UNIVERSITY OF EDUCATION, WINNEBA

COLLEGE OF TECHNOLOGY EDUCATION, KUMASI

ASSESSING THE EFFECTIVENESS OF COMMUNICATION IN CONSTRUCTION PROJECT TEAM PERFORMANCE IN SELECTED METROPOLISES IN GHANA

JUSTICE AGBEVADE

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A Dissertation in the DEPARTMENT OF CONSTRUCTION AND WOOD TECHNOLOGY EDUCATION, FACULTY OF TECHNICAL EDUCATION, submitted to the School of Graduate Studies, University of Education, Winneba in partial fulfilment of the requirements for the award of the Master of Philosophy (Construction Technology) degree.

SEPTEMBER, 2017

DECLARATION

STUDENT'S DECLARATION

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

SIGNATURE …….

DATE ……

SUPERVISOR'S DECLARATION

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

NAME: Dr. Nongiba A. Kheni

SIGNATURE……..

DATE……

ACKNOWLEDGEMENT

I wish to recognize the help of the many individuals who helped me through consolation and in numerous different approaches to accomplish the finish of this work and to every one of them I am extremely grateful. However, some of them I feel the requirement for specific specify.

I am specific obliged to my Supervisor, Dr. Nongiba A. Kheni for his commendable remarks, help and the direction he gave over the span of my work.

I additionally thank every one of my lecturers and staff in the office for their resolute endeavors and devotion to teach and prepare me up to this far. On account of every one of the individuals who offered to compassionately react to surveys of this review.

I likewise want to thank my dear wife, Millicent Agbevade (Mrs.) for her care, exertion, responsibility to teach me and guidance

I express my true appreciation to my cohorts for their support and consolation all through the course. At the highest priority on the rundown are Dr. Justice Dzokoto (Senior Lecturer, Central University), Richard Apau and Albert Banunle etc. Most importantly I express gratitude toward Almighty God for His affection and the endowment of life. His beauty has been adequate for me.

GOD BLESS YOU ALL

DEDICATION

I wish to dedicate this work to Almighty God, my dear wife, Millicent Agbevade (Mrs.) and my children, Collins Klenam Kofi Agbevade and Nicole Bubune Aku Agbevade.

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ABSTRACT

Challenges often arise on construction project sites in connection with communication relating to many issues bordering on the construction project site. Despite wide recognition of the importance of communication within the construction industry, a combination of organisational and personal factors invariably render communication within project sites ineffective. The aim of the study was examined how communication among project team members in construction project sites affect construction project performance in Ghana. The researcher employed a cross sectional survey research design in conducting the study. Survey questionnaire were administered to a total of 167 individual project team members of 16 construction project sites undertaken by 16 purposely selected D1k1 construction firms in the Accra and Kumasi Metropolises. Analysis of the data was performed using the Statistical Package for Social Sciences (SPSS Version 20). The findings of the study showed that the communication channels used often by the project teams included meetings, telephone calls, face-to-face interactions and drawings. With regards to the communication platforms, the findings show although different platforms were used, personal communication platforms (calls, emails, face-to-face interaction) was the most important for the project teams. The finding also show that the effectiveness of project team communication based on the dimensions of accuracy, clarity of procedure, understandable, timeliness and completeness had significant effect on project performance. All the five dimensions of communication had positive effects on project performance but the effects of understandable and clarity of procedure were the only ones that were statistically significant. The findings further revealed that poor listening skills of team members, unclear communication objective, unclear channels of communication and limited resources are the major barriers to effective communication among project team members. The major drivers of communication noted included extent of coordination among project team members, timeliness of access to information, understanding the language(s) and culture of team members. The study recommends concerted efforts in line with the study finding be made by project team members aimed at enhancing the performance of projects.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Construction is a fragmented and dynamic sector with a project-based nature. This makes many stakeholders operate in frequently changing sets of relationships which are contractually driven. The culture shows a reality of conflicts and lack of mutual respect and trusts (Dainty, Moore, & Murray, 2006). The efficiency and effectiveness of the construction process strongly depend on the quality of communication (Hoezen, M., van Rutten, J., Voordijk, H., & Dewulf, G., 2010). Construction industries play an important role in economic growth of developing countries and it is long familiar combating with numerous uncertainties. The expansion of construction sector widely spreads out with an increased complexity of management of construction projects. Communication is the soul of the project. In the world of project management today, it has become increasingly more important to turn efforts toward more effective means of communication. As blood flows, it pumps oxygen through the body to sustain life. Likewise, communication is the lifeblood of projects and organisations. Information and communication are an integral part of any construction effort (Priyadharshini & Satheesh, 2015). Effective communication performance is seen as a critical requirement for meeting delivery success in arguably intense collaborative, interdependent and multidisciplinary project based sectors (Kwofie, T. E., Fugar, F., Adinyira, E., & Ahadzie, D. K. (2014l) that project managers, contractors, design team all can keep in touch during project life cycle. People at site can receive instruction, layout, working drawings, structural details etc. and

go about their work. People at the office can keep track of development at the site too. Project communication is the exchange of project specific information with the emphasis on creating understanding between project stakeholders. Communication is essential for the purpose of information distribution and human understanding of the project. Project communication, in general, is the responsibility of everyone on the project team. However, in particular, project manager is responsible for the development of project communication management plan (Gavade, 2017). Construction industry sources suggest that 85% of the project manager's time is spent on communication and 70% project documentation is paper based which delays the project activities and create hurdles to project delivery (Wierzbicki, 2006). Improvement in the communication within stakeholders could reduce the project failure. Open communication at all the levels could lead to innovation and better technical solution (Chung, Skibniewski, & Kwak, 2009).

Abugre (2013) stressed that over the past years many scholars have argued that employee commitment to work is the result of worker satisfaction in construction workplace. Worker satisfaction and commitment lead to organisational citizenship behaviour, reduction in absenteeism and turnover which would benefit the organisation. Organisational communication is a process that enables groups and or partners to learn from each other and to coordinate their tasks, helping the group to develop and maintain a viable relationship (Cooper and Robson, 2006). It was emphasised by Ochieng and Price (2009) that both internal and external communication provides the invisible glue which can hold a dislocated multicultural project team together. Effective communication is the key to managing expectations, misconceptions, and misgivings on multicultural project teams. As confirmed, good communication strategies are primary in establishing,

cultivating, and maintaining strong working relationships on heavy construction engineering projects.

According to Eriksson and Pesamaa (2007), the procurement structure and contracting arrangements define the team roles and line of communication that significantly influence the performance outcome of construction projects. Ensuring communication effectiveness which is essential to enhancing managerial efficiencies is crucial to the project management practice on construction towards success. This assertion is underpinned by the fact that effective communication plays a critical role in team effectiveness, integration, and performance that are crucial factors in engendering project delivery success (Kwofie et al., 2015). Additionally, the influence on information flow is greater than that of information composition. Communication ineffectiveness among construction firms/companies inherent from information flow was late delivery of information, barriers to information access, and procedures in information dissemination (Dainty *et al.,* 2006). On information composition, the dominant communication ineffectiveness were largely misunderstanding of information, inaccuracies, and lack of clarity in project related information shared (Den & Emmitt, 2007).

Onowa (2013) posited failure in communication or perception clashes of interest of value, gap between anticipated and actual event, degree of flexibility and capacity of organisation to respond to the unexpected all those by no means are possible constraints to organisational intention but the major concern here is the breakdown in management function due to no communication. Affare (2012) opined that all the various stages of construction rely on professionals transferring appropriate and relevant information to

develop a buildable design that meets the clients' requirements. As the project unfolds and the design is realised, information in the form of drawings, specifications and construction methods must be communicated from one expert to another. In other words information must be transferred and understood so that the various aspects of the project can be assembled to realise the design.

The construction industry is wholly reliant upon effective communication between individuals, teams and organisations. However, in a project-based industry, interaction tends to be characterised by unfamiliar groups of people coming together for short periods before disbanding to work on other endeavours. This temporal dimension complicates an already problematic communication environment in which technical language, an adversarial culture and noise/distraction all combine to prevent straightforward information flow from one party to the other. Indeed, the sheer number of stakeholders involved in the processes undertaken during a construction project renders communication networks exceptionally complex and subject to change. Furthermore, with the current imperative to improve industry performance by designing and constructing more rapidly, many processes that are reliant upon effective communication occur concurrently. This increases the probability of problems occurring in the transmission and reception of vital information to the construction effort. Hence, in many ways the communication effectiveness of managers defines their performances as managers; superior performance demands superior communication (Dainty *et al.,* 2006).

1.2 Statement of the Problem

One of the most critical issues in construction project management that have drawn lots of attention in recent times is the management of information flow among project team members (Emmett, 2013). Due to the multiplicity of professionals that often form construction project team, communication has always been a challenge among team members. The need to effectively utilised appropriate communication media and channels to ensure accuracy, completeness and understandable transfer of information among project team members is critical for the successful completion of construction projects. Several studies have shown that effective communication improve teamwork, reduce conflicts and rework and contribute significantly to project success (Emmett 2013; Thomas, 2000).

Ineffective communication, on the other hand, has been found to be responsible for the failure of many construction projects. According to Tipili and Ojeba (2014), ineffective communication practice resulting from factors such as unclear communication objectives, unclear channels of communication, ineffective reporting system, ineffective communication between the parties on the project, stereotyping and language difficulties has been a leading cause of project failure and poor performance.

In Ghana, communication at construction project sites is faced with many difficulties. Among these challenges include lack of effective communication tools and platforms, lack of management commitment to appropriate communication systems, poor communication skills, language and cultural difference and other personal characteristics.

Affare (2012) noted that despite wide recognition of the importance of communication within the construction industry in Ghana, a combination of organisational and personal factors have rendered communication within project sites ineffective.

Against the backdrop of communication problems among project team members in the Ghanaian construction industry as reported by many studies including that of Affare (2012), Duodu (2016) and Adinyira (2017) it is important to understand how the effectiveness of communication among project team members influences project performance. While this is very important, very little empirical studies have been done to examine the effect of effective communication on project performance creating a dearth in knowledge. This study was conducted to bridge the dearth in knowledge by examining the effects of effective communication among project team members influence construction project performance on sites in selected Metropolises in Ghana.

1.3 Aim of the Study

The aim of the study is to examine how communications among project team members in t construction project sites affect construction project performance in Ghana.

1.4 Objectives of the Study

The study seeks to achieve the following objectives:

a) To identify project team communication practices at construction project sites in selected metropolises in Ghana

b) To evaluate the influence of project team communication on construction project performance in selected metropolises in Ghana

c) To identify barriers to effective project team communication at construction project sites in selected metropolises in Ghana

d) To identify drivers to effective project team communication at construction project sites in selected metropolises in Ghana.

1.5 Research Questions

The study seeks to provide answers to the following questions;

a) What are the project team communication practices at construction project sites in selected metropolises in Ghana?

b) To what extent do project team communication on construction project sites influence project performance in selected metropolises in Ghana?

c) What are the barriers to effective project team communication at construction project sites in selected metropolises in Ghana?

d) What are the drivers to effective project team communication at the construction project sites in selected metropolises in Ghana?

1.6 Significance of the Study

The construction industry is considered the bedrock for economic development of every country. In developing countries such as Ghana, the construction industry has become even more important as the need to bridge infrastructural deficit become even more important. Against this backdrop, any issues that affect the construction industry become an important issue for national development. This study, which examined the effectiveness of communication in construction project performance, is therefore very relevant for national development.

The findings of the study provide information and baseline knowledge on the effectiveness of communication among construction project site in some Metropolises of Ghana. This information is useful for construction project managers, policy makers and government in their efforts to develop policies and strategies that will make the construction industry vibrant and contribute to economic growth and socio-economic development.

Also to academics, students and other researchers, the findings of this study serve as reference material and a source of literature for further studies on a similar phenomenon. Researchers with interest on the interrelationship between communication and project performance will particularly find this study very useful as it expounds on the drivers and barriers to communication at construction project sites and how the effectiveness of communication influence project performance.

1.7 Definition of terms

Communication:

Communication is defined as the exchange and flow of information and ideas from one person to another; it involves a sender transmitting an idea, information, or feeling to a receiver (Affare, 2012).

Performance:

The accomplishment of a given task measured against preset known standards of accuracy, completeness, cost, and speed. In a contract, performance is deemed to be the fulfilment of an obligation, in a manner that releases the performer from all liabilities under the contract.

1.8 Scope and Delimitation of the study

The study was delimited to assessing the effectiveness of communication among construction project team members in construction project performance. The study thus covered only construction projects that were ongoing at the time of the conduct of the study. The study focused on communication among construction project teams. As a result of this, the researcher contacted only the construction project team members for the study. Other support staffs such as casual workers, foremen and laborers were not considered in the conduct of the study. The study was also designed to be conducted in Metropolises in Ghana and as such only the major cities in Ghana were considered.

1.9 Organisation of the Study

The study is organised into six chapters. The first chapter (Chapter one) presents the introductory aspect of the study which includes the background to the study, problem statement, research objectives, research questions, the significance of the study, delimitations, operational definitions and organization of the study.

The second chapter (chapter two) presents a review of relevant literature on the study. It covers theoretical review, conceptual framework and review of empirical studies on the topic.

The third chapter (Chapter three) described the methodology used in the design, collection and analysis of data for the study. It highlights specifically the research design, population and sampling approached used, methods of data collection and how data collected were analysed. The results from analysis of data collected are presented in the fourth Chapter. The Chapter five presents discussions of the results obtained from the study while chapter six present summary of the findings, conclusions drawn and recommendations made.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The chapter delved into the review of existing literature on evaluation and assessment of communication in construction projects within the context of Ghana. This chapter reviewed researches and works published in peer review journals and books locally and internationally. The chapter began by discussing the construction industry in Ghana, and also provided background information on the concept of communication on construction projects. The chapter also reviewed related works on the channels, methods and models of communication used in construction projects. Further discussion was carried out on the effects of communication on construction projects performance. Relevant theories, as well as empirical studies conducted on the study topic, have also been reviewed in this chapter. The chapter further provided a critical review of the barriers and drivers of effective communication on construction projects. The chapter ends by providing a conceptual framework for the study.

2.2 Construction Industry of Ghana

The construction industry is an important sector of the Ghanaian economy. It contributes an average of 8.5% of the Gross Domestic Product (Fugar & Agyakwah-Baah, 2010). It employed about 2.3 % of the economically active population in 2002 (Amankwa, 2003). The industry provides means of production for other industries or commodities to be consumed. As Ghana aspired to become a middle-income nation by 2015, and with the

recent discovery of oil in commercial quantities, the role of the construction industry is absolutely important (Fugar & Agyakwah-Baah, 2010).

Ghana has seen major development in the construction industry in the past 10 to 20 years. This trend, combined with a desire for well-designed and landscaped environments, has created opportunities for professionals in the landscape industry. The industry can develop through the promotion of formal education in its respective disciplines; assist in the development of curricula that provides access to students for training and intern positions within construction companies, as well as relevant government sectors. Professional bodies associated with the industry should draft licensing bills for approval by parliament and assist with enforcement. In addition, standards should be developed to guide the development of the industry. These measures will regulate activities of practitioners and ensure high standards (Asiedu, Buah & Blankson, 2010).

The Ghanaian construction Industry, according to Anaman and Osei-Amponsah (2007) was the third largest growing economic sector outstripping the manufacturing industry in 2004 with a constant GDP growth of about 5.8 % from 2004 to 2005. Subsequently, the emergence of Ghana as an oil producing country, the Ghanaian construction industry is projected to grow stronger at a rate of 13% (ISSER, 2008). Besides the important growth in employment and GDP contributions, the construction industry in Ghana still has a huge potential of contributing more to job creation and higher contribution to GDP. Considering the extent of the contribution of construction to the economy, coupled with the fact that it is labour intensive, it is also worth noting that the construction industry is

featured by constantly changing working environments such as conditions on site and different types of work being carried out simultaneously by several workers. The construction industry of Ghana, like other developing countries, relies on labour intensive methods (Dadzie, 2013).

The construction industry plays an essential role in the socio-economic development of a country. The activities of the industry have a lot of significance to the achievement of national socio-economic development goals of providing infrastructure, sanctuary and employment. It includes hospitals, schools, townships, offices, houses and other buildings; urban infrastructure (including water supply, sewerage, drainage); highways, roads, ports, railways, airports; power systems; irrigation and agriculture systems; telecommunications and many others.

The construction sector holds immense potential for stimulating growth, boosting project exports and generating employment. The domestic construction sector happens to be one of the fastest growing sectors, with an impressive average growth of 7-8 per cent per annum. The foundation of a higher growth rate rests on a sound and efficient infrastructural development which makes the construction sector a key sector. The rapid expansion of infrastructure by both government and the private sector has triggered off construction activities and fuelled demand in many key sectors like cement, steel, paints and chemicals, glass, timber and earth moving equipment and machinery. The construction sector is a crucial industry having strong backwards and forward growth linkages (Osei, 2013).

2.3 Concept of Communication in Construction Projects

The term "communication" has been derived from the Latin "communis," that means "common". Thus "to communicate" means "to make common" or "to make known", "to share" and includes verbal, non-verbal and electronic means of human interaction. Scholars who study communication analyse the development of communication skills in humans and theorise about how communication can be made more effective (Broni, 2010). According to Golparvar-Fard, Peña-Mora and Savarese (2009), nowadays the projects have large dimensions. They need a lot of time and resources to implement. They use a lot of funds and it is unrealistic that each employee drove by itself. Therefore, project managers are responsible for projects. A good project manager must be able to organise resources, to plan and prepare procedures to define cost, schedule, team performance, but in particular must be able to communicate effectively.

Construction industry plays a huge socio-economic significance role in the development of the economy of any country. Considering its unique nature, the industry employs the diverse range of occupational cultures and qualifications, from unskilled, craft, managerial professional and administrative. Its structure culture and working practices present a challenging environment within which to utilise effective HRM strategies and technique. Hence managing communication is a key enabler of effective Strategic Human Resource Management. Communication problems are the greatest challenge in international business, because managers spend on average, 75% of their time communicating (Waziri & Khalfan, 2014).

Ochieng and Price (2009) posited that ‘‘communication as the lifeblood of any system of human interaction as without it, no meaningful or coherent activity can take place”. Nevertheless, defining communication is obscure as it is such a multi-dimensional and imprecise concept. Despite, the difficulties inherent in defining communication, it is essential that a working definition of the concept is developed to fortify the analysis of communication practice contained in this paper. In this study, communication is viewed as a professional practice where suitable tools and regulations can be applied in order to improve the utility of the data communicated and is a social process of interaction between individuals.

According to Al-Fedaghi, Alsaqa and Fadel (2009), communication is typically defined as a process of sending and receiving. Such a communication process can be found in many disciplines, ranging from psychology and sociology to engineering, technology, and artificial intelligence. Consequently, great interest has been shown in finding an idealized communication model that provides “both general perspective and particular vantage points from which to ask questions and to interpret the raw stuff of observation” Aiyewalehinmi (2013) holds that completion of every construction project needs not only material labour, which is carried out on communication labour that produces construction commodity by both skilled and unskilled labour (termed blue collar) on the site, and the white collar workers in offices.

The blue collar worker produces material aspects of a construction commodity while the white collar produces informational conditions for the exchange and meaning aspect of a

construction commodity. This means construction productivity is directly related to the amount and quality of information that flows between the people who are managing and those that are doing the work. The three social parties involve (Non-Employees, Management and Union) have an important role in determining the kinds of communication systems that operate in a project and the quality of information that is available.

Gavade et al (2014) opined that many industries in India use the internet as a channel to communicate or to exchange information more effectively but construction industry lagging behind others. The increasing usage of internet and the web-based system can bring about a change in the construction industry also by improved quality, competitiveness, profitability and better relation with project stakeholders. Dainty, et.al, (2006) have recognised that the term "communication is in itself a multifarious and complex term, which can mean different things in different context and situations. This is certainly the case within the construction industry, where each project demands communication between wide varieties of participants. There seems little doubt that communication plays a vital role in the effectiveness of organisations.

Although managers in different industries undertake diverse tasks and activities, it has been recognised that they spend most of their time involved in communication. Priyadharshini and Kumar (2015) were of the view that project communication is the exchange of project-specific information with the emphasis on creating understanding

between the sender and the receiver. Project communication is the responsibility of everyone on the project team.

Hoezen (2004) emphasised that since the early 1940s, the literature on communication in construction has appeared, mainly based on the situation in the UK. Many problems concerning communication have been reported, with a focus on intra-supplier communication within the construction sector; demand-supply communication during the design phase; and communication between and within single demand and supply side parties, during whole the construction process. In this division, the demand side contains (representatives of) principals, users, investors, etc. and the supply side architects, (sub) contractors, advisors, etc. Based on an overview of this literature, the importance of improved communication in construction and the main factors influencing communication are discussed.

According to Aulich (2013), the construction industry operates primarily as a system of sub-contracting and purpose built alliances. There is a wide spread of stakeholders involved in conceiving a building project through typical stages such as design, finance, build, manage, upgrade and, ultimately replacement and a corresponding need for communication and cooperation. Specialists who can prevent bridges falling down or who build 20 storey buildings are seen as the hard-nosed, action people who have helped bring us into the modern era. However, there are intuitive activities and disciplines which help us to achieve the type of construction achievements that have been the hallmarks of the 19th, 20th and now the 21st centuries. Most of these so-called soft disciplines are about how one helps people, often highly skilled, achieve those construction and engineering

goals. The key components are consultation and communication. Dainty et al. (2006) wrote that communication within project-based environments presents special challenges. This is especially true within the construction industry, where interaction tends to be characterised by unfamiliar groups of people coming together for short periods before disbanding to work on other endeavours.

Kassab, Hipel and Hegazy (2006) in an article stressed that the most common reason for construction disputes is a breach in communication and expectations. Depending on the size of your project, the hub of communications could be the Estate or Property Manager, or it could be a large enough project to warrant the retention of a professional Owners Representative. Concerted effort is necessary to facilitate communications between the team members. This includes the Architect and Contractor, but many other professionals are required as well: engineers, permit & entitlements expediter, interior designer, communications & computer system designers & installers, furnishing installers, landscape designers, etc. A construction project has an enormous number of "moving parts": A successful project demands that the professionals involved are experienced, appropriate, have the same mindset, and are team players with complimentary skill sets– and that they are managed to bring out their best work to meet the vision and goals of the project.

Senaratne and Ruwanpura (2016) stressed that effective communication process is essential for the success of construction projects. Previous research shows that construction project teams spend the majority of their time communicating with other

parties and stakeholders. However, only few previous studies address project-level communication process in construction, in particular, from a project management perspective. Dainty et al (2006) stated that the construction industry is wholly reliant upon effective communication between individuals, teams and organisations. However, in a project-based industry, interaction tends to be characterised by unfamiliar groups of people coming together for short periods before disbanding to work on other endeavours. This temporal dimension complicates an already problematic communication environment in which technical language, an adversarial culture and noise/distraction all combine to prevent straightforward information flow from one party to the other. Indeed, the sheer number of stakeholders involved in the processes undertaken during a construction project renders communication networks exceptionally complex and subject to change. Furthermore, with the current imperative to improve industry performance by designing and constructing more rapidly, many processes that are reliant upon effective communication occur concurrently. This increases the probability of problems occurring in the transmission and reception of vital information to the construction effort.

Wikforss and Löfgren (2007) lamented that communication tools introduced with a purpose of imposing better control and coordination of construction projects are an arena for such knowledge contests. Communication solutions aim at breaking down barriers that professional groups carefully and successfully have built up over a long period of time. They aim at making construction knowledge more general, thereby challenging the expertise that for decades has become more and more the province of specific professions and home to an ever increasing array of professional jargons. These tools also aim at

coordinating activities between professional groups, which today all apply their own special routines and have their own particular ideas as to how coordination should be achieved. This may result in communication tools that are so generally conceived, so shallow and so uninteresting that they can be generally accepted but are hardly ever used; or, someone may take control of the tools and modify them to suit their own special needs, thus obtaining a toolkit that is both sophisticated and functional – for a few (Wikforss, 2006).

2.3.1 Phases of Construction Projects

Yang and Wei (2010) outlined and explained the following as stages in a construction project:

2.3.1.1 Design

This is the first stage of a construction project and once it is completed, it signals the beginning of the bidding process. In design, bid, build contracts, the owner chooses a contractor based on completed designs. In this stage, an architect or engineer first assesses the feasibility of the design based on regulations and codes of the building, as well as the number of rooms, the size of the building, and the amount of space. Then, he or she creates schematic designs, or sketches, researching the type of equipment and materials needed and their cost. And finally, the working drawings are created. These are the project's final specifications and drawings that builders use for construction and that contractors add to their bid.

2.3.1.2 Pre-Construction

The bidding process is over and the owner has chosen a contractor. The contractor is then paired with the project team, comprising of a contract administrator, project manager, field engineer, and superintendent. Then, the team gets the site ready for construction. They conduct a site examination, test soil, and identify any possible unexpected situations, like environmental problems.

2.3.1.3 Procurement

The project team purchases the required equipment, materials, and labor. In other words, the procurement stage is when the team buys everything they need to complete the project. The complexity of this stage depends on the size of the project and the company. Large, national construction companies usually have procurement departments that purchase labor and materials for hundreds of projects at once. On the other hand, for smaller projects, the superintendent may buy small quantities of materials from local building supplies or hire a local laborer as and when the materials are needed.

2.3.1.4 Construction

To kick-off the construction phase, the superintendent will arrange a pre-construction meeting with the subcontractors and material vendors to set the ground rules for working together. Then, the team must get ready to start construction, completing activities like setting up temporary storage facilities, securing the site, developing a materials and

handling plan, establishing safety programs, and more. After that, the team begins construction.

2.3.1.5 Commissioning

Once construction is completed, the commissioning stage beings. There are two parts to the commissioning process. First, the project team must test the systems and equipment to make sure everything is working correctly before turning over the building to the owner. Then, the team must train the owner's personnel in the operation and maintenance of the systems in the new building.

2.3.1.6 Operational Phase

When the owner moves into the new building, a warranty period begins. This ensures that all the materials, equipment, and building quality meet the expectations included in the contract. There are two types of warranties: express warranties (written and included in the contract) and implied warranties (established or required by law). This final phases ties up any loose ends. The team formally completes any remaining contractual obligations to finish the project. They may create a project punch list of any tasks that didn't get accomplished and may conduct a post-project review, document lessons learned, archive project documents, or prepare a project completion report.

2.4 Theoretical and Empirical Review

Theories are very vital for the development and completion of any academic research, because it forms the foundation upon which research the hinges. In this regard, thorough review of relevant and vital theories that underpin the project or topic under study were reviewed. Over the years, a good number of concerns, views and opinions have been expressed by experts and scholars on communication in construction projects and how communication affects performance in general. Ineffectiveness of communication among projects team members as well as other workers on the construction project sites has been blamed for poor construction project performance (Affare, 2012). In this study, the Shannon's Information Theory, Attribution Theory and Cognitive Learning Theory of communication are relevant and are therefore reviewed and integrated into the study.

2.4.1 Shannon's Information Theory

This theory was proposed by Claude E. Shannon in 1948 to find fundamental limits on signal processing and communication operations such as data compression (Shannon, 1948). The theory has found applications in many other areas, including construction communication, statistical inference, natural language processing, and many other areas of study.

Shannon's (1948) model of the communication process is, in important ways, the beginning of the modern field. It provided, for the first time, a general model of the communication process that could be treated as the common ground of such diverse

disciplines as journalism, rhetoric, linguistics, and speech and hearing sciences. Part of its success is due to its structuralism reduction of communication to a set of basic constituents that not only explain how communication happens, but why communication sometimes fails. Good timing played a role as well. The world was barely thirty years into the age of mass radio, had arguably fought a world war in its wake, and an even more powerful, television, was about to assert itself. It was time to create the field of communication as a unified discipline, and Shannon's model was as good an excuse as any. The theory's enduring value is readily evident in introductory textbooks. It remains one of the first things most students learn about communication when they take an introductory communication class. Indeed, it is one of only a handful of theoretical statements about the communication process that can be found in introductory textbooks in both mass communication and interpersonal communication (Fugar, 2004).

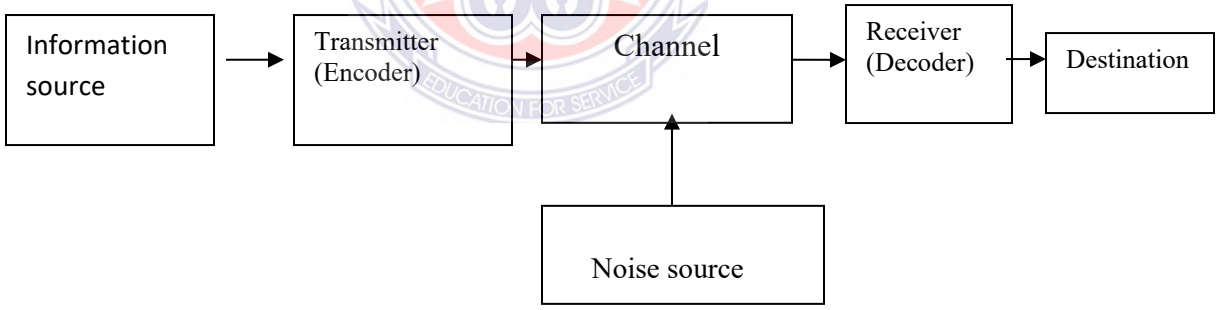

Figure 2. 1 Shannon's model of communication.

Source: Adapted from Al-Fedaghi et al. (2009).

In the study's flow-based perspective, Shannon's theory reflects a limited view of *states* of entities being communicated, because in such a model information is observed in either sent or received states. Implicitly, the theory indicates that information passes, or is transferred, through the presence of a channel in the model. Such a view is analogous to

conceptualizing the notion of travel as transfer from one point and arrival at another point. In a more comprehensive view, the process of (air) travel includes the notions of being received at the travel station (airport), processed (e.g., luggage and passports), released to boarding (waiting for boarding), and actual transfer onto the plane. On the other end, after being transferred, passengers arrive, are processed, released, and then transfer (leave for hotels). Similarly, information in the communication stream is not just sent and received, but also has repeated lifecycle states: received, processed (changing its form), created (generating information from information), released (e.g., waiting for channel to be available), and transferred (Al-Fedaghi et al., 2009).

2.4.2 Cognitive Learning Theory

Cognitive Learning theory is another related discipline which often deals with the unique way that every individual tends to conceptualize, imagine, understand and communicate. For example, some individuals are primarily linear thinkers who move sequentially from one step to another according to established principles (often principles established by their special training or discipline). Others are holistic, preferring to look at the whole picture and often needing to make their own re-patterning of the information. Others are more intuitive or prefer to paint a general picture. Some are more eloquent verbally than others who may prefer to see ideas in visuals. Others are quick to read social cues and can detect colleagues who are struggling to understand an issue but are reluctant to show their ignorance. Others are extroverts and tend to take possession of meetings whilst others will only express their reservations behind closed doors and in the presence of people they trust.

There are many variations of personality types and skill sets, often overlaid by the professional training they have received but usually the dominating mode of learning in groups starts with concepts and ideas that are familiar before attaching them to new ideas. Participants in a Core Working Group should keep that in mind during briefing sessions as well as avoiding jargon that may not be familiar to all the participants. Failure to understand the individuality of each stakeholder is often a cause of the communication breakdowns that are all too common in the construction industry. Misunderstandings, different assumptions, imbalances in knowledge within a group of stakeholders (*asymmetric knowledge*) not dealt with early in the life of a project can spiral out of control as the project progresses. This is the occupational nightmare of construction professionals such as project managers and financiers which often end up in expensive legal wrangles or worse (Aulich, 2013).

2.4.3 Attribution Theory

The attribution theory posits that communication performance measures lies in the causal locus domain and that the measure of the effectiveness of the performance outcome will always depend on and be influenced by the human behavioural competencies (skills) input in the communication process (McIntosh, 2009; Manusov & Spitzberg, 2008; Manusov & Harvey, 2001). Alternatively, in making attributions, the primal motive and purpose is to achieve 'cognitive control' through explaining and understanding the causes behind behaviours and performance outcomes (Kwofie et al., 2014). It can be said also that attribution making gives order and predictability to process, action and the outcome

and that effective communication performance in a communication process are likely to be as a result of high communication competency skills (Weiner, 2006).

2.4.4 Review of Empirical Studies

Execution of all construction projects requires communication between all professionals and project team members at all the various construction stages. It is the responsibility of the professionals to transfer relevant and appropriate information for the development of buildable designs that meet the requirements of the clients. There should also be communication from one expert to another in within the project cycle on information concerning project specifications, forms of drawing and construction methods as the design is realized and projects unfolds. As such resolving design and construction problems using appropriate communication methods and media are essential for successful projects execution. Quite a number of researches have been conducted on the role communication play in projects management more importantly construction projects as this study seek to assess. Several of such studies have been conducted elsewhere within the African continent and in the global arena. It is therefore important to review such studies to identify the existing problems and difficulties relating to construction project communication.

Yang et al (2007) conducted a quantitative research on how to manage building construction projects using an enhanced ICT techniques and strategy for communication among small and medium scale enterprises in India. Yang et al (2007) argued that, giving

the circumstances that bedevilled communication in building construction industry. ICT can be effectively leveraged to address construction project communication to ensure successes in project performance. Yang et al (2007) further argued that information and communication can be effectively introduced to do away with a lot of bottlenecks that serves as barriers to effective communication for construction project management.

Affare (2012) assessed project communication management on the construction project in Ghana. Though the assessment was not adequately done, it still presents some basic information on the effect of project communication on construction project performance. The study sampled professionals of construction consulting firms located within the Greater Accra Region of Ghana. Affare (2012) showed that hindrances such as poor listeners, poor leadership, unclear communication, unclear channel of communication, as well as language difficulties affect the efforts of effective communication within the construction industry of Ghana. She, therefore, posited that project communication vehemently affects employee performance within the project industry in Ghana.

Tipili and Ojeba (2014) conducted a quantitative research on evaluating the effects of communication on the delivery of construction projects in Nigeria. In their work, forty (40) professionals with over five (5) to fifteen (15) years' experience in the construction industry of Bauchi in Nigeria were sampled for the study. In all, 32% of the respondents were Quantity Surveyors, 18% were Project Managers, 23% were Architects and 27% were other professionals comprising of consultants, labourers and much more. The responses gathered from the professional within the construction industry in Nigeria

suggest that the appreciation of project communication and its resultants effect on project performance and delivery within Nigeria is strong. The professionals also agreed unanimously that communication at the project site is paramount. The professionals further agreed to the fact that lack of proper communication channel ultimately affects project performance and delivery in Nigeria. The research showed that various levels and channels of communication have been established within the construction industry in Nigeria such as communication between contractor and consultants. Tipili and Ojeba (2014) therefore concluded that project communications affects the performance of professionals thereby leading to a significant effect on construction project delivery and performance.

Wang and Hu (2014) conducted a quantitative research on the impact of project communication to project performance in China using the construction industry. The research reported that project communication has a significant impact on the schedule of the project and its performance. Wang and Hu (2014) recognised project communication as means of ensuring effective collaboration among external and internal partners of construction projects. The research further stated that, project communication a significant impact on project successes and failures. Wang and Hu (2014) further posited that there are a significant correlation and connection between communication ways, channels, frequency, and feedback and project performance. This presupposes that the way in which communication is done in the construction industry is relevant for the success or otherwise of the projects.

King (2016) provided as an assessment of problems associated with poor project management performance targeting projects within the construction industry. King (2016) posited that implementation of sound project management practices afford the stakeholders within the construction industry the opportunity to significantly meet project objectives. On the contrary, King (2016) stated that lack of sound project management results in project delay with accompanied cost thereby resulting dispute in some situations. Project communication was a key variable in the assessment. King (2016) therefore concluded that sound project management and communication has effects on project performance in the construction industry. The preponderance of literature have shown a linkage between construction project communication and the success or otherwise of building projects within the construction industry both in Ghana, Africa and Globally.

2.5 Projects Team Communication Practices at Construction Sites

Several processes and practices are carried out in construction project communication. Communication in the construction industry takes many forms and also happens through a set of channels or media. These practices and processes have a great effect on the effectiveness or otherwise of construction project performance (Olaniran et al, 2015). Among the project team in the construction industry, there is way in which communication takes place. Communication carries a special importance within the industry as a result of its project-based structure. Given that construction is such a

fragmented, dynamic and disparate sector, effective communication becomes essential "for the successful delivery of performance goals (Velentzas and Broni, 2010).

2.5.1 Channels of Communication

Affare (2012) noted that during project, communication can occur in various directions depending on who is communicating. There is upward communication to management from your own organisation and the customer's organisation. Lateral communication takes place with customers and within project teams. Machinery needs to be put in place for further communication to take place, either downward communication (from superior to subordinate), horizontal communication (between colleagues) or upward communication (from subordinates to superior). Mehra (2009) stated that communication will always involve more than one person.

Velentzas and Broni (2010) emphasised that downward communication is communication created by directors and managers and passed down the hierarchy of workers in the organisation. In traditional organisations, this is the preferred method of communication i.e. Managers decide what the systems, rules and procedures will be and then they pass these down to employees they manage and supervise. Downward Communication can increase efficiency by synchronising organisational procedures and can ensure that everybody is working towards the same overall aims and objectives. Types of downward communication include job descriptions, appraisals/evaluations, organisational policy, and organisational systems (Jerry, Wofford, Gerloff & Robert, 2002). Although there are advantages to downward communication organisations, experts

have begun to encourage upward communication. This is communication which originates at the lower level of the employment hierarchy and is then communicated up through the line.

Organisations encouraging upward communication believe that everybody is capable of generating thoughts and ideas which may help the organisation to progress, particularly when they are working closely in the area that the idea applies to. Upward communication may increase motivation and make employees feel valued and respected whilst enabling managers to understand how employees are feeling. Furthermore, if problems occur at they are more likely to be identified earlier by those working closely in the area that they occur. Types of upward communications include suggestion schemes, feedback forums/surveys, grievance procedures and employee-manager discussions (Velentzas & Broni, 2010).

Wikforss and Löfgren (2007) indicated that construction projects of today are dependent on reliable and updated information on a number of ICT-based business systems, communication tools and shared storage servers. To solve problems that have risen onsite and handle critical construction issues there is a need for quick access to necessary information. To solve a site problem, production management personnel have to run back and forth between the construction site and their computers inside the site office. This leads to inefficient use of managerial resources due to that the production management team is occupied at their computers a large part of their working hours. Production managers and construction supervisors experience that they often have to be at two places at the same time; at the site, office doing administrative work at their computer as well as

being out on the site coordinating work (Löfgren, 2006). Documentation of building activities, production meetings and various inspections often have to be carried out twice; once when they are actually occurring and then again in a computer document using different templates.

According to Mehra (2009), communication will always involve more than one person. As a project unfolds, communication can occur in various directions. There is upward communication to management from one organisation and the customer's organisation. Lateral communication takes place with customers and within project teams. Ineffective communication will have adverse effects on construction project. Some effects of communication in project delivery are discussed in the next session (Olaniran et al., 2015).

According to Kwofie et al (2015) the under listed factors have great effects on the communication channel thereby affecting the effectiveness of communication in construction projects:

- Inexperience interpretation of working drawings
- Poor and distorted information
- Unclear channels of information
- Site meeting
- Late dissemination of instruction
- Appropriate communication media for specific purposes
- Project annual report
- Work breakdown structure

2.5.2 Forms/Methods of Communication in Construction Projects

It was emphasised by Affare (2012) that there are various ways and methods of communicating information in the construction industry. Although a vast majority of information is exchanged verbally and delegated, most data is exchanged in written format either as hard copy or electronically. Even if the information is exchanged verbally such as through project meetings and instructions, this information is well documented and stored for future reference. The scope of work and details of construction are communicated by means of drawings, contract documents, addenda and specifications (Maslej, 2006). Contracts are commonly issued when one entity passes down work to another: for example, when an owner hires a consultant or designer they form a contractual relationship by means of signed contract. Same is true when a consultant, on behalf of the owner, hires a general contractor to execute the work designed by the consultant. The contractor may wish to sub-contract some of his work to subcontractors in which case, again a contractual relationship is formed. Unfortunately, miscommunication is a common occurrence in construction when work is passed down from one entity to another (Maslej, 2006).

For ease of classification, the forms and methods of communication in the construction industry as indicated by Mehra (2009) include; Formal Writing which takes the form of Project Plan, Project Charter, Specifications, Reports, Metrics; Formal Verbal which happens in the form of presentation and speeches fall under this category; Informal Writing examples of which include informal methods of communication such as memos,

e-mail, notes, etc.; Informal verbal which include meetings, and stakeholders conversations; Nonverbal Messages which are conveyed through our facial expressions as well as our postures and gestures; and finally Para-verbal Messages which include the tone, pitch, and pacing of our voice and account for about 38% of what is perceived and understood by others.

Sharma (2007) explains that managers prefer written communication because it provides a record of what has been transmitted and it can be re-read if first reading was not clear. The problems with written communication are that; many managers are not good at drafting and they prefer verbal medium, superiors often refuse to read written reports of any substantial length. Face to face verbal orders, telephone discussions, speeches and discussions at meetings are forms of oral communication because it is faster and provides for immediate feedback. Face-to-face communication is not always possible in dealing with large groups. When a message is passed in the form of gestures or signals, the communication is said to be non-verbal. Non-verbal communication could be expressed by facial expression, movement of the eyes, the use of the hands, arms or fingers (Florence, 2015).

2.5.3 Models of Communication

According to Adler and Towne (1978), all that ever has been accomplished by humans and all that ever will be accomplished involves communication with others. Many social and organisational problems derive from unsatisfactory relationships brought about by inadequate communication between people. Success on and off the job often stems from

one's ability to transfer information and express ideas to others. Effective communication frequently results in friendships that are more meaningful, smoother and more rewarding relationships with people on and off the job, and increased the ability to meet personal needs. Psychologist Abraham Maslow (1970) suggests that the capability to satisfy personal needs arises mainly from the ability to communicate.

Florence (2015) presents that the simplest communication theories describe how information is sent and received. These model the differences, for example, between a conversation among two individuals and the exchange of ideas in a six-person staff meeting, and what affects those exchanges. Five Forms of Communication theory lists different communication models, while Relational Dialectics explores how the conflicting desire for autonomy and connection affects interpersonal communication. Florence (2015) indicated that Lasswell introduced an important model of five levels of communication identified from his experiences in the Second World War, elements of which survive in more developed modern models. These include Who, the source; Says what, the message; In Which Channel, through what channel or medium; To Whom, the audience; and To What Effect, the desired effect.

Lasswell's (1948) model has been further developed and modernised and is now referred to as the 'Five Ws' and this model has been widely used, particularly when managing change. However, addressing the 'Five Ws' is an essential element of all communication, getting this right is the first step in the process and is dependent upon what is required to be communicated at the time. This is particularly important when managing change in an

organisation. Everyone who needs to be told about something should be told. It is advisable to relate the communication to all as soon as possible. Openness is the key to making everyone feel involved (although there will always be some things which are not disseminated as widely as others). Where appropriate, communicate widely so that individuals are given the opportunity to influence the process and local ownership is gained. Barriers can also be identified and overcome. The time to communicate with relevant people should be carefully considered. It might be a set meeting or a one-off arrangement. If the communication covers a wide range of people where possible it is desirable that discussion stake place at the same time avoid confusion, the spread of rumours or misunderstandings. If internal and external stakeholders are involved, internal staff should be communicated with prior to external stakeholders; this is to prevent staff hearing from other sources, including the media.

Key communications should be made as soon as possible following a significant event or decision. Clear messages related to the subject or problem. In complex situations it is advisable to create a shared meaning and understanding, this can be done by checking back with the recipients through an iterative process; let them ask questions; and asking for clarification of what they have understood being clear words, behaviours and symbols are not misunderstood or misinterpreted. Choose the most effective medium to get your message across; this could be in meetings, seminars, press releases etc. Make time to communicate properly, do not do it in the corridor, in the toilet or the car park. This leads to gabbled and garbled messages and can contribute to the 'grapevine'. The most

appropriate person depending on the subject. If it involves external agencies include the Press Officer (Florence, 2006).

Al-Fedaghi et al (2009) presented that a communication *model* is an idealised systematic representation of the communication process. Such models serve as standardisation tools, and they provide the means to *1)* question and interpret actual communication systems that are diverse in their nature and purpose, *2)* furnish order and structure to multifaceted communication events, and *3)* lead to insights into hypothetical ideas and relationships involved in communication.

Intermediary model of communication (sometimes referred to as the gatekeeper model or two-step flow (Katz, 1957)). This model, which is frequently depicted in introductory texts in mass communication, focuses on the important role that intermediaries often play in the communication process. Mass communication texts frequently specifically associate editors, who decide what stories will fit in a newspaper or news broadcast, with this intermediary or gatekeeper role. There are however many intermediary roles (Foulger, 2002) associated with communication. Many of these intermediaries have the ability to decide what messages others see, the context in which they are seen, and when they see them. They often have the ability, moreover, to change messages or to prevent them from reaching an audience (destination) (Foulger, 2002).

2.6 Communication and Construction Project Performance

The work of Abugre (2011) stressed that to motivate and retain employees to work hard, effective organisational communication plays a significant role. The work has established

the positive impact of good organisational communication on worker satisfaction which ultimately leads to improved work performance in the workplace. Also, the work provides useful guidelines for managerial practice and implications in the area of organisational communication. In a study by Kwofie, Adinyira and Fugar (2015), it was found that effects to the overall communication ineffectiveness among the project team on mass housing projects, the variables project team composition adopted on the housing scheme under management, control, monitoring, and coordination style in subcontracting on housing units under scheme, and prospective buyer involvement in the construction process under scheme are said to be making substantial contribution to the impact of the factor to the overall communication ineffectiveness. The impact of the subcontracting style adopted across housing units under scheme to the mass housing project team communication ineffectiveness is seen to be moderate.

Enshassi and Burgess (2006) indicated that efficiency of the supervision and team performance is challenged by the procurement structure and contracting adopted on the construction projects. By drawing on the theoretical and practical perspective of mass housing delivery in Ghana and composition of the project team, it can be emphasized that indeed procurement structures and subcontracting systems adopted on mass housing project offer inherent challenges in the management and communication performance on Mass Housing Projects that consequently result in loss in productive time in the delivery compared to traditional construction projects. Guevara and Boyer (1981) examined the effect of communication in two ways: communication characteristics and individual characteristics - as feedback, information processing, accuracy, modality choice, directionality, influence, mobility aspirations, and satisfaction with communication, trust,

and interaction. Looking at the strategic role of communication systems in the industry, communication may be described as nerve systems that make it possible for several hundreds of people to do dozens of jobs or tasks in an integrated and orderly manner (Aiyewalehinmi, 2013).

In a study by Cheung, Yiu and Lam (2013), it was revealed that project performance is always one of the key concerns of construction project managers. It is often regarded as the critical indicator to measure the success of construction organisation. Their paper further advances existing knowledge on the achievement of project performance by investigating its relationship with trust and communication. Specifically, the mediating role of communication is studied to detect any direct and/or indirect effect of communication on this relationship. An analytical approach to mediation analysis was performed to achieve this objective. Five significant mediation models were identified. These models demonstrate that trust affects communication and in so doing influenced project performance. Specifically, effective information flow is the versatile mediator to the trust project performance relationships among all of these significant models. This implies that the improvement of information flow would likely improve project performance (i.e., achieve satisfactory and worthwhile quality; maximise project time, cost, and quality). In this context, the findings point to the need for managers to direct efforts or resources to effectively manage information flow as part of the project management system.

2.6.1 Communication Management Process

Gavade et al (2014) outlined the following as communication management process: Communication management process is set of four steps viz. Communication planning, information distribution, performance reporting and administrative closure.

2.6.1.1 Communication Planning

Plan Communication is the process of determining the project stakeholder, information needs and defining a communication approach. The Plan Communication process responds to the information and communications needs of the stakeholders; for example, who needs what information, when they will need it, how it will be given to them, and by whom. While all projects share the need to communicate project information, the informational needs and methods of distribution vary widely. The important factor for project success is identifying the information needs of the stakeholders and determining a suitable means of meeting those needs. Effective communication means that the information is provided in the right format, at the right time, and with the right impact. Efficient communication means providing only the information that is needed. On most projects, the communication planning is done very early, such as during project management plan development.

2.6.1.2 Information Distribution

Information distribution involves making needed information available to project stakeholders in a timely manner. It includes implementing the communication

management plan as well as responding to unexpected requests for information. The information distribution process is described in detail in three steps:

Input for Information Distribution

Work result is the outcomes of the activities performed to accomplish the project. It shows which deliverable has been completed and which have not, to extent quality standards are met, what costs have been incurred or committed etc. is collected as part of project plan execution and it also useful for performance reporting. The project plan is a formal, approved document used to manage and control project plan execution. Communication management plan may be formal or informal, highly detailed or broadly framed based on needs of the project. It is distributed structure which details to whom information will flow, and what methods will be used to distribute various types of information. These must be compatible with the reporting relationship described by the project organisation chart.

Tools and Techniques for Information Distribution

- ***Communication skills:*** Communication skills are used to exchange information. The sender is responsible for making the information clear, unambiguous, and complete so that the receiver can receive it correctly and for confirming that it is properly understood. The receiver responsible for the making sure that the information is received in its entirety and understood correctly. Communications have many dimensions: Written and oral, listening and speaking; Internal (within project) and external (to the customer, the media, the public etc.); and Vertical (up and down the organisation) and horizontal (with peers)

- ***Information retrieval system:*** Information can be shared by the team members through a variety of methods including manual feeding systems, electronic text databases, project management software, and systems which allow access to technical documentation such as engineering drawings.
- ***Information distribution system:*** Project information may be distributed using a variety of methods including project meetings, hard copy document distribution, and shared access to networked databases, fax, electronic mail, voice mail, and video conferencing.

Output from Information Distribution

Project records may be including correspondence, memos, reports, and documents describing the project. This information should, to the extent possible and appropriate, be maintained in an organised fashion. Project team members may often maintain personal records in a project notebook.

2.6.2 Effectiveness of Communication in Construction Projects

In the flow of communication within the construction industry, communication methods, communication channels and communication barriers or factors have a strong effect on the effectiveness of communication and project team performance. The effectiveness of communication also determines the project team performance within the project execution. The effectiveness of communication and project team performance has a consequential effect on project performance. Therefore, the barriers that affect effective communication ultimately affect project performance.

2.6.2.1 Effective Communication

In efforts to improve the quality of communication, some researchers develop theories about what makes communication effective. These theories explore what goes right when ideas pass between two parties, and how to repeat that success more easily and reliably. Examples include Cutlip and Center's seven Cs of communication, which holds that attention to clarity, credibility, content, context, continuity, capability and channels improves the quality and effectiveness of communication. The Narrative Paradigm theory holds that humans pay more attention to stories than to data or logic, so communicating with a narrative structure is often more effective and convincing (Florence, 2015).

Effective communication occurs when the desired effect is the result of intentional or unintentional information sharing, which is interpreted between multiple entities and acted on in a desired way. This effect also ensures the message is not distorted during the communication process. Effective communication should generate the desired effect and maintain the effect, with the potential to increase the effect of the message. Therefore, effective communication serves the purpose for which it was planned or designed. Possible purposes might be to elicit change, generate action, create understanding, inform or communicate a certain idea or point of view. When the desired effect is not achieved, factors such as barriers to communication are explored, with the intention being to discover how the communication has been ineffective (Velentzas & Broni, 2010).

Communication according to Maslej (2006) is said to be effective within the working group in the construction industry only when the transmitted ideas achieve their desired

action or reaction, as the operations involve the team effort of the client, quantity surveyor, architect, consulting engineer, specialists and the contractor's organisation with the main objective of getting things done through human beings. The effectiveness of communication is very central to the stability, well-being, peace, progress and performance of organisations. The organisation and groups depend on effective communication to perform all their functions including planning, directing, controlling, decision making and the execution of decisions and goals. Thus, leadership, management, operations and performance cannot take place or be achieved without communication between persons and units (Ainobushoborozi, 2013).

2.6.2.2 Ineffective Communication

Other researchers work to identify what goes wrong with communication in order to avoid those pitfalls when developing communication strategies. These look at situational, cultural and cognitive reasons why communication might fail, or break down, between groups. The Groupthink theory explores why cohesive groups rarely consider or communicate all options when solving problems. Cognitive Dissonance Theory states that communication breakdowns often happen because people don't like and will act to ignore or avoid -- information incompatible with their opinions and beliefs (Florence, 2010).

Ainobushoborozi (2013) wrote that, on the other hand, communication is regarded ineffective when there is no listening, no clarity in speech, speaking at the wrong level, using jargons, being too negative in speech, using sarcasm or careless words,

communicating in an emotional state, using poor non-verbal communication and being insincere. Ineffective communication hampers organisational success. Ineffective communication results when the managers are not in regular touch with their employees. Lack of the essentials (Clarity, consideration, courtesy, correctness, completion, concreteness and conciseness) also leads to ineffective communication.

Often managers are surrounded with a pool of information; in such cases, they tend to ignore the messages or communication of the subordinates. At times, the wrong perception also hampers communication, that is, the employees might perceive the message in different meaning which was not intended by the manager. Thus, there can be a problem in encoding and decoding of the message. Poor listening (for instance when the receiver is not focused to what the sender of message is saying) also leads to ineffective communication. Emotions like anger and stress may also lead to communication breakdown as messages may be interpreted in the wrong manner when a person is angry and frustrated than when he is relaxed. Sometimes, the messages are not carefully planned (For example, the medium of transmission of message and the time of message delivery are not chosen rightfully). This again makes communication ineffective. Linguistic differences are a great obstacle to effective communication. This is perhaps due to the ambiguity of language. Managers should try to overcome all the causes for ineffective communication so as to ensure organisational success.

2.6.3 Improving Communication in Construction Projects

Alluich (2012) posited that communication strategies should be based on a thorough understanding of the ways that humans co-operate in joint undertakings, the key principles of social dynamics and learning theory plus the ways in which people deliver, accept and understand words and pictures. The disciplines of organisational and environmental psychology have become a basic fundamental of modern business activities from management and organisational strategy to marketing and customer relations and to the improvement of working, recreational and living environments.

However, it is rare for a mature industry such as construction to adopt or examine those disciplines for guidance about either strategies or operations. This is despite the fact that the construction industry is almost entirely based on the principle of sub-contracting, business and professional alliances, all of which require understanding of environmental psychology and social dynamics in order to build trust, reputation, and teamwork and client satisfaction. There is, therefore, a major need for communications to be systematic, understood by all stakeholders and intelligently applied.

Dueitt (2017) reiterated that working in construction is often hectic, and maintaining effective and clear communication throughout a project is extremely challenging as a result. Dueitt (2017) outlines some ways in which efficient communication can streamline construction management business practices:

- **Constant communication:** First off, ensuring that there's a continuous stream of coherent internal communication will ensure that resources are not wasted. A

company's lack of interaction will inevitably lead to someone deploying resources they would have known not to otherwise.

- **Improvement from the inside out:** Simmons goes on to note that everything comes from within. Fixing any communicative inefficiency in your company's operations will, in turn, affect communication with clients and other external organisations for the better.

- **On the same page:** Make it paramount that everyone involved with a project is made aware of variations or changes. If this isn't the case, an unknowing mistake that will cost time and money is guaranteed.

- **Easy to remember:** Making sure an important message is written down in some fashion or another is key. Many times directions or information passed on verbally will be lost by the wayside, so whether it is physically on paper or in some database, having a reminder can be the difference between things running smoothly and a costly hiccup.

Florence (2015) was of the opinion that it is critical that you establish a clear chain of communication and command for the input and distribution of information. All requests for information, change order requests, and directives to and from the Client should be introduced in writing and addressed through proper channels to ensure issues are

responded to by the right party without delaying progress, and captured and documented for the project. It has been cleared that the shape and importance of team changes based on project importance and amount. Olaniran (2015) noted that as the project gets more complex and bigger, the coordination of the design team also gets harder. Identifying the design problems of big construction projects and understanding the form of communication between design team members could help for better team building in future.

Ainobushoborozi (2013) noted that in order to improve effectiveness of communication in civil engineering projects as a strategy to achieving increased labour productivity, the following recommendations need to be implemented;

- Proper organisation structures should be formed to encourage effective communication through influencing coordination and flow throughout the organisation system. This should be matched up with an appropriate and suitable information communication system

- Standardisation of documents and information that will ensure delivery of information on the right time.
- Firms need to develop and implement education and training programmes for its employees as this increases work and task awareness on advancements and new methods and techniques thus increasing their efficiency.

