

GROUP INTERACTION RESEARCH METHODS

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The importance of group interaction in construction projects should not be underestimated. However, observing, capturing and understanding the behaviour, dynamics and nature of even a small group's interaction is difficult. Individual behaviour, speed of interaction, sociological, psychological, organisational and environmental factors that influence the process make group research complicated. The tools used to capture and analyse group interaction must be relatively simple to use but effective. Unfortunately the growing interest in construction communication and group behaviour is not matched with developments in interaction based research methods. A problem faced by researchers is whether research tools are appropriate and will produce useable and meaningful results. The paper reviews six research methods and tests their usefulness on a group of post-graduate research students studying group interaction. Often the difficulties with using such tools are not self-evident. The practical limitations associated with each method are discussed along with their potential benefits.

Keywords: construction communication, group research, communication research methods.

INTRODUCTION

The complexities and intricacies of group research can present unexpected problems that may affect the applicability of some research tools, even though they have been successfully used in other fields of study. Careful consideration must be given to the underlying purpose of the research, the type and nature of data that needs to be collected and the appropriate research methods. Selecting an appropriate research method is not simple and methodological limitations are not always obvious. This initial study, aims to investigate the reflections of a group of postgraduate students who were given the task of collecting group interaction data and analysing it. Aspects associated with the research tools used are considered and, from the reflections, the strengths and weaknesses of the research methods are identified. At this stage the research methods are described and factors that should be considered are raised.

Observations: Sensitivity of human behaviour

One of the reasons why there is little information available on construction communication is that professionals may be involved in confidential discussions and they may not wish to complicate negotiation procedures by allowing a third party to observe (Hugill 1999; Loosemore 1998). Entering sensitive environments requires negotiation involving agreement on the research method to be used, the degree of

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observation and the method of recording interaction, before the researcher is allowed to observe discussions. Parties may be keen to limit intrusion and invasion of privacy.

The type of research methods that the researcher wishes to use may influence the decision on whether or not the researcher is allowed into the environment to collect data. While recording interaction using video and audio recording provides a rich source of data, people are often reluctant to let such equipment be used to observe interaction. Less resistance may be experienced when researchers use written records to collect data from the observation. Whilst using a less desirable research method may reduce the richness of the data collected there may be no other way of extracting data from the situation; unfortunately, such compromises may be difficult to avoid.

Confidentiality of observations

The method used to collect the data must be sensitive to the participants involved and suitable for the field of study. If the people wish to be anonymous, this should be observed and names should be removed. Where the subject material being discussed is confidential, it must remain confidential; the coding-up, interpretations and inferences made must not allow others to identify features that could tie the research data back to the original participants studied and the specific information. Even when such information is removed from the data, it is still possible to gain some interesting observations of human behaviour. The general nature of the situation may be discussed and participants suitable coded so that confidential material is never revealed. It is often useful to code-up audiotapes, transcripts and other records so the names of the subjects are never recorded. When a video camera is used to record data anonymity and confidentiality is more problematic until the videotape is destroyed.

Typical or favourable behaviour

When observing interaction, the subjects being observed are often aware of the observation. In such situations, the subjects may change their behaviour, perhaps unconsciously, helping them to provide what they consider to be suitable impression. It may be possible to observe the subjects, without their knowledge, in the natural environment, for example, by using hidden recording devices or being present in the environment under the guise of a normal participant.

When subjects discuss their encounters, they may present their actions in a favourable light. Also, when collecting information, following a particularly stressful event, the emotion, pressure and tension experienced may distort an individual's memory of the event (Loosemore 1996). People tend to recall events that are highly salient, before discussing the detail of more mundane encounters (Gorse 2002).

Multiple research perspectives

A limited perspective is often gained from human behaviour that is observed, coded and turned into quantitative data alone. The group environment is not one that can be controlled and qualitative analysis is often required to explain the context surrounding trends found in quantitative data (Emmitt & Gorse 2003). There is a danger, particularly with statistical methods, of becoming too focused on the intricacies of measuring, and thereby focusing attention on the classification of interaction instead of observing the actual behaviour of interest (Cassell & Symon 1994). When making quantitative records reflective commentary can be used to help explain the events and acts observed. The use of quantitative and qualitative research methods together increases the detail of the information collected thereby improving the overall methodology and reducing some of the limitations.

Classification Communication Acts and events

Most communication research is based on observations of external factors, such as the sending and receiving of verbal and written messages, facial expressions, emotions and body language, or reactions to these messages. Observation of overt factors of communication, identifying who makes the communication act and whom the communication is specifically directed at, has been termed the ‘surface meaning’ of communication (Heinicke & Bales 1953; Gorse 2002). Surface meaning research recognises that there are many different levels of communication taking place, but this limits observations to those communication acts that are most obvious, to acts that are instantly recognisable. The focus is on the main overt communication acts and their overt direction, who the communication is predominantly aimed at.

Coding communication acts

Researchers cannot observe abstract concepts; therefore, aspects of interaction can be translated into observable phenomena, using operational definitions for each of the conceptual variables (Clark 1991). It is important to establish low-level constructs, simple definitions of observable phenomenon, which can be explicitly tied to the data, before communications at more abstract, and possibly more complicated, level can be developed. Basic and simple observations provide robust data.

Poole et al. (1999.p106) notes that, “the design of coding schemes involves a complex set of choices, and these choices determine what claims the resulting data can support”. The findings of a coding system are tied to the method used to capture the data. There are limitations involved with the results and difficulties when attempting to compare results that have been obtained from different systems.

The Bales’ (1950) interaction process analysis (IPA) is one of the most widely used techniques to study overt group interaction, yet this method can easily be compromised. Gameson (1992) and Gorse (2002) both used the method in its original form to study construction professionals. However, Wallace’s (1987) study of design team interaction used a bespoke system that used some elements of Bales’ IPA system, and parts of other methods. The combination severely limited its potential use in other contexts; it may better to use two or more methods rather adapting a method.

Video and audio recordings

As participants often give permission to audio record ‘one-to-one’ interviews, the use of an audio recording is a common method of collecting interaction data. Taking notes during interviews is often avoided as it may interfere with the interaction flow of the interview. Gameson’s (1992) study of interaction characteristics associated with construction professionals used a tape recorder to collect data from interviews. However, using audio and video recorders to record ‘real’ professional interaction as it occurs may meet with resistance. Hugill (1999) used an audio-tape to collect interaction data of site meetings. Hugill made a point noting the difficulties of gaining access to this sensitive business environment. Even when allowed to observe meetings it was some time before permission was granted to audio-record the meeting’s interaction. Thus, a significant negotiation process is often required to observe interaction in a professional environment.

Retrospective accounts and reflections

Self-reports (or measure) of the subject’s feelings or beliefs can be used to produce retrospective accounts and re-constructions of actions and events. This type of methodology assumes that people can provide relatively accurate accounts of past events. While such accounts may be abbreviated, they provide a source of data that are otherwise almost unobtainable (Clark 1991). Dairies have been used in construction to gain reflections and accounts of events. Emmitt’s (1997) diary was completed by the researcher who consistently recorded events immediately following the observation, whereas, Loosemore (1998) dairies were completed by the subjects. Unless controlled, periods between the event and participants recording of the event will vary, and memory of events may be prone to some variation.

Another method of collecting interaction data is to conduct interviews after the event; compiling retrospective accounts of any occurrences. Collecting information post-hoc can reduce the problems caused by having a researcher observing sensitive negotiations. Although Loosemore experienced problems of collecting data with dairies during sensitive periods; few problems were found when collecting information after the event. In contrast to the difficulties experienced during sensitive times, Loosemore found that people were often enthusiastic to confide after the event. However, where events had caused emotional impact, people remained emotional about their experience and this prevented them giving an unbiased and rational perspective of occurrences. People tend to remember and recount periods of heightened emotion rather than recall all of the detail of events.

Behaviour management profiles (Conflict management profiles)

The behaviour management profiles are a development of two dimensional grid models, similar to the Blake and Mouton’s (1964) managerial grids. The profiles are used to quickly establish self-perceptions and perceptions of others on a particular issue of group behaviour (Fryer *et al.* 2004). Once the data is collected members can be asked to form a focus group and reflect on their observations.

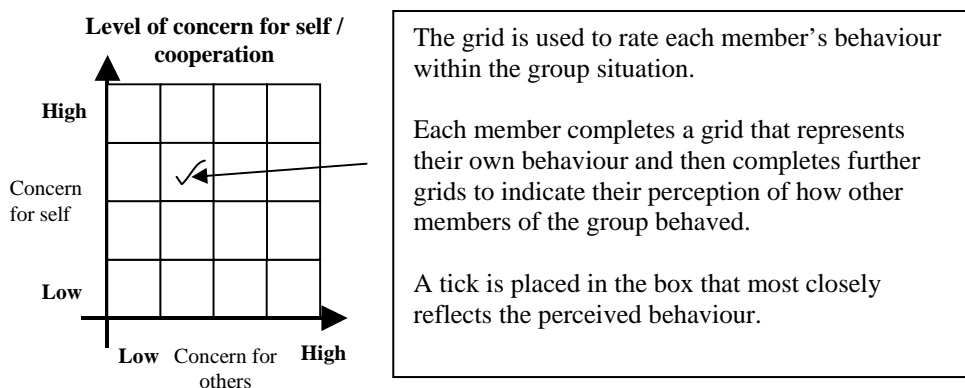


Figure 1. (Fryer *et al.* 2004)

Multiple Level Observation

Multiple level observation systems are very useful for reducing some of the limitations of associated with individual perceptions. Rather than limiting observation to an independent researcher, the system is based on participant observation of others

and a self-study of internal feelings. Those engaged in the discussion are asked to consider the actions of themselves and others. In small groups each individual provides data on their own behaviour and every other members' behaviour. To add a third dimension, independent observers can also provide data. The advantage of participant study is that observations are not just limited to overt interaction and behaviour, but they also capture the participants' own feelings and values of their self and others within the group. Simple Multiple level Observation Techniques (SMOT), such as that suggested by Fryer et al. (2004), allow researchers and participants to pick a specific issue, event or period within the group context and use multiple perceptions to investigate it. The individual and group perceptions can be explored in some depth. There are standard multiple level observation systems, which have the benefit of being consistent in whatever context the research is set, but these methods can be complicated.

Bales and Cohen's (1979) SYMLOG (System for the Multiple Level Observation of Groups) is one of the widest reported systems of multiple level observation methods. The system requires the participants to complete a number of forms. The time for each individual member to understand and complete the SYMLOG self study sheets is about three to four hours for a group of five; larger group sizes require more time (Bales 1980). Due to the depth of analysis of multiple levels of perception SYMLOG is complicated to apply (Poole 1999). The use of Bales' SYMLOG is often impracticable. However, understanding how others behave and feel during interaction is extremely important. Exposing group members to the feelings and beliefs experienced, by other members, during team activities may help develop a group that has a greater appreciation of others.

RESEARCH METHOD

This study explores the ease and usefulness of a number of research methods, used for studying small group interaction, when used by a group of postgraduate researchers undertaking small group research for the first time. A group of 18 postgraduate research students were given the task of observing and analysing group behaviour using different data collection and analysis methods. All students took part in one of three 30 minute group discussions, each discussions was video recorded. Following the group meetings, each student was given a video copy of one group meeting. The students were asked to transcribe the data, quantify communication acts based on who spoke to whom and code the communication using Bales (1950) interaction process analysis. The students were asked to use two further tools to explore perceptions of the group experience, these included Fryer *et al.*'s (2004) Simple Multiple Level observation Technique (SMOT) and the behaviour management profiles. The students were given 4 weeks in which to explore and analyse the data. Following this exercise the students were asked to reflect on the usefulness of the tools used.

RESULTS

Video data and observations / reflection of video data

Strengths

Events and situations can be observed and reflected on.
Provides initial understanding of the group interaction, good

Weaknesses

Can be difficult to interpret any underlying intentions, may be considered wrong to infer intentions. Other methods should be used to identify participants intentions during a specific sequence of event. Participants could be asked to review the

<p>base to work from.</p> <p>Accurate account of discussion.</p> <p>Data set in context, some surrounding information available.</p> <p>Can judge positive and negative reaction, often missed in other data.</p> <p>Body language, voice tone, intonation and emotion can be examined. Emotional context can change literal meanings of words considerably, which is missed in transcripts.</p> <p>Disjointed conversations make much more sense and gain a congruent reaction. Transcripts of such event are meaningless.</p> <p>Recordings are essential to recall what happened.</p> <p>Without video data other analysis can be inaccurate.</p> <p>Useful for cross-examining perceptions, whether individuals do what they say do.</p> <p>Participant, non-participant and external observation can be used to assess data.</p> <p>Can be watched by many different people – obtaining multiple observations. Can be used for many different purposes.</p> <p>Requires little training, however, quality of observations dependent on researcher’s training, experience and skill.</p> <p>Can be repeatedly reviewed to capture the subtle nuances of interaction.</p> <p>Recollections of events, based on memory alone, are sometime different from the video evidence.</p> <p>Issues can be examined in detