PROJECT PERFORMANCE AND MANAGEMENT AND DESIGN TEAM COMMUNICATION

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This study aimed to investigate patterns of interaction that emerged during management and design team meetings. Patterns of interaction associated with successful and unsuccessful project outcomes were tested to determine whether the differences found were significant. The findings of this study are based on the observations of thirty management and design team meetings associated with ten construction projects. This study provides a small but significant insight into this under-researched field. On completion of each project, data were collected on its performance, in respect of whether the project was completed within the scheduled time and budgeted cost, or not. The research data for this project were observed, classified and analysed using the Interaction Process Analysis method. Findings suggest that communication during management and design meetings exhibits regular patterns of interaction. On examination of the Interaction Profiles against project outcomes, initial results suggest that there are differences in the interaction associated with successful and unsuccessful project. Higher levels of positive socio-emotional communication were associated with projects with more successful outcomes.

Keywords: communication, interaction process analysis, group meeting, design, project performance

INTRODUCTION

Organizational research is problematic and complex (Bryman, 1988); however, the instability, uncertainty and transient nature of construction projects further complicates such studies (Bresnen, 1988). Initial difficulties are often experienced when attempting to gain access into the organizational setting where communication is taking place (Hugill, 1999). Meetings in the construction industry are sensitive, they are often used to discuss and agree the allocation of resources between different specialists, working for different organizations. Collecting information to determine whether interaction during management and design meeting has a relationship with the project success, in terms of scheduled project duration and budget, takes time. The process must be observed and researchers must wait until the end of the project to collect feedback on the project's success.

Critics of communication theories, that are linked to outcomes, argue that assessing the performance and outcomes of group interaction and decisions is complex and conclusions are far from straight forward. Valid criteria for judging the effectiveness of real world decisions are difficult to define and often conflict; what might appear to be a successful short term decision may experience problems in the long term, and vice versa (Poole, 1999).

While some researchers such as Hackman and Morris (1975) have failed to find a consistent relationship between the group interaction variables and performance, others, such as Jarboe (1988), have made some important observations. For example, Jarboe found that less defensive communication was associated with higher quality solutions, and increased levels of suggested solutions were found to be a significant predictor of quality solutions. Research on communication in business environments is complex but, it is important that attempts are made to understand the nature of communication and its influence on the construction process. Communication is probably the one aspect of the management of projects that pervades all others. Without effective interaction, the ability of a project to meet its objectives is left to chance.

BALES' GROUP DEVELOPMENT AND INTERACTION

The work of Bales (1950) made it apparent that interaction is more than just a conduit for exchanging messages (Gouran, 1999). Bales' (1950; 1953) research did two things, it developed a method for categorizing communication acts, and established the Bales (1953) Equilibrium Theory of phase movement during group communication. The Bales' Interaction Process Analysis (IPA) system provided a detailed observational scheme for coding group members' communicative behaviour, at a micro level, so that it could be recorded, isolated and interpreted (Schultz, 1999). Although it is clear that the IPA method is directly linked to the Equilibrium Theory, the method has been used to develop other theories and make comparisons across a variety of groups in different situations.

The publication of Bales IPA shifted attention from issues of reasoning and oral style to explaining how content patterns of communication constitute systemic processes influencing group integration and performance (Mabry, 1999). The Bales IPA system and studies that have developed from it (Bales and Strodtbeck, 1951; Bales, Strodtbeck, Mills, and Roseborough, 1951) have been particularly influential in helping develop an understanding of interaction as a part of the group process (Gouran, 1999). The work of Bales, and others using his method, provides a basis for the view that groups constitute systems, and the communication within them exhibits regularities associated with groups and their members' interactions (Gouran, 1999).

By coding member's behaviour into discrete categories, observers have been able to interpret whether participants' comments are helpful or disruptive to a group, and whether the communication acts are balanced (Schultz, 1999). The Bales (1950) IPA method and theory works on a relationship between social-emotional and tasks-based communication acts. Scholars generally agree that there are two main dimensions of group life, task and social aspects (Frey, 1999), and that these are used to accomplish tasks and maintain relationships. Many of the early studies of interaction noted the importance of social dimensions of group work and principles of co-operation in group discussion (Keyton, 1999). The two dimensions are said to be interrelated. Bales (1950; 1953) and many others have argued that the primary issue facing work oriented groups is the need to maintain a balance between task and social demands (Frey, 1999; Keyton, 1999). Bales (1953) suggested that as groups address problems socio-emotional issues arise. During disagreements tension is built between members as they focus on the problem rather than maintaining relationships (Poole,1999). Bales' observations noted that conflict, even when constructive, leads to tension that can damage cohesiveness and threaten group maintenance. However, too much attention to cohesion stifles constructive conflict and threatens task performance

