

COMMUNICATION IN BUILDING PROJECTS: EMPIRICAL RESULTS AND FUTURE NEEDS

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ABSTRACT

This paper discusses communication between key actors in building projects. It presents results from an empirical study of four projects. The analysis is based on more than 5000 registered contacts, a questionnaire and many interviews. The paper discusses issues such as what factors affect communication, communication patterns, reasons for communication, communication methods and future needs. The need for communication is undervalued in building projects. Project briefing and time are important factors for communication. The most common reason for communication is to co-ordinate, plan and schedule the work. The actors wish to communicate more for the purposes of receiving information about decisions and determining levels of ambition. Meetings and telephone conferences are the most frequently used methods of communication. There is a wish to increase the use of electronic mail and other IT-tools.

KEYWORDS

Communication; building projects; communication pattern; causes; communication methods.

INTRODUCTION

The building market has changed dramatically during the last decade. It has forced the industry to think in fundamentally new ways. Much shorter project times, higher quality and much lower costs are often mentioned as goals for the industry. This creates higher demands on all actors, including demands related to the exchange of information between them.

Lack of communication is often mentioned as a characteristic of building projects (Hatush and Skitmore, 1997). Bowen and Edwards (1996) emphasize the importance of effective communication between people during the design phase. Communication between actors who are active during different project phases is also often discussed. It is a common opinion that communication has become less effective and that the industry today lacks systems for effective communication in projects.

Bowen and Edwards indicate that face-to-face-contact between people has received only minor attention in the discussion of effective communication. Good technical systems for communication are not enough. Pietroforte (1997) discusses how the structure of organizations influences communication. He argues that communication in the building process could be improved through an increased understanding of the nature of the information being communicated and of the organizational context that supports the information exchange.

This paper focuses on communication between actors in building projects. It considers both the nature of the information communicated and the organizational context. Important questions are: How much do the key persons communicate with each other? Why do they communicate? What methods do they use? What are their future needs? By closely following actual communications in four building projects, communication patterns are identified. "Communication" here refers to all transfers of intentions and facts between key persons in building projects.

The aim is to improve understanding of the current communication patterns and to identify future needs. The study is limited to housing projects. It considers only communication between different groups of actors (as opposed to communication within groups); for example, communication between two architects would not be included.

METHOD

Seven groups of actors

The study was limited to communication between seven groups of actors: client, architect, structural designer, installation designer, contractor, installation contractor and material supplier. Communication within a specific group, for example between two architects, was not included. A reference group with ten experienced practitioners indicated that these groups of actors are the ones that most need to communicate effectively in order to design and build a good building. A pilot study indicated that it was possible to capture more than 75% of all communications related to such projects by focusing on these groups of actors.

In each building project 1-3 key persons were identified as representatives for each group of actors. A key person was a person who was expected to have an important role in communicating with other groups of actors. Fifty-two key persons were identified. Forty-eight of these registered their communications continuously from the end of the briefing stage (or when they joined the project organization) until the production was finished. There were 11-16 key persons in each of the four projects: 10 clients, 8 architects, 9 structural designers, 6 installation designers, 11 contractors, 6 installation contractors and 2 material suppliers.

Mapping the communication

Forty-eight key persons continuously registered their own communications in a pocket-sized diary with a specially developed form. Every time the key person made a contact, he or she filled in one page with four questions: Whom did you contact (seven alternatives + other)?; Why did you make the contact (16 alternatives)?; What did you communicate about (free text)?; What method did you use (seven alternatives)?

One of the researchers introduced every key person to the study and also had regular contact with each of them to achieve similar understanding of communication events.

Many contacts are made during formal meetings. For this reason, these meetings were followed up in a different manner. After every meeting, the researcher went through the minutes with the chairman or the secretary of the meeting in order to identify all issues that were discussed.

Mapping the background

To better understand the communication among the groups, different types of background data were collected. The researcher had several *informal interviews* with every key person at times when they met to collect information about the key person's experience, the role in the project, the project progress, etc. At the end of the study all 52 key persons (response rate 100%) filled in a *questionnaire* to provide a summarized and more systematic picture of their view of the project and communication within the project.

FOUR BUILDING PROJECTS

Communications were tracked in four building projects of different types. The projects were chosen while they were still in very early stages, two of them even before the client had obtained the building permit from the authorities.

The projects were chosen in consultation with representatives from clients, designers and contractors in reference groups. Important criteria for inclusion were different contract forms, different types of buildings, experienced clients, sites located close to Gothenburg, project completion dates corresponding to the research project schedule, and medium-sized projects to obtain a clear view of the communication patterns. All of these practical restrictions made it quite simple to choose projects as there were only a few projects that fit the profile, (see Table 1).

		<i>Project A</i>	<i>Project B</i>	<i>Project C</i>	<i>Project D</i>
Type of building		New construction of residential building housing	Conversion of hospital	Conversion and extension of a school building	New construction of multi-dwelling blocks
Contract form		Design-build contract, "restricted"	General contract	General contract, "co-ordinated"	Design-build contract, "performance requirements"
Project cost (\$US)		2.5	2	5	4
Project time (months)		21	15	20	16

Table 1: Four building projects

Project A is a new construction of terrace houses and semi-detached houses of one or two storeys. Briefing and pre-design were performed with internal resources and an external architect. It took several years before the design phase was begun, which is considered normal for this type of project. Design and production were performed as a "restricted" design-build contract, which means that the client chooses the designers. The type of contract in combination with the type of building resulted in there being relatively few contacts between the actors. More than 1/3 of the registered communications were between the client and the contractor, 13% between the client and the architect, 10% between the architect and the contractor, and 10% between the contractor and the installation (sub-)contractor.

Project B is a conversion of a hospital building. The design is performed by a "general consultant" (the architect), i.e., a consultant who chooses all other designers. All designers are contracted on fixed prices. The production was performed as a traditional general contract. In reality, an external professional project manager controlled the project. Many of the key persons had worked together before in similar projects. There was more communication than expected during the design. Both the client and the architect indicated that the design process should have been more firmly controlled. There was less communication than expected during the production phase. The client explained that the drawings were good and that the contractor organization was good. One-quarter of the registered communications were between the client and the contractor, 15% between the architect and the installation designer, 13% between the client and the architect, 13% between the client and the installation (sub-)contractor, but there was no contact at all between the contractor and the designers.

Project C is a conversion and extension of a school building. The client was very experienced. The designers were hired on cost plus contracts. The contractor was hired as a kind of "co-ordinating" general contractor. The contractor became a co-ordinator for several parallel contracts. The building

was considered complicated. The project time was short. The design began before the briefing was finished. The client organization was considered large and not very clear in its structure. They were involved in 62% of all registered communications! Eighteen percent of the communications were between the client and the contractor, 13% between the client and the architect, 12% between the client and the structural designer and 12% between the client and installation (sub-)contractor.

Project D is a new construction of multi-dwelling blocks. The client was a consortium of which the contractor was part. The contractor ran the project on a design-build contract with full responsibility for a number of performance criteria. The contractor had a lot of experience from similar projects. It was the intention to finish the design before the start of production. However, a late decision led to the design and the production being performed in parallel. There was a lot of communication during the briefing; this process was considered tough and slow. There was also much communication during the period when design and construction were performed in parallel. The contractor was involved in 54% of the registered communications. Fifteen percent of the communications were between the contractor and the structural designer, 12% between the contractor and the architect, and 10% between the contractor and the client.

EMPIRICAL RESULTS

What factors affect the volume of communication?

Seven important factors for communication were identified during a pilot study. The key persons in the main study were then asked to rank these in order according to how much they consider the factors affect the volume of communication. Some trends can be identified in the answers, (see Table 2).

The project briefing and the time are considered most important. The project manager, the contract form, the type of project and personal relations have almost the same average rank for all key persons. The IT-status is considered to be of the least importance, probably because IT-tools are as yet not much used in medium-sized and small projects.

Differences in opinion can be identified among the groups of actors. The most obvious difference is between designers and all other groups. All designers ranked time as the most important factor for communication, while the clients and contractors considered the project briefing to be most important.

	<i>Client</i>	<i>Architect</i>	<i>Structu- ral signer</i>	<i>Install- de- tion signer</i>	<i>Contrac- tor</i>	<i>Install- tion con- tractor</i>	<i>Material supplier</i>	<i>All</i>
<i>No. of responses</i>	11	8	8	6	11	6	2	52
Project briefing	1	2	5	3	1	2	1	1
Time	2	1	1	1	2	3	5	2
Project manager	5	3	6	4	5	1	3	3
Contract form	6	4	2	6	4	5	4	4
Type of project	3	7	3	4	3	6	1	5
Personal relations	4	5	3	2	7	3	6	6
IT-status	7	6	7	7	6	7	7	7

Table 2: How much some fundamental factors influence communication in building projects, in rank order (1 = most important).

Who contacts whom?

All groups of actors have important roles in communication. But the communication pattern differs significantly from project to project. The main difference is between the different types of contract forms. Projects B and C are general contract. Here there is heavy communication within the design teams, between the client and the design team and also between the client and the production team.

There were very few contacts between designers and contractors. In projects A and D the communication was much more spread out. Here, there was heavy communication between designers and contractors (see Table 3).

<i>Contacts...</i>	<i>Project A</i>	<i>Project B</i>	<i>Project C</i>	<i>Project D</i>
...within design team	3	29	28	15
...within production team	18	6	3	15
...between client and design team	17	25	37	10
...between client and production team	39	38	26	10
...between design team and production team	23	2	6	50
Total	100%	100%	100%	100%

Table 3: Contacts between and within groups of key persons (number of contacts, %).

Reasons for communication

The reason for communication was registered for every single contact. The most common reason was co-ordinating, planning, scheduling, etc., 17.1% of all contacts; to give information or documents, 16.5%; to give an explanation because of changes, 11.0%; to receive an explanation because of changes, 10.7%; and to receive an explanation because of deficiencies and errors in information and documents, 8.5%. All of these reasons were common in all four projects (see Table 4). The actors expected that the most common reasons for communication should be for receiving explanations because of changes or deficiencies and errors. They expected many fewer contacts for the purpose of giving information or documents.

In the reference groups there were discussions about how communication could be changed to be more effective. One opinion was to try to reduce the number of communications caused by changes, deficiencies or errors. More than 35% of all contacts considered these reasons. In projects B and C, more than 40% of all contacts considered these reasons.

What methods of communication are used?

The most used method of communication was formal meetings, with 57% of all contacts being made during meetings. In projects B and C, performed on general contracts, an even higher percentage of contacts were made at meetings. Contacts by telephone were also common, at 21%, especially in projects A and D, performed on design-build contracts. Faxes made up 11% of all contacts and are still surprisingly common, with larger part. It was also a surprise that only 5% of the contacts were made by e-mail (see Table 5).

<i>Reason for communication</i>	<i>Project A</i>	<i>Project B</i>	<i>Project C</i>	<i>Project D</i>
Co-ordinating, planning, scheduling, etc.	1	1	2	2
Give information or document	4	4	1	1
Give explanation because of changes	2	2	5	4
Receive explanation because of changes	3	3	4	6
Receive explanation because of deficiencies and errors in information and documents	9	5	3	9
Give information about decisions	7	6	6	5
Receive information or document	6	9	9	3
Give explanation because of deficiencies and errors in information and documents	14	7	7	10
Receive information about decisions	10	8	8	8
Knowledge exchange with other actors	15	11	10	7
Remind	13	10	11	11
Determine level of ambition	5	13	12	12
Order or suborder products or services	8	12	14	14
Receive information about approval	11	14	13	12
Make inquiries about products or services	12	16	14	15
Give information about approval	16	15	16	16

Table 4: Reasons for communication in rank order (1 = most common reason).

<i>Method</i>	<i>Project A</i>	<i>Project B</i>	<i>Project C</i>	<i>Project D</i>	<i>All projects</i>
Meetings	51	74	61	34	57
Telephone	36	15	13	34	21
Fax	4	7	12	18	11
E-mail	0	2	7	6	5
Data files	1	1	3	3	2
Letters	2	1	3	1	2
Drawings	6	0	1	4	2
Total	100%	100%	100%	100%	100%

Table 5: Method used for communication (number of contacts, %).

FUTURE NEEDS

There is a wish among the actors in building projects to improve communication. Here we point out some of these wishes.

Volume of communication. Communication is undervalued. There is a need for more communication than is planned for. In three of the four projects in this study the actors afterwards wished for more communication than they had expected beforehand.

Communication patterns. The communication patterns depend heavily on the type of contract. There is a wish for more communication in early phases to make sure that the design is more finished before production starts. There is also a wish to have a more varied communication pattern throughout the whole project.

Reasons for communication. The most important reason for communication is to co-ordinate, plan and schedule the work. The actors wish this reason to remain as the most important in the future. The actors would like to communicate more for the purpose of receiving information about decisions,

determining level of ambition and exchanging knowledge with other actors. They wish to communicate less for the purpose of giving information or documents, giving explanations because of changes, deficiencies and errors, and to remind people.

Methods for communication. Face-to-face contacts are important to the actors. They wish to communicate often through meetings. They also wish to increase the use of e-mail and data files. They wish to decrease the use of traditional letters for transferring information.

CONCLUSIONS

The aim of study presented here is to improve knowledge and understanding about the current situation with respect to communication in building projects. It focuses on communication between actors. A main conclusion is that, for the most part, communication between the actors is satisfactory. Most communications made are of great value, with only a minor part being considered unnecessary. One reason for the overall effectiveness of communication is that all of the project organizations were supportive of the communication process.

The need for effective communication is undervalued in most projects. There is a need for more extensive communication than it is currently planned for. There is also a need to reduce certain types of communication and increase other types.

The actors have different opinions about what factors influence communication. They agree that project briefing and time are most important. But designers consider the time factor to be the most important, while contractors consider project briefing to be the most important. Designers also mention personal relations, while contractors add the project manager as one of the most important factors. For clients, the type of project is important in determining how the communication will be. It is no surprise that the communication patterns depend on the type of contract. Most obvious is that almost all communications pass by the client organization in projects built on general contract. This situation causes a lack of communication between designers and contractors in those projects. Of course this influences the feedback from production to design.

There are many reasons for one actor to contact another actor. The most common reason is to co-ordinate, plan and schedule the work. The actors expected this reason to be one of the most important and they wish it to remain the most important reason in the future. It was a surprise for the actors that the second most common reason for communication was to give information or documents. They wish to reduce this type of information exchange in the future. Other common reasons for communication were to give or to receive explanations because of changes. It is easy to understand that the actors would like to reduce this type of communication in the future. Instead they wish to communicate more for the purpose of receiving information about decisions, determining level of ambition and exchanging knowledge with other actors.

The richest methods of communication are face-to-face contact, telephone and formal group meetings. These are also the most used methods of communication in building projects. More than half of all registered communication incidents happened during either informal meetings or formal group meetings. The actors used the telephone in more than 20% of all communication incidents. The biggest surprise was that e-mail was used in no more than 5% of all communication incidents and not at all in one of the projects. The actors wish to keep the face-to-face contacts, but also to increase the use of e-mail and data files.

This paper presents some empirical data on actual communications in typical building projects. It also points out areas where communication can be changed to fit actors' future needs. It is based on interviews, questionnaires and self-observations by 52 key actors in four building projects. The next step in the study is to test ideas from the first part of the study on a new building project and to evaluate how communication influences the project outcome.

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