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Assessment of Communication Practices adopted for Managing Construction Projects in Abuja

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Communication enables exchange of ideas and instruction from one person to another. In the construction industry, effective communication among project participants helps to improve the level of understanding in order to achieve project objectives. This study assessed the communication practices adopted for managing construction projects in Abuja. The study employed data from key stakeholders who are actively involved in construction projects domiciled in Abuja, where a total number of 155 questionnaires were administered, with 132 returned. Subsequently, 30 interviews were carried out with key stakeholders to elicit responses regarding some objectives of the research. Key findings of the study indicated that drawings are the most used mode of communication. Language was the most frequently stated as a barrier to effective communication by all the stakeholders. Furthermore, the site operatives were the most difficult people to communicate with during project construction phase. The Mechanical engineers, Quantity surveyors and Civil engineers communicate frequently with the Architects. The outcome of this research highlights practical implications for the construction project team regarding communication practices adopted. It further exposed the need for effective communication among stakeholders in the construction for achieving project goals.

Keywords: Communication, Communication frequency, Barriers to communication, Modes of communication

INTRODUCTION

Human activities require sending and receiving information for continuity thereof. These activities cut across many sectors including the construction activities. Dave and Koskela (2009) assert that many construction activities rely heavily on information passage from one party to another. Information often flows from the topmost level of management and cascades all to the bottom. Information which is disseminated in the construction industry often involves financial activities, managerial activities and technical actions. On most construction sites, various stakeholders are often involved to ensure that the projects' objective are meet, and this is often achieved through effective communication among relevant stakeholders. Abadie *et al.,* (2013) submitted that ineffective communication method remains a stumbling block to project delivery. This could be the reason why Aulich (2013) and Kamalirad *et al.* (2017) emphasised the need for a detailed dissemination of information to all the relevant stakeholders. Bond-Barnard *et al.* (2013), Xie *et al.* (2010), and Brownell *et al.* (1997) stated that effective communication among project participants helps to improve the level of understanding in order to achieve project objectives. Efficient and effective communication is key to achieving project objectives. Failure to share project information adequately amongst project participants affects coordination and control regarding project delivery (Meng, 2012; Gorse & Emmitt, 2007). Furthermore, Akintoye and Shehu (2010) and Erntzen (1988) asserted that inadequate communication could lead to conflict between stakeholders, thereby affecting quality and time of project completion. Akintoye and Shehu (2010) and Scanlin (2008) attributed projects failures in the construction industry to improper communication. Gorse and Emmitt, (2007) further submitted that communication network often breakdown during crises between relevant stakeholders, which inhibits projects success.

Darvik and Larsson (2010) believed that various stakeholders should device means to communicate effectively and regularly in-order to ensure projects are delivered as planned. Cheung *et al.* (2013) noted that effective and efficient communication among project stakeholders could mitigate the risk of project failure. According to Wong and Lam (2011), the mode of communication and information transfer among relevant stakeholders are key to project performance. Therefore, there is the need for various stakeholders to communicate effectively so

as to complete project within the cost target, time and quality. Therefore, when construction project stakeholders communicate effectively, there would be a cut on the volume of needless expenditure (Kamalirad and Kermanshachi 2018).

There are few reported studies with regards to the communication practices adopted for construction projects management in global South (Ejohwomu & Oshodi, 2014; Laryea & Leiringer, 2012). For instance, existing research regarding communication focused on communication in Korea (Woo*et al.*, 2016), identification of causes and effects of poor communication in construction industry (Gamil & Rahman 2017), framework to enhance communication practice for site-based construction workers in the Kingdom of Saudi Arabia (Alaboud, 2016), Abbas (2019) was on the effectiveness of immersive virtual reality-based communication for construction projects, exploring how construction project teams manage different stages of project communication process in Sri Lanka (Senaratne & Ruwanpura, 2016) and the influence of communication on the success design of high-rise residential building on Surabaya (Listyaningsih, 2019). Other existing studies on communication include Leje *et.al*, (2019), Ejohwomu *et al.* (2017), Kwofie *et al.* (2015). Hence the need for this study. Nigeria a country located in the Global South was chosen for this duty due to her huge human population and presence of high construction companies currently operating to provide the needed amenities and facilities. There is the need to expand the horizon, hence, the study assessed the communication practices adopted for construction projects management in Abuja. Initial enquiry carried out for the study revealed that the bulk of construction operation carried out in Nigeria involving key stakeholders in the construction industry is situated in Abuja such as the Centenary City Project among others (Oxford Business Group, 2018). This foregoing suggests that reliable data could be gleaned from key stakeholders regarding communication practices adopted for managing construction projects in Abuja, hence the choice for adopting Abuja, Nigeria.

