

# **The Role of Communication in Construction Project Delivery <sup>1</sup>**

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## **ABSTRACT**

An effective system for passing on information and instructions and for receiving feedback is essential for successful project management and control. This study is aimed at assessing the impact of communication among construction stakeholders on project delivery with respect to completion time, cost, client satisfaction and health and safety performance. The objectives were to determine the level of use of communication tools in project communication, determine challenges facing effective communication, and evaluate the effect of effective communication on project delivery. A questionnaire survey, involving thirty five (35) construction stakeholders in Imo State, Nigeria was used. Descriptive statistics and inferential statistics (regression analysis and Friedman ANOVA) were adopted to analyze data obtained. The results revealed that project specifications, project plan, reports, memos, and presentation are the most applied communication tools, while hardware, procedures, terminology and training are the top four factors affecting effective project communications. The study concludes that project communication affects time, client satisfaction, project, and cost performances of building project delivery. To improve project communication, the study recommended the need to close all communication gaps, maximize the use of ICT, and to tailor communication to named stakeholder.

**Keywords:** Impact, Communication, Construction project delivery, Construction industry.

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## INTRODUCTION

### 1.1 Background of Study

Information and knowledge are transferred and co-ordinated through the participants of the project, commonly including clients, architects, consultants, engineers, main contractors, sub-contractors, and suppliers (Moynihan and Harsh, 2016). Each participant in the project is responsible for a particular functional work during the entire process. To co-operate in the project, these independent participants need accurate and timely information from members of the team to make appropriate decisions and accomplish their work. Therefore, much complex information is communicated and transferred between these participants for task implementation. The information ranges from drawings, reports, to various specifications.

Communication between project participants is identified as one of the critical success factors to facilitate successful completion of the construction projects. (Kwofie *et al.*, 2015; Yong and Mustaffa, 2013). Kwofie *et al.* (2015) explain five critical factors that contribute to project teams' effectiveness on construction projects. One factor is effective communication among project team members. Yong and Mustaffa (2013) reveals that 'commitment and communications' is one of three major aspects that the stakeholders recognize as critical success factors for Malaysian construction projects. Moreover, numerous studies have highlighted the importance of effective communication to project efficiency and effectiveness (Hoezen *et al.*, 2008; Emmitt & Gorse, 2003; Thomas *et al.*, 1998). Hoezen *et al.* (2008) confirm that levels of communication effectiveness among project teams significantly contribute to the efficiency and effectiveness of the construction process, and improvement in communication among the teams is the first thing to be considered in project delivery. If there is effective communication among project participants, accurate information will be quickly communicated, and consensus will be easily achieved. Subsequently, it will improve teamwork, reduce conflicts and rework, and contribute to project success. Therefore, effective communication is a widely recognized factor for the success of construction organizations and projects (Yong and Mustaffa, 2013; Meng, 2012; and Agu *et al.*, 2018).

A number of authors have defined communication in different ways, which are mainly reflections of their points of view and orientation of the concept itself. One of these authors defined communication as the establishment of social units from individuals by the use of languages or signs, and the sharing of common sets of rules for various goal-seeking activities (PMI, 2013). Stanley (2007) also defines communication as a clear, open and timely sharing of information with appropriate individuals or groups. Communication involves transmitting and receiving ideas, information and languages. Communication is one aspect of the management of projects that

pervades all others. Effective communication is essential for the functioning of any organization. Breakdown in communication contributes to a group of problems that result in low work quality and productivity (Agu *et al.*, 2018).

However, several challenges render communication ineffective in the construction industry. These challenges include coping with its ingrained culture, fragmented delivery structure, and the apparent reluctance to embrace new ICT solutions (Dainty *et al.*, 2006). Communication among construction project participants is a complex activity, and poor communication may adversely affect project performance or cause interface problems (Mousli and El-Sayegh, 2015; Martin *et al.*, 2014; Dainty *et al.*, 2006). Poor communication may affect the willingness as well as the ability of different participants to exchange information, which may result in poor performance (Koufteros *et al.*, 2007). Poor communication among key partners is also another cause of design change and rework. (Martin *et al.*, 2014). Mousli and El-Sayegh (2015) point out that poor communication and coordination is one of the major causes of design-construction interface problems that impede the successful delivery of construction projects within the specified time, cost, and quality. This study therefore seeks to evaluate the effects of effective communication on timely project delivery.

