



KEYNOTE LECTURE

## ON THE DESIGN OF A SURVEY TO MEASURE EFFECTIVE COMMUNICATION IN BUILDING

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### Abstract

Although effective communication is identified as a key indicator of project performance, communication aspects on contractors' evaluation are not yet included. This paper aims to review the most relevant contributions on the specific literature in order to design a survey to test for the parameters that affect effective communication among Construction Agents (CA), i.e. PM's, builder, designer and other professionals participants, during the construction process of the project. The survey will be based on the experience and perceptions of the corresponding professionals in Spain. The availability of these parameters is crucial and it represents basic information for developing procedures and tools for the evaluation and selection management of CAs.

### Key words

Construction management, construction projects, criteria assessment, effective communication.

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## 1 INTRODUCTION AND GOALS

*“The correct choice of construction contractor(s) is a critical function of either the client or the client’s consultant/project manager, that usually has a significant impact on the success or otherwise of a project”* (Kumaraswamy, 1996 [1]). Within this context, several factors must be considered in the selection process in order to predict the success of a construction project. Communication is the most important skill for an effective project leader (Oduami, 2002 [2]). It can integrate the management of different areas of a construction project; it is a basic tool for continuous improvement through process enhancement and thus the resulting increase in competitiveness. It allows the implementation of tools for innovation, and most importantly, it helps to adapt the changes and improves response times to them in the execution of a construction project. Communication is classified as one of the most important skills for the project manager, attributable to long-term profitability (Gushgar *et al.*, 1997 [3]). Jha and Iyer (2006) [4] found that the critical factors affecting quality performance in construction projects are the ‘human element rather than machinery’ and ‘good communication among people’.

Effective communication has been identified as a key indicator of performance in an evaluation model of a successful construction project (Yeung *et al.*, 2009 [5]), also lack of communication has been identified as one of the critical factors of delays in building projects (Doloi *et al.*, 2012 [6]). Although, there are a number of criteria and methods proposed for an appropriate choice of contractors, communication is rarely considered. The evaluation of the communication process includes an analysis to identify and select suitable factors and objectives and measurable characteristics that can be attributed to the communicative process.

Also, not only is the contractors’ evaluation important to achieve project objectives but also the selection of Construction Agents CAs (CAs in this paper are professionals involved in the construction process, such as owner or project manager, builder, designer and other participants defined by the Law in Spain [7]) is essential.

This paper aims on one hand to explore the state of the art on effective communication in building projects and, on the other, to design a survey for the professionals in Spain in order to determine, in a future research, the parameters that affect effective communication among CAs during the construction process of the project.

The structure of the paper is as follows. In Section 2 the state of the art on the parameters of interest will be introduced. The details of the survey will be developed in Section 3 and the paper will finish with a future research section.

## 2 STATE OF THE ART ON PARAMETERS INVOLVED IN THE COMMUNICATION PROCESS

*“Communicating involves the exchange of information. The sender is responsible for making the information clear, unambiguous, and complete so that the receiver can receive it correctly. The receiver is responsible for making sure that the information is received in its entirety and understood correctly”* (Project Management Institute PMI, 2000 [8]). Hargie (1986) [9] argues that successful social communication is a skill that involves the effective interaction among people. For Gayeski (1993) [10], the communication is essentially the transfer of information among people and it is determined by the rules and norms of social behaviour as people translate their meaning and use the information. With rules and proper tools the usefulness of information can be improved. Stanton *et al.* (2007) [11] identify

communication as "*the verbal or nonverbal transmission of information between someone who wants to express an idea and who hopes to grasp or is expected to grasp*".

From these definitions it can be identified that the communication process involves: emission of signals (sound, symbols, gestures, signs, etc.) with the intent to publicize a message, for communication to be successful, the receiver must have the skill to decode the message and interpret it and the process is reversed later when the recipient responds and becomes the issuer. And that the elements of the process are the Code like a system of signs and rules that are combined with the intention of disclosing something, the Medium that is the physical medium through which information is transmitted, the Sender, the Receiver and the Noise (a disturbance which interferes with the normal development of the signal in the process like distortions of sound, the fluency of the speaker, spelling errors, etc.).