The objectives of this study are: to assess the various modes of communication most used, barriers to effective communication, communication frequency which leads to the development of sociogram among parties on sites on one hand and among professionals on the other hand; and to assess the most difficult stakeholder to communicate with. The subsequent sections of this study discuss review of relevant literature, methodology, results, discussion and conclusion.

REVIEW OF LITERATURE

Communication in the Construction Industry

Littlejohn and Foss (2008) viewed communication as an everyday human activity that is connected totally with all of human life. Loosemore and Muslmani (1999) viewed communication as a cycler loop where information flows from one party to another. Cheung *et al.* (2013) defined communication as a two-way procedure often between a person(s) who transmit information and a person (s) who receives the information using usually adopted means. Wu *et al.* (2017) described communication as a process where information is shared, exchanged and transmitted transversely around project stakeholders during project lifecycle. Zulch (2014) noted that for communication to be complete, the information usually from the sender, encodes the messages sent before transmitting the message to the receiver who in turn decoded the message sent. Encoding of message entails conversions of thoughts, feelings and idea so that another person(s) receives and understand the information passed (Zulch, 2014). It can be observed that all the aforementioned authors all agree communication is key to human survival and often involves more than one person. Decoding is the ability to understand and comprehend and listen attentively to messages transmitted (Akunyumu, 2016). When the sender turns in an information, the receivers translates the message received, which often result in feedback. Wu *et al.* (2017) ; Vee and Skitmore (2003) believed that project success is determined by communication. Sharing of information from one party to another is a key component of effective communication (Titus & Bröchner, 2005). Johannessen and Olsen (2011) noted that communication process of construction often involves: project performance report, request for changes, forecasts and plans, organizational process and updates of project process. The construction has been noted to be lackadaisical with regards to effective communication; communication is not given adequate attention in the construction industry (Bandulahewa, 2015). Effective communication among stakeholders is a key challenge that affect project success (Rajhans & Shah, 2012). According to Wu *et al.* (2017) and Thomas *et al.* (1998), sufficient interaction among team members using appropriate communication media prevent dispute among the stakeholders involved in a project. Cheng *et al.* (2001) noted that timely communication among stakeholders ensures construction project completion as planned. Gorse and Emmitt (2007) submitted that effective communication is needed from project inception stage to completion stage. That could be the reason why Tai *et al.* (2009); Ceric (2001) and Cheng *et al.* (2001) believed the need for adequate communication among various stakeholders involved in project delivery in order to avoid

misunderstanding. Garcia *et al.* (2014) asserted that information is transmitted from one party on a construct site through the production and exchange of drawings during the entire project life cycle. Ejohwomu *et al.* (2017); Kennedy *et al.* (2001) cautioned against the misinformation and information distortion in order to avoid conflict. Azmy (2012) stated that conflict that could arise during project life cycle can be mitigated through effective communication.

Modes of communication

Formal communication

Alsamadani *et al.* (2013) noted that formal communications includes: presentations from upper management, written communication, training and toolbox talks. Sheykh and Kandlousi (2010) mode of communication accepted by constituted authority. Crampton *et al.* (1998) noted that formal communication support organisations in achieving their key objectives. Altinoz (2009) believed that formal communication processes are the mediums set up for inter and intra organization communication. Alexander (2015) viewed formal communication to include: vertical, horizontal, or diagonal. Formal communication could be spoken, written, direct, indirect method.

Informal communication

Informal communication typically takes the form of ad hoc conversations and announcements. According to Alsamadani *et al.* (2013), informal communications are not limited to ad-hoc communication among individual crew members. For example, informal safety communication could occur when one worker passes by another crew member and informs her of a hazard that has been created by work in transition. Butt *et al.* (2016) viewed private conversation between project stakeholders as the sending and receiving of information between key stakeholders other than in normal communication norm is an informal communication. Crespin-Mazet *et al.* (2015) attributed that the advantages of informal communication include: ease of information transmission, flexibility and openness. Informal communication projects key stakeholders thought, views, feeling and level at which each stakeholder is motivated compared to the formal method of communication (Adnan *et al.*, 2012).