- Analysis of form of communication and use of proper communication instruments that ensure simple and clear information communication. Strategies to obtain feedback should be implemented to compare perceptions of the communicator and the receiver. This will reduce asking for clarity or misunderstandings in communication.

Ainobushoborozi (2013) did indicate that issues regarding expected problems (such as site personnel recruitment and the transportation of materials) in addition to unforeseen problems (such as possible shortages in manpower and the breakdown of equipment) should be studied and resolved at the relevant stages of the project (such as the planning, tendering or contracting stages). Emergency scenarios should be established at the early stages of the project to deal with unexpected issues. During the construction stage, precise daily control and follow-up procedures should be applied regarding issues such as the remote examination of the quality of construction work, monitoring the productivity level of site workers, and calculation of the rate of material consumption.

2.7 Barriers to Effective Project Team Communication at Construction Sites

According to Hoezen (2004), the main problem of communication in the Dutch construction industry lies in the lack of stakeholders' ability to empathise with the other parties involved. This is especially the case between demand side and supply side parties. Since designers and contractors do not experience how their choices affect the use and maintenance of the product, it is difficult to communicate about these topics. This results in Contractors who do not think along with the Consultants; Consultants who are not

open-minded to the Contractors' input; and designers who design objects that do not always match the wishes and needs of their Principals. In addition, the stakeholders' perception of their roles in the process is not always perceived as professional.

Haghbin, Eslami and Davoudi (2014) indicated that the contractual relationships defined in a project context can serve as barriers to the free exchange of knowledge due to liability concerns but in spite of all these difficulties for teamwork in construction design, it is inevitable and successful project delivery is not possible without the collaborated team. System design faults refer to problems with the structures or systems in place in an organisation. Examples might include an organisational structure which is unclear and therefore makes it confusing to know whom to communicate with. Other examples could be inefficient or inappropriate information systems, lack of supervision or training, and a lack of clarity in roles and responsibilities which can lead to staff being uncertain about what is expected of them ((Velentzas & Brobi, 2010).

Within the Ghanaian construction industry, there is a strong appreciation of the importance of project communication and its importance within the industry. Indeed, various levels and channels of communications have been established within the construction industry, for example, communication between the clients and consultants or consultants and contractors. In spite of that, there have been many hindrances to effective communication on a construction project in Ghana. These include; poor listeners, poor leadership, unclear communication objectives, unclear channels of communication, ineffective reporting system, ineffective communication between the parties on the project, stereotyping and language difficulties (Affare, 2012).

As Dainty et al. (2007), highlighted the overriding focus has been on research for management, rather than research of management. It is crucial for the construction research community to strengthen the debatable assumption that culture is an organisational variable, which is subject to conscious manipulation. In reality, the intact dialogue of culture change within the construction sector appears strangely detached from the broader defining culture. Dainty et al. (2007) states the management of change is stated with examples of failed attempts to change the culture. These have focused on the content of change programmes at the exclusion of understanding the context and process change. A more nuanced understanding of construction culture and recognition that it is mutually comprised with its structure are required if multi-culturalism is to be accurately understood and responded to.

Attitudinal barriers come about as a result of problems with staff in an organisation. These may be brought about, for example, by such factors as poor management, lack of consultation with employees, personality conflicts which can result in people delaying or refusing to communicate, the personal attitudes of individual employees which may be due to lack of motivation or dissatisfaction at work, brought about by insufficient training to enable them to carry out particular tasks, or just resistance to change due to entrenched attitudes and ideas, it may be as a result of delay in payment at the end of the month (Velentzas & Brobi, 2010).

Velentzas and Broni (2010) were of the position that physical barriers are often due to the nature of the environment. An example of this is the natural barrier which exists if staffs are located in different buildings or on different sites. Likewise, poor or outdated

equipment, particularly the failure of management to introduce new technology, may also cause problems. Staff shortages are another factor which frequently causes communication difficulties for an organisation. While distractions like background noise, poor lighting or an environment which is too hot or cold can all affect people's morale and concentration, which in turn interfere with effective communication.

The following are the barriers to communication in the construction industry as indicated by Adeleke (2004):

- Lack of detailed drawings, these may not give a full description of the mind of the designer.
- Inexperience of the site agents or clerk of works will lead to misinterpretation which can cause a lot of damages and changes to the original design.
- Poor and horrible writing or lettering can mislead the clerk of works or the other operative.
- Geographical location where communication cannot be easily passed
- Poor recording of bills of quantities and omission of items or rates
- Fear of the authority especially the senior staff can cause one of the junior staffs to make mistakes during a face-to-face communication.
- Inferiority complex of artisans and operatives can also lead to misinterpretation of information.
- Telephone message wrongly received is also a barrier.
- Nervousness is also a barrier. Mistakes can also occur if the one delivering the message is not composed.

- The complexity of the job can also be a barrier if the job is not fully understood.
- Availability and level of technology can as well be a barrier if the job needs a sort of specialist to carry it out.

Kwofie et al. (2014) and Affare (2012) outlined the following as some of the barriers to effective communication in construction projects:

- Poor listening skills of team members
- Poor leadership
- Unclear communication objective
- Organisation structure
- Unclear channels of communication
- Ineffective reporting system
- Ineffectiveness of communication channel
- Limited resources
- Personal stereotyping
- Language difficulties
- Physical distance between the project participants
- Interpersonal conflicts

2.8 Drivers of Effective Communication in Construction Projects.

Communication among project team members in a construction project is vital for the successful execution and completion of the project. Often times, such communication enhanced and hindered through certain controllable drivers. The construction project

team members consist of individual and persons with diverse background and orientation that have been put together to execute a given project. The ability of the project team members to communicate effectively and efficiently has the tendency of ensuring the project performance successes and milestones (Velentzas and Broni, 2010). According to Florence (2015), the process of communication within the construction industry and particularly among project teams' members is the most important part of the project execution cycle. The inability of project team's members to properly appreciate the communication within the project execution phases has dire consequences on the entire project.

Preponderance of literature have given suggestions on factors and measures that drive communication among project team members within the construction industry (Adeleke, 2004; Affare, 2012; Florence, 2015; Kwofie et al., 2014; Velentzas & Broni, 2010;) these drivers according to the existing literature include;

- Extent of coordination among project team members
- Availability of sufficient and accurate information
- Information overload (Too much information than can efficiently use)
- Timely access or availability of information
- Varying perception and interpretation given to information
- Key information has been withheld during its dissemination
- Access to information source
- Appropriate communication media for specific purposes/audiences
- Availability of effective communication strategies
- Understanding the language(s) and culture of team members

- Communication skills of project team members
- Availability of effective communication tools/materials
- Varying capacity and capabilities of project team members
- Support and commitment among project team members

Dubois and Gadde (2002) coordination among project team members in the construction project sites is an essential ingredient for effective communication. When project team members are able to coordinate effectively, they are able to reason and come to terms with the construction project processes and procedure which ultimately leads to enhanced project team performance thereby resulting in good project performance. More important also, in the construction project communication is the availability and accuracy of information that is circulated among project teams members. Wrong dissemination of information will ultimately lead to a wrong interpretation of data being it architectural drawings or designs. As such it is important to consider the kind of information that is given in the construction sites.

The amount of information given within a time frame among project team members and the timely manner in which the information is given are all drivers of effective communication within the construction industry (McCann and Forde, 2001). Timely and sufficient supply of information is crucial in any construction process. The inability of the project team members to interpret same information differently has the tendency to cause misunderstanding and conflict among project team's members, hence varying perception and interpretation given to information serves as a driver to effective communication that

needs to be checked. In the communication process, key information that is withheld by a team member has dire effects on the project.

Access to the source of information, and the need to use the appropriate communication method depending on the audience as well as the availability of effective communication strategies are all drivers of effective communication in the construction industry (Affare, 2012; Florence, 2015). According to Suter et al. (2009), cultural and language differences among project team members are drivers of effective communication within any organisational setup. The ability for people to co-exist and communicate effectively well depends on the language being used to communicate to them (Salend and Salinas, 2003). Availability of communication tools and materials, as well as the communication skills abilities of project team's members, are all drivers of effective communication. Project team members have varying capacity and as such their support and commitment play a vital role in the communication effectiveness (Leung et al., 2004). Factors driving effective communication among project team members within the construction industry needs to be critically assessed and evaluated to find out the extent to which they affect the success or otherwise of a construction project.

2.9 Conceptual Framework for the Study

Communication occurs at various stages of the construction project design and implementation process. In construction project communication, communication can be internal or external. Communication between contractors' organisation and clients' organisation are considered external. Such communications are necessary to ensure that the contractor meets the required specification and needs of the client. Internal

communication occurs within the contractors' organisation among project team members. Internal communication within the contractors may include communication of drawings, design, and specifications by the client.

The conceptual framework developed for this study is based on the Shannon's information theory. The theory provided some key components that are considered in the process of communication. The components include; source of the information, the transmitter thus, the methods in which the information is communicated, the channel in which the information is communicated and the destination of the information. The reliance of the construct in this study on the Shannon's information theory has to do with the components of channels and methods of communication. These two components are the most important element of every communication process and as such must be highly considered in information communication.

One aspect of communication considered most significant in construction industry is communication among project team members. Project team members consist of Consultants, Engineers, Project Managers, Contractors, Architects, Quantity Surveyors Foremen and as well as Nominated Supplier. The bulk of communication among the project team members is done by the Project Manager, therefore, his ability to communicate effectively among the project team will ensure great project performance.

Several channels of communications exist within the construction industry. Channels of communication include vertical, and lateral or horizontal. An information flow from highest person within the project team to other members of the team is considered downwards; the flow of information from a lowest person in the project team to the

highest person is upwards communication whereas horizontal or lateral communication deals with information flow among project team members of equal ranks within the project execution. Project team members communicate using one or two of these communication channels.

This study among other objectives intends to identify the construction project communication practices which include the channels and methods used by construction firms in Ghana. There are several means by which communication takes place. The methods of communication includes, formal writing in the form of project plan, charter, reports, drawings and specification; formal verbal which takes the form of speeches and presentation; informal writings such as emails, memos and notes; informal verbal such as meetings, stakeholders and conversations are categorized here as well as nonverbal messages which takes the form of facial expressions. Communication occurs through one or two of these methods within construction project execution.

The desire to have effective communication is hindered by communication barriers or enhanced through drivers referred to in this concept as mediating factors. Culture, systems, environment, equipment, organisational objectives, and much more are all potential barriers that can affect effective communication. There is the likelihood of communication problems surfacing due to the different cultural background of people involved in project execution. This makes it imperative for appropriate systems to be put in place to ensure adequate and effective communication among parties to a project.

In the flow of communication within the construction industry, communication methods, communication channels and communication barriers or factors have a strong effect on

effective communication and project team performance. Project team performance has consequential effect on the construction project performance to large extent. A well-designed organisation structure ensures timely, accurate and reliable utilisation of information among parties on a construction project and these can hugely affect or influence the performance of project.

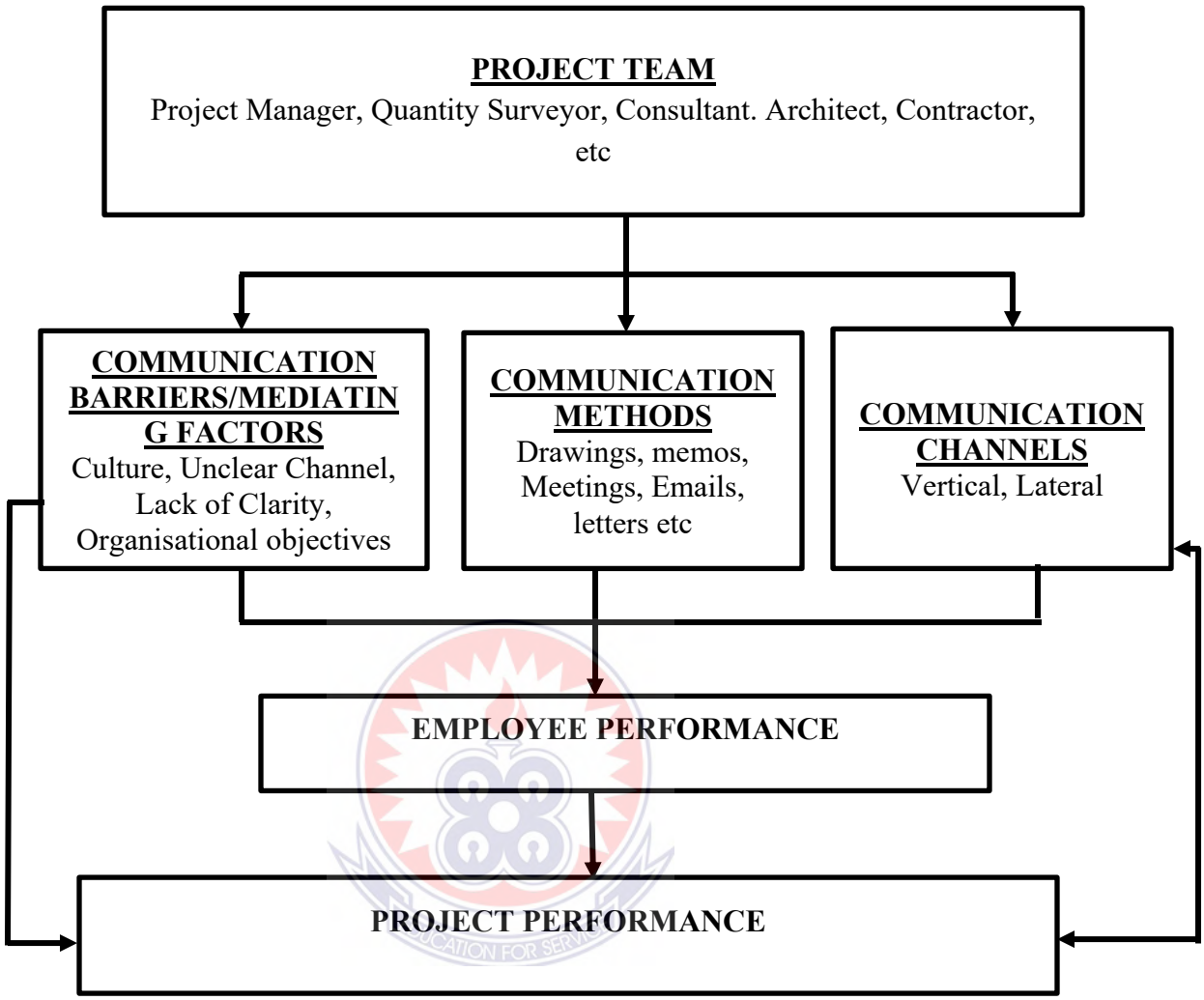

Figure 2. 2 Conceptual Framework for the Study

Source: Author's Construct (February 2017)

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter provides details of methodological approaches adopted in carrying out the research. It presents issues on research paradigm, research design, population, sample size and sampling techniques, data collection instruments method and data analysis technique used in the study.

3.2 Research Paradigm

All researches were based on some underlying philosophical assumptions or paradigm about what constitutes 'valid' research and which philosophy was appropriate for the development of knowledge in a given study. Research paradigm shows the philosophical framework within which the study is conducted (Quinlan *et al.,* 2011). It is simply the way in which humans make sense of the world around us. The study aims at assessing the effectiveness of communication in project team performance using the Accra and Kumasi Metropolises as study areas. The research adopted the positivist/objectivist philosophy to offer explanations on what the effect of communication is on project performance.

The positivist philosophy or worldview is based on the assumption that patterns (trends), generalisations, methods, procedures as well as cause-and-effect issues are also applicable to the social research (Glicken, 2003; Denscombe, 2013 and Lincoln *et al.,* 2011). This view means that scientific methods used in natural can equally be applied to the study of the objects of the social sciences, namely people. Positivists assume that

reality is objectively given and is measurable using properties which are independent of the researcher and his or her instruments; in other words, knowledge is objective and quantifiable. From the positivist point of view, scientific methods and systematic knowledge generation process using quantification can be applied to enhance precision in the description of parameters and the relationship among variables of any research work.

The other major school of thought is the constructivist/Interpretive philosophy. The Constructivist/Interpretive maintain that the behaviour of social object (e.g. human beings) are based on subjective interpretation and that it is only through the study of subjective interpretation of reality that social objects can be understood. Constructivists believe that although there may be many interpretations of reality, the interpretations are in themselves part of the scientific knowledge they are pursuing. Interpretivist thus focuses on exploring the complexity of social phenomena with a view to gaining understanding. The purpose of research from the Interpretivist viewpoint is to understand and interpret everyday events, experiences and social structures, as well as the values people, attach to these phenomena (Collis & Hussey, 2013; Rubin, 2011).

In this study, the positivist/objectivist philosophy was considered much more appropriate because it allows the researcher to examine the effect of project communication on project performance using quantifiable observations that lead to statistical analysis. Positivist philosophy as Collins and Hussey (2013) noted adheres to the view that only "factual" knowledge gained through observation (the senses), including measurement, is trustworthy. The researcher, therefore, adopted the positivist paradigm that allows for the collection of empirical data through questionnaire administration. The role of the

researcher in this study was limited to data collection and interpretation through objective approach and presentation of findings that are observable and quantifiable.

3.3 Research Design

The study adopted a descriptive survey to undertake issues rose in the study. The survey mechanism was adopted because; it involves the collection of data from a small group of people in order to make an effective generalisation of outcomes to forecast behaviour/attitudes of a given population. In addition to this, a survey allows generation of issues to a larger population of interest using appropriate statistical analysis that suits data gathered from a study.

The study employed cross sectional survey design using mainly quantitative method. The survey involved collection of individual project team members opinion on communication in the various construction project sites and its effect on the performance of constructions projects. The focus of the survey was to examine the effectiveness of communication in construction project performance at selected construction project sites in the Accra and Kumasi Metropolises.

3.5 Population

The population of a research study includes all the individuals or objects that have characteristics of interest to the problem under investigation (Kothari, 2004). This study was conducted among construction project sites in Accra and Kumasi Metropolises. The targeted population of this study, therefore include all construction projects teams of

D1K1 constractors in the Kumasi and Accra Metropolises. The scope of the study included eight (8) D1K1 Contractors construction project sites each in the Accra and Kumasi Metropolises. The targeted personnel were the project team members such as project managers, architects, engineers, employees, management, contractors, consultants, clients and quantity surveyors of the targeted project sites. A recognisance survey conducted to identify the sixteen construction sites with on-going projects, eight projects were identified in each Metropolises with total on-site project team members of individuals 192.

3.6 Sample Size and Sampling Technique

Sample size deals with using small group or subset to represent a population. This is because it is sometimes difficult in reaching out to all members in a population. In this study, a multistage sampling approach was used in the selection of respondents. In the first stage, the Accra and Kumasi Metropolises were purposively selected as the study areas. Accra and Kumasi were the two largest cities in Ghana and were characterised by massive construction and infrastructure development projects. The selection of the two Metropolises was to enable the researcher reach large numbers of construction project sites for the study.