The Project Management Institute (2000) [8] defines nine project management knowledge areas: Integration, Scope, Time, Cost, Quality, Human Resource, Communications, Risk and Procurement. Communication Management includes the process required to ensure proper collection and dissemination of project information. It consists of communication planning, information distribution, performance reporting, and administrative closure. Project Communication Management should provide the critical link among people, ideas and information that are necessary for success. Also, communication is an important influence factor on the success of a safety management system for construction sites (Ismail *et al.*, 2012 [12]).

Many researchers have explored the issue in order to determine the characteristics of effective communication. For Dainty *et al.* (2006) [13], effective communication is based on; the efficiency with which the coded information is transmitted through communication systems, channels and networks, the suitability of media and channels used, and how those receiving the communication decodes, interprets and acts accordingly and the ability to minimize noise that might impede the process. On the other hand, a lack of clear objectives, information overload, a channel or inappropriate media, problems of perception and attitude, the physical distance in relation to the means chosen, and the length of the chain of transmission, are factors that cause difficulty in communication (Baguley, 1994 [14]).

In relation to the use of different channels and media, Dainty *et al.* (2006) [13] also mentions that the correct choice depends on four main criteria: a) the amount and importance of information required: in terms of quantity, there are different channels that transmit different amounts of information. b) Instant information required: defined by the moment of transmission required. c) Effective communication: referring to the accuracy of the information transmitted. In this case, bidirectional communication is important. d) Efficient communication: related to the speed of transmission of messages, depending on the distance of transmission.

Tucker *et al.* (2001) [15] determine that the key to project information management, though, consists of the information flows associated with inter-organisational communications. The inter-intra organisational structures such as alliances, establishes communication mechanisms and helps to achieve an efficient and effective communication; which is essential to achieve the objectives of a construction project (Cheng *et al.*, 2001 [16]). It is determinant for effective information management and thus for communication among all professionals linked to the construction process during the whole lifecycle of the project. Short and informal lines of communication as well as regular construction control meetings among project teams further support the achievement of the desired quality level in a construction project (Jha and

Iyer, 2006 [4]). According to Busseri and Palmer (2000) [17] communication between team members and with personnel outside of the team improves work performance, quality and effectiveness and an important tool to achieve this communication are team meetings.

Information plays one of the most important roles for effective communication. Information should not be excessive, should be clear, must be available to personnel who need it, and should be easy to understand and accessed. The construction industry has for many years suffered from difficult-to-access, out-of-date and incomplete information (Shoesmith, 1995 [18]). A core issue is the effective management of information, both in the form of information flows that permit rapid inter-organizational transactions between project participants, and in the form of information accumulated, coded and stored in firm database structures. Therefore, timely and accurate information is important for all project participants because it forms the basis on which decisions are made and how physical progress is achieved (Mohamed and Stewart, 2003 [19]). It is recognized that it is a challenge, establishing effective communication in dynamic conditions and more, given the combination and amplification of the effect of the dynamics of three elements: complexity, uncertainty and speed. Since construction projects today are more technologically complex, the structures are larger, built in crowded urban places, combining the most advanced and complex systems, and resulting in more information to flow from a greater number of personnel at any given time more quickly (Laufer *et al.*, 2008 [20]).

### **3 SURVEY DESIGN**

After studying and analysing the main references on communication process and identifying the factors that can affect it, in this Section we define the parameters of interest, the target population and the survey itself.

#### **3.1 Parameters of interest**

Five parameters were selected as they were considered as the most important that may be associated with measurable and/or evaluated characteristics: a) The Organization, b) Communication Management, c) Media and Channels, d) Quality of Information and e) Communication Quality in each Area of the Building Process Management.

- a) The Organization or structure established for communications flow. Organizations are structures composed of people, to achieve goals and objectives through the use of resources. To achieve these objectives effective communication is required. Through it organization members get information about their organization and the changes that are generated within it. Planning, organization and control are achieved only through communication and integration of administrative functions. And, this in turn is affected by the characteristics of the organization: size of the organizations (Armstrong, 2001 [21]), information flows (Tucker *et al.*, 2001 [15]), shape of lines of communication (Jha and Iyer, 2006 [4]), etc. An efficient and effective communication is linked to the organization type and its features (Cheng *et al.*, 2001 [16]).
- b) Communication Management involves planning, developing strategies, tools and techniques to achieve communication objectives. Communication Management promotes communication between members of the organization, facilitates the integration between corporate goals and the staff objectives, increases the cohesion of team members and reduces sources of conflict, as well as contributing to the creation

of spaces for information, participation, opinion and improves the final product. Being included as one of the nine project management knowledge areas by the Project Management Institute (2000) [8], it is necessary to assess their specific impact on the quality of the communication process.