Modes of communication in the construction industry

Posea (2012), Abdullahi (2012), (Mehra, 2009) and (Maslej, 2006) classified the following as the modes of communication adopted in the construction industry.

i. Verbal communication: Verbal communication involves the use of words, both written and spoken, to relay a message.
ii. Telephone communication: This can fill the gap between written media and face- to-face dialogue it is quick and can be used to accomplish a variety of tasks without having to travel to another location
iii. Reports: A report provides beneficial information for all members of the project team. Reports are used to record and convey information about the status or condition of the project or a portion of it. Report may be generated by all members of the project team, such as field observation reports by architects, daily reports by contractors, or installation quality control reports by manufacturer representatives.
iv. Written communications include news articles and mailed flyers provide updates.
v. Oral communications may include periodic meetings with residents and recorded updates that people can obtain through a phone call.
vi. Electronic communication: electronic communication is gaining momentum particularly in the construction during the construction stage. Starting with faxes, the use of electronic communications has expanded to include email, text messaging, and now, social media, such as Facebook, LinkedIn, and Twitter. Electronic communications can also include web-based software programs that provide full project management capabilities. Electronic communications are typically used in addition to other communication tools and methods. The main benefit of electronic communications is the ability to store and quickly retrieve documents.
vii. Project portal: Use of the portal permit direct access to information relating to a project.
viii. Drawing: Drawing consist of pictographic representation of a building, usually prepared the design team members in line with the client needs.

Zulch (2016) categorised communication mode in the construction industry under the following: interpersonal communication, group communication, mass communication, public communication and organisational communication.

Barriers to effective communication

Effective communication is mostly neglected which may result in accidents and loss of life and hence will affect overall productivity (Olanrewaju *et al.*, 2017; Emmitt & Gorse, 2003). Olaniran (2015) and Cheng *et al.* (2001) stated that barriers to effective communication are unsuitable communication channels and unexpected communication

breakdown, information overload, lack of openness and filtering of information may increase the lack of communication efficiency. Multifaceted construction project often involves many stakeholders, who need to send and receive information, this exchange of information is usually challenging due to the nature of the project and number of stakeholders (Kamalirad & Kermanshachi 2018; Dawood *et al.,* 2002). Kwofie *et al.* (2015) submitted that access to information, challenges in flow of information and component; and import of information are barriers to communication. Emuze and James (2013) conducted a study using observation method to elicit response among general workers and site managers in the Eastern Cape Province of South Africa. Findings from the study indicated that communication problems occur on construction sites due to language- and cultural diversity-related barriers; site managers are generally effective at communicating; the South African workforce is diversely cultured, which potentially leads to misunderstandings on sites, and language barriers between site management and site workers impede performance improvement. Similarly, a study was undertaken by Affare (2012), where 97 professionals working with consultants, project clients and contractors were sampled. The research established that poor communication had resulted in project delays, project cost overrun and project abandonment and project communication was also shown to strongly affect the performance of professionals within the construction industry. Barriers hindering effective communication included: poor listeners, poor leadership, unclear communication objectives, unclear channels of communication, ineffective reporting system, ineffective communication between the parties on the project, limited resources, information filtering, lack necessary skills, lack of trust, stereotyping, language difficulties. Akunyumu (2016) identified noise as a barrier to effective communication among stakeholders.

METHODOLOGY

The study adopted mixed methods methodology. Mixed methods research is both a methodology and a method, which involves the process of collecting, analysing, and mixing qualitative and quantitative data strands in a single or a series of studies (Oyewobi, 2014; Creswell *et al*., 2006). Interviews and questionnaire survey were conducted. The questionnaire was designed to elicit response in line to the research objectives comprised of two sections. The simple random sampling was used to select construction companies from the total list of registered construction companies in Abuja and the purposive sampling was used to select respondents from these companies for the interview (Bhattacherjee, 2012). Creswell and Plano Clark (2011) are of the opinion that having different sample sizes for the strands is a good option because it helps the researcher to obtain an in-depth qualitative exploration and robust quantitative examination of the research problem.

