

The Issue of Communication in the Construction Industry: A case of South Africa

Berenger, Yembi Renault^{1*} & Justus, Ngala Agumba²

^{1 & 2}Department of Construction Management and Quantity Surveying, Faculty of Engineering and the Built Environment, University of Johannesburg, South Africa

* renault08@yahoo.fr

ABSTRACT

Communication within construction presented exceptional problems. This is particularly evident within the construction sector, where interactions have the tendency to be characterised by unacquainted classes of people coming together for brief periods before dispersing to work on other ventures. Owing to its specific characteristics, the construction industry creates a complex communication environment. This paper sought to improve communication in construction. In order to define the problem in more detail and to achieve the purpose of the study, an exhaustive literature review on communication in construction was conducted, a total of ten experts on the practice of communication in construction in Gauteng (South Africa) were interviewed, through semi-structured, in-depth interviews. Findings revealed that the majority of issues regarding communication in construction were reported to be between demand and supply-side stakeholders. The robust interaction in construction projects between stakeholders seems to make construction projects very exposed to communication problems. Furthermore, a waste of time was revealed as a result of poor communication, a discrepancy in stakeholders' power and about poor consensus particularly in the public sector, and a lack of stakeholders' ability to sympathise with the other parties involved.

Keywords: Communication, Construction Industry (CI), South Africa

INTRODUCTION

In today's world, people have a better understanding of the necessity to practice good communication in the society in order to effectively deliver meaningful communication. Construction is a fragmented and dynamic sector with a project-based nature (Perumal, 2011). More often, problems in construction are regarded as communication problems (DETR, 1998). Because of its unique characteristics, the CI forms a complex communication environment. For that reason, a lot of stakeholders work in regularly varying sets of relationships which are contractually driven. The culture presents a reality of conflicts and lack of reciprocal respect and trust [Dainty *et al.* 2006]. This study aims at improving communication in construction. To define the problem in more detail and to achieve the research aim, an extensive literature review on communication in construction was carried out, and interviews were conducted with experts in the field of construction in Gauteng (South Africa). This gave a first impression of the situation in the practice and literature of construction. The findings, as well as the empirical details from the interviewees, are reported in section 4 of the treatise. A more focused problem definition, the research aim and set-up to cross-examine the problem are also presented. The next section (Section 2) reports the literature study. The paper ends with some conclusions.

Purpose of Study

The purpose of this study is to improve communication in the construction industry, which would significantly lead to fewer delays and lower expenses.

LITERATURE REVIEW

Defining Communication

Many researchers have defined communication differently, however; the core meaning remains the same. Communication is the process in which information is encoded and imparted by a sender to a receiver via a channel/Medium (Perumal, 2001). The message is

then decoded by the receiver and feedback given to the sender. According to Axley (1984), communication can be defined as a metaphorical 'pipeline' along which information is transferred from one person to another. It is the essential component of any system of human interaction as deprived of it, no significant or logical activity can take place (Thomason, 1988). Nevertheless, defining the term communication is difficult as it is such a multifaceted and vague concept. Communication can have a diversity of meanings, contexts, forms and impacts and so will mean diverse things to different people in various situations (Dainty et al., 2006). This is undoubtedly the case within the CI, where a plethora of dissimilar communication occurs concurrently. Communication requires that all parties must have an area of communication commonality (Perumal, 2011). According to the author, these communication commonalities include auditory means such as speaking, singing and at times tone voice as well as nonverbal and physical means such as body language, sign language, eye contact and even written communication. It is a process by which we assign and convey meaning in an attempt to create shared understanding. This process necessitates a wide repertoire of skills in intrapersonal and interpersonal processing, listening, observing, speaking, questioning, analysing and evaluating. Collaboration and cooperation occur through communication. They are three categories of communications in business (Perumal, 2011): written, verbal and non-verbal communication. Written communication comprises letters, emails, memos, reports and formal documents. Verbal communication comprises chat, presentation and voicemails. Non-verbal communication uses signals to communicate and study body language (Thompson, 2002).

Regardless of the complications inherent in defining what communication is, it is imperative that a working definition of the notion is developed to underpin the analysis of communications practice contained in this paper. To accomplish this, it is necessary to break down the concept in order to describe its composite components. These components can be summarised as follows (Dainty et al., 2006):

- i. Communication generally includes the transfer of information, a general concept that comprises meanings namely process data, knowledge, skills as well as technology (Cheng *et al.*, 2001). In construction, information is exceptionally varied given the important number of parties involved with construction activities.
- ii. To communicate is to bridge a distance of some description, which can range from being short and simple, to long and complex (Skyttner, 1998). Once more, in construction, the disparate location of many of those involved with projects often require communication over longer distances than in, for instance, manufacturing environments.
- iii. Successful communication (at an interpersonal level in any case) is a social skill involving the effective interaction between people (Hargie, 1986). In spite of development in off-site production techniques, construction remains a labour-intensive industry and therefore, social activity demanding communication between a wide variety of participants.
- iv. Interpersonal communications between people generally require conveying facts, feelings, values and opinions (Kakabadase *et al.*, 1988). Hence, interpersonal communications can be considered subjective and value laden. In many respects, construction is not an exact science and as such necessitates a degree of subjective understanding from those participating.
- v. Communications do not only occur between individuals but can occur between groups or organisations (Baguley, 1994). Construction is inherently a team activity involving the concurrent involvement of many specialists so as to achieve efficaciously project objectives.

- vi. Communication can be seen as a transactional process where something is exchanged between the parties involved (see Eisenberg and Goodall, 1993). Construction can be regarded as a series of transactions between the parties involved. Facilitating these transactions has been widely recognised as a key issue for the industry to address if it is to improve its performance in the future.

These various outlooks on communication all suggest that communication is basically about the transfer of information between people. Consequently, the point of communication in most cases is that one person (or team or organisation, etc.) desires another to receive information from another. Within an organisational context, this could be to convey an instruction to influence the actions of others, or may require an exchange of or request for information. To some extent, this interaction will be determined by the rules and norms of social behaviour, as it is people who translate the meanings and utilise the information (Gayeski, 1993).

Furthermore, this suggests that communication has to be a two-way process, as unless the transmitter of the information receives feedback that the message has been received, and then they will be unsure as to whether communication has taken place or if it has taken place successfully. Put simply, Therefore, communication involves the giving out of messages from one person and the receiving (and successful understanding) of messages by another in response (Torrington and Hall, 1998). The ways in which these messages can be conveyed are multifarious and may include speech, body language, writing, graphical or electronic media or any combination of these forms. As such, communication can be considered as a professional practice where proper rules and tools can be applied to improve the usefulness of the information communicated, as much as it can be a social process of interaction between people.

The Importance of Effective Communication

Nowadays, the importance of effective communication cannot be overemphasised. Almost every manuscript on how to manage people will cover important principles of how to communicate effectively with the personnel. At an individual and team level, people find it hard to operate in the industry if they do not develop a reciprocally agreed communication *modus operandi* to underpin their work activities (Dainty et al., 2006). Likewise, the management of organisational processes also calls for the establishment of a dynamic and effective communication channels that allow their numerous mechanisms to be conjoined appropriately. Armstrong (2001) briefly summarised the importance of communication to organisations as follows:

- i. **Achieving coordinated results:** organisations operate using the collaborative actions of people, but independent actions lead to results discordant with organisational objectives. Coordinated outcomes, therefore, demand effective communications.
- ii. **Managing change:** Almost all organisations are subject to constant change. This, sequentially, affects their personnel. Acceptance of and willingness to incorporate change is possible only if the reasons for this change are well communicated.
- iii. **Motivating employees:** the extent to which an individual is driven to work efficiently for their organisation rest on the accountability they have and the scope for accomplishment afforded by their role. Feelings in this respect will depend upon the quality of communications from senior managers within their organisation.
- iv. **Understanding the needs of the workforce:** In order to respond efficiently to the requirements of their personnel, it is important that they develop an effective channel of communication. This channel must enable feedback from the workforce on

organisational policy in a way that inspires an open and truthful exchange of ideas between employees and executives of the organisation.

Given the advantages of effective communication delineated above, the consequence of poor communications for an organisation is that employees will misjudge management decisions or respond to them in a way that was not deliberated. Equally, managers will misread the prerequisites of employees and will consequently suffer from lower performance and a higher turnover of staff.

Communication has become even more important as the business world has begun to move towards what is now defined by Dainty et al. (2006), as a 'knowledge-based economy'. A knowledge revolution has underpinned the shift towards a predominance of service sector organisations. Debatably, almost all large construction enterprises have now become service sector organisations, outsourcing the majority of their fruitful attitude and efficiently acting as managers of the process. Professional as well as managerial employees control their payroll, and it is these 'knowledge workers' whose intellectual capital becomes the ingredient that underpins organisational growth and development (Dainty, 2006). The challenge for such firms is how to generate knowledge sharing and enrich 'communities of practice' for improved performance. Communities of practice entail where groups of people who share a worry for the same questions, or set of problems come together and act together on a continuing basis (Wenger *et al.*, 2002).

