Assessment of Cause and Effect Factors of Poor Communication in Construction Industry

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Abstract. Effective communication in construction industry is a core competency element to the success of the project. But it has been always a challenging mission to perform the communication effectively because the industry itself is characterized as fragmented, dynamic, and comprises of many parties (client, consultant, contractor, authorities) which leads to the presence of poor communication. There has been no publication to address the poor communication in a broad context especially identifying and assessing the causative factors and effects to this issue in the construction industry. However, this article aimed to identify and assess the significance of these factors through ranked them individually based on its level of significance/severity. Quantitative approach was adopted to conduct this study using structured questionnaire survey. A 5-point Likert’s type scale was used to assess the factors gradually based on their significance. Descriptive analysis was used to analyse the data collected from the survey. Average index (AI) and standard deviation were used to rank the importance of the factors in descending order. The study found that, the most dominant cause factors of poor communication is fear to communicate in the project space however the most dominant effect factor is high stress in workplace. The findings of this study serve best to draw a platform for construction practitioners to introduce strategies and plans to avoid the cause and diminish the effect of poor communication in construction industry.

1. Introduction
Currently According to Oxford dictionary, communication is defined as “The imparting or exchanging of information through speaking, writing, or using some other medium” [1]. In a similar concept, Longman dictionary defined communication as “the process by which people exchange information or express their thoughts and feelings” [2]. Communication can have various different meanings, contexts, and forms which relatedly depend on the discipline referred accordingly. The key aspect of both mentioned definitions introduced communication as the way of sending or receiving information by different means [3]. Sinha [4] defined communication synonymously and equivalently as the process of coding one’s thought, ideas and feeling into signals that are transmitted to others who receive, decode, understand and react to them on the basis of their own previous experiences and future expectations. However, in the construction industry, communication can be defined as the mutual exchange of project information and processes with the assurance of creating an understandable platform between receiver and sender [5]. An effective communication is one of the crucial factors contributing to the success of the project [6-8]. The Project Management Body of Knowledge guide [9] defined project communication management as "one of the main knowledge
areas in project management which include the processes requires to ensure timely and appropriate generation, collection, distribution, storage, retrieval and ultimate disposition of project information”. In addition, communication covers all task related to producing, compiling, sending, storing, distributing and managing project records. It also requires an accurate report on the project status, performance, change and earned value [10].

Furthermore, communication is considered one of the most important aspects of project management that pervades all others [11]. Emmitt and Gorse [12] described communication as a key management competency of leadership and decision-making are founded on good communication skills. In another word, communication is the ability to effectively communicate with employees, though not an easy skill to master is an obvious requirement for good leadership [13]. Emuze and James [14] reveals that communication is one of the fundamental aspects of the construction industry and it is the key aspect to project success. Communication affects the project implementation from the inception stage to the handover stage; as a result, it is necessary to understand its important role in the success of construction industry [8, 15].

A survey was conducted by Coopers [16] on the current state of project management revealed that 17% increase in finishing project within budget was associated due to effective communication. It was then stressed by PMI [5], the cost overrun in construction projects is also associated with improper communication and information management.

Communication is an essential element in the processes of construction and it is an augmentation factor of collaboration and cooperation among construction parties [17-18]. However, communication among the parties is not always concise and effective and, in many situations, it turns out to be unsuccessful and this is resulted in the phenomenon of poor communication [19]. Poor communication in construction industry is a repetitive issue in all construction projects and it is caused by many elements which of these, the unique characteristics of construction industry as a fragmented and involves many parties [6]. It also leads to many other issues such as cost, time overruns, delay, dispute and sometimes failure of the projects as a whole [20].

The reason of communication lack in the construction project is due to the complex and fragmented nature of the industry. In a single project several players are in charge of communication in the construction project which includes contractor (general contractor, design-builder, and construction manager), developer, sub-contractors, and owner/client: public (government), private and labour: unionized, non-unionized [21,26]. These characteristics of construction industry impact the methods and quality of communication which then need to be investigated in a broad context.

Poor communication issue has attracted many researchers and publication platforms to investigate its cause and introduces solutions and strategies. PMI [5] in its press release considered poor communication as one of the most causes of cost and time overruns in construction projects and it was vindicated that this issue causes overruns in the form of direct and indirect means [5,25]. Hoezen et al [22] declared that, most of the major issues in construction projects are caused by improper communication and it mostly reported between the demand side party and the supply side. In spite of the study mentioned before, this article aimed to assess degree of significance for causes and the degree of severity of effect factors which were predefined by [20] in article entitled “Identification of Causes and Effects of Poor Communication in Construction Industry: A Theoretical Review “and this paper also discussed the findings obtained from questionnaire survey.