In the second stage, construction projects were also selected purposively. The focus of the study was on construction projects that were on-going and were being handled by D1K1 Class of Contractors. The study aim warrant that construction projects with well-structured project teams to be covered by the study. This will ensure inclusive of typical project team for construction projects. The reason for selecting construction projects that

were on-going was to ensure access to project teams members participating in the construction project.

The use of purposive sampling enabled the researcher to purposively select construction projects that met the criteria and fell within the research scope (D1K1 Contractors) as 12th January, 2017. At each project site also, the respondents selected were also done purposively. The reasons and consideration used in the selection of respondents were to include the project team members who were working full-time on the selected project sites and understood the tenets of the project and communication practices.

In all sixteen (16) projects that were selected with eight (8) in Accra and the other eight (8) in Kumasi. At each project site, twelve respondents were selected. The total sample size for the study was 192. These respondents selected/sampled included Quantity Surveyors, Project Managers, Architects, Principal Consultants, Managing Directors, Main Contractors/Representatives, Sub-contractors/Representatives, Service Engineers, Electrical Engineers, Nominated Supplier and Client

3.7 Data Collection Instruments and Procedure

In order to achieve the objectives of the study, empirical data were collected for analysis. The data used were collected mainly from primary sources through field surveys with the aid of a structured questionnaire. These included data on the personal information of the employees, communication practices used at the selected construction projects, the effectiveness of the communication methods and how effective communication influence project performance.

The questionnaires used were structured questionnaire with questions that cover all the thematic areas of the study. The questions contained in the questionnaire were mainly closed-ended questions. Some of the questions asked were also Likert scale question of 5-points. The questionnaires were distributed to participants to be completed within two weeks after which they were collected. Other options such as same day delivery were accepted. In order to ensure that items in the questionnaire were valid and reliable, a pre-test was carried out in a construction firm at Lapaz. Detected errors and ambiguities in the questionnaires were attended to and corrected accordingly before the final administration of the questionnaire

3.8 Data Analysis Techniques

The data collected for the study were analysed using the Statistical Package for Social Sciences (SPSS Version 20.). Prior to the entry and analysis, data collected were edited and reviewed to ensure completeness and legibility of responses. After the editing, the data were coded and entered into the SPSS software and analysed. In the analysis of data, both descriptive and inferential statistics were employed in the process. The descriptive analysis dealt with the presentation of results with measures of central tendencies (Mean, Median and Mode), measures of dispersion (Standard deviation and coefficients of variation) and simple frequency counts.

Descriptive analyses was used to analyse data on the communication practices of construction project sites, the barriers to communication, drivers of effective communication and the factors that influence communications at construction project

sites. A multiple linear regression analysis was also performed to determine the effect (influence) of communication on project team performance.

To determine the importance of various communication platforms available to the construction project teams in their communication practices, the Relative Importance Index (RII) approached as used by Johnson and LeBreton (2004) and Owusu-Manu *et al.* (2004) for similar studies was employed. The approach is based on the formula; $\mathbf{RII} = \frac{\sum \mathbf{w}}{(\mathbf{A} * \mathbf{N})}$, Where, W is the weighting given to each statement by the respondents and A is the higher response integer (5); and N, the total number of respondents.

3.9 Study Area

The study was conducted in the Accra and Kumasi Metropolises. The two Metropolises were selected as a result of high level of construction projects making them a good hub of information. A brief description of the study areas (Accra and Kumasi Metropolis) and maps are presented below;

3.9.2 Accra Metropolis

The Accra Metropolis was established by the Local Government Act, 1993, (Act 462) and Legislative Instrument 1615 which also established the Six (6) Sub-Metropolitan District Councils in 1998. Having gone through a number of changes in terms of size and number of Sub-Metros, the AMA as it exists now was established in 2012 with L.I. 2034 following the creation of the La Dadekotopon Municipal Area. The AMA consists of ten Sub Metropolitan District Councils made up of 72 communities and 76 Electoral Areas.

The population of Accra Metropolis according to the 2010 Population and Housing Census is 1,665,086 representing 42 percent of the region's total population. The Metropolis is entirely urban (100%). It has a sex ratio of 93 and youthful population (children under 15 years) (42.6%) depicting a broad base population pyramid which tapers off with a small number of elderly persons (60+ years) constituting 5.9 percent. The total age dependency ratio is 48.5 percent, the child dependency ratio is higher (42.6%) than that of old age dependency ratio (5.9) (GSS, 2010)

The housing stock of Accra Metropolis is 149,689. The total number of households in these houses was 450,794 with the population per house estimated to at (11.1%) and an average household size of 3.7 (GSS, 2010). As a result of the large and increasing population of the Accra Metropolis, building construction projects are also plenteous. Public housing development agencies such as the Social Security and National Insurance Trust (SSNIT) and the State Housing Corporation (SHC), private housing and estate development companies as well as other construction companies are undertaking construction projects in the Metropolis. This makes the Accra Metropolis suitable for this study which sought to examine the effects of communication on project performance. A map of the Accra Metropolis is presented below;

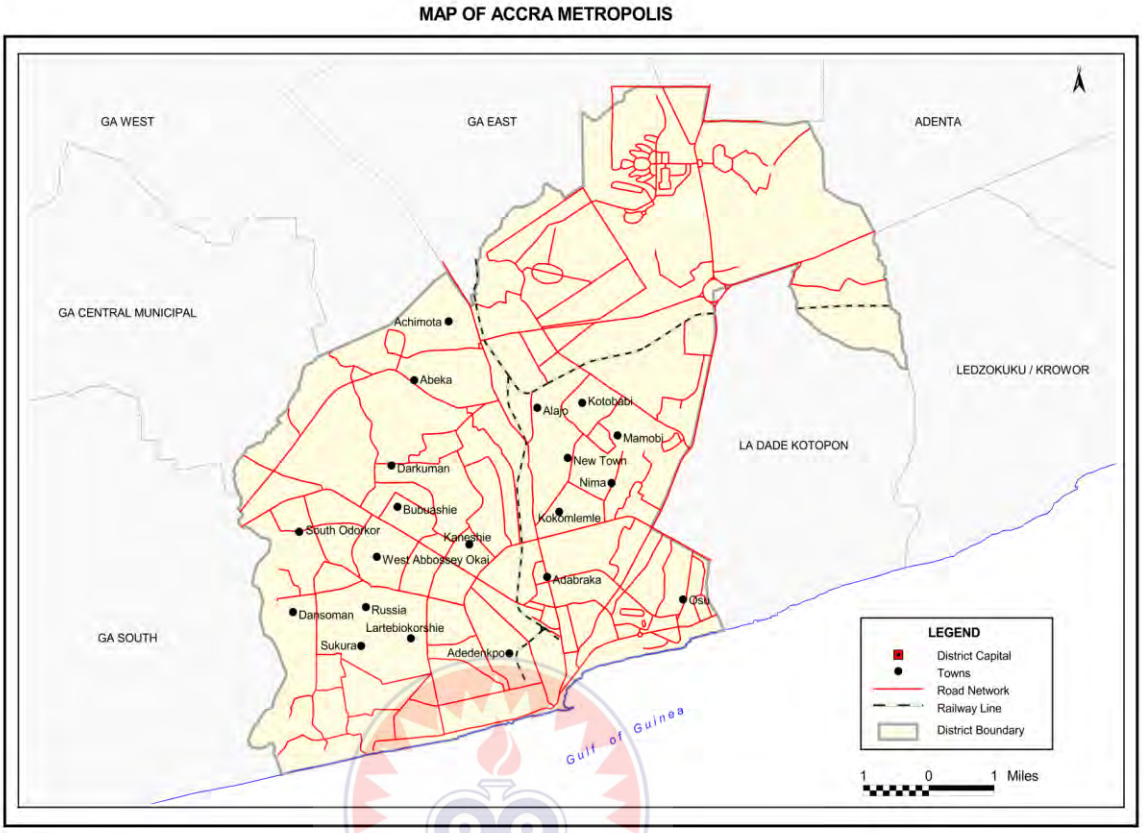

Figure 3. 1 Map of the Accra Metropolis

Source: Ghana Statistical Service (2010)

3.9.2 The Kumasi Metropolis

Kumasi Metropolis is one of the thirty (30) districts in Ashanti Region and it is located between Latitude 6.35^0N and 6.40^0S and Longitude 1.30^0W and 1.35^0E and elevated 250 to 300 meters above sea level. The Metropolis shares boundaries with Kwabre East and Afigya Kwabre Districts to the north, Atwima Kwanwoma and Atwima Nwabiagya Districts to the west, Asokore Mampong and Ejisu-Juaben Municipality to the east and Bosomtwe District to the south. It is approximately 270km north of the national capital, Accra. It has a surface area of approximately 214.3 square kilometres which is about 0.9 percent of the region's land area.

The Kumasi Metropolis covers the second largest city in Ghana and it is the only Metropolis in the Ashanti Region. It was established by Legislative Instrument 1614 of 1995 under the Local Government Law 1988, PNDC Law 207, which is now replaced by the Local Government Act 462, 1993. The Metropolis is divided into ten (10) sub-metropolises namely Asokwa, Subin, Nhyieaso, Bantama, Manhyia, Kwadaso, Oforikrom, Tafo, Suame and Asawase. According to the Ghana Statistical Service (2010), the Kumasi Metropolis alone accommodates about 36.2 percent of the total population of the Ashanti region.

The relationship between Kumasi and its adjoining districts as well as Accra may be described as symbiotic. These adjoining districts to the Metropolis serve as bread baskets by providing farm produce while Kumasi provides the avenue for marketing these products to consumers, not only from other parts of Ghana but also from the West African sub-region. This partly explains why Kumasi has become a converging point for brisk commercial activities. In addition to this, the Metropolis provides services at various levels in the fields of healthcare, education, inter-city transport, financial services and wholesale and retail trade among others, to residents from the adjoining districts and beyond.

The Kumasi Metropolis is a rising city with a lot of building construction project ongoing. Several Estate and construction projects in Ghana are located in Kumasi making the Metropolis suitable for this study which sought to assess the effect of communication on construction project performance. Some of the famous construction companies that are

currently active in the Kumasi Metropolis include ASKOBEN LIMITED, CONSAR LIMITED and BROCK LIMITED. A map of the Kumasi Metropolis is presented below;

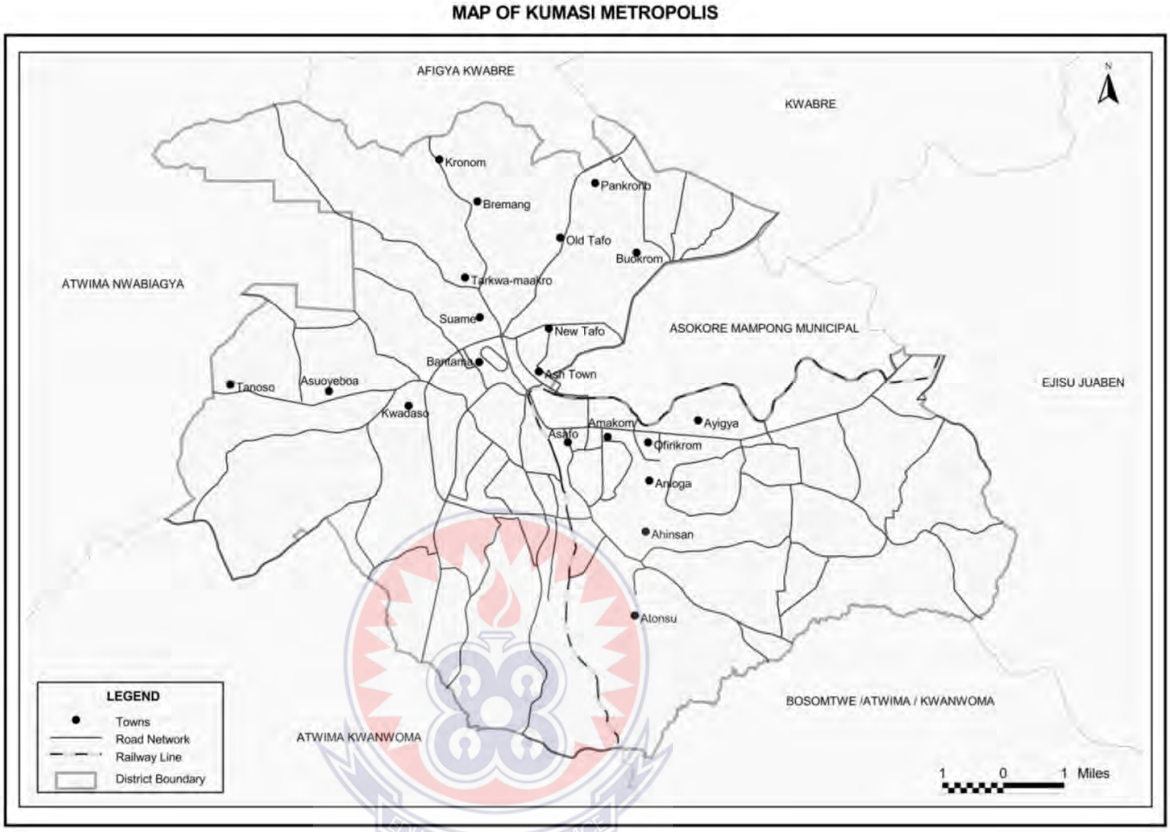

Figure 3. 2 Map of the Kumasi Metropolis

Source: Ghana Statistical Service (2010)

CHAPTER FOUR

PRESENTATION OF RESULTS

4.1 Introduction

This chapter presents the results from analysis of the data collected for the study. The chapter is organised based on the objectives of the study. The first section chapter presents results on the composition of the project team and their demographic characteristics. The second section covers results on communication practices by project team members at the project site, followed by the effectiveness of the communication and the effect communication has on project performance. The last section presents results on the determinants/drivers and barriers to effective communication at construction project sites. The data were collected from 167 project team members out of a sample of 192 giving a response rate of 87%. Although there are no fast rule about what response rate that is appropriate for any study, a response rate of more than 50% when the study population is more than 30 is often considered appropriate (Babbie, 1990).

4.2 Characteristics of the Project Team

The results of the study as presented in Table 4.1 show that eleven (11) portfolios in construction project teams were identified in the study. These included Quantity Surveyor, Project Manager, Architect, Principal Consultant, Managing Director, Main Contractor, Sub-Contractor, Service Engineer, Electrical Engineer, Nominated Supplier and Client. The results, however, show that only 5(3%) of the project team members were clients and 7(4.2%) being nominated suppliers. The highest proportion of the

30(18%) were sub-contractors followed by Service Engineer who was 26, constituting 15.6% of the total respondents.

The rest of the respondents were made up of 19(11.4%) Quantity Surveyors, 21(12.6%) Project Managers, 10 (6%) Architects, 8 (4.8%) Principal Consultants, 9(5.4%) Managing Directors, 16(9.6%) Main Contractors and 16 (9.6%) Electrical Engineers. The generally show that at least all the key Professionals in construction project team participated in the study. The results showing the composition of project teams investigated are presented in Table 4.1.

Table 4. 1 Composition of Project teams

Project Team category	Frequency	Percentage
Quantity Surveyor	19	11.4
Project Manager	21	12.6
Architect	10	6.0
Principal Consultant	8	4.8
Managing Director	9	5.4
Main Contractor	16	9.6
Sub-Contractor	30	18.0
Service and Civil Engineer	26	15.6
Electrical Engineer	16	9.6
Nominated Supplier	7	4.2
Client	5	3.0
Total	**167**	**100.0**

4.2.1 Demographic Characteristics of the Respondents

The demographic characteristics of the respondents considered in this study include the gender of the respondent, age, their highest educational qualifications and length of service in their present organisation. From the results of the analysis, it was observed that the respondents were made of 156(93.4%) males and 11(6.6%) females. With regards to age also, the result shows nearly half (41.9%) of the respondents were 21 to 30 years of age. This was followed by those who were 31 to 40 years, who were 64, constituting 38.3% of the respondents. Respondents who were 20 years or younger were only 2, constituting 1.2% of the total number of respondents. The rest of the respondents were made of those who were 41 to 50 years, 51 to 60 years and those older 60 constituting 12%, 3% and 3.6% respectively.

With regards to education, the results show that only one (1) respondent had a Doctorate degree. Nearly half (49.1%) of the respondents had Bachelor degree as their highest academic qualification, 14(8.4%) with Master's Degree, 55(32.9%) with HND and 15 (9%) with Construction Technology Certificates as their highest academic qualification. In terms of the length of time the respondents have worked at their present companies, the results show that the highest proportion (40.1%) of the respondents have worked for 5 years or less in their present company while only 19(11.4%) have worked for more than 20 years. The remainder of the respondents were made up of 43(25.7%), 26(15.6%) and 12(7.2%) of the respondents who have worked for 6 to 10 years, 11 to 15 years and 16 to 20 years respectively. The demographic characteristics of the respondents are presented in Table 4.2 below;

Table 4. 2 Demographic Characteristics of the Respondents

Characteristics	Categories/options	Frequency	Percentage
Gender	Female	11	6.6
	Male	156	93.4
Age	20 or less	2	1.2
	21-30	70	41.9
	31-40	64	38.3
	41-50	20	12
	51-60	5	3
	above 60	6	3.6
Education	CTC	15	9.0
	HND	55	32.9
	Bachelor Degree	82	49.1
	Master's Degree	14	8.4
	Doctorate	1	0.6
Length of service	5 or less	67	40.1
	6-10	43	25.7
	11-15	26	15.6
	16-20	12	7.2
	More than 20	19	11.4

Source: Field Survey (2017)

4.3 Project team communication practices at construction project sites

The study identified the communication practices of the project team members of the construction project studied. The communication practices were examined with respect to the communication channels used, their effectiveness and platforms that respondent considers important at construction projects site.

4.3.1 Communication Channels Used by Construction Project Team

In the conduct of this study, about ten (10) communication channels were identified as the medium through which construction project team members communicate. A 5-point Likert scale construct (1=Very rarely, 2=rarely, 3=Moderate, 4= Often and 5= Very often) was then used to determine the frequency with which each communication channel is used by team members of construction projects. The results based on the mean of the rating given by the respondents show that on the average meetings were often used as a communication channel at the project site (Mean= 4.0, SD=1.044). The results further show that telephone calls, face-to-face interactions drawings as channels of communication were also used often used with mean score 4.1, 4.1 and 3.6 respectively.