Additional prerequisite for effective communication in construction stems from the industry's tendency to experience change and transition. Dealing with change is more challenging in traditional industries like construction, which have revealed an unwillingness to embrace different ways of working, but is debatably more significant, taking into account the dissimilar pools of knowledge that must be incorporated in construction projects (Dainty et al., 2006). In the past, a 'silo' like mentality has triumphed which has been exposed to interfere with knowledge sharing within the industry (Dainty *et al.*, 2004). Nevertheless, effective communication has the supremacy to break down such obstacles by bringing people together, thus promulgating improved cooperation and combined working within the sector. Therefore, effective communication can be regarded as the keystone of future industry improvement.

Communication in Construction

The literature on communication in construction has emerged in the early 1940s, mostly based on the situation in the United Kingdom [Emmitt and Gorse 2003]. Many problems regarding communication have been reported, with an emphasis on intra-supplier communication within the construction industry; demand-supply communication during the design phase; and communication between single demand and supply side parties, during the entire construction process. Here, the demand side comprises principals, users and investors and the supply side encompasses architects, contractors, subcontractors and advisors. The importance of improving communication in construction and the main factors influencing communication are discussed.

The efficiency of the construction process relies upon the quality of communication. According to Hoezen (2006), the following explain the reasons why improvements in communication are important:

- i. An improvement in communication within the building team, in project teams and between the project manager and contractors could minimise failure (Thomas *et al.*, 1998; Franks, 1998; and Somogyi, 1999).

- ii. More open communication at all levels could lead to innovations (Lenard and Eckersley, 1997) and better technical solutions (Atkin *et al.*, 2003).
- iii. Improving communication in early stages of projects would positively influence the quality as viewed by all stakeholders involved (Emmit and Gorse, 2003; and Brown, 2001).
- iv. Discussing the theme of communication during staff meeting would lead to better decision making, for example, less hastiness in moving to answers and better strategies of looking at the prerequisites first (Barrett, 1995; and Salisbury, 1998).

Various factors influence communication in construction; an overview can be derived from literature:

- i. The first category of factors is connected to the organisation of the construction process (Hoezen, 2006). The Key aspects are the dissimilarity between formal and informal communication paths during the design stage (Mackinder and Marvin, 1982) as well as during the development stage (Pietroforte, 1992; and Higgin and Jessop, 1965); and the separation of design and production (Hill 1995).
- ii. The second category involves the stakeholders themselves. Conflicting interests could result in hidden agenda, usually leading to limited communication (DETR, 1998; CIB, 1997; and Brown, 2001), and all stakeholders' frames of reference are considered of great influence on communication as well (Moore and Dainty, 2001; and O'Reilly, 1996).

Some studies have been concluded so that the CI could profit from improved communication. Even though the studies focus on numerous aspects of communication in construction, no literature overview has been discovered on the topic of demand-supply communication in construction.

Studies stressed on intra-supplier communication (e.g. head-and subcontractors) or intra-demander communication (e.g. principal and end user) or look at just one stage of the construction process. In the cases where communication between demand and supply side parties was studied, the focal point was on just a few stakeholders instead of considering many parties from each side.

METHODOLOGY

This study investigation began with a comprehensive literature review on the topic of communication in construction. In order to gain additional insight into communication issues, ten experts and professionals in the field of construction were interviewed. The selection criteria of the interviewees was based on their profession (constructor, consultant or professional principal); the type of projects they were currently working on or had worked on (Residential construction projects, building, institutional and commercial construction projects, industrial, specialised industrial construction, highway and heavy construction projects); and the sector they were working in or building for (private or public construction project).