quality (Pavitt, 1999). The socio-emotional energy which has built up is removed by positive emotional acts, such as joking, and praise, and negative emotional acts, such as disagreements, expression of frustration and even aggression. Bales claimed that, if socio-emotional issues are not addressed when required, the increase in tension may inhibit the groups ability to progress in its work (Keyton, 1999; Poole, 1999). Bales (1953) suggested that groups must maintain an equilibrium, moving backwards and forwards between task and socio-emotional related issues. Too much attention to tasks limits the relational communication. Bales (1953) argued that positive reinforcements, such as showing solidarity, being friendly, helping to release tension and agreeing, are needed to offset negative reactions, such as showing tension, antagonizing, being unfriendly and disagreeing, if groups are to perform effectively. Keyton (1999), drawing on the work of McGrath (1984), stated that positive relational acts need to be in excess of negative relational acts to accomplish tasks successful. A larger positive to negative ratio facilitates and regulates the flow of interaction among members and affects the motivation (Keyton, 1999) and satisfaction of members (Bales, 1953). The total communication of healthy groups are said to contain several times as much positive socio-emotional talk as negative socio-motional talk, and about twice as much task related interaction compared to maintenance interaction (Pavitt, 1999).

It is suggested that the information gleaned from the IPA coding scheme can be used to estimate the effectiveness of a group, as well as individual members' performance, thereby allowing members to change those patterns that hinder performance (Schultz, 1999).

DEVELOPMENT OF GROUP NORMS

One of the aims of the present study was to determine whether or not management and design team meetings had a tendency towards a specific pattern of communication; a norm of communication. Though it is suggested that the behaviour and characteristics of groups change and develop over time and cannot be considered a constant (Wallace, 1987), it is also well known that groups develop and are subject to behavioural norms. Keyton (1999. p.206) suggested that, "One of the first outcomes of group interaction is the development of group norms". Scheerhorn and Geist (1997, p.92) described group norms as the "recurrent patterns of behaviour and patterns of thinking". The norms of group behaviour may be specifically associated with the reason or purpose the group formed, or they may be attributable to the group make-up. In almost every situation there are a number of specified roles or repertoire of acts that provide information about how the individual should interact (Jackson, 1965), and these vary from one situation to another (Furnham, 1986). It is important to note that the norms found in laboratory groups, groups created for the purpose of studying group behaviour, have been found to be different to real life groups, bona fide groups (Ketrow, 1999). Fledman (1984) has identified four ways that norms are developed, they are as follows:

    from statements made by leaders
    from previous events that establish a precedent. [Keyton (1999) offers an
        example of this suggesting that, when members are faced with a deadline, the
        group may change the normal leisurely pace of interaction to ensure the
        deadline is met.]

> simply developed from repetitive behaviour patterns. [Such patterns are
>> particularly prominent in certain seating configurations (Ketrow, 1999) and
>> meeting procedures (Sunwolf and Seibold, 1999).]
> from experience gained from previous group experiences.

Norms provide clues about appropriate behaviours in specific group settings. The
expectations of the way members are supposed to act are articulated into implicit rules
that are adopted by the group to regulate its members' behaviour (Fledman, 1984).
Such norms and rules are said to provide powerful controls over group behaviour. So
while there are rules and norms which are explicit, it is those that are implicit that are
said to have the greatest direct effect on relational behaviour (Keyton, 1999). Norms
are considered to be the least visible yet most powerful form of social control that can
be exerted on a group. "These powerful regulators of group members' behaviour
generally develop slowly, often implicitly, and typically unconsciously from social
pressures exerted in group interaction" (Keyton, 1999. p. 206). Some norms are
sufficiently strong that individuals will express a judgement differing to the one they
hold privately (Asch, 1955).

There are often gaps in the rules, responsibilities and duties of construction
professionals; the relationships between professionals can be vague and are rarely
defined in detail. When professionals are unaware of their duties and responsibilities,
the group and its behavioural norms may influence and affect their actions. Studies by
Janis (1982) and Senge (1990) have shown that norms and rules can affect the
decision making process. They can encourage cohesion and agreement and suppress
critical inquiry (Janis, 1982), reduce political input and increase rational discussion
(Senge,1990).

