he is doing been caused by the combination of physiological, psychological and environmental circumstances. This agrees to Thiyagu and Dheenadhayalan (2015) that, satisfying the workers' basic needs such as food, clothing and shelter, contributes to job satisfaction as it meets the highest psychological needs of the employee. Every worker has a need to belong and for their worth to be obvious. Therefore, job satisfaction has to do with the way workers feels about their work and the various aspects, especially to some extent it has to do with how workers preferred or undesired their work (Thiyagu and Dheenadhayalan, 2015).

4.9 Summary

Chapter 4 critically explained the analysis obtained from the primary data collected. A brief discussion was drawn from the questionnaires retrieved and a descriptive statistic was used for the analysis. It presented the descriptive statistics in a form of mean score, standard deviations and the relative importance index was used to ranked the other objectives of the research on determine measures for improving unskilled labour productivity on construction sites from the perspective of skilled labour.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

Chapter five concludes the study. First of all, the achievement of the objectives, and contributions of this research are presented. Conclusions and recommendations from the study are put forth. Finally, Suggestions for further studies and limitation are outlined.

5.2 ATTAINING THE RESEARCH OBJECTIVES

The study was articulated to achieve a particular aim that is to determine measures for improving unskilled labour productivity on construction sites from the perspective of skilled labour.

The following objectives were set:

1. To ascertain the factors that affect productivity of unskilled labour on construction sites.
2. To identify the techniques to improve unskilled labour productivity on construction sites.

5.3 SUMMARY OF FINDINGS

In this sub-section, the research objectives are revisited to consider how they were attained through the various stages of the topic under study. All together in the analysis, the study employed relative importance index, standard deviation and mean scores.

5.3.1 To ascertain the factors that affect productivity of unskilled labour on construction sites.

In addressing this objective, based on a literature review, forty-six (46) factors were grouped under four (4) sub-headings namely; Education and training, human resource management, health and safety and quality management. Respondents were asked to share their level of agreement or disagreement on a scale of 1-5. After the data analysis, it was revealed that, education and training was ranked first (1st) based on the Relative Importance Index (RII = 0.71) with an average mean of 3.57 and an average standard deviation of 1.02, Human Resource Management was ranked second (2nd) based on the Relative Importance Index (RII = 0.71) with average mean value of 3.57 and a standard deviation of 0.95, health and safety was ranked third (3rd) with a Relative Importance Index of (RII = 0.70) and an average mean value of 3.32 and quality management was ranked fourth (4th) with a Relative Importance Index of (RII = 0.55) and an average mean value of 2.74.

5.3.2 To identify the techniques to improve unskilled labour productivity on construction sites.

A review of existing literature on techniques to improve unskilled labour productivity on construction sites from the perspective of skilled labour. In the questionnaire questions, respondents were asked to identify their level of important and not very important on a scale of 1-5. The twenty (20) factors were grouped under four (4) subheadings namely: communication, job satisfaction, employee training and employee motivation. After the data analysis, it was revealed that, most of the variables had an average mean score more than 3.50 and a standard deviation value of less than 1, which means that the degree of importance of the various methods had influence in improvement of unskilled labour productivity on construction sites.

5.4 CONCLUSIONS

On the basis of this research, several key factors and techniques that contribute to the improvement of unskilled labour productivity on construction sites from the perspective of skilled labour have been discussed and the researcher would like to make the following conclusions:

- Effective communication, job satisfaction, employee motivation, health and safety, human resource management, employee education and training were found to be paramount for the construction companies which agrees with the opinions of the other construction researchers.
- It can then be concluded that construction companies in Ghana should provide unskilled labour with a good motivational packages, a good working environment, and basic education and training that will provide a basis for the growth of their potential which will make them secure at workplace while their efficiency is not compromise.

5.5 RECOMMENDATION

From the perspective of skilled labour, building construction companies should be committed to implement the following recommendations in order to improve the productivity of unskilled labour on construction sites in Ghana. Based on the findings of the study, the following recommendations were made:

- From the study, it was revealed that, Management of the construction industry should consider the importance of education, training and human resource

management in the organization because it is essential, improving it may lead to achievement of incomes expected from any construction project.