The data were gathered through semi-structured, in-depth interviews. The format was that of a conversation with a structure and a purpose. Furthermore, to confirm the richness of the method employed, the participants in the study were first notified about the purpose of the study, what their participation involved, and how the results would be circulated. Subsequently, the interviewees were required to think of one or more particular projects that they were presently working on or had lately delivered. Open interview questions based on the purpose of the study allowed interviewees to talk about their experience. During the interviews, notes were made, which were transcribed directly after each interview. All types

of comments were grouped into three categories characteristics of the South African Industry; the importance of communication in construction; and the factors influencing communication. Due to the interview method selected, not all the interviewees' comments were analogous. For instance: some interviewees focused on the organisation of the construction industry as a whole, whereas others went into detail about contractual aspects. Regardless of these dissimilarities, there were lots of parallels and conflicting interpretations, drawing a clear picture of the communication environment as shaped by the construction industry. After the analysis, a synopsis of main topics was presented to the group of interviewees, sitting together. A discussion took place, during which nuances and adjustments were made. Interviewees clarified their observations to one another, providing further insight into the background of conflicting ideas. Based on this consultation, conclusions were reached.

DISCUSSION AND FINDINGS

Characteristics of the South African Construction Industry

The image of the South African CI, as perceived by the interviewees, is one of the industries made up of conservative, poor communication among stakeholders. Even more than in other sectors, human factors seem to ascertain most if construction projects develop in a good way or not: there needs to be some "chemistry" between the individuals involved to make the process go well (Hoezen, 2006). Because of the small margins, the hierarchy within the supply-side is rigid, and stakeholders behave in both strategic and calculating ways. This behaviour is a result of lack of mutual trust, reversely discouraging stakeholders to ameliorate their communication. The respondents stated that when something goes wrong, it results in pointing fingers on both sides, the claiming of extra efforts, attached to a declining level of trust. The interviewees further reported that trust is the main reason for principals' wishing to be involved in the whole process. Because of their tendency to control every detail, several consultants are implicated. In infrastructure projects top management just give the impression to get involved in the latter stages of the construction process only, while in public housing projects, for instance, their involvement is being asked more and more in earlier phases of the process. However, they still have little experience with it. Consequently, top management only thinks about the product to construct, rather than the problem it should tackle.

Discussions, as a result, tend to be about product specifications and project plans rather than about functional requirements, wishes and needs. Regardless of the fact that communication has been organised in much the same way for a long time, interviewees affirm that a dialogue is starting: constructors are reconsidering their professional relationships with clients, and government becomes conscious that procurement should be less detailed. In general, interviewees honour the industry for its devotion, hard work and expertise.

The Importance of Improving Communication: Interviewees' Perceptions

Overall, communication in construction was not identified as problematic by the interviewees; nevertheless, they acknowledged that communication processes are far from optimal. A waste of time was revealed as a result of poor communication. For instance, errors from early stages of the construction process have to be resolved later which, result in making adjustments in latter stages of the construction process and more often requires extra money. Interviewees believe that improved communication would undoubtedly lead to fewer delays and lower expenses. Furthermore, all stakeholders' contentment about the process as well as the standard of the product could escalate when they would communicate effectively.

Factors Influencing Communication: Interviewees' Perceptions

According to the interviewees, the main problem of communication in the South African CI lies in the lack of stakeholders' ability to sympathise with the other parties involved. This is

particularly the case between demand side and supply side parties. Knowing that designers and constructors do not experience how their choices affect the use and maintenance of the product, it is hard to communicate about these themes. This results in constructors who do not think along with the principal; principals who are not open-minded to the constructors' input; and designers who design objects that do not always match the wishes and needs of their principals. Moreover, the stakeholders' discernment of their functions in the process is not on all occasions viewed as professional. Respondents state that principals do not always think meticulously about their wishes and needs, and do not take responsibility so as to implement their will. Neither are constructors as responsible as respondents think is indispensable: they usually act in strategic and manipulative manners. The respondents approve that the preparatory measures of the project are necessary. Principals should get their requests clearer and consequently sufficient time should be spent on the brief. As regards the brief, some interviewees suggested that the brief should comprise mostly functional specifications; others stated that specifications should be unmistakable and detailed. Though, interviewees share a complete agreement that the principal's outlook of his or her own role is critical. For a clear communication, principals should consider themselves as chiefs and similarly act like this by being honest and straightforward regarding the prerequisites and making obvious the do's and don'ts.

Lastly, interviewees mentioned a discrepancy in stakeholders' power and about poor consensus, particularly in the public sector. Frankness about the budget available and reciprocal accountability could positively affect communication.

The Research Set-up and Problem of Communication in Construction

The interviews conducted in South Africa, support the findings in the literature. The factors influencing communication as declared by the interviewees have their place into either the organisation of the construction process or the interests of stakeholders involved. According to the results, interviewees seemed to concentrate on the communication between stakeholders on the demand side and stakeholders on the supply side. This is the area where the majority of issues were revealed, and therefore, demand-supply communication seems worth to be examined in more detail.