METHODOLOGY

Data were collected from ten projects. For each project three management and design
team meetings were observed, providing a total of 30 meetings. Observations were
obtained by attending meetings and classifying and coding interaction between the
construction professionals. The method used to categorize the communication acts is
the Bales (1950) Interaction Process Analysis (IPA) system. The method is used to
identify and classify communication acts into one of twelve categories. These
comprise of six socio-emotional categories, also referred to as relationship categories,
and six task base categories. Labels used to identify the categories are shown in
Figure (1 and 2). The interaction of each professional is then collated to provide an
interaction profile for the whole group. Prior to observation of the meetings, training,
to ensure reliability, was undertaken in accordance with the method described by
Bales (1950). Intercoder reliability using the Bales method is measured using Chi
Square(x^2). Values in excess of $0.5p$ (p = probability) are considered to be reliable.
At the end of the training period, reliability values of p=0.6 –0.7 were achieved.

RESULTS AND DISCUSSION

The following profiles (Figure 1 and 2) represent the interaction for all meetings
observed. The profiles in Figure 1 show a solid line representing interaction during
meetings for projects that were completed within budget and a broken line for those
that were over budget. Figure 2 compares the interaction in terms of projects
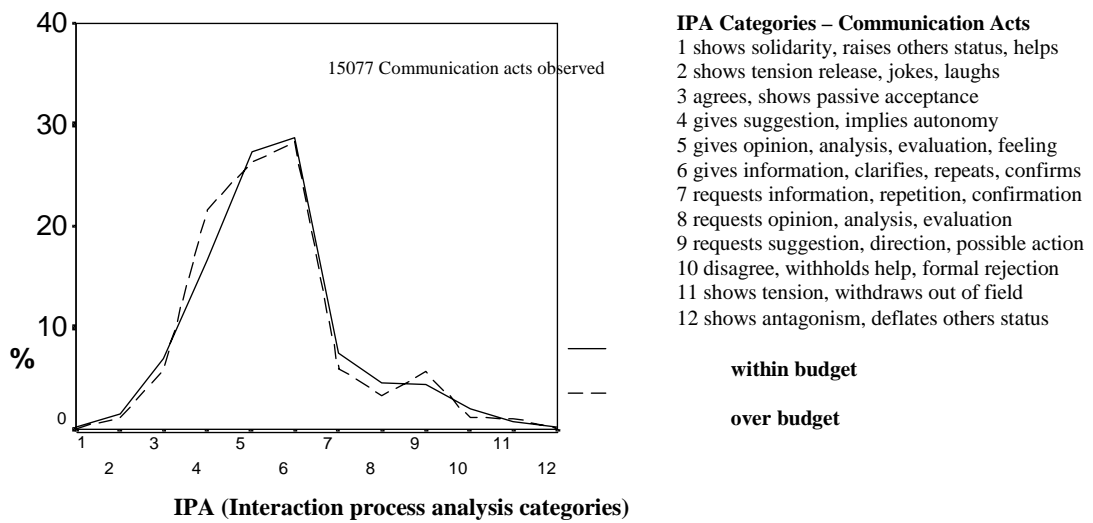completed within the scheduled completion time and in excess of the scheduled
duration.

Figure 1: Interaction profile for group meetings of projects that were within budget and those that were over budget

Although the line graphs in each of the comparisons (Figure 1 and 2) appear to have similar profiles the difference between the two sets of profiles is significant.
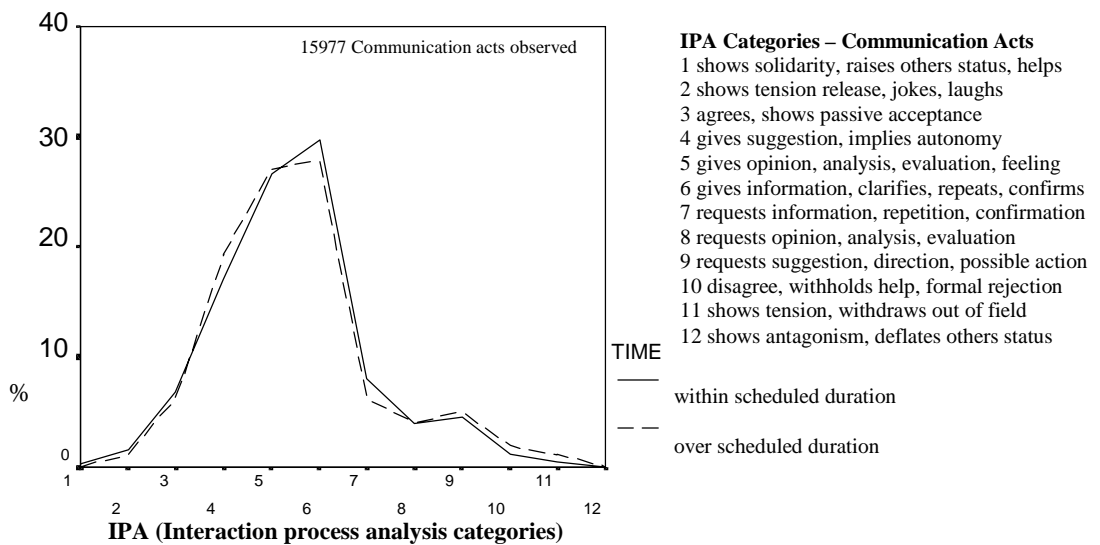

Figure 2: Interaction profile for group meetings of projects that were within and those that were over scheduled duration

The difference associated with interaction of projects that were within and over budget produced the following results: x^2=127.727, df=11, p=<0.001 and projects that were completed within and in excess of the scheduled duration provided values of: x^2=95.598, df=11, p=<0.001, showing a significant difference. (Chi-square statistic x^2, degrees of freedom *df*, probability = *p*).

An examination of the profiles of each individual case study and those presented here suggests that the management and design team meeting do have certain regularities and tendencies (norms) that are not common to other context. None of the situations examined by Bales (1950) had such high levels of task based communication (categories 4, 5, 6, 7, 8, and 9) compared to socio-emotional communication (categories 1, 2, 3, 10, 11 and12). However, one aspect that was typical of other situations observed by Bales was the amount of task based communication concerned with giving information, opinions and suggestions (categories 6, 5and 4) being much higher than requesting information, opinions and suggestion (categories, 7,8 and 9).

The other notable difference, compared with previous studies is the relationship between positive and negative socio-emotional communication and its association with project performance. Other reports previously discussed suggest that groups associated with desirable outcomes have considerable more positive socio emotional communication (categories 1, 2 and 3) than negative socio-emotional communication (10, 11 and 12). Previous research suggests that the positive socio-emotional communication occurs several times more frequently than negative socio-emotional communication in healthy groups. The difference between positive and negative socio-emotional interaction in the profiles shown, as found in management and design team meeting context, is much less than was previously suggested.

On examination of each of the individual meetings and the two profiles shown, there is support for the theory that greater amounts of positive socio-emotional interaction compared to negative socio-emotional interaction has desirable influences on the groups performance. The profile of projects completed within budget (Figure 1) exhibit higher levels of positive socio-emotional communication (categories 1showing solidarity, 2 tension release and 3 agreeing) than the positive socio-emotional communication of projects that were over budget. Although projects completed within budg*et al.*so have more negative communication than those that were over budget, the difference between positive and negative socio-emotional is still higher in projects with successful outcomes.

The interaction profile that compares the projects in terms of those completed within the scheduled duration, or not, presents a similar profile to the cost comparison. The positive emotional communication (categories 1, 2 and 3) of successful projects have higher levels of positive interaction than the unsuccessful projects. The level of negative socio-emotional interaction for successful projects is lower than for the unsuccessful projects. Thus, the relationship between the amount of positive and negative emotional communication for successful and unsuccessful projects is similar to the cost profiles, with successful projects having higher levels of positive socio-emotional communication. However, an even higher level of positive socio-emotional communication is associated with the projects that complete on time.

CONCLUSION

The research has found that management and design team meetings tend towards a particular pattern of communication. However, variation between individual meetings may suggest that differences could exist in profiles at different stages of the construction phase. This requires further investigation. Significant differences were noted between projects that had successful outcomes and unsuccessful outcomes. The theory that more positive than negative socio-emotional communication is required for successful outcomes is supported although not to the same extent previously found.

This paper has discussed the relationship between positive and negative socio-emotional aspects of interaction but has not investigated task based interaction in any detail. An examination of task based communication concerned with giving and receiving different types of task based information will be undertaken as the next stage in this research project.

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