- It was found from the study that, health and safety on construction sites was vital for improving unskilled labour productivity on construction sites thus, the study recommends that management of the construction industry should give proper attention to the health and safety of unskilled labour in order to improve their output on construction sites.
- From the study, it was also revealed that, training sessions will enhance or upgrade unskilled labour skills, therefore the study recommends that, the management of the construction industry should conduct frequent training sessions to promote the unskilled labour to the semi-skilled or skilled labour.
- It was established from the study that; communication is a method of improving unskilled labour productivity. Thus, the study recommends that management of the construction industry should improve on communication between the workers (skilled and unskilled labour) to reduce failure and better technical solutions leading to clear and open communication at all levels that could lead to new ideas and innovations on construction sites.

5.6 LIMITATIONS OF THE STUDY

The study looked at how unskilled labour productivity can be improved, however, responses of the study were obtained from the skilled labourers against the assumption that the skilled labour fit the productivity requirements of the unskilled labour. There is

therefore the possibility that some of the responses gathered could not reflect the reality on the ground though they are relevant.

5.7 FURTHER RESEARCH

- The researcher recommends a further research into consideration of major factors (both positive and negative) that affect the unskilled labour productivity on construction sites.
- A similar study should be conducted to validate the findings of this study by collecting data from unskilled labour on construction sites.
- Further research should also be conducted on the motivational factors to improve unskilled labour productivity on construction sites.



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APPENDIX

QUESTIONNAIRE

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
COLLEGE OF ART AND BUILT ENVIRONMENT
DEPARTMENT OF BUILDING TECHNOLOGY, KUMASI – GHANA

SURVEY QUESTIONNAIRE (SKILLED WORKERS)

PRODUCTIVITY IMPROVEMENT OF UNSKILLED LABOUR ON CONSTRUCTION SITES: A CASE STUDY OF ACCRA POLYTECHNIC

Dear Sir/Madam,

This questionnaire forms part of an MSc. Construction Management research project being part of an academic requirement which aims **to to determine measures for improving unskilled labour productivity on construction sites.**

I would be very grateful if you could spend 10 minutes of your time to answer the attached questions so that I can contribute towards the improvement of unskilled labour productivity in the Construction industry in Ghana and make comments wherever necessary.

I appreciate that you are already busy and that participating in this survey will be another task to add to a busy schedule, but your contribution will provide a vital information and **all data provided are purely for research purposes and will be kept anonymous and completely confidential.**

Thank you for your valid input in advance.

Yours faithfully,

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INSTRUCTIONS FOR THE QUESTIONNAIRE:

This questionnaire consists of five (5) sections. Please read carefully and answer as accurately as possible.

(Please tick (✓) where applicable)

Part A: Background of respondents						
1	Position in company	Artesian <input type="checkbox"/>	Foreman <input type="checkbox"/>	Supervisor <input type="checkbox"/>	Engineer <input type="checkbox"/>	Proj. Manger <input type="checkbox"/>
2	Years in this organization	Less than 1 <input type="checkbox"/>	Less than 2 <input type="checkbox"/>	Less than 3 <input type="checkbox"/>	Less than 4 <input type="checkbox"/>	More than 5 <input type="checkbox"/>
3	Working experience in years	Less than 5 <input type="checkbox"/>	5 – 10 <input type="checkbox"/>	11-15 <input type="checkbox"/>	16-20 <input type="checkbox"/>	Above 20 <input type="checkbox"/>
4	Qualification	Master <input type="checkbox"/>	BSc <input type="checkbox"/>	HND <input type="checkbox"/>	C.T.C <input type="checkbox"/>	NVTI <input type="checkbox"/>
Part B: Background of company						
5	Company's years of existence	Less than 5 <input type="checkbox"/>	5 – 10 <input type="checkbox"/>	11-15 <input type="checkbox"/>	16 - 20 <input type="checkbox"/>	Above 20 <input type="checkbox"/>
6	No. of staff do you have	Less than 50 <input type="checkbox"/>	51 – 100 <input type="checkbox"/>	101-150 <input type="checkbox"/>	151- 200 <input type="checkbox"/>	Above 200 <input type="checkbox"/>
7	Unskilled labour on temporary	Less than 10 <input type="checkbox"/>	11 – 20 <input type="checkbox"/>	21- 30 <input type="checkbox"/>	31- 40 <input type="checkbox"/>	Above 40 <input type="checkbox"/>
8	Permanent unskilled labour	Less than 10 <input type="checkbox"/>	11 – 20 <input type="checkbox"/>	21- 30 <input type="checkbox"/>	31- 40 <input type="checkbox"/>	Above 40 <input type="checkbox"/>
9	Casual Unskilled labour	Less than 10 <input type="checkbox"/>	11 – 20 <input type="checkbox"/>	21- 30 <input type="checkbox"/>	31- 40 <input type="checkbox"/>	Above 40 <input type="checkbox"/>