## **1.2 Statement of Research Problem**

Most problems encountered in construction are traceable to faulty communication and communication gaps (Agu *et al.*, 2018; Akinradewo, Ojo and Oyefusi, 2018). The ever-changing needs of employers/clients, coupled with the pace at which technological advancements have reshaped world today is re-structuring the way and manner in which on-site communication is carried out (Agu *et al.*, 2018). However, project communication on construction sites comes with its own difficulties and challenges that need to be surmounted. Information or data may be altered at various stages; from the sender's end, during the process of transfer through a medium and finally at the receiver's end. Problems of noise and distortion and the need to overcome these challenges or at least mitigate their negating influence can pose as a serious challenge to all involved in the construction process. PMI (2013) – Pulse of the Profession report revealed that US\$135 million is at risk for every US\$1 billion spent on a project. Further research on the importance of effective communications uncovers that a startling 56 percent (US\$75 million of that US\$135 million) is at risk due to ineffective communications. The key problem area in project communication deals with gaps in understanding the business benefits, challenges surrounding language used to deliver project-oriented information, and unclear and peppered project jargons (PMI, 2013).

Many organizations have difficulty communicating with the appropriate levels of *clarity and detail*. This difficulty is likely exacerbated by the divide between each key audience and its understanding (or lack thereof) of project-specific, technical language. Not surprisingly, this

trouble spot also impacts the success of an organization's strategic initiatives. The data show that an average of four out of five projects that are communicated with sufficient clarity and detail—communicated in the language of the audience—meet their original business goals and intent, compared to just over half of projects when communications are not sufficiently clear and detailed.

### **1.3 Aims and Objectives of This Paper**

The aim of this paper is to evaluate the effect of Communications among construction stakeholders on project delivery. The objectives are to:

1. Determine the level of use of tools applied in construction project communication.
2. Examine challenges facing effective communication in construction project interfaces.
3. Evaluate the effect of communication on project delivery.

### **1.4 Research Hypothesis**

The key hypothesis addressed by the study is stated below:

Ho: Communication mechanism is not a significant determinant of the completion time of building project.

## **LITERATURE REVIEW**

### **2.1 Overview of Construction Communication**

An effective system for passing on information and instructions and for receiving feedback is essential for successful site management and control (Abdul, 2006; Reinout, 2008; Mohammed, 2010). This system must work both within and among the consultants, contractors, sub-contractors, suppliers and clients who contribute to the design and construction of the final structure. It is therefore necessary to use recognized channels of communication to ensure that all parties to the construction contract get the information they need. Communication flow in the construction industry according to Barry (1990) is upwards, lateral and downwards. Lateral communication is between people of roughly equal status performing similar task, upward and downward communication on site provides essential feedback to management. It is used to report progress of site works, to make suggestions and also to seek clarifications or help, although people often seek information from their peers before going to their bosses (Barry, 1990). The level of communication and degree of emphasis given to it on the construction site differs from one organizational structure to another. According to Dennis (1972) the skilled craftsmen used to accept simple instructions and expand these to suit their individual needs and conditions by always completing the work successfully on an intuitive basis. Now with so many interdependencies

between activities, the instructions must be more explicit; workmen can no longer device ways and means, because they could seriously affect

### **2.1.1 Methods in Construction Project Communication**

Communication on a typical construction site according to Barry (1990) and Reinout (2008) takes place via the following means:

**i. Spoken Communication:** this could be a face-to-face (direct) communication or an indirect telephone call or dictated message. Face-to-face communication is a powerful method, although most people do not use it skillfully. Barry (1990) asserts that spoken communication needs careful planning, clear expression and the ability to arouse the listener's interest and support. Its major drawback is the lack of permanent record and the ease of forgetting vital information. One vital spoken communication adopted on site is site meetings, used to inform, coordinate, allocate task, update plans and check progress.