In the literature, communication in the CI is studied quite rigorously; nevertheless, the topic of demand-supply communication has not yet been surveyed exhaustively. Owing to this deficiency in literature and the relevance of the subject to the industry concerned, the objective of our study project is defined as acquiring insight into the organisation of demand-supply communication processes in construction and developing an approach to improve the efficacy of this organisation.

Communication was thus defined as a process in which the participants create and share information with each other so that to achieve reciprocal understanding (Rogers and Kincaid, 1981). In order to achieve the aim of the study, two research objectives were formulated:

- i. To investigate how demand-supply communication is organised in construction; and
- ii. To investigate the design processes of effective demand-supply communication for construction projects.

With reference to the above objectives, a research set-up was designed as follows:

Literature Study:

As already mentioned above the main goal of the study is to contribute to:

- i. The field of communication by contributing to the knowledge on group communication, since stakeholders in construction, are part of different working groups);

- ii. The field of management by defining how the organisation of demand-supply communication works in construction and;
- iii. The field of construction by improving demand-supply communication.

The previous literature survey in the area of construction will be extended with an overview of relevant reviews on demand-supply communication in the sectors of designing and management. Some instruments are already accessible to an influence on demand-supply communication. Considering there is minor scientific base on the running of these instruments, additionally, an overview of demand-supply communication influencing instruments and procedures will be made (not necessarily in construction).

Theoretical Framework Development:

Dainty et al. (2006), proposed a model for group communication, combining several theories in the form of communicational (Shannon and Weaver, 1949), constructional (Walker, 2002); and organisational (Handy, 1999). The model contains both formal and informal communication routes, and members are regarded as individuals. Influencing factors in this model are members' roles (formal and informal); their degree of maturity and expertise; and all kinds of noise (language variances; changing frames of reference; physical noise (like plant and machinery), etc.). This model appears to be a good starting point for studying demand-supply communication. All factors influencing communication as identified from literature can fit within the model proposed by Dainty, Moore and Murray. Furthermore, the model could be developed and adapted to the aims of our study.

Empirical Research

In order to examine issues with demand-supply communication in the practice of construction, the structuring of demand-supply communication will be scrutinised in multiple construction projects, including tools used to enhance this communication.

Organisation of Demand-Supply Communication Processes

The empirical evidence will be analysed within the theoretical framework to acquire insight in the organisation of communication processes and factors that influence this. The consequences of methods and tools of this communication will be investigated.

Development of Approach

The insights gained will help to make recommendations for the use and development of methods and instruments to improve the efficiency of demand-supply communication in construction.

CONCLUSION

This research study started by defining a project to improve communication in construction. Based on the literature related to communication in construction and the interviews with experts in the South African CI, it was likely to address in more detail the issue of communication in construction. Literature concluded top management only thinks about the product to construct, rather than the problem it should tackle. The management of organisational processes also calls for the establishment of a dynamic and effective communication channels that allow their numerous mechanisms to be conjoined appropriately. A waste of time was revealed as a result of poor communication, a discrepancy in stakeholders' power and about poor consensus particularly in the public sector, and a lack of stakeholders' ability to sympathise with the other parties involved. Further, it was reported that the majority of issues regarding communication were to be between demand and supply-side stakeholders. The robust interaction in construction projects between stakeholders (on demand and supply side) seems to make construction projects very exposed to communication problems. Interviewees also affirmed that dialogue is starting: constructors

are reconsidering their professional relationships with clients, and government becomes conscious that procurement should be less detailed. In general, interviewees honour the industry for its devotion, hard work and expertise. Interviewees believe that improved communication would undoubtedly lead to fewer delays and lower expenses. Furthermore, all stakeholders' contentment about the process as well as the standard of the product could escalate when they would communicate effectively. Because of the insufficiency of literature on demand-supply communication in construction, it can be stated that more research on the subject in question is needed.