On a scale of 1 to 5, please rank the following factors that affect the productivity of unskilled labour on construction sites by ticking the appropriate cell.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

		Degree of agreement				
Part D: Factors that affect productivity of unskilled labour		1	2	3	4	5
D1	Education and training					
1	Lack of labour experience					
2	Lack of empowerment (training and resourcing)					
3	Leadership and competency of construction management					
4	Lack of training sessions					
5	Misuse of time schedule					
6	Material shortages					
7	Tool and equipment shortages					
8	Interference					
9	Construction method					
D2	Human resource management					
10	High workforce absenteeism					
11	Labour dissatisfaction					
12	Increase of labour age					
13	Labour disloyalty					
14	Poor relations between labour and supervisors					
15	Lack of labour observation					
16	Lack of periodic meeting with labour					
17	Payment delay					
18	Low amount of pay					
19	Lack of financial motivational system					
20	Poor condition of camping					
21	Working 7 days per week without taking a holiday					
22	Work overtime					
23	Increasing number of labour in order to accelerate work					
24	Rest time(s) during the work day					
25	Labour fatigue					
26	Poor relations among workers					

D3	Health and safety					
27	Poor health of the workers					
28	Unavailability of safety engineer on site					
29	Ignore safety precaution					
30	Inadequate lighting					
31	Accident					
32	Pollution and noise					
33	Dangerous working condition					
34	Inadequate safety plan					
35	Lack of place for eating and relaxation					
36	Working within a confined space					
D4	Quality Management					
37	Drawings and specifications alteration during execution					
38	Changing order					
39	Incomplete/revise drawing					
40	Inspection delay					
41	Rework					
42	Low quality of raw materials					
43	Inefficiency of equipment					
44	High quality of required works					
45	Bad weather condition					
	<i>If others, please specify and rank</i>					

On a scale of 1 to 5, please rank the following methods to improve unskilled labour productivity on construction sites by ticking the appropriate cell.

1	2	3	4	5
Not very important	Not important	Neutral	Important	Very important

		Degree of importance				
Part E: Techniques to improve unskilled labour productivity		1	2	3	4	5
E1	Employee Training					
1	Training on job					
2	Development of training policy for unskilled labour					
3	Introduction of modern technology					

4	Attending workshop						
E2	Communication						
5	Clear communication						
6	Oral communication						
7	Written communication						
8	Effective communication						
9	Interpersonal communication						
E3	Employee Motivation						
10	Receiving credit for work done						
11	Monetary rewards						
12	Well motivated staff						
13	Workers will still perform well even if their salary is delayed						
14	Workers put in their best when they are given incentive						
15	Motivation by management						
E4	Job satisfaction						
16	Excellence manager-subordinate relationship						
17	Supervisor verses unskilled labour relationship						
18	Good safety working environment						
19	Company prestige						
20	Work security						
	<i>If others, please specify and rank</i>						

Thank you