Based on the mean scores, it was also observed that internet/website and fax as channels of communication were rarely used as channels of communication among project team members given the mean score of 2.4 (standard deviation of 1.890) and 1.6 (standard deviation of 1.801). The mean scores for other channels of communication such as hard copy distribution or posts, email, social media and memos were approximately 3 indicating that respondents considered those channels as been moderately used as channels of communication at construction project sites. The results showing the communication channels and a summary statistics on how often they are used at construction project sites are presented in Table 4.3

Table 4. 3 Communication channels used by project team and ratings of frequency of use

Channel	N	Mean	SD	Rank
Telephone calls	167	4.1	1.241	1
Face-to-face interaction	167	4.1	1.419	2
Meetings	167	4.0	1.044	3
Drawings	167	3.6	1.373	4
Social media (Whatsapp, Facebook etc.)	167	3.2	1.601	5
Hard copy distribution or post	167	3.1	1.609	6
E-mail	167	3.0	1.654	7
Memos	167	2.6	1.562	8
internet/website	167	2.4	1.890	9
Fax	167	1.6	1.801	10

Source: Field Survey (2017)

4.3.2 Effectiveness of Communication Channels Used by Construction Project Team

The effectiveness of communication channels used at the selected construction project site was determined using a 5-points Likert scale defined as 1=Very ineffective, 2=Ineffective, 3=Neutral, 4=Effective and 5=Very effective. The respondents were asked to indicate the effectiveness of each communication channel based on the scale above. The results from analysis of data obtained are presented in Table 4.4.

The results from the analysis of the rating of the effectiveness of the different communication channels used by the selected construction project team members based on the means and standard deviation show that the respondents rated effective communication channels such as meetings (Mean=4, SD=1.081), Telephone calls (Mean=4.3, SD=1.004) and face-to-face interactions (Mean=4.2, SD=1.176). The results

also show that the respondent's rate drawings as a channel of communication effective (Mean=3.7, SD=1.404).

The results also show that the respondents were neutral on the effectiveness of communication channels such as hard copy distribution/posts (Mean=3.2, SD=1.640), Internet/website (Mean=2.5, SD=1.913), email (Mean=3.0, SD=1.901) and Memo (Mean=2.6, SD=1.549).Only fax as a channel of communication was rated ineffective (Mean=1.7, SD=1.901). The results showing the respondents rating of the effectiveness of communication channels used as construction project sites are presented in Table 4.4.

Table 4. 4 Respondents ratings of the effectiveness of communication channels used

Communication Channel	N	Mean	SD	Rank
Telephone calls	167	4.3	1.004	1
Face-to-face interaction	167	4.2	1.176	2
Meetings	167	4.0	1.081	3
Drawings	167	3.7	1.404	4
Hard copy distribution or post	167	3.2	1.640	5
Social media (Whatsapp, Facebook etc.)	167	3.0	1.672	6
E-mail	167	3.0	1.777	7
Memos	167	2.6	1.549	8
Access networked project database/internet/website	167	2.5	1.913	9
Fax	167	1.7	1.901	10

Source: Field Survey (2017)

4.3.3 Communication Platforms used and their relative importance to construction projects

The study also sought to identify the communication platforms used by the selected construction team members and the Relative Importance Index (RII) of each communication platform for communication in the selected construction project site. The results in Table 4.5 present the RII, weight and rank given to each platform based on the rating of their relative importance in the construction project teams' communication practices in 5-point linear scale.

From the results, it is observed that the top ten (10) most important communication platforms used by project team members included Personal Communication (emails, calls), Site Review Meetings, Project Annual Report,, Team Meetings Discussions, Record management system, Record management system, Project Status Report, Public Relations, Meeting Suppliers / Customers, Organisation breakdown structure, Work breakdown structure and Noticeboard.

Among the seventeen (17) platforms, Personal communication platforms (calls, emails, face-to-face interaction) was the most important platform for communication among the selected construction project team members with RII of 0.831 and ranked 1st. The second most important platform for communication among project team members as the result shows were Site Review Meetings and Project Annual Report with RII of 0.825 each. The least important communication platform used by the project team members was Performance evaluation scheme. The results showing the relative importance each communication platform used by the selected project team members are presented in Table 4.5

Table 4. 5 Relative Importance Index of communication platforms used at construction project sites

Communication Platform	Importance						W	RII	Rank
	0	*1*	*2*	*3*	*4*	*5*			
Personal Communication (emails, calls)	3	0	11	19	55	79	694	0.831	1
Site Review Meetings	5	5	5	20	46	86	689	0.825	2
Project Annual Report,	2	7	6	20	50	82	689	0.825	2
Team Meetings Discussions	4	7	11	20	62	63	652	0.781	3
Record management system	4	10	10	30	63	50	622	0.745	4
Record management system	4	10	10	30	63	50	622	0.745	4
Project Status Report	5	5	17	31	57	52	620	0.743	5
Public Relations	4	9	23	17	68	46	608	0.728	6
Meeting Suppliers / Customers	5	4	26	19	72	41	606	0.726	7
Organisation breakdown structure	7	5	14	44	63	34	587	0.703	8
Work breakdown structure	12	9	12	33	63	38	574	0.687	9
Notice board	10	15	21	40	33	48	549	0.657	10
Customer Satisfaction Survey	10	16	21	45	33	42	535	0.641	11
Project Business Case	15	14	25	37	55	21	500	0.599	12
Employee suggestion Scheme	16	11	28	42	51	19	492	0.589	13
Social Gathering	27	19	28	52	22	19	414	0.496	14
Performance evaluation scheme	8	14	22	41	44	2	367	0.440	15

Source: Field Survey (2017)

4.3.4 Effectiveness of communication at construction project site

The effectiveness of communication at the selected construction projects sites was measured under five dimensions (Accuracy, Clarity in Procedure, Understandable, Timeliness and Completeness) using a 5-point Likert scale defined as 1=Very poor, 2=Poor, 3= Fair, 4= Good and 5=Very good. Respondents were asked to respond to the effectiveness of communication at their project sites using the defined scale above under the five dimensions of effective communication. The results of the analysis are presented in Table 4.6.

From the results of the analysis, it was observed that the respondents considered the communication at their project sites under each of the five dimensions to be effective.

However, in terms of the absolute values of the mean scores, completeness was rated slightly higher in effectiveness (Mean=4.2, SD=0.784), followed by timeliness and understandable with means of 4.1 and standard deviations of 0.784 and 0.778 respectively. Accuracy was rated least in terms of effectiveness with mean of 3.9 and standard deviation of 0.874. Notwithstanding the slight variations, the mean ratings of the effectiveness for each of the five dimensions were 4 indicating effective. The results of the effectiveness of communication at the selected project sites under the five dimensions of communication are presented in Table 4.6

Table 4. 6 Effectiveness of communication at construction project site

Dimensions	N	Mean	Std. Dev.	Rank
Completeness	167	4.2	0.784	1
Understandable	167	4.1	0.755	2
Timeliness	167	4.1	0.778	3
Accuracy	167	4.0	0.693	4
Procedure	167	3.9	0.874	5

Source: Field Survey (2017)

4.3.5 Construction Project Performance

With regard to the performance of the selected construction projects, five criteria were used in the assessment viz. cost saving, Timely delivery, Quality output, Health and safety and environmental protection. The respondents were asked to assess the performance of their construction projects by rating various indicators on the above performance criteria c using a 5-point scale defined as 1=Strongly disagree, 2=Disagree, 3= Uncertain, 4=Agree and 5=Strongly agree. The results from analysis of data obtained are presented in Table 4.7.

As the results show, overall the mean scores for each criterion of performance was approximate '4', meaning the respondents were positive about the performance of their construction projects under each of the five dimensions. Specifically, the mean score for cost saving was 3.9≈4 with a standard deviation of 0.899, which means respondents agreed that their project achieves cost saving. The overall mean score for timely delivery, quality output, health and safety as well as environmental protection were 3.8, 4.2, 3.6 and 4 respectively which are approximate '4' and hence correspond with agree in the Likert scale used.

Considering the results on individual criteria, it is noted that quality output had the highest mean score followed by environmental protection (Mean=4, SD=0.912), cost saving (Mean=3.9, SD=0.899), timely delivery (Mean=3.8, SD=1.001) and then health and safety (Mean=3.6, SD=1.171). The results showing respondents rating of the performance of their construction projects under cost saving, timely delivery, quality output, health and safety and environmental protection dimensions are presented in Table 4.7.

Table 4. 7 Respondents rating of selected Construction Projects Performance

Criteria	Indicator	Mean	Std. Dev.
Cost saving		**3.9**	**0.899**
	Waste of materials is minimised	3.8	0.947
	Project resources are efficiently utilised	4.0	0.850
Timely delivery		**3.8**	**1.001**
	Delays are minimised	3.7	1.012
	Planning, monitoring and control is effectively implemented	3.9	0.924
	Project activities are completed on schedule	3.8	1.066
Quality Output		**4.2**	**0.832**
	Quality of executed work conform to specification	4.4	0.829
	Materials used to conform with relevant standards	4.3	0.860
	Workmanship meets desired standards/requirement	4.0	0.806
Health and safety		**3.6**	**1.171**
	There are accident requiring over three days off duty	3.3	1.303
	Safety awareness is high	3.9	1.010
	Safety inspections are carried out regularly	3.7	1.201
Environment Protection		**4**	**0.912**
	Project meets environmental standards require by EPA	4.1	0.915
	Pollution (dust and noise) at project sites are minimised	3.9	0.982
	Environment is reclaimed/restored after project is completed	4.0	0.839
Total		3.9	0.963

Source: Field Survey (2017)

4.4 Effectiveness of project team communication in construction project performance

The studies also examined the effectiveness of communication on construction project performance. To achieve this, a multiple linear regression analysis was performed to test if the effectiveness of communication-based on the dimensions of accuracy, clarity of procedure, understandable, timeliness and completeness predicted project performance. From the analysis, the results obtained show that the five predictors (accuracy, clarity of procedure, understandable, timeliness and completeness) explained 24.4% of all variations in construction project performance (r^2=0.244, F (5,167) =10.39, p<0.001).

From the analysis, it was also observed that all the five dimensions of communication (accuracy, clarity of procedure, understandable, timeliness and completeness) had positive effects on construction project performance. However, only understandable (β=0.209, P<0.01) and clarity of procedure (β=0.134, p<0.01) had a significant effect on project performance. The remainder of the variables on communication effects was not statistically significance. The results of the regression output showing the effects of communication on construction project performance are presented in Table 4.8.

Table 4. 8 Regression output on the effects of communication on project performance

Model Summary			*R=0.494* *R-Square=0.244* *Adjusted R=0.220* *S.E of estimates= 0.501* *F(5,161)= 10.39, P<0.01*	
Predictors	**Co-efficient (β)**	**S.E**	**T**	**Significance**
(Constant)	1.865	.309	6.040	.000
Accuracy	.036	.063	.569	.570
Procedure	.134	.048	2.765	.006
Understandable	.209	.059	3.545	.001
Timeliness	.016	.060	.260	.795
Completeness	.109	.061	1.798	.074

Dependent Variable: Project performance
Source: Field Survey (2017)

4.5 Drivers/Determinants of effective communication at Construction Project Sites

The drivers or factors that determine the effectiveness of communication among construction team members were identified with a 5-points Likert scale construct. Respondents were asked to indicate the extent to which various factors identified as

factors that determine the effectiveness of communication influence the effectiveness of communication at their construction project sites under a5-point scale defined as 1= Very Low extent, 2=Low extent, 3=Moderate, 4=large extent and 5=very large extent. The results of the analysis are presented in Table 4.9.

From the results it is seen that factors that were considered to determine the effectiveness of communication to a large extent included Extent of coordination among project team members (Mean=3.8, SD=1.222), availability of sufficient and accurate information (Mean=3.9, SD=0.896), Timely access or availability of information (Mean=3.8≈4, SD=0.933), Access to information source (Mean=3.5, SD=1.206), appropriate communication media for specific purposes/audiences Mean=3.5, SD=1.091), availability of effective communication strategies (Mean=3.6, SD=1.133) Understanding the language(s) and culture of team members Mean=3.5, SD=1.201) and Communication skills of project team members Mean=3.8, SD=1.089).

The remainder of the factors that were considered to have been drivers of effective communication includes, availability of effective communication tools/materials (Mean=3.6, SD=1.169), varying capacity and capabilities of project team members (Mean=3.7, SD=1.034), support and commitment among project team members (Mean=3.8, SD=1.060). The results further show that respondents however considered 'varying perception and interpretation given to information' to have a moderate driver of communication effectiveness (Mean=3.2, SD=1.257), likewise Key information been withheld during its dissemination (Mean=3.1, SD=1.343). The results showing

respondents indication of the extent to which various factors drive communication at their project site are presented in Table 4.9

Table 4. 9 Factors that drives effectiveness of communication among project team

Statements	N	Mean	SD	Rank
Availability of sufficient and accurate information	167	3.9	0.896	1
Timely access or availability of information	167	3.8	0.933	2
Support and commitment among project team members	167	3.8	1.060	3
Communication skills of project team members	167	3.8	1.089	4
Extent of coordination among project team members	167	3.8	1.222	6
Varying capacity and capabilities of project team members	167	3.7	1.034	7
Availability of effective communication strategies	167	3.6	1.133	8
Availability of effective communication tools/materials	167	3.6	1.169	10
Appropriate communication media for specific purposes/audiences	167	3.5	1.091	11
Understanding the language(s) and culture of team members	167	3.5	1.201	12
Access to information source	167	3.5	1.206	13
Varying perception and interpretation gave to information	167	3.2	1.257	14
Key information has been withheld during its dissemination	167	3.1	1.343	15
Information overload (Too much information than can efficiently use)	167	2.9	1.355	16

Source: Field Survey (2017)

4.6 Barriers to Effective Communication at Construction Project Sites

The study sought to identify the barriers to communication at construction project sites. The results in Table 4.10 presents the respondents' indication of the extent to which they agree to statements that were identified as barriers to communication at construction project sites. The extent to which respondents agreed to each barrier was measured using

a 5-point Likert scale defined as 1=strongly disagree, 2=Disagree, 3= Uncertain, 4=Agree and 5=strongly agree.

From the results, it's clear that the respondents considered poor listening skills of team members (Mean=4.2, SD=1.362), Unclear communication objective (Mean=3.8, SD=1.388), Unclear channels of communication (Mean=3.8, SD=1.516) and limited resources (Mean=3.7, SD=1.400) as barriers to effective communication among project team members. The results show that response were neutral poor leadership (Mean=2.6, SD=1.454), organisational structure (Mean=2.8, SD=1.411), ineffective reporting system (Mean=2.8, SD=1.382) and interpersonal conflict among project team members (Mean=2.7, SD=1.410). The respondents only disagreed with personal stereotyping (Mean=2.4, SD=1.356).

Table 4. 10 Barriers to effective communication among construction project team

Barriers	N	Mean	Std. Dev.	Rank
Poor listening skills of team members	167	4.2	1.362	1
Unclear communication objective	167	3.8	1.388	2
Unclear channels of communication	167	3.8	1.516	3
Limited resources	167	3.7	1.400	4
Ineffectiveness of communication channel	167	2.8	1.364	5
Physical distance between the project participants	167	2.8	1.367	6
Ineffective reporting system	167	2.8	1.382	7
Organisation structure	167	2.8	1.411	8
Interpersonal conflicts	167	2.7	1.410	9
Language difficulties	167	2.6	1.449	10
Poor leadership	167	2.6	1.454	11
Personal stereotyping	167	2.4	1.356	12

Source: Field Survey (2017)

CHAPTER FIVE

DISCUSSION OF RESULTS

5.1 Introduction

This chapter presents the discussions of the findings of the study. It involves an explanation of the results obtained in the context of the research problem and scope. The discussions are underpinned by the theories and philosophical assumptions that informed the study and linked to observations from the review of empirical studies. The discussions are outlined based on findings and the objectives of the study.

5.2 Project team communication practices at construction projects sites

Communication is essential in every human endeavour and construction projects are not an exception. The nature of communication practices and their effectiveness is important for the success of construction project execution (Dainty *et al.,* 2006). In this study, about ten (10) channels were identified through which project teams communicate. From the results, it was noted the communication channels used often by the project teams included meetings, telephone calls, face-to-face interactions and drawings. Other channels of communication such as internet/website and fax were rarely used. The remainder, hard copy distribution or posts, email, social media and memos were noted to have been moderately used.

Clearly, from the results, the channels often used were all synchronous communication channels. This supports Amando *et al* (2012) claims that most people prefer synchronous

communication channels. Emmitt (2007) also opined that for effectiveness in construction projects, synchronous communication channels are preferable. Also despite the emergence and benefits in electronic communication, emails and fax were yet among the communication channels not often used by the project team. This implies that the Ghanaian construction project team members are yet to embrace electronic communication holistically.

Regarding the effectiveness of the communication channels used by the construction project team, the results indicated that the respondents rated only meetings, Telephone calls and face-to-face interactions as effective. All other communication channels including emails, fax, memos and post were not rated effective. Interestingly as noted by Adinyira *et al.* (2017), fax which used to be considered the fastest and most efficient medium of communication has now lost its prominence in communication. This is a clear demonstration of the fact that communication is dynamic and move together with the rapid advancement of technology. It is therefore sterile to remain in a traditional set of communication practices or system.

Communication takes place through several platforms and these platforms are also essential in understanding the entire spectrum of communication practices and their effectiveness. The study identified seventeen (17) platforms through which the selected project team communicate. From the results, however, it was noted that not all the platforms were considered equally important to the project team members. An analysis of the relative importance of the different communication platforms to the project team members showed that Personal communication platforms (calls, emails, face-to-face

interaction) were the most important platform for the selected construction project team members with Relative Importance Index of 0.831. Personal communication platforms are synchronous in nature and therefore confirms Amando *et al.* (2012) claim of high preference for synchronous communication.

The results further show that the top ten (10) most important communication platforms used by project team members included Personal Communication (emails, calls), Site Review Meetings, Project Annual Report, Team Meetings Discussions, Record management system, Record management system, Project Status Report, Public Relations, Meeting Suppliers / Customers, Organisation breakdown structure, Work breakdown structure and Noticeboard. The least important communication platform used by the project team members was Performance evaluation scheme.

The study further examined the overall effectiveness of communication among project team members based on five dimensions viz. Accuracy, Clarity (Procedure), Understandable, Timeliness and Completeness. From the results of the analysis, it was observed that the respondents considered the communication at their project sites under each of the five dimensions to be effective. However, in terms of the absolute values of the mean scores, completeness was rated slightly higher in effectiveness followed by timeliness and understandable, accuracy and clarity (procedure).

5.3 Construction Project Performance

The study also examined the performance of the selected construction projects based on five criteria viz. Cost Saving, Timely delivery, Quality output, Health and safety and

environmental protection. The findings of the study show that overall the respondents were positive about the performance of their construction projects under each of the five dimensions. However, considering the results on individual criteria, it is noted that quality output had the highest mean score followed by environmental protection (Mean=4, SD=0.912), cost saving (Mean=3.9, SD=0.899), timely delivery (Mean=3.8, SD=1.001) and then health and safety (Mean=3.6, SD=1.171).

The study measured the quality of output in relation to conforming to client specification, using standard materials and workmanship with desired standards/requirement. The results, therefore, imply that the respondents were positive in relations to their project meeting specification and standards of quality. With regards to environmental protection also the result indicates that respondents were positive their projects meet environmental standards (EPA standards minimise pollution and well reclaimed after completion of projects).