**ii. Written Communication:** though very vital and important as a means of communication on site, Barry (1990) considers it to be a major feature of a bureaucratic organization. It provides a readily accessible bank of site information and large quantities of documents can be stored and retrieved with ease. Written communication ranges from notes on a scrap paper to formal typeset report. To increase the value of information passed through written communication, it is important to ensure that ideas are limited to sentences, information should also be more direct, monotony and unnecessary words should be avoided.

**iii. Graphical and Numerical Communication:** Where information being handled is extensive and complex, written information becomes unsatisfactory. Hence, the reliance on graphical and numerical communication, notably in the form of drawings, diagrams, schedules, and charts. A single drawing can convey a great deal of information in a much cheaper way than would be possible using words alone. Drawings are useful as long as they are accurate, easy to understand and supplied at the right time. The bill of quantities use numerical data linked with rightly structured texts to give condensed information. They are expected to fully and accurately describe projects. Bar charts and network diagrams are valuable ways of presenting information which is partly numerical and partly written.

**iv. Information and Communication Technology:** Reinout (2008) defines communication technology as the use of technologies to communicate with other people. This includes the use of everything from postal services to wireless phones and internet. Suleiman (2008) describes the categories of handheld devices which could be used to communicate on construction sites. They include personal digital assistants (PDAs), tablets, personal computers (PCs) such as note book

computers, handheld computers and wearable computers. All these could be used to transmit, collect and distribute information effectively on site. He however noted that the use of communication technology has not been fully exploited.

### **2.1.2 Challenges Facing Construction Project Communication**

This section will present the main communication challenges that arise in construction projects. To understand these communication challenges must be explained first the background of construction projects.

Along with shipbuilding and aerospace, the construction industry is one of the oldest and most established project-based sectors (Keegan and Turner, 2003). Although in the last century the industry has evolved from being mainly craft based to a more versatile version, the project has remained undisturbed and a fundamental unit of the industry. While the construction has adopted innovations, its evolution continues being linked to the limitations that it has to produce in a fixed place. Because despite the evolution, it is still being built in situ and as it is based on projects, it joins a professional diversity in different locations. These people will work collectively for short periods of time, before they disband to work on other ventures.

Before studying the techniques that favour effective communication, it is important to understand the difficulty in which the manager performs. The barriers that impede effective communication are very complex and varied due to the variation of the actors involved. Therefore, we will next study the nature of construction projects and the restrictions that their structure generates in communication. It will be emphasized how the nature of the sector is directed to temporal associations and by so many interactions of short duration and how this lack of continuity in the relations undermines the effective communication.

### **2.1.3 Impact of Effective Communication on Building Project Performance**

Husain (2013) identified that the role played by communication during change in the business organizations as essential for successful change management. The employees are the key sources to bring about change in organizations. To encourage employees for desired change, organizations must address the apprehensions and issues related with them. Job insecurity should be decreased and a sense of community should be created so that employees may feel their responsibilities. The need for change and its advantages will motivate the staff to participate in change plan and execute it. According to Kibe (2014) investigated the effects of communication strategies on organizational performance. A descriptive research design was used in this study. 132 questionnaires were distributed employees. The findings of this research showed the importance of both the theoretical level and practical level. It concluded that for any organizational

performance to be effective, an open communication environment should be encouraged. Once members of the organization feel free to share feedback, ideas and even criticism at every level it increases performance.

Bery, Otieno , Waiganjo and Njeru (2015), explored the effect of employee communication on organization performance in Kenya's horticultural sector. This study was carried out in flower farms in Kenya. The population of this study was all flower farms in Kenya which were the 14 flower farms registered in the KFC directory (2013) and based in Naivasha. A total of 2460 respondents were targeted by the study out of which 1888 responded giving a response rate of 76.7%. Correlation and regression analysis were used to test on the relationship between the variables of the study. The study found that communication facilitates exchange of information and opinion with the organization, that communication helps in improving operational efficiency thus improving organization performance. It concluded that communication is a major determinant of organization performance. The study recommended that organizations should develop effective communication strategies since it will facilitate passing of information both within and outside the organization thus improving performance.