The first section focused on questions regarding respondent`s demographics, while the other section elicited responses with regards to mode of communication used on construction project, extent of usage and the most effective mode of communication on construction projects. For the purpose of this study, the population of study (unit of analysis) is the construction firms in Abuja. The total population of registered firms in Abuja according to Abuja Galleria (2014) were 260. According to Aiyetan (2009), if N=260, then n =155 (where N= total population and n= sample size). Out of these, 132 questionnaires were returned and deemed valid for analysis. A five-point Likert scale was adopted for the questionnaire to achieve neutrality of responses provided. Relative importance index (RII) was used to rank the most dominants factors with respect to the objectives of the study. According to Johnson and LeBreton (2004), RII aids the research in identifying the manner at which given a variable partakes in forecasting a criterion with respect to other available predictor variables adopted when ranking. Consequently, data were gained from 30 semi structured interviews with Architects (4), Builders (5), Quantity surveyors (4), Iron benders (2), Bricklayer (1), Welder/fabricator (1), Carpenter (1), Plumber (1), Mechanical engineer (4), Civil engineer (4), and Electrical engineer (3). All the interviews conducted lasted for about 35 minutes each and the participants all consented to having their audio responses recorded, transcribed verbatim and subsequently used for analysis. For anonymity and ethical reasons, the details of the participants were not presented in the research findings. Subsequently, the interviews conducted were all analysed using the Social Network Analysis modelling software the Krackplot to show the network of communication between parties on sites.

RESULTS

In this section, only the result from the field survey is presented here. The subsequent section discusses the result obtained.

Table 1 depicts that the respondents consist of 28 Architects which stood at 21.2% of the total population, 23 Builders which stood at 17.4%, 20 Quantity surveyors 15.2%, 20 Civil engineers 15.2%, 16 Mechanical engineers which is 12%, 15 Electrical engineers 11.4% and 10 other professionals which stood at 7.6%. Table further depicts that 93.2% of the respondents (123 number) responded that their companies had an annual turnover of N100 million and above while the

remaining 6.8 had turnover of N50-100 million. Table 1 also shows that 32.6% of the responses were Building companies, 12.9% were Civil engineering companies and 72% are Building and Civil engineering companies.

Table 1: Respondents' Demographics

Professionals	**Number**	**Percentage**
Architects	28	21.2
Builders	23	17.4
Quantity Surveyor	6	15.2
Civil Engineers	20	15.2
Electrical Engineers	15	12
Mechanical Engineers	16	11.4
Others	10	7.6
Turn over		
Amount	**Number**	**Percentage**
5-20million	-	-
21-50million	-	-
51-100million	9	6.8
100million above	123	93.2
Business scope of companies		
Types	**Number**	**Percentage**
Building	43	32.6
Civil engineering	17	12.9
Building and Civil engineering	72	54.5

In Table 2, the opinions of the professionals revealed that the most often used mode of communication for the builders is the drawings being ranked 1st and the face to face discussion being ranked 2nd. For the Architects, Drawing was ranked 1st and face to face discussion and telephone communication being ranked 2nd, the QS ranked Drawings and text messages 1st and face to face discussion 3rd. the Civil Engineer ranked drawings and reports 1st and telephone communication 2nd the Mechanical Engineer ranked Drawings 1st and Telephone communication, meetings, Text messages and 3D 2nd. For the Electrical Engineer, 3D was ranked 1st, telephone communication 2nd and Drawings 3rd while others ranked drawings 1st, meetings, reports, telephone communication and text messages 2nd.
In the general opinion of all respondents, Drawing was ranked 1st, Telephone communication 2nd, and face to face communication3rd, faxes, video conference, Facebook and Twitter were ranked least. An analysis of variance (ANOVA) was further carried out to find out if there was significant variation between the most often used modes of communication for the different professionals. The result yielded a P-value of 0.6 which is greater than 0.05. This means that there was no variation in the way they had responded.