The cost saving dimensions results also show that there is minimised waste and efficient use of resources. By timely delivery, the results also imply that project activities are completed on schedule, with minimal delays with planning, monitoring and control effectively implemented. The findings on health and safety also show that there are accident requiring over three days off duty, high safety awareness and inspection programmes effectively implemented.

5.4 Effect of project team communication on construction projects' performance

One of the main objectives of the study was to determine the effect or influence of communication on project performance. This was achieved by performing a multiple linear regression analysis to test if the effectiveness of communication-based on the dimensions of accuracy, clarity of procedure, understandable, timeliness and completeness predicted project performance. The results generally show that the five predictors (accuracy, clarity of procedure, understandable, timeliness and completeness) explained 24.4% of all variations in project performance (r^2=0.244, F (5,167) =10.39, p<0.01). All five dimension of communication had positive effects on project performance but understandable (β=0.209, P<0.01) and clarity of procedure (β=0.134, p<0.01) had a statistically significant effect on project performance.

There are many studies that support the claim that communication affects project performance. Hoezen et al. (2008), Pinto (2002) and Scott-Young and Sampson (2008) are among some of the studies that have demonstrated that communication has effect on project performance. Ineffective communication has been found to contribute to the failure of projects being on time or on a budget (Hoezen et al., 2008 and Dyer, 2008). The results of this study imply that the extent to which communication is understandable and the clarity of procedure affect project performance much more significantly. If communication is not understood, it may lead to rework thereby delaying project completion time and as well increased the cost of the project.

Clarity of procedure in communication is also important for project performance. The study results show a significant positive relationship between clarity of procedure in

communication and project performance. This implies that more clarity in the procedure of communication leads to increase performance. The results show that in addition to the other dimension of communication, a unit increase in project performance is predicted by 0.134 unit increase in clarity of communication procedure. The findings are in consonant with Affare (2012) observation that clarity of procedure in communication is important for construction projects in Ghana.

5.5 Drivers of effective communication at Construction Project Sites

The study also evaluated the drivers/factors that determine communication effectiveness among construction project team members in Ghana. From the results it was noted that key factors that determines the effectiveness of communication to a large extent is the extent of coordination among project team members, availability of sufficient and accurate information, Timely access or availability of information, Access to information source, appropriate communication media for specific purposes/audiences, availability of effective communication strategies, Understanding the language(s) and culture of team members, and Communication skills of project team members. The rest included, availability of effective communication tools/materials, varying capacity and capabilities of project team members support and commitment among project team members.

The results further show that factors such as varying perception and interpretation gave to information' and withholding of Key information during its dissemination influence communication effectiveness moderately. The results show that there are many factors considered by the respondents to have driven communication effectiveness. Liu (2007)

categories drivers of effective communication at construction project sites into three viz. personal factors, interpersonal factor and the environment. From the findings of this study, it can be observed that most of the factors considered drivers of effective communication are personal and interpersonal factors. The results clearly show the organisation or environment was considered the least as factors that drive communication at construction project sites.

As Mailabari (2014) noted, effective communication require ingredients such as understanding, openness and trust. In the absence of these ingredients, communication stumbles. Understanding the language(s) and culture of team members as identified in this study as drivers of effective communication affect the requirement of understanding in effective communication as posited by Mailabari (2014). As project teams are often made up of people from different cultures who speak different languages, having a common language of communication and understanding the culture of other teams members become an important driver of communication.

As the results also show, many of the factors that were considered by the respondents to drive the effectiveness of communication at their sites were personal factors. This reflects the fact that communication is an interpersonal matter. While the environment and availability of communication tools/materials may equally be important drivers of effective communication, personal factors become paramount. Effective communication result from personal interactions that create friendships that are more meaningful, smoother and more rewarding (Affare, 2012). Many of the theories of communication are

underpinned by the nature of human behaviour and interaction of people when communicating.

5.6 Barriers to Effective Communication at Construction Project Sites

No matter the channel and medium of communication, there are often factors that hinder the flow, receive and understanding of information communicated. These hindrance called barriers exist in every communication platform. In this study, the researcher explored the barriers to communication among construction project team members. The identified barriers included poor listening skills of team members, unclear communication objective, and unclear channels of communication and limited resources as the major barriers to effective communication among project team members.

The results further showed that the response were neutral on poor leadership, organisational structure, ineffective reporting system, and interpersonal conflict among project team members and disagreed that personal stereotyping is a barrier to communication at their project sites. The findings of the study are synonymous to recent studies on communication among construction project team members. Affare (2012) on project communication management on construction projects in Ghana, poor listening skills were identified and rank as the most critical barrier in communication effectiveness. Other barriers identified by Affare (2012) which were synonymous to the findings of this study include limited resource, unclear communication objectives and unclear communication channels. The findings of the study in lieu of Affare (2012)

observation imply that the barriers to communication are ubiquitous across the construction industry.

To further understand the barriers to effective communication among construction project teams, it is important to recognise that construction project team members are often engaged in contractual terms sometimes independent of other team members. As a result of this, the project teams often appear to be fragmented, dynamic and disparate. These characteristics according to Mailabari (2014) have the tendency to cause conflict, lack of mutual respect and trust, and act as hindrance to open communication among project teams.

Factors that influence the nature and extent of coordination among project teams tend to become barriers of communication. As Dubois and Gadde (2002) noted, coordination among project team members in the construction project sites is an essential ingredient for effective communication. When project team members are able to coordinate effectively, they are able to reason and come to terms with the construction project processes and procedure which ultimately leads to enhanced project team performance thereby resulting in good project performance.

CHAPTER SIX

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATION

6.1 Introduction

This chapter presents a summary of the main findings of the study, conclusions drawn and recommendation made. The entire study was conducted to examine how the effectiveness of communication among project team members in the construction industry affects project performance in Ghana. The main findings thus addressed the objectives of the which included examining the communication practices, their effectiveness, how overall communication affect project performance, drivers and barriers to effective communication among construction project team members.

6.2 Summary of Main Findings

The main findings of the study addressed the specific objectives of the study viz. to identify project team communication practices at construction projects sites, to assess/evaluate the influence of project team communication on construction projects' performance, to identify barriers to effective project team communication at construction project sites, and to identify drivers to effective project team communication in selected metropolises in Ghana. The main findings of the study under the various objectives are presented below;

6.2.1 Project team communication practices at construction projects sites

The study note about ten (10) communication channels used by construction project team members. Analysis of the data, however, shows that communication channels used often by the project teams included meetings, telephone calls, face-to-face interactions and drawings. Channels of communication such as internet/website and fax were rarely used were found to be rarely used.

In terms of the effectiveness of the communication channels, the findings show that the respondents considered only meetings, Telephone calls and face-to-face interactions as the only effective communication channels. The rest of the communication channels including emails, fax, memos and post were not rated effective. The study also identified seventeen (17) platforms through the selected project team communicate. From the results, however, it was noted that not all the ten platforms were considered equally important to the project team members. The results show that that Personal communication platform (calls, emails, face-to-face interaction) was the most important platform and performance evaluation scheme, the least important channels.

The overall effectiveness of communication among project team members based on five dimensions viz. Accuracy, Clarity (Procedure), Understandable, Timeliness and Completeness was also determined. The results show that the respondents considered the communication at their project sites under each of the five dimensions to be effective. However, in terms of the absolute values of the mean scores, completeness was rated slightly higher in effectiveness followed by timeliness and understandable, accuracy and clarity (procedure).

6.2.2 Effect of project team communication on construction projects' performance

The findings of the study regarding the effect of communication on project performance show that results general show that that the five dimensions of communication (accuracy, clarity of procedure, understandable, timeliness and completeness) explained 24.4% of all variations in project performance. Also, each of the dimension of communication was found to have had positive effects on project performance but understandable and clarity of procedure having a statistically significant effect on project performance.

6.2.3 Drivers or factors that determine effective project team communication

In identifying the drivers or determinants of communication effectiveness among construction project team members in Ghana, the results show that the extent of coordination among project team members, availability of sufficient and accurate information, Timely access or availability of information Access to information source, appropriate communication media for specific purposes/audiences availability of effective communication strategies, Understanding the language(s) and culture of team members, and Communication skills of project team members were the key drivers.

6.2.4 Barriers to effective project team communication at construction project sites

The barriers to effective communication among construction project team members noted in this study included poor listening skills of team members, unclear communication objective, unclear channels of communication and limited resources as the major barriers to effective communication among project team members. Poor leadership, organisational structure, ineffective reporting system, and interpersonal conflict among

project team members were not found to be an important barrier to communication effectiveness among construction project team members.

6.3 Conclusion

Communication is an integral part of human interaction that cannot be overlooked. There can be no understanding and cooperation among people without communication. In the construction industry where different individuals and professional are involved in executing a single task, communication becomes even more valuable. There is an increasing need to expound knowledge regarding communication management and its implication in the construction industry. This study examines the effects of communication on the performance of construction projects in Ghana. The rationale of the study is that by examining the nature of communication practices and their implication on performance, relevant empirical information can be generated to aid reforms in communication among construction project team members.

From the analysis of the data collected, it was observed that multiple channels and platforms are used in communication among construction project team members in Ghana. While not all the channels and platforms are used more frequently or are important to all project teams' members, there each form the fabric of the communication system within construction project site. Not all the communication channels were found to be equally effective. The results single out meetings, telephone calls and face-to-face interactions to be the most effective channels. The most important platforms for communication was also found to be personal communication platforms (calls, text, emails etc.)

Notwithstanding the channels or platform used, communication was found to be significant in predicting construction projects performance. The more effective the communication system is, the higher the project performance and the vice versa. This observation implies that project team members can improve the performance of projects by improving the effectiveness of communication. The effectiveness of communication require satisfying five dimensions of communication viz. accuracy, understandable, clarity of purpose, timeliness and completeness. Interesting understandable and clarity of purpose were the most significant dimension affecting project performance. Therefore by improving understanding in communication and clarity of purpose, project performance could drastically improve.

The study therefore concludes that effective communication is important for improving the performance of construction projects. Ineffective communication among construction project teams lower project performance. The quality of output, timeliness of delivery, health and safety, environmental protection are dimensions of construction project performance affected by ineffective communication. Therefore to ensure that there is improved performance in construction projects, efforts must be mad to improve the effectiveness of communication among construction project team members.

6.4 Recommendations

The following recommendations are been made based on the findings of this study.

6.4.1 Create social and informal mechanisms for interaction among project team members

The findings of the study show that synchronous communication platforms were effective. To bridge the barriers to personal interactions, management should endeavour to create a work environment that is sociable and promote interaction among project team members. This will go a long way to promote trust and understanding among project team members.

6.4.2 Invest in project communication infrastructure

Considering the importance of communication to project performance, it is recommended that management of construction projects must see the need to invest communication media and infrastructure used in the communication process of construction projects. In this era electronic communication has become indispensable; however, the results of the study show that electronic communication was very limitedly used. Email and fax were rarely used among project team members. Therefore by investing in communication infrastructure to encourage electronic communication, the general effectiveness of communication within project sites can be enhanced**.**

6.4.3 Structuring of organisational communication system

Per the results of the study, it appears the construction projects studied did not have formally structure and laid down mechanisms for communication among project team members. This was evident in the observations that clarity in the channel of

communication was considered key barriers to effective communication. It is therefore recommended, management of construction projects should take steps to outline communication channels, strategies and objectives for project team members. This is envisaged to be able to improve communication effectiveness and project performance.

6.4.4 Leverage on Advance in Technology to Improve Effectiveness of Communication

Technology has revolutionised communication in the last few years. It is recommended that construction project managers should continually embrace new technologies to foster and improve information flow among project team members. Social media has become the trailblazer for communication in modern times, but from the results of this study, social media was not prominently noted in the communication practices of project team members. Management can, therefore, leverage on the various social media platforms to create an effective system of communication among project team members.

6.5 Limitation and Suggestion for Future Research

The methodology and design used as well as the general structure of the study were not without limitation. In the first place the study used survey method where questionnaire were administered. The answers provided and recorded were based entirely on the recollection and subjective judgment of the respondents. Also as a psychometric data the degrees to which the information provided by respondents can be considered accurate and objective were unknowable. Future studies should consider using multiple data collection methods to improve reliability and validity.

Secondly, the population of the study was quite diverse, however during analysis the response were treated homogenously. This approach in the analysis affected the possibility of obtaining case specific information. To solve this challenge, further studies should employ expert judgment and elucidation methods.

The third limitation of the study is that many other staff who are not part of the construction team but contribute to the day-to-day operation were left out. This makes the researcher lose the opportunity to obtained in-depth information across board. It is suggested that further studies should be very inclusive making sure all key players are considered in the conduct of the study.

REFERENCES

Abugre, J. B. (2013). Current and desired employee communication patterns in Sub-Saharan Africa: Empirical evidence on four Ghanaian organisations. *Journal of African Business*, *14*(1), 33-46.

Abugre, J. B. (2011). Appraising the Impact of Organisational Communication on Worker Satisfaction in Organisational Workplace, University of Ghana

Adeleke, A., Ogundele, O.J.K. & Oyenuga,O.O. (2004). Business policy and strategy. Lagos: Concept publications.

Adler, R., & Towne, N. (1978). *Looking out/looking in* (2nd ed.). New York: Holt, Rinehart and Winston.

Affare, M. A. W. (2012). *An assessment of project communication management on construction projects in Ghana* (Master's dissertation, Institute of Distance Learning, Kwame Nkrumah University of Science and Technology).

Ahadzie, D., Proverbs, D., & Olomolaiye (2007). 'Critical success criteria for mass housing building projects in developing countries'. International Journal of Project Management vol. 26, issue 6, p.675-687

Ainobushoborozi A (June 2013). Impact of Effective Communication On Labour Productivity In Civil Engineering Projects A Case Study Of Kampala Central Division.

Aiyewalehinmi, E. O. (2013). Factor analysis of communication in the construction industry. *The International Journal of Engineering and Science*, *2*(10), 49-57.

Al-Fedaghi, S., Alsaqa, A., & Fadel, Z. (2009). Conceptual model for communication. *International Journal of Computer Science and Information Security*, *6*(2), 29-41.

Amando, M., Ashton, K., Ashton S., Bostwick, J., Clements, G., Drysdale, J., Francis, J., Wiley, D. (2012). Project Management for Instructional Designers. Retrieved from http://pm4id.org/. lincenced under a creative commons attribution non-commercial shareAlike(BY-NC-SA) [Assesed on 16th June, 2017)

Amankwa, O.P.J. (2003). *Ghana: A human geography for secondary schools*, St. Francis Press, Ghana

Anaman, K. A., & Osei-Amponsah, C. (2007). Analysis of causality links between the growth of the construction industry and growth of the macro-economy in Ghana. *Construction Management & Economics*, 25, 951-961.

Asiedu, J. B. K., Buah, J. N. & Blankson, J. E. (2010). The Landscape Industry And Practice In Ghana, *XXVIII International Horticultural Congress on Science and Horticulture for People (IHC2010): International Symposium on Advances in Ornamentals, Landscape and Urban Horticulture*

Aulich, T. (2013). 'The role of effective communication in the construction Industry: a guide for education and health clients', *Australasian Journal of Construction Economics and Building, 13* (4) 92-101

Badu, E., Owusu-Manu, D., Edwards, J. D., Adesi, M., & Lichtenstein, S. (2013) Rural Infrastructure Development in the Volta Region of Ghana: Barriers and Interventions. *Journal of Financial Management of Property and Construction*,

18, 142-159. Available at: http://dx.doi.org/10.1108/JFMPC-11-2012-0040 (Accessed, 26/04/2017)

Broni, J. V. G. (2010). Ethical dimensions in the conduct of business: business ethics, corporate social responsibility and the law. The" ethics in business" as a sense of business ethics. In *International Conference On Applied Economics–ICOAE* (p. 795).

Cheung, S., Yiu, T., & Lam, M. (2013). "Interweaving Trust and Communication with Project Performance." *J. Constr. Eng. Manage.*, 10.1061/(ASCE)CO.1943-7862.0000681, 941-950.

Chung, B., Skibniewski, M. J., & Kwak, Y. H. (2009). Developing ERP systems success model for the construction industry. *Journal of Construction Engineering and Management*, *135*(3), 207-216.

Collis, J., & Hussey, R. (2013). *Business research: A practical guide for undergraduate and postgraduate students*. Palgrave macmillan.

Cooper, D. J., & Robson, K. (2006). Accounting, professions and regulation: Locating the sites of professionalization. *Accounting, organisations and society*, *31*(4), 415-444.

Dadzie, J. (2013). Perspectives of Consultants on Health and Safety Provisions in the Labour Act: A Study of Theory and Practicals, Engineering Management Research Vol. 2 No. 1; 2013

Dainty, A. R. J., Green, S., & Bagilhole, B (2007). People and Culture in Construction, Oxon: Taylor and Francis Group.

Dainty, A., Moore, D. & Murray, M. (2006), *Communication in construction; theory and practice*, Taylor and Francis.

Dainty, A., Moore, D., & Murray, M. (2007). *Communication in construction: Theory and practice*. Routledge.

Den O. A., & Emmitt, S. (2007). Exploring effectiveness of team communication: Balancing synchronous and asynchronous communication in design teams. *Engineering, Construction and Architectural Management*, *14*(5), 408-419.

Denscombe, M. (2013). The role of research proposals in business and management education. *The International Journal of Management Education*, *11*(3), 142-149.

Dubois, A., & Gadde, L. E. (2002). The construction industry as a loosely coupled system: implications for productivity and innovation. *Construction Management & Economics*, *20*(7), 621-631.

Dueitt, H. (2017). *Effective Communication Helps in Construction Management*. *Notevault.com*. Retrieved 27 July 2017, from http://www.notevault.com/blog/effective-communication-helps-in-construction-management/-0

Duodu, S.A. (2016). *Management of Delays in Construction Projects in Bia West District*. (Master's Degree Thesis, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana.

Emmett, A. (2013). Silent Soliloquy: An Unknown Photographer Chronicles the 'Inscrutable Laughter' of Japanese American Internment. *Visual Communication Quarterly*, *20*(2), 75-90.

Enshassi, F., & Burgess, R. (2006). "Managerial effectiveness and the style of management in the Middle East: an empirical analysis," *Construction Management and Economics, 9*(1), 79–92

Eriksson, P. E., & Pesämaa, O. (2007). Modelling procurement effects on cooperation. *Construction Management and Economics*, *25*(8), 893-901.

Florence, O. (2015). *Effect of communication on employee performance at Ghana Revenue Authority, Kumasi* (Doctoral dissertation, Kwame Nkrumah University of Science and Technology).

Foulger, D. (2002a). Roles in Media. Presented at National Communication Association Summer Conference, May, 2002. Retrieved from http://evolutonarymedia.com/papers/rolesInMedia.htm

Fugar, F. D. K. & Agyakwah-Baah, A. B. (2010). 'Delays in building construction projects in Ghana', *Australasian Journal of Construction Economics and Building, 10* (1/2), 103-116

Gavade, J.J., Konnur, B.A. & Thorbole, A.S. (2014). Project Communications Management - A Web Based Construction Management Approach, International *Journal of Advanced Technology in Engineering and Science, 2*, 8.