2. Method of Study
Figure 1 show the process adopted to carry out this study in sequence order
According to figure 1, the first step is to identify the cause and effect factors of poor communication in construction industry worldwide. The second step to develop questionnaire survey and collect the data. Questionnaire consists of three parts which includes: demography of respondents causes factors and effects factors. The respondents were asked to rank the significance and severity of causes and effects respectively using 5 points Likert type score. The third step is to analyses the data using statistical software. It was found that the cause and effect factors of poor communication in construction industry are 41 and 27 respectively. The basic method to assess the importance of these factors is using 5-point Likert’s type scales to give the respondent the space to evaluate the significance and severity of each factor. Questionnaire set consisted of two parts, the first part is about the demographic profile of targeted respondents and the second part is the assessments of predefined factors. To understand the sequences of this research, figure 1 illustrate the major steps followed in this research. After the completing data collection, the responses were validated and any response was incomplete considered valid. The internal consistency of the instrument was tested using Cronbach’s alpha. The following section is to analyse the data and discusses the findings.

3. Results and Analysis
This part presents the results and analysis of data. The Level of significance and level of severity for causes and effects factors were determined based on the collected data through questionnaire tool. This part starts by introducing the demographic profile of participating respondents then analysing the ranking of the factors accordingly using AI and standard deviation.

3.1 Demography’s of Respondents
This subsection presents the demographic attributes of participants who participated in this study. Table 1 demonstrates the demographic data of respondents which includes organization, category of organization, role of respondent in the organization, and highest level of qualification of respondents and number of years of experience in the construction industry.
### Table 1. Participant’s demography

| Category                        | Items               | Percentage of responses |
|---------------------------------|---------------------|-------------------------|
| **Role of respondent in the organization** |                     |                         |
| Company Director                | 13.3                |                         |
| Project manager                 | 3.3                 |                         |
| Architect                       | 33.3                |                         |
| Project engineer                | 10.0                |                         |
| Clerk of work                   | 6.7                 |                         |
| General worker                  | 33.3                |                         |
| Others                          | 13.3                |                         |
| **Respondents qualification**   |                     |                         |
| Diploma                         | 13.3                |                         |
| Degree                          | 50.0                |                         |
| Master                          | 23.3                |                         |
| PhD                             | 6.7                 |                         |
| Others                          | 6.7                 |                         |
| **Respondents’ working Experience in construction (years)** |                   |                         |
| 0-10                            | 50.0                |                         |
| 11-20                           | 26.7                |                         |
| 21-30                           | 16.7                |                         |
| More than 31                    | 6.7                 |                         |
| **Type of organization**        |                     |                         |
| Consultant                      | 30.0                |                         |
| Contractor                      | 30.0                |                         |
| Client                          | 26.7                |                         |
| Others                          | 13.3                |                         |
| **Category of organization**    |                     |                         |
| Government                      | 20.0                |                         |
| Private                         | 76.7                |                         |
| Others                          | 3.3                 |                         |

Table 1 shows the respondents demography data elicited from the study. It is shown that respondents involved in this study are mostly in top management level of their companies. Regarding the role of respondents, directors are 4 (13.3%), project manager 1 (3.3%), architect 10 (33.3%), Project engineer 3 (10.0%), Clerk of work 2 (6.7%), general worker 10 (33.3%) and others 4 (13.3%). It is also shown in table 2 that respondents mostly obtained high level of qualification and the number of degree holders is 15 (50%). In regards of number of years of experience, it is shown that all respondents are senior employees in their organization. Table 1 also presents the data of respondent’s demography from organization perspectives. Consultant and contractors allocated 30% of the type of organization however client and others allocate 26.7% and 13.3% respectively. In term of category of organization, percentage of private companies carries the highest percentages of 76.7% however governmental carries 20% and others only 3.3%. This signifies that, the organization selected are acceptable to be considered in this study because the companies are considered to have many projects in place. The data elicited in table 1 confirms that, respondents participated in this study are qualified and hold an adequate knowledge of construction industry therefore, their responses and opinion regarding the issue of communication and evaluating the causes and effects factors are sufficient and satisfactory.