Table 2: Mode of communication often used on construction sites

	COMMUNICATION MODE	BUILDERS		Arch		QS		CE		ME		EE		OTHERS			
S/NO		MEAN	RANK	MEAN	RANK	MEAN	RANK	MEAN	RANK	MEAN	RANK	MEAN	RANK	MEAN	RANK	OVERALL MEAN	RANK
1	Meetings	4.57	4	4.68	6	4.65	6	4.75	4	4.75	2	2.2	17	4.7	2	4.33	7
2	Reports	4.39	6	4.79	5	4.8	4	5	1	4.25	7	3.4	9	4.7	2	4.48	5
3	Drawings	4.83	1	5	1	4.9	1	5	1	5.00	1	4.4	3	5	1	4.88	1
4	Telephone communication	4.61	3	4.89	2	4.8	4	4.9	3	4.75	2	4.6	2	4.7	2	4.75	2
5	Faxes	2.09	18	2.57	17	2.1	18	1.65	20	2.19	17	1.8	18	2.1	20	2.07	20
6	E-mails	2.74	12	4.82	4	4.1	9	3.8	8	4.19	9	4.4	3	3.8	9	3.98	8
7	Facebook	2.13	15	2.79	15	3.65	12	2.45	14	1.63	19	1.6	19	2.3	17	2.36	17
8	Twitter	2.13	15	2.71	16	3.25	14	2.55	13	1.63	19	1.6	19	2.3	17	2.31	18
9	Text messages	4.43	5	4.57	8	4.9	1	4.6	6	4.75	2	4.4	3	4.7	2	4.62	4
10	Requests for information/interpretation (RFIs)	3.13	11	3.32	10	3.65	12	3.4	10	3.31	14	3.2	10	3.5	10	3.36	10
11	Proposal requests	3.52	8	3.89	9	4.35	7	3.75	9	3.94	12	3.2	10	4.2	8	3.84	9
12	Change order requests	3.30	10	2.93	14	4.1	9	2.95	11	4.00	10	2.4	16	3.2	12	3.27	12
13	Change order	3.52	8	3.04	13	3.75	11	2.9	12	4.25	7	3.8	7	3.2	12	3.49	11
14	Face to face discussion	4.65	2	4.89	2	4.85	3	4.65	5	5.00	1	4.2	6	4.4	7	4.66	3
15	E-conference	2.13	15	2.32	18	2.2	17	2.2	16	4.00	10	3.6	8	2.3	17	2.68	15
16	Project intranet	2.52	13	3.25	11	2.1	18	2.15	17	3.69	13	2.8	14	2.8	15	2.76	14
17	On-line chat system	1.96	19	3.14	12	3.2	15	2.35	15	3.06	15	2.6	15	3.1	14	2.77	13
18	3-D design drawing	4.04	7	4.64	7	4.15	8	3.85	7	4.75	2	4.8	1	5	1	4.46	6
19	4-D simulation construction	2.17	14	2.18	19	2.25	16	1.75	19	2.50	16	3	12	3.3	11	2.45	16

20	Video conference	1.74	20	2.14	20	2.05	20	2.1	18	2.13	18	3	12	2.7	16	2.27	19	

Archi=Architects, QS=Quantity surveyors, CE=civil engineers, ME= mechanical engineers, EE= Electrical Engineers. Analysis of Data 2015

Regarding barriers to communication, the findings are presented in Table 3. There are a lot of barriers to effective communication on construction sites in Abuja. As can be seen in table 3, the interviewees highlighted the following as being the barriers to effective communication: documentation problems, education, language, understanding, personal issues, relationship, technical know -how, motivation, communication modes (when the right mode is not used), trainings, communication channel, procedural challenges, communal effects, economic issues, poor listeners and gatekeeping. Language was most frequently stated barrier to effective communication because of the fact that most of the foreigners that are employed on the jobs do not understand and speak good English another factor was lack of training and education amongst others.

Table 3: Barriers to effective communication

Opinion of Respondents	Barriers
Architects	
One: Lack of instruction booklets, inexperience of supervising officers and other persons involved. Two: level of education of parties, language barrier. Three: language, understanding, politics, contractor being mischievous. Four: language, lack of education i.e. inability to read or write and lack of IT knowledge.	Documentation Problems Education Language Barriers Understanding Economic issues
Quantity surveyors	
One: language, gender and perception. Two: late delivery of letters, drawings and instruction. Three: logistics, language, ambiguous messages, insisting on doing it the old way i. e. throwing away instructions, incentives, discipline, motivation and level of knowledge. Four: misunderstanding and complexity of information.	Language Communication modes Trainings Motivation Understanding
Iron benders	
One: superiority complex; if chain of communication is broken. Two: language, level of education, technical know- how and communal effect.	Personal issues Communication channel Education Procedural challenges Communal effects
Bricklayer	
Technical know-how and language.	Procedural challenges Language
Welder/fabricator	
Language, education and technical know-how.	Language Education Procedural challenges
Carpenter	
Language barrier, not paying attention.	Language Poor listeners
Plumber	
Language and training.	Language Training
Mechanical engineer	
One: understanding, not knowing the project standard, withholding information (for some reasons).	Understanding Gatekeeping

Two: superiority complex. Three: feeling too qualified to handle a project. Four: lack of understanding.	Personal issues
Civil engineer	
One: withholding information due to race or cross-cultural attitudes, level of education and language. Two: lack of mutual understanding Three: language barrier, attitude to work, illiteracy, management issues and political issues; Four: if the chain of communication is broken;	Gatekeeping Education Language
Electrical engineer	
One: none availability of the person passing the information on the site when required. Two: understanding, technical know-how, insisting on doing it the old way. Three: superiority complex.	Timeliness Understanding Procedural challenges Personal issues

Table 4 is a summary of the responses obtained from the respondents about how frequently they communicate with one another on site during construction. It can be seen that each respondent's interaction differs from project to project; it also differs, depending on the stage of construction. Some parties do not need to interact at all at some stage, and at other stages need to interact more frequently.