Neves & Eisenberger (2012) reviewed that management communication was positively associated with a temporal change in POS, mediates the relationship between management communications and implications of practice. Specifically, it revealed that management communication affects performance mainly because it signals that the organization cares about the well-being and values the contributions of its employees. This study also adopted the use the perceived organization support in terms of communication as indicators on the effect of communication on organization performance. Rho (2009) assessed the impacts of organizational communication on the perception of red tape by comparing internal communication with external, especially client-oriented, communication in both public and nonprofit organizations. In the view of Inedegbor, Ahmed, Ganiyat, & Rashdidat (2012) practices of effective business communication, were related to the category of business (service versus manufacturing) and its size.

Ogbo, Onekanma and Ukpere (2014) emphasized that flexibility in inventory control management is an important approach to achieving organizational performance. The study also found that here is a relationship between operational feasibility, utility of inventory control management in the customer related issues of the organization and cost effectiveness technique are implemented to enhance the return on investment in the organization. Nnamani & Ajagu (2014) examined the relationship between the employees and their work environment, to assess the extent of employee performance on productivity and to find out the extent environmental factor has enhanced to performance. The survey method and the research tool was questionnaire. The study had a population size of 1,152, out of which a sample size of 297. Two formulated hypotheses were tested using Pearson's correlation coefficients and z-test statistical tools. Study reveal that there

was unsafe and unhealthy work place environment, poor motivation, lack of innovation, high cultural interference and allow organizational interpretation process caused low productivity in the company.

## RESEARCH METHODOLOGY

This study adopted exploratory research methodology which Cooper and Schindler (2006) explained as a tool that enables a researcher to develop concepts more clearly, establish priorities, develop operational definitions, and improve the final research design. The research was conducted in Owerri Municipal, Imo state, Nigeria.

The population of this study consists mainly of thirty five (35) randomly selected construction professionals namely: architects, builders and quantity surveyors currently located and doing business in Owerri, Imo state, Nigeria. The combined population was obtained after a preliminary inquiry conducted to the offices of the respective professionals' bodies in the state capital. Based on the research approach chosen in this work that is, quantitative research approach, data were collected from the primary sources (sample population) in the field. The Primary data were obtained through field survey with questionnaires. A self-administered questionnaire was designed to collect all data. A questionnaire was a carefully designed instrument for collecting data in accordance with the specification of the research questions (Uzougulu, 1998). The questions consisted of only close ended questions. Close ended questions entail multi choice questions which would require the respondent to tick the answer from a given alternative answers. The questions were simplified and structured in a way that enabled respondents to provide relevant answers and also that would not make them to be biased or furious when answering them.

Multiple linear regressions are statistical tool that allows a researcher to examine how **multiple independent variables that** are related to a set of dependent variable. Once you have identified how these multiple variables relate to your dependent variable, you can take information about all of the independent variables and use it to make much more powerful and accurate predictions about why things are the way they are. This latter process is called "Multiple Regression".

The formula for multiple regressions is seen below:

$$Y' = a + b_1 X_1 + b_2 X_2 \quad (\text{equation 3.1})$$

Where Y = a predicted value of Y (which is the dependent variable)

A = the intercept

- B1 = the change in Y for each increment change in X1
- B2 = the change in Y for each increment in change in X2
- X = X is independent variable.

## RESULTS AND DISCUSSION

### 4.1 Results

The study adopted survey involving questionnaire administered to construction stakeholders in the study area. A total of thirty five (35) questions were sent-out to three categories of respondents in three sectors namely: contracting; consultancy; and public authority. Thirty five valid responses were retrieved, and the questionnaire response rate of the study was 100%. The results is seen Table 1.