### 3.2. Reliability Analysis of Study Data

To conduct reliability test of questionnaire items in this study, it is essential to calculate Cronbach’s alpha. Cronbach’s alpha is used to estimate the internal consistency reliability associated with scores derived from Likert scale used in this study [23]. It also tests the reliability and validity of scores. In this study, Likert type scale was used in this study in the range of 1 to 5 to assess the factors based on given indications. SPSS is used to calculate Cronbach’s alpha. Cronbach’s alpha value for the five Likert scales which is ($\alpha = 0.812$). To interpret this data, a rule of thumb is derived by George [24] who
stated any value between 0.8 and 0.9 is considered good internal consistency. For the study data, it is considered good and this indicates the scales hold sufficient degree of reliability, satisfied and consistent to be used for further analysis and investigations.

3.3. Assessment of Cause Factors of poor communication in construction industry
The average index (AI) score is referred for all causes and effects factors. It is employed to assess the factors and rank them from the most important to the less important.

| Causative Factors                                                                 | STDV | AI    | Ranking |
|-----------------------------------------------------------------------------------|------|-------|---------|
| Fear to communicate                                                               | 0.56 | 4.37  | 1       |
| Delay notification of change                                                      | 0.61 | 4.33  | 2       |
| Lack of sector experience                                                         | 0.53 | 4.30  | 3       |
| Individual barrier (habits)                                                       | 0.59 | 4.17  | 4       |
| Poor progress measurement                                                         | 0.83 | 4.17  | 5       |
| Contractual barriers (restrictions)                                              | 0.97 | 4.13  | 6       |
| Poor communication skills                                                         | 0.71 | 4.10  | 7       |
| Slow information flow among parties                                               | 0.66 | 4.10  | 8       |
| Lack of communication among parties                                               | 0.80 | 4.10  | 9       |
| Lack of effective communication system and platform                               | 0.83 | 4.07  | 10      |
| Usage of different terms and methods                                              | 0.78 | 4.07  | 11      |
| Lack of confidence between stakeholders                                           | 0.72 | 4.03  | 12      |
| High confidentiality                                                              | 0.72 | 4.03  | 13      |
| Informality                                                                       | 0.67 | 4.03  | 14      |
| Improper communication channel                                                    | 0.79 | 4.00  | 15      |
| Lack of communication plan                                                        | 0.98 | 4.00  | 16      |
| Language barrier                                                                  | 0.61 | 3.97  | 17      |
| Lack of mutual trust among construction teams                                     | 1.08 | 3.93  | 18      |
| Lack of collaboration and representation between stakeholders                      | 0.78 | 3.93  | 19      |
| Negligence and casualness                                                         | 0.71 | 3.90  | 20      |
| Poor communication management                                                     | 0.92 | 3.90  | 21      |
| Inaccessibility of project information                                            | 0.68 | 3.87  | 22      |
| Frequent change of project contract                                               | 0.82 | 3.87  | 23      |
| Weak organizational structure for communication purpose                           | 0.82 | 3.87  | 24      |
| Incorrect delivery of instructions or technical info                              | 0.83 | 3.83  | 25      |
| Lack of communication procedure and training                                      | 0.85 | 3.80  | 26      |
| Poor detailed drawings                                                            | 0.90 | 3.77  | 27      |
| Different level of skills among construction team                                 | 0.53 | 3.70  | 28      |
| Different level of education among construction team                              | 0.65 | 3.70  | 29      |
| Lack of clear communication objectives                                            | 0.86 | 3.57  | 30      |
| Improper communication time management                                            | 0.86 | 3.57  | 31      |
| Lack of appropriate communication medium                                           | 0.94 | 3.50  | 32      |
| Poor planning                                                                     | 0.94 | 3.50  | 33      |
| Lack of support for advanced communication technology                              | 0.90 | 3.47  | 34      |
| Natural problem on site (Noise, rain)                                             | 1.00 | 3.40  | 35      |
| Lack of understanding among parties                                               | 0.81 | 3.37  | 36      |
| Complexity of construction industry                                              | 0.96 | 3.37  | 37      |
| Unavailability of information in time of need                                     | 1.01 | 3.23  | 38      |
| Diversity of culture and ethics among parties                                     | 0.89 | 3.20  | 39      |
| Frequent technology malfunction                                                   | 1.00 | 3.20  | 40      |
| Gender difference                                                                 | 0.74 | 3.00  | 41      |
| Overall average                                                                   | 0.87 | 3.80  |         |
In this subsection, the assessment of effect factors is introduced by evaluating the average index. Table 3 demonstrates the factors and their assessments.