Table 4: Communication frequency

	Client	Architects	Builders	Quantity surveyors	Contractors	Sub-contractors	Site operatives	Civil engineer	Mechanical Engineer	Electrical engineer	Total
Architects 1,2,3,4	3,5,1,3	2,0,5,4	3,5,3,5	1,1,2,4	0,2,3,4	3,3,1,3	5,5,1,3	2,5,1,2	2,4,1,2	2,2,1,2	23,32,19,32
Builders 1,2,3,4,5	5,2,4,4,5	1,1,3,5,1	0,0,3,5,0	1,2,2,4,1	5,2,2,3,5	5,4,3,3,5	5,5,3,3,5	2,5,3,5,5	2,0,4,5,1	5,0,4,5,5	31,21,31,42,3
Quantity surveyors 1,2,3,4	0,1,3,1	5,2,5,2	5,3,5,3	5,2,0,3	0,4,2,3	2,3,1,2	3,3,5,3	1,2,1,2	1,2,2,2	1,2,2,2	23,24,26,23
Iron benders1,2	5,4	5,2	5,5	4,0	3,5	3,0	2,5	5,5	5,5	5,5	42,36
Bricklayer	0	5	5	0	3	3	0	5	5	5	31
Welder/fabricator	2	2	0	0	2	0	5	2	2	0	15
Carpenter	0	5	5	2	2	2	0	4	5	5	30
Plumber	2	1	5	1	0	5	5	5	5	5	34
Mechanical engineer 1,2,3,4	0,3,3,4	5,5,3,5	1,5,3,5	1,4,3,4	4,3,4,3	5,3,4,5	1,4,3,2	1,5,3,0	5,3,2,5	5,3,2,5	28,38,30,38
Civil engineer 1,2,3,4	5,3,1,2	3,5,0,5	5,5,0,5	0,3,0,0	5,2,2,0	2,3,1,0	5,3,5,5	0,3,5,5	1,4,2,5	1,3,2,5	27,34,18,32
Electrical engineer1,2,3	1,2,3	3,0,5	1,2,5	2,0,3	4,0,3	4,5,3	4,5,3	1,2,3	5,2,2	5,0,2	30,18,32

Key: 5 several times a day, 4 once a day, 3 several times each week, 2 once a week and 1 once in two weeks

The communication network Sociogram is as depicted in Figure 1. The communication network Sociogram between professionals on site is depicted in Figure 2. Figure 1 illustrates a number of important findings. All parties on site do communicate with one another during construction but the frequency of communication depends on the stage of construction. This is evident from Figure 1 sociogram where the interaction of the respondents was sort with other parties on site. All parties do interact but the thicker the links/lines the more frequent the communication was i. e. several times a day.

Architect 1, communicated with all parties on site except the contractor but communication was most frequent with the artisans.

Builder 1, also communicated with all parties on site; but most frequently with the client, contractor, Subcontractor, Artisan and the Electrical engineer.

Quantity surveyor 1 communicated with the parties on site but did not communicate with the Client and Contractor but communicated most frequently with the Architect, Builder and fellow QS.

Iron bender 1 communicated with all parties but most frequently with the client, Architect, Builder, civil Engineer, Mechanical engineer and the Electrical engineer.

The Bricklayer did not communicate at all with the client, the QS and other artisans but communicated most frequently with the Architect, the Builder, Civil engineer, Mechanical engineer and the Electrical engineer and less frequently with the Contractor and Sub-contractor. This was so because the stage of work only needed the attentions of the Architect, the Builder, Civil Engineer, Mechanical engineer and the Electrical engineer since the work to be done was going to temper with works of other professionals.

The welder/fabricator did not communicate at all with the Builder, Quantity surveyor, Subcontractor and the Electrical engineer, most frequently with the Artisans and less frequently with Client, Architect, Contractor, Civil engineer and Mechanical engineer.