Gawade, P. (2017). Scheduling and monitoring of multistoried building using project management software.

Glicken, M. D. (2003). *Social research: A simple guide*. Pearson College Division.

Golparvar-Fard, M., Peña-Mora, F., & Savarese, S. (2009). D4AR–a 4-dimensional augmented reality model for automating construction progress monitoring data collection, processing and communication. *Journal of information technology in construction*, *14*(13), 129-153.

Guevara, J. M., & Boyer, L. T. (1981). 'Communication problems within construction'. *Journal of the Construction Division*, in Proceedings of the American Society of Civil Engineers, December, 107(4), 551–57.

Haghbin, S., Eslami, Y., & Davoudi, P. (2014). Intra-Communication Analysis of Design Team in Construction Projects. *International Journal of Innovative Science, Engineering & Technology*, *1*(6), 5-8.

Hoezen, M., van Rutten, J., Voordijk, H., & Dewulf, G. (2010). Towards better customized service-led contracts through the competitive dialogue procedure. *Construction management and economics*, *28*(11), 1177-1186.

Hoezen, M. E. L. (2004). The problem of communication in construction, University of Twente

ISSER (2008). The State of the Ghanaian Economy, University of Ghana. Author.

Jerry, C., Wofford, E., Gerloff, A. & Robert, C. (2002). Cummins, *Organisational Communication*, New York: McGraw-Hill.

Johnson, J.W. and LeBreton, J.M. (2004) History and Use of Relative Importance Indices in Organizational Research. *Organizational Research Methods*, *7*, 238-257. Available at http://dx.doi.org/10.1177/1094428104266510 (Accessed 21/04/2017)

Kassab, M., Hipel, K., & Hegazy, T. (2006). Conflict resolution in construction disputes using the graph model. *Journal of construction engineering and management*, *132*(10), 1043-1052.

Katz, E. (1957). The Two-Step Flow of Communication. *Public Opinion Quarterly, 21*, 61-78.

King, D. T. (2016). *Assessment of problems associated with poor project management performance.* Long International. Accessed: February 16, 2017. Available at:http://www.long-intl.com/articles/long_intl_assessment_of_problems_associated_with_por-pm_performance.pdf

Kothari, C. R. (2004). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. *New Age International. New Delhi*, 12-15.

Kwofie, T. E., Fugar, F., Adinyira, E., & Ahadzie, D. K. (2014). Identification and Classification of the Unique Features of Mass Housing Projects. *Journal of Construction Engineering*, *2014*.

Kwofie, T.E , Adinyira, E., Fugar, F. & Ahadzie, D. (2014). A Conceptual framework for Evaluating Communication Performance among Mass Housing Project Team, *Kwame Nkrumah University of Science and Technology, Kumasi, Ghana*

Kwofie, T. E., Adinyira, E., & Fugar, F. (2015). Nature of Communication Ineffectiveness Inherent in the Procurement Systems on Mass Housing Projects, *Kwame Nkrumah University of Science and Technology, Kumasi, Ghana*

Lasswell, H. (1948). "The Structure and Function of Communication in Society." In Lyman Bryson (Ed.), *The Communication of Ideas*. Harper and RowLeung, M.

Y., Ng, S. T., & Cheung, S. O. (2004). Measuring construction project participant satisfaction. *Construction Management and Economics*, *22*(3), 319-331.

Lincoln, Y. S., Lynham, S. A., & Guba, E. G. (2011). Paradigmatic controversies, contradictions, and emerging confluences, revisited. *The Sage handbook of qualitative research*, *4*, 97-128.

Löfgren, A (2006). *Mobile computing and Project communication – mixing oil and water?* Licentiate thesis, Royal Institute of Technology, Stockholm.

Manusov, V., & Spitzberg, B. H. (2008). Attributes of attribution theory: Finding good

Manusov, V., & Harvey, J. H. (2001). *Attribution, communication behavior, and close relationships*. Cambridge University Press.

Maslej, M. (2006). *Communication in the construction industry.* Technical thesis project (Diploma). George Brown College USA

Maslow, A. (1970). *Motivation and personality.* New York: Harper & Row

McCann, D. M., & Forde, M. C. (2001). Review of NDT methods in the assessment of concrete and masonry structures. *Ndt & E International*, *34*(2), 71-84.

McIntosh, D. M, (2009). The Forest of Performance Theories: *A Review of Theories of Performance, Review of Communication, 9*(3), 267-272

Mehra, S. (2009). Project communication management. Available on line at http://www.scribd.com/doc/7875707/project-communication-summary-by-sachin-mehraOchieng, E., & Price, A. D. (2009). Framework for managing multicultural

project teams. *Engineering, Construction and Architectural Management*, *16*(6), 527-543.

Milford, R. (Ed.) CIB World Building Congress 2007 'Construction for Development', 14-17 May 2007, Cape Town, South Africa.

Ochieng, E. G., & Price, A.D. (2009). Framework for managing multicultural project teams. Engineering, Construction and Architectural Management, 2009, 16 (6), 527 – 543.

Olaniran, O. J., Love, P. E., Edwards, D., Olatunji, O. A., & Matthews, J. (2015). Cost overruns in hydrocarbon megaprojects: A critical review and implications for research. *Project Management Journal*, *46*(6), 126-138.

Osei, V. (2013). The Construction Industry and its Linkages to the Ghanaian Economy-Polices to Improve the Sector's Performance, International Journal of Development and Economic Sustainability, 1(1), 56-72

Priyadharshini, S.N. & Satheesh, K.S. (2015). Project Communication : Is key to productive construction and It's Research needs in the future of Construction Engineering and Management, International Journal of Science, Technology & Management, *4*, 1

Quinlan, D., Swain, N., & Vella-Brodrick, D. A. (2012). Character strengths interventions: Building on what we know for improved outcomes. *Journal of Happiness Studies*, *13*(6), 1145-1163.

Rubin, A. (2011). Teaching EBP in social work: Retrospective and prospective. *Journal of Social Work*, *11*(1), 64-79.

Salend, S. J., & Salinas, A. (2003). Language Differences or Learning Difficulties The Work of the Multidisciplinary Team. *teaching exceptional children*, *35*(4), 36-43.

Senaratne, S., & Ruwanpura, M. (2016). Communication in construction: a management perspective through case studies in Sri Lanka. *Architectural Engineering and Design Management*, *12*(1), 3-18.

Shannon, C. E. A (1948). Mathematical Theory of Communication. *Bell System Technical Journal, 27*, 379-423 and 623-656, July and October, 1948.

Sharma, S.C. (2007). *Management of systems.* India: Kana Publishers Ltd.

Suter, E., Arndt, J., Arthur, N., Parboosingh, J., Taylor, E., & Deutschlander, S. (2009). Role understanding and effective communication as core competencies for collaborative practice. *Journal of interprofessional care*, *23*(1), 41-51.

Thomas, J. W. (2000). *A review of research on project-based learning.*

Tipili, L. G., & Ojeba, P. O. (2014, July). Evaluating the effects of communication in construction project delivery in Nigeria. In *Proceedings of the Multi-disciplinary Academic Conference on Sustainable Development* (Vol. 2, No. 3).

Wang, Z., & Hu, Q. (2014). The research on the impact of project communication to project performance. Accessed: February 16, 2017, available at: http://link.springer.com/chapter/10.1007/978-3-642-27296-7_32#page-1

Waziri, F., & Khalfan, S. (2014). Cross-Cultural Communication in Construction Industry: How do Chinese Firms Cross the Barriers in Tanzania?. *Cross-Cultural Communication*, *6*(13).

Weiner, B. (2006). *Social motivation, justice, and the moral emotions: An Attributional approach.* Mahwah, NJ: Lawrence Erlbaum Associates.

Wikforss, Ö (Ed.) (2006). *Kampen om kommunikationen: Om projektledningens information steknologi*, Research report, Royal Institute of Technology, Stockholm.

Wikforss, O., & Löfgren, A. (2007). Rethinking communication in construction. *Journal of Information Technology in Construction (ITcon)*, *12*(23), 337-346.

Yang, J. B., & Wei, P. R. (2010). Causes of delay in the planning and design phases for construction projects. *Journal of Architectural Engineering*, *16*(2), 80-83.

Yang, J., Ahuja, V., & Shankar, R. (2007). Managing Building Projects through Enhanced Communication-An ICT Based Strategy for Small and Medium Enterprises. In

APPENDIX I

QUESTIONNAIRE

QUESTIONNAIRE FOR CONSTRUCTION PROJECT TEAMS

Dear Sir/Madam,

I am a Master of Philosophy candidate at the University of Education, Winneba. As part of the requirement for the award of the degree, I am conducting research study **on the topic "*Assessing the Effectiveness of Communication in Construction Project Performance; a study of Constructions projects sites in selected Metropolises in Ghana*"**

I'm therefore, seeking your assistance to fill the questionnaires attached for the purpose of the study. The filling the questionnaire will take about twenty minutes to complete. Kindly answer all the questions as best as you can. The research results will be used for academic purposes only and will be treated with utmost confidentiality.

SECTION A: Personal Information of Respondents

For each of the following questions please tick the option that best describes your choice

1. What is your gender please?

[ ] Female

[ ] Male

2. Which of the following age group do you belong to?

[ ] 20 years or less

[ ] 21 to 30 years

[ ] 31 to 40 years

[ ] 41 to 50 years

[ ] 51 to 60 years

[ ] above 60 years

3. What is your highest academic qualification obtained?

[ ] Construction Technology Course

[ ] HND

[ ] Bachelor degree

[ ] Master Degree

[ ] Doctorate degree

[ ] Other (specify)……..

4. Which is your position/role in the project you are working on now?

[ ] Quantity Surveyor

[ ] Project Manager

[ ] Architect

[ ] Principal consultant

[ ] Managing director

[ ] Main Contractor/Representative

[ ] Sub-contractor/Representative

[ ] Services Engineer

[ ] Electrical Engineer

[ ] Nominated Supplier

[ ] Client

[ ] Other (specify)…….

5. What is the total length of time you have worked in the construction industry?

[ ] 5 years or less

[ ] 6 to 10 years

[ ] 11 to 15 years

[ ] 16-20 years

[ ] More than 20 years

SECTION B: COMMUNICATION CHANNELS USED BY CONSTRUCTION COMPANIES

6.For each of the following communication channels, indicate the extent to which it is employed at the construction project you work at currently using the scale provided. *Circle or tick 1, 2, 3, 4 or 5 to indicate very rarely, rarely, average, often and very often* respectively in terms of the frequency of use. Circle or tick '0' against communication channels not used on the project at all. If you want to change your answer, cross it out and circle or tick a new number

1	Hard copy distribution or post	0	1	2	3	4	5
2	Access networked project database/internet/website	0	1	2	3	4	5
3	Meetings	0	1	2	3	4	5
4	E-mail	0	1	2	3	4	5
5	Fax	0	1	2	3	4	5
6	Telephone calls	0	1	2	3	4	5
7	Face-to-face interaction	0	1	2	3	4	5
8	Social media (Whatsapp, Facebook etc.)	0	1	2	3	4	5
9	Drawings	0	1	2	3	4	5
10	Memos	0	1	2	3	4	5
11	Others (specify)…….	0	1	2	3	4	5

7. What is your most preferred channel of communication? (*Tick only one option*)

[ ] Hard copy distribution or post

[ ] Access networked project database/internet/website

[ ] Meetings

[ ] E-mail

[ ] Fax

[ ] Telephone calls

[ ] Face-to-face interaction

[ ] Social media (Whatsapp, Facebook etc)

[ ] Others (Specify)……

8. By what means do you communicate most frequently to other project team members?

[ ] Hard copy distribution or post

[ ] Access networked project database/internet/website

[ ] Meetings

[ ] E-mail

[ ] Fax

[ ] Telephone calls

[ ] Face-to-face interaction

[ ] Social media (Whatsapp, Facebook etc)

[ ] Others (specify)……

SECTION C: COMMUNICATION EFFECTIVENESS AND PROJECT PERFORMANCE

9. For each of the following communication channel, indicate how effective it is used at the construction project site you work for using the scale provided. Circle or tick **1, 2, 3, 4 or 5 to indicate very ineffective, ineffective, uncertain, effective and very effective** respectively in terms of the frequency of use. Circle or tick '0' against communication channels not used on the project at all. If you want to change your answer, cross it out and circle or tick a new number.

1	**Hard copy distribution or post**	**0**	**1**	**2**	**3**	**4**	**5**
2	Access networked project database/internet/website	0	1	2	3	4	5
3	Meetings	0	1	2	3	4	5
4	E-mail	0	1	2	3	4	5
5	Fax	0	1	2	3	4	5
6	Telephone Calls	0	1	2	3	4	5
7	Face-to-face interaction	0	1	2	3	4	5
8	Social media (Whatsapp, Facebook etc.)	0	1	2	3	4	5
9	Drawings	0	1	2	3	4	5
10	Memos	0	1	2	3	4	5
11	Others (specify)	0	1	2	3	4	5

10. How important are the following communication channels at your construction project site? **Tick or circle, 1, 2, 3, 4, or 5 to indicate importance in ascending order. Tick '0' if not applied**

Communication channels	Relative importance					
Site Review Meetings	0	1	2	3	4	5
Notice board	0	1	2	3	4	5
Project Annual Report,	0	1	2	3	4	5
Formal Communication (emails, phone calls)	0	1	2	3	4	5
Work breakdown structure	0	1	2	3	4	5
Project Status Report	0	1	2	3	4	5
Customer Satisfaction Survey	0	1	2	3	4	5

Record management system	0	1	2	3	4	5
Social Gathering	0	1	2	3	4	5
Public Relations	0	1	2	3	4	5
Resource breakdown structure	0	1	2	3	4	5
Team Meetings Discussions	0	1	2	3	4	5
Organisation breakdown structure	0	1	2	3	4	5
Employee suggestion Scheme	0	1	2	3	4	5
Performance evaluation scheme	0	1	2	3	4	5
Project Business Case	0	1	2	3	4	5
Meeting Suppliers / Customers	0	1	2	3	4	5

11. How will you rate the effectiveness of communication at the site of your project in relations to the following dimensions? Rate by ticking or circling the 1 for very poor, 2 for poor, 3 for fair, 4 for good and 5 for very good

Dimension	Description	Rating				
Accuracy	The accuracy of information received as compare to what is intended to be communicated	1	2	3	4	5
Procedure	The existence, use and effectiveness of formally defined procedures outlining scope, methods of communicating	1	2	3	4	5
Understandable	Understanding of information given to you by other project team members	1	2	3	4	5
Timeliness	Timeliness of information received including design and schedule changes	1	2	3	4	5
Completeness	The amount of relevant information received	1	2	3	4	5

12. Overall, how effective do you think communication between project team members is at the construction stage of the project you are working on currently?

[ ] Very ineffective

[ ] Ineffective

[ ] Moderate

[ ] Effective

[ ] Very Effective

13. How will you rate the performance of the construction project you work at in relations to the following statements/indicators? Rate by ticking or circling 1 for strongly disagree, 2 for disagree, 3 for uncertain, 4 for agree and 5 for strongly agree. Please any remark you have on each index in the last column

Performance Criterion	Statements/Indicators	Rating				
Cost	Waste of materials is minimize	1	2	3	4	5
	Project resources are efficiently utilized	1	2	3	4	5
Timely delivery	Project activities are completed on schedule	1	2	3	4	5
	Planning, monitoring and control is effectively implemented	1	2	3	4	5
	Delays are minimized	1	2	3	4	5
Quality of work	Quality of executed work conform to specification	1	2	3	4	5
	Materials used conform with relevant standards	1	2	3	4	5
	Workmanship meets desired standards/requirement	1	2	3	4	5
Health and Safety	There are accident requiring over three days off duty	1	2	3	4	5
	Safety awareness is high	1	2	3	4	5
	Safety inspections are carried out regularly	1	2	3	4	5
Environmental protection	Project meets environmental standards require by EPA	1	2	3	4	5
	Pollution (dust and noise) at project sites are minimized	1	2	3	4	5
	Environment is reclaimed/restored after project is completed	1	2	3	4	5

14. To what extent do instances of poor communication occur at your project site

[ ] Very low extent

[ ] Low extent

[ ] Moderate

[ ] High

[ ] Very high

15. What has been the effect(s) of poor communication on project performance at your project sites (*You can select more than one option*)

[ ] Cause delay in project completion
[ ] Bring about cost overrun due to rework
[ ] Cause lack of co-ordination
[ ] Cause misunderstanding at project sites
[ ] Cause disputes and arbitration

SECTION D: DRIVERS AND BARRIERS TO EFFECTIVE COMMUNICATION

16. Indicate the extent to which the following factors drive the effectiveness of communication at construction project sites. **Circle or tick 1, 2, 3, 4 or 5 to indicate Very Low extent, Low extent , average, large extent and very large extent** respectively.. Circle or tick '0' against statements you do not consider as a factor that drives the effectiveness of communication at construction project sites.

1	Extent of coordination among project team members	0	1	2	3	4	5
2	Availability of sufficient and accurate information	0	1	2	3	4	5
3	Information overload (Too much information than can efficiently use)	0	1	2	3	4	5
4	Timely access or availability of information	0	1	2	3	4	5
6	Varying perception and interpretation given to information	0	1	2	3	4	5
7	Key information been withheld during its dissemination	0	1	2	3	4	5
8	Access to information source	0	1	2	3	4	5
9	Appropriate communication media for specific purposes/audiences	0	1	2	3	4	5
10	Availability of effective communication strategies	0	1	2	3	4	5
11	Understanding the language(s) and culture of team members	0	1	2	3	4	5
12	Communication skills of project team members	0	1	2	3	4	5

13	Availability of effective communication tools/materials	0	1	2	3	4	5
14	Varying capacity and capabilities of project team members	0	1	2	3	4	5
15	Support and commitment among project team members	0	1	2	3	4	5
16	Others (specify)……						

17. To each of the following condition in the table below, please tick or circle 1, 2, 3, 4, or 5 to indicate the extent to which you agree with the statement below as a barrier to effective communication in construction projects sites in Ghana. 1=strongly disagree, 2=disagree, 3=not sure, 4=agree and 5=strongly agree

	Barriers	Extent of agreement					
1	Poor listening skills of team members		1	2	3	4	5
2	Poor leadership		1	2	3	4	5
3	Unclear communication objective		1	2	3	4	5
4	Organisation structure		1	2	3	4	5
5	Unclear channels of communication		1	2	3	4	5
6	Ineffective reporting system		1	2	3	4	5
7	Ineffectiveness of communication channel		1	2	3	4	5
8	Limited resources		1	2	3	4	5
9	Personal stereotyping		1	2	3	4	5
10	Language difficulties		1	2	3	4	5
11	Physical distance between the project participants		1	2	3	4	5
12	Interpersonal conflicts		1	2	3	4	5

18. What you think can be done to improve communication at among project team members?

Please write your suggestions in the space below

_____

_____

_____

_____

_____

END OF QUESTIONNAIRE; THANK YOU VERY MUCH