- c) Media and Channels are the shape and physical medium used for transmission of communication. A proper selection of Media and Channels depends on the amount or importance of information to send (Dainty *et al.*, 2006 [13]), the geographic location of the project management team, the number of receivers (Armstrong, 2001 [21]), and the characteristics of the available channels such as transmission speed, capacity, quality, noise reduction, etc.
- d) Information is the message itself of all communication. An effective communication should start with Quality of Information. Clearly the position of its relationship to the other parameters chosen is important.
- e) The relationship between the degree of communicative quality of the different areas of knowledge or the existence of a communication design in each of them is a factor affecting the integral communication quality of project development.

### **3.2 Target population**

For the selection of the sample and given the geographical framework of the investigation, the CAs should be defined. In Spain, CAs are defined and regulated by the Law 38/1999 of 5 November ("*Ley de Ordenación de la Edificación - LOE*") [7]. In addition to the owner, designer, builder and product providers, in Spain there are other agents to ensure a good technical, economic and functional building through the allocation of technical responsibilities. These are: the Facultative Manager, which is formed by the Construction Manager and the Execution Manager. The Construction Manager leads the technical aspects of the development of work, e.g. aesthetic, urban and environmental agreement to the project, the license, contracts, etc. His responsibility, moreover is of the final certificate of the work, is to act as a technical consultant and give solutions if required. The Execution Manager leads the implementation of the work and controls the quantity and quality of the construction. The Execution Manager is permanently based on site and his role is more practical in nature than the Construction Manager, but his responsibilities are no less limited than the Construction Manager. However, he is less qualified and experienced than the Construction Manager.

For Facultative Manager, Construction Manager, Execution Manager and Designer agents the law demands that they employ an AC such as an Architect, Technical Architect, Engineer or Technical Engineer, as appropriate, and meet the conditions required by their profession. The AC depends on the form and function of the building to be constructed. In this way, variables like Professional Title or the Experience as CA should not be disqualified in the analysis. Similarly, the perception in terms of Years of Experience could be something that at first glance may not be readily identifiable.

The target population consists of registered professionals in the Professional Associations in Spain, with reference to the construction sector. The distribution of the survey and collection of information was done through an online survey website (Encuesta Fácil, 2010 [22]). The service of an online survey allowed quick and easy access to the survey through a link in addition to a systematic collection of responses. It also allowed the design of the survey to be customized to the requirements of the study.

### 3.3 Survey specifications and structure

To evaluate the influence of the communication parameters and its features, single-selection test questions organized into a matrix were used. The same type of question was asked throughout the survey, allowing consistency in the overall scheme.

The scale chosen for the survey was a 5-point ordinal scale: Very High, High, Medium, Low and Very Low or, in some cases, Very Good, Good, Regular, Bad or Very Bad.

The survey was schematically divided into three parts and the estimated average time spent in responding was approximately 10 minutes:

- The first part identifies the profile of the respondent: Professional Title, Experience as CA and Years of Experience.
- The second part allows the respondent to assess the importance of the selected communication parameters in the communication process.
- The third part allows the respondent to qualify the characteristics of the factors assessed in the second part of the survey or its importance to communication parameters.

### 3.4 Collection data

Initially in Catalonia, the management for the distribution was conducted in collaboration with the Institute of Statistics and Applied Mathematics to Building (IEMAE) and of School of Building Construction of Barcelona (EPSEB) from the Polytechnic University of Catalonia (UPC) with the valuable collaboration of the Professional Associations. For the rest of the Spanish territory, the survey was sent directly by e-mail to the associates. A total of 90 surveys were completed in Catalonia and 422 questionnaires were received of 5480 e-mails sent to the associates in the rest of Spain. So, the resulting sample size of the dataset for future analyses was 512.

## 4 FUTURE RESEARCH

Once data have been collected many analyses are possible in order to test which parameters are actually involved in an effective communication process, as well as to look for tools for the evaluation and selection management of CAs. More details on the survey proposed in this paper and some preliminary findings based on the analysis of the data can be found in Rodriguez *et al.* (2012) [23].

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