**Table 1: Questionnaire Administration**

Sector	Administered	Retrieved	%
Consultancy	10	10	(28%)
Contracting	9	9	(26%)
Public	16	16	(46%)
Total	<b>35</b>	<b>35</b>	(100%)
<b>Response Rate</b>		<b>100%</b>	

#### 4.1.1 Level of Usage of Project Communication Tools

Table 2 shows the level of usage of communication mechanisms as ranked by respondents. The table reveals that the most used communication is specification followed by project plan and report respectively. The least communication mechanism used is gestures with mean score of 2.45. Less used communication mechanisms are facial expression, postures, pitch pacing of voice and gestures respectively.

**Table 2: Level of Use of Project Communication Tools**

Communication Tools	Mean	Rank
1. Specification	4.21	1
2. Project plan	4.04	2
3. Report	4.03	3
4. Memos	4.02	4
5. Presentation	4.01	5
6. Metric	4.00	6
7. Speeches	3.92	7
8. Conversations	3.68	8
9. Site meetings	3.64	9
10. Note	3.58	10
11. E-mail	3.56	11
12. Facial expressions	2.78	12
13. Postures	2.75	13
14. Pitch	2.74	14
15. Pacing of voice	2.72	15
16. Gestures	2.70	16

#### 4.1.2 Factors Affecting Effective Communication

Table 3 shows the common challenges of on-site communication. From the response, the most prevalent challenge is information overload (0.76) (i.e. issuing too many information/instructions at same time). Others are procedures/means of communication (0.75), difference in background (0.74) and noise and distraction (0.73). Interestingly, all the variable examines scored 70% and above. This means that all variables examined are somewhat critical in the study area.

**Table 3: Factors Affecting Effective Communication**

Factors Affecting Communication	Mean	RII	Ranking	Significance
Hardware	2.93	0.73	4 <sup>th</sup>	Significant
Procedures	3.02	0.75	2 <sup>nd</sup>	Significant
Terminology	2.85	0.71	7 <sup>th</sup>	Significant
Training	2.83	0.71	7 <sup>th</sup>	Significant
Badly expressed messages	2.83	0.71	7 <sup>th</sup>	Significant
Information overload	3.05	0.71	1 <sup>st</sup>	Significant
Difference in background	2.98	0.71	3 <sup>rd</sup>	Significant
Inconsistent verbal and non-verbal communication	2.89	0.71	6 <sup>th</sup>	Significant
Emotional reaction	2.81	0.71	10 <sup>th</sup>	Significant
Noise/distraction	2.91	0.71	4 <sup>th</sup>	Significant

### 4.1.3 Effects of Communication on Building Projects Delivery

Table 4 shows the effects of communication on building projects delivery. Time is ranked first, with a mean score of 4.54 while client satisfaction, project management was ranked second and third respectively with a mean score of 4.48 and 4.19 respectively. Cost is the fourth ranked effect with mean score of 4.12.

**Table 4: Effects of Communication on Building Projects Delivery**

Performance Indicators	Mean	Rank	Significance
Time	4.54	1	Significant
Client Satisfaction	4.48	2	Significant
Cost	4.12	4	Significant
Sustainability	3.73	5	Significant
Quality	3.71	6	Significant
Health and Safety	3.54	7	Significant

Communication mechanisms were further analysed using regression analysis to predict the probable time, client satisfaction, project management and cost to construction project. Since these variable (time, client satisfaction, project management and cost) were ranked test will mean score of above 4.00.

### 4.1.4 Effect of Communication Mechanism on the Completion Time of Building Projects

Table 5 shows the multiple regression model summary and overall fit statistics. R with value of 0.661 can be considered to be a measure of the quality of the prediction of time of completion of building project. This indicates a good level of prediction. The adjusted R<sup>2</sup> of the model is 0.179 with R<sup>2</sup> (coefficient of determination) = 0.437. This explains the proportion of variation accounted for by the regression model. This means that the multiple regressions explain 43.7% of the variance in the data. The Durbin-Watson statistics, which checks for independence of observations (i.e. independence of residuals), is 1.631. This fall between the two critical values of 1 and 3 that is generally accepted to be normal for accepting residual variables to be correlated. This further suggests that there is no first order linear auto-correlation in the multiple regression data.

**Table 5: The effect Communication tools on Completion Time of Projects.**

R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
0.661	0.437	0.179	0.633	1.631

#### 4.1.5 Test of Hypothesis

- H<sub>0</sub>: Communication mechanism is not a significant determinant of the completion time of building project
- H<sub>1</sub>: Communication mechanism is a significant determinant of the completion time of building project.

**Decision Rule:** Reject H<sub>0</sub>, if p-value is less than 0.05.

Table 6 shows the F-ratio test to indicate whether the overall regression model is good fit for data. The multiple regression, F-test has the null hypothesis (H<sub>0</sub>) that there is no linear relationship between the variable (in other words R<sup>2</sup> = 0). The F-test shows that the independent variable statistically predicts the dependent variable, F (16, 35) = 1.695, p-value = 0.004 < 0.05, thus we reject H<sub>0</sub> and then conclude that there is a linear relationship between the variable in the model.

**Table 6:** ANOVA Table for Completion Time

	<b>Sum of Squares</b>	<b>Df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
Regression	10.880	16	0.680	1.695	0.004
Residual	14.043	35	0.401		
Total	24.923	51			

Table 6 shows coefficients of the independent variables on time with the intercept and the significance levels of each variable. The table also helps in determining the significant predictions among the variables.

From Table 7, metric, facial expression and the meetings have p-value that is less than 0.05. These three communication mechanisms are significant variables in predicting effect of building project delivery in terms of time.

**Table 7: Coefficients of the Independent Variables on Completion Time**

Communication Mechanisms	Unstandardized Coefficients		Standardized coefficients	T	Sig.	Collinearity Statistics	VIF
	B	Std. Error	Beta			Tolerance	
(Constant)	4.78	1.31		3.64	0.00		
Project plan	-0.08	0.23	-0.07	-0.35	0.73	0.48	2.08
Specification	-0.09	0.25	-0.07	-0.37	0.71	0.56	1.74
Report	-0.12	0.24	-0.12	-0.49	0.63	0.36	2.74
Metric	0.023	0.18	0.02	0.13	0.90	0.57	1.76
Presentation	-0.01	0.19	-0.01	-0.05	0.96	0.51	1.95
Speeches	0.05	0.14	0.07	0.38	0.71	0.63	1.58
Memos	0.07	0.20	0.08	0.38	0.71	0.48	2.10
E-mails	0.13	0.20	0.16	0.67	0.51	0.37	2.73
Note	-0.04	0.20	-0.04	-0.18	0.86	0.34	2.91
Site meetings	-0.20	0.27	-0.20	-0.73	0.47	0.28	3.60
Conversations	0.25	0.37	0.23	0.70	0.49	0.21	4.86
Facial expressions	0.26	0.23	0.31	1.11	0.27	0.28	3.51
Postures	-0.01	0.25	-0.01	-0.04	0.01	0.31	3.22
Gestures	0.28	0.13	-0.48	2.08	0.03	0.41	2.42
Pitch	-0.12	0.21	-0.18	-0.58	0.56	0.23	4.42
Pacing of voice	0.01	0.22	0.01	0.03	0.97	0.25	4.04

## 4.2 Discussion

The essential characteristics of an effective communication have answered all questions asked, give something extra when desirable, include only relevant statements, avoid unnecessary repetition and achieve appropriate readability. This result corroborates Asemah (2011)'s conclusion that for meaningful communication among persons or groups, there has to be an agreed signs or symbols that is comprehended by all actors particularly between the sender and receiver at a go with clear stated instructions and illustration. The willingness to give additional information at the point of request spliced communication. These are critical to regarding a communication to be complete.

Specification and project plan which are classified as formal writing were ranked higher among the communication mechanisms that are often among construction professionals. Report and memos were ranked high also. While presentation which is classified as formal verbal communication mechanisms was ranked next to the aforementioned. The findings above are corroborated by Maslej (2006) submission that, scope of work and details of construction are communicated by means of drawings, contract document addenda and specifications. There are

various ways and methods of communicating information in the construction industry, which could be formal or informal. Mailabari (2014) also reported that though a vast majority of information is exchanged verbally and delegated, most data is exchanged in written format either as hard copy or electronically. Both verbal presentation and formal means of communication are essential in actualizing fruition of construction projects. In construction site, most communication are written down for record purpose, contractors also ensure that client or client's representative verbal instruction are made format in the instruction book for record purpose and for effective communication of financial implication of such verbal instruction.

This study examined the effect of communication mechanisms on building projects delivery. The findings show that time, client satisfaction, project management and cost were highly ranked variables and has an important effect on project delivery. Clients' satisfaction is a function of the project being finished to quality specified, time and budgeted cost. These are critical factors that constitute success of any construction project. As stated by Mehra (2009), communication is very essential in project execution as it plays vital role in all stages of construction. Based on these high ranked effect of communication mechanism on building project delivery, regression analysis was carried out to develop models for future use.

Model one (1) predicts effect of communication mechanisms on completion time of building projects is based on metric, facial expression and site meetings. This result is in consonance with the observation made by Tipili *et al* (2014) that, construction professional communicate informally under some conditions. Also, Furst, Abrams, MacKenzie, Tissue and Citrin (2012) opined that facial expressions help the recipient(s) of a message to interpret that message as the speaker intends it on time. However, according to Davis (2014), facial expressions are very important part of communication. Though nothing is said verbally, much could be passed across and understood. Akinradewo, Ojo and Oyefusi (2018) also submitted that construction personnel transfer information on paper based files (drawings, data collection forms, correspondences, progress information and specifications) at site meetings.

From Model 2, effect of communication on client satisfaction for building projects is predicted by posture and gestures. According to Jacklyn (2011), posture and gestures are attached view which allows the professional to take actions the way a client-wants. This assertion is reinforced by Olarewaju, Tan, and Kwan (2017) that consultants and clients make influence on each other by sharing information, emotions and feelings. As a matter of fact, it forms particularly diverse and complex clients-consultants relations, which can be determined as the transfer and reception of information for finding the best possible solution, for making influence on each other, changing attitudes, feelings and behaviour in the process of consultation.

## CONCLUSION AND RECOMMENDATIONS

### 5.1 Conclusion

The study was conducted with an intention to assess the impact of communication on construction project delivery in Nigerian construction industry. Deducing from the results of the questionnaire survey and data analysis, the results of this study clearly reflect that efficiency in communication plays a key role in successful implementation of building projects and also affects performance of the entire life cycle of construction projects. The most effective characteristic of communication is that sender answers all questions asked. Completeness of communication will help receiver understand the expectation of the giver and also helps in carrying out professional task expected by all participating professionals on the project. To be able to perform the expected communication functions, specification is the most use communication mechanism among professionals for successful building projects delivery. Specification must be complete, clearly stating all expected qualities of all items of work in appropriate clauses and avoidance of any ambiguity.

Communication has effect on time, client's satisfaction and cost. All these variables help to achieve the stated quality expected. Cost, time and quality of work done are the main target for success of construction project. Client's satisfaction is regarded to base on fulfillment of expected quality that birthed the project. Uncertainty in any communication mechanism (working drawing, specification, etc) if not clarified could lead to delay and delay claims. Overall quality of the work could be affected as enthusiasm of workers when working with poor communication mechanism that the application of communication mechanisms model would ensure successful building projects delivery on time, project cost and client's satisfaction.

### 5.2 Recommendations

Based on the conclusion of the study, the following are the recommendations:

- This study therefore recommends that the best way to control cost of construction is to improve site communication through workshops and seminars to improve the knowledge base of construction workers.
- Also, adequate communication software customized to attend to site communication challenges should be introduced.

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