REFERENCES

- Armstrong, M. (2001). *A Handbook of Human Resource Management Practice* (8th Edn), Kogan Page, London.
- Atkin, B., Borghrants, J. and Josephson, P.E. (2003). *Construction Process Improvement*, Blackwell Science.
- Axley, S. (1984). Managerial and organisational communication in terms of the conduit metaphor. *Academy of Management Review*. 9: 428–37.
- Baguley, P. (1994). *Effective Communication for Modern Businesses*, McGraw-Hill, London.
- Banner, D.K. and Gagne, T.E. (1995). *Designing Effective Organisations*, Sage Publications.
- Barret, P. (1995). *Facilities Management: Towards Best Practice*, Blackwell Science.
- Brown, Stephen A. (2001). *Communication in the design process*, Spon Press.
- Cheng, E.W.L., Li, H., Love, P.E.D. and Irani, S. (2001). Network communication in the construction industry. *Corporate Communications: An International Journal*. 6(2): 61–70.
- CIB (Construction Industry Board Working Group) (1997). *Briefing the Team*, Thomas Telford.
- Dainty, A., Moore, D., and Murray, M. (2006). *Communication in Construction: Theory and Practice*. Taylor and Francis
- DETR (1998). *The Report of the Construction Industry Task Force: Rethinking Construction (The Egan Report)*, HMSO.
- Emmitt, S. and Gorse, C. (2003). *Construction Communication*, Blackwell Publishing Ltd.
- Franks, J. (1998). *Building Procurement Systems*, 3rd edition, Longman.
- Gayeski, D. (1993). *Corporate Communications Management: The Renaissance Communicator in Information-Age Organisations*, Focal Press/Heinemann, Boston, MA.
- Handy, C. (1999). *Understanding Organisations* (4th Edn), Penguin.
- Hargie, O. (1986). *A Handbook of Communication Skills*, Routledge, London.
- Higgin, G. and Jessop, N. (1965). *Communication in the Building Industry: The Report of a Pilot Study*, Tavistock.
- Hill, C.J. (1995). Communication on construction sites, *Proceedings of 11th Annual Conference of Association of Researchers in Construction Management*, September 18-20, University of York.
- Hoezen, M.E.L., Reymen, I.M.M.J, and Dewulf, G.P.M.R. (2006). *The Problem of communication in construction*, University of Twente, Enschede, The Netherlands.
- Kakabadase, A., Ludlow, R. and Vinnicombe, S. (1988). *Working in Organisations*, Penguin, London.
- Latham, M. (1994). *Constructing the Team*, HMSO.
- Lenard, D. and Eckersley, Y. (1997). *Driving Innovation: the Role of the Client and the Contractor*, Report No. 11, Construction Industry Institute, Adelaide, Australia.
- Mackinder, M. and Marvin, H. (1982). 'Design: Decision Making in Architectural Practice', in *BRE Information Paper*, Ip 11/82, July.
- Moore, R.M. and Dainty, A.R.J. (2001). 'Intra-team boundaries as inhibitors of performance improvement in UK design and build projects: a call for change' in *Construction Management and Economics*, (19): 559 – 562.
- O'Reilly, J.J.N. 1992, *Better Briefing Means Better Buildings*, The Department of the Environment/Building Research Establishment.
- Pietroforte, R. (1992). *Communication and Information in the Building Delivery Process*, Ph.D. Thesis, Massachusetts Institute of Technology.
- Rogers, E.M. and Kincaid, D.L. (1981), *Communication Networks: Toward a New Paradigm for Research*. The Free Press, New York.
- Salisbury, F. (1998). *Briefing Your Architect*, The Architectural Press, 2nd edition, reprinted by Butterworth Heinman.
- Shannon, C.E. and Weaver, W. (1949). *The Mathematical Theory of Communication*, University of Illinois.
- Skyttner, L. (1998). Some complementary concepts of communication theory. *Kybernetics: The International Journal of Systems & Cybernetics*. 27(2): 155–64.
- Somogyi, A. (1999). *The Role of Project Management*, Report, unpublished.

- Thomas, S.R., Tucker, R.L., and Kelly, W.R. (1998). 'Critical communication variables' in *Journal of Construction Engineering and Management*, 124(1).
- Thomason, G. (1988). *A Textbook of Human Resource Management*, Institute of Personnel Management, London.
- Thompson, S. (2002). *Communicate in the workplace*; Software Publication Pty. Ltd: Australia
- Torrington, D. and Hall, L. (1998). *Human Resource Management* (4th Ed), Prentice Hall, London.
- Vasanthi R. Perumal and Abu Hassan, A. Bakar. (2011). The needs for Standardisation of document towards efficient communication in the Construction Industry. *The Word Applied Sciences Journal*, 13(9):1988-1995.
- Walker, A. (2002). *Project Management in Construction*, Blackwell Science.
- Wenger, E., McDermott, R. and Snyder, W.M. (2002) *Cultivating Communities of Practice*, Harvard Business School Press, Boston, MA.