**Table 3. Effect factors of poor communication Sorted by Descending AI**

| Effect Factors                                | STDV | AI   | Ranking |
|----------------------------------------------|------|------|---------|
| High stress in workplace                     | 0.57 | 4.50 | 1       |
| Cost overrun                                 | 0.84 | 4.30 | 2       |
| Information overlapping                      | 0.75 | 4.30 | 3       |
| Conflict among construction parties (Dispute)| 0.94 | 4.27 | 4       |
| Worsening relationship among construction parties | 0.78 | 4.27 | 5       |
| Poor project planning                        | 0.74 | 4.27 | 6       |
| Wrong execution of activities                | 0.77 | 4.23 | 7       |
| Poor risk management                         | 0.68 | 4.23 | 8       |
| Time overrun                                 | 0.66 | 4.20 | 9       |
| Poor project information management          | 0.91 | 4.17 | 10      |
| Late response to disaster                    | 0.82 | 4.13 | 11      |
| Unclear communication channel                | 0.94 | 4.13 | 12      |
| Poor collaboration among construction parties| 0.86 | 4.13 | 13      |
| Design error                                 | 0.76 | 4.10 | 14      |
| Poor team work                               | 0.94 | 4.07 | 15      |
| Failure of the project                       | 1.00 | 4.03 | 16      |
| Low level of satisfaction among parties       | 1.03 | 4.03 | 17      |
| Rework occurrence                            | 0.87 | 4.00 | 18      |
| Demotivated workforce                        | 1.10 | 3.97 | 19      |
| Frequent remedies in design and planning schedule | 0.87 | 3.93 | 20     |
| Misinterpretation                            | 0.98 | 3.93 | 21      |
| Poor project documentation                   | 0.91 | 3.93 | 22      |
| Low productivity                             | 0.99 | 3.90 | 23      |
| High accident rate                           | 1.18 | 3.83 | 24      |
| Waste generation                             | 1.10 | 3.77 | 25      |
| Affects construction process                 | 0.76 | 3.37 | 26      |
| Misunderstanding                             | 1.01 | 3.23 | 27      |

| Average value                               | 0.92 | 4.00 |
| Maximum Value                               | 1.18 | 4.50 |
| Minimum Value                               | 0.57 | 3.23 |

Table 3 shows the analysis for effect factors of poor communication in construction industry. From the calculation, standard deviation for all the factors equals 0.92 which displayed good variations of the answers from targeted respondents. This is justified that; the background of respondents’ matters in their opinions toward the effect factors of poor communication furthermore signifies good distribution of the mean values. Aside from that, the maximum and minimum average index (AI) is 4.50 and 3.23 respectively and the overall average score of AI is 4.00. The most ranked effect factor is high stress in workplace which carries an AI of 4.5 and this indicates poor communication leads to high stress in workplace. The second most ranked is cost overrun which carries an AI of 4.30. This confirmed to the findings by PMI in 2013 [5] press release which stated that, more than half of all project budget risk is due to ineffective communications and improper time management of project communication. It also stated ineffective communications among relevant parties contribute 56% of the total risk of a construction project. The report elaborated poor and substandard communications is the primary
contributor to project failure one third of the time, and had a negative impact on project success more than half the time. Thus, it suggested a high-level, executable communications strategy to reduce financial risks.

4. Conclusion
This article presented the assessment of cause and effect factors of poor communication in construction industry. A total of 41 cause factors and 27 effects factors were assessed based on their significance and severity correspondingly. The study considered the factor of fear to communicate as the most dominant causative factors of poor communication in construction industry. In the other hand, stress in workplace as the most severe effect of poor communication in construction industry. The findings of this study help to define the most cause and effect factors of poor communication in construction industry which eventually assist construction parties to understand the causes and effects of poor communication and introduce effective resolution for these factors by evading the cause and reducing the effect. In conclusion, poor communication issue requires more attention from researchers and academicians to introduce effective methods and strategies to overcome the issue for the sake of augmenting the performance level and produce successful projects.

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Acknowledgement
Authors appreciatively acknowledge the financial support provided by BP Renalcare grant and also Malaysia Ministry of Higher Education (MOHE).