The Carpenter Communicated most frequently with the Architect, the Builder, the Mechanical engineer, the Civil engineer and the Electrical engineer. Not at all with the client and other Artisans and less frequently with the Quantity surveyor, Contractor and the Subcontractor. This was so because the works to be carried out was going to temper with other professionals works so the need for communication was increased.

The Plumber communicated with all the parties on site except the contractor but most frequently with the Builder, Subcontractor, Artisans, Civil engineer, Mechanical engineer and Electrical engineer. This was so because the works of the Plumber was going to interfere with the works of other parties so their attentions were required often.

The mechanical engineer communicated with all parties except the client, most frequently with the Architect, Subcontractor, Mechanical engineer and Electrical engineer.

The civil engineer communicated most frequently with the client, the Builder, the Contractor and the Artisans but not at all with the Quantity surveyor and less frequently with others.

The Electrical engineer communicated with all parties on site; but most frequently with the Mechanical and Electrical engineer.

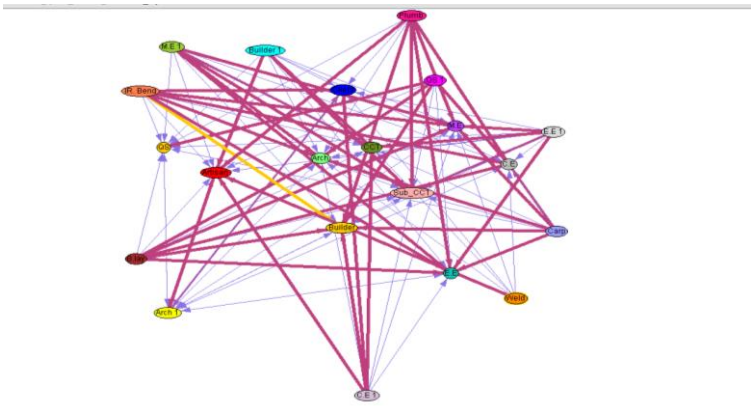

Figure 1: Communications network Sociogram among parties on site

From Figure 2, it can be seen that all professionals on site communicate with one another. All parties on site communicate with the Architect but the frequency of communication varies at different times. It can be said that the mechanical engineer (ME 1), QS and civil engineer communicate most frequently with the Architect.

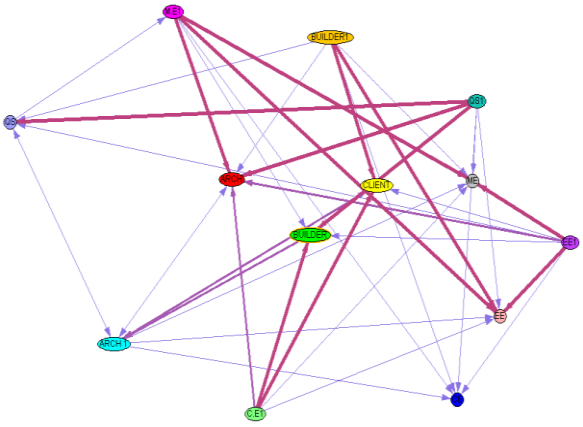

Figure 2: Communications network sociogram among professionals on site

Figure 3 illustrates the most difficult stakeholder to communicate with. The major stakeholders in the construction industry in Abuja comprises of clients, Architects, Builders, Quantity surveyors, Civil engineer, Mechanical engineer and Electrical engineer and site operatives. Majority of the respondents (clients, architects, builders, quantity surveyor, civil engineer, mechanical engineer and electrical engineer, ranked the site operatives 48% as the most difficult people to communicate with during project construction phase. Second to this were the subcontractor with 42% and followed closely by the contractor with 37% as the most difficult stakeholder to communicate to.

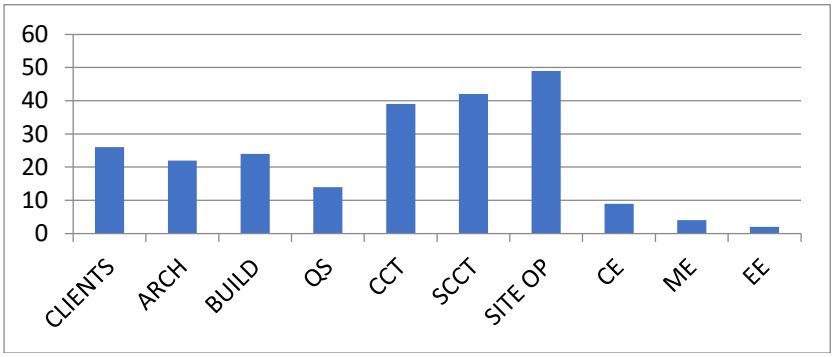

Figure 3 Most difficult stakeholder to communicate to

DISCUSSION

This section discusses the result of the empirical study carried out. This study was undertaken to assess the communication practices adopted for managing construction projects in Abuja, Nigeria. The first objective of the study focuses on assessing the various modes of communication most used, barriers to effective communication. Various modes of communication adopted in the construction industry were earlier reported in the literature review section. The result on the mode of communication often used on construction sites indicates that all the respondents, Architects, Builders, Quantity surveyors, Civil engineers, Mechanical engineers, Electrical engineers and other respondents utilise meetings, reports, drawings, telephone communication, faxes, e-mails, Facebook, twitter, text messages, request for information/interpretation (RFIs), proposal requests, change order requests, change order, face to face discussion, E-conference, project intranet, on-line chat system, 3-D design drawing, 4-D simulation construction and video conference as the mode of communication. These results are in agreement with Posea (2012), Abdullahi (2012), (Mehra, 2009) and (Maslej, 2006) studies regarding the existing modes of communication adopted in the construction industry. The results of the empirical study also indicated the stakeholders are information and communication technology (ICT) compliant since they embrace the modern methods of communication. This result could be said to be fairly in tandem with the findings of Jacobsson and Linderoth (2012) regarding stakeholders usage of ICT. The discrepancy of this result with that of

Jacobsson and Linderoth (2012) could be attributed to difference in the geographic local of the two studies, i.e. the research of Jacobsson and Linderoth (2012) was done in Sweden and research was carried out in Nigeria.

The second objective was designed to assess the barriers to effective communication. Regarding the barriers to effective communication: documentation problems, education, language, understanding, personal issues, relationship, technical know -how, motivation, communication modes (when the right mode is not used), trainings, communication channel, procedural challenges, communal effects, economic issues, poor listeners and gatekeeping are existing barriers to communication in the construction industry. All of the respondents acknowledged that language was the most frequently stated barrier to effective communication because of the fact that most of the foreigners that are employed on the jobs do not understand and speak good English another factor was lack of training and education amongst others. This finding is consistent with the outcome of the research carried out in the Eastern Cape Province of South Africa by Emuze and James (2013) and that of Jallow *et al*. (2014) were the findings from the study indicated that communication problems occur on construction sites due to language- and cultural diversity-related barriers.

Assessing the communication frequency which leads to the development of sociogram among parties on sites on one hand and among professionals on the other hand is the third objective. The result indicated that each respondent's interacts with each other but interaction differs from project to project; it also differs, depending on the stage of construction. Some parties do not need to interact at all at some stage, and at other stages need to interact more frequently. This finding suggests that all the key stakeholders working on construction site communicate with each other, which might prevent conflict from occurring. This result aligns with the research of Olanrewaju et al. (2017) who noted that effective communication among site operatives in the construction could minimize the occurrence of conflict.

The last objectives examined the most difficult people to communicate with. The finding indicated that site operatives are the most difficult people to communicate with; followed by the subcontractor and the contractor. These findings can be attributed to the low level of literacy of site operatives, hence the difficult to communicate with them.

CONCLUSION AND RECOMMENDATIONS

The present study assessed the communication practices adopted for construction projects management in Abuja, Nigeria and the objectives of this study were: to assess the modes of communication often used, barriers to effective communication, communication frequency and assessing the most difficult stakeholder to communicate with. The study adopted mixed method approach to elicit responses for the study. Even though other communication modes were being utilized, the most effective mode of communication was the drawings due to its ease of understanding. Again, regarding barriers to effective communication language, was the most stated barriers to effective communication. Consequently, the result further showed that site operatives are the most difficult people to communicate with; followed by the subcontractor and the contractor. Based on the findings of this research, the study concludes that communication practices adopted for construction projects in Abuja, Nigeria is effective. This study recommends that other available modes of communication should be effectively utilised in order to improve communication between stakeholders. Again, the site operative should be trained on communication and interaction skills in order to engender improved project delivery.

The outcome of this research brings forward practical implications for the construction project team regarding communication practices adopted. It further exposes the need for effective communication between stakeholders in the construction for achieving the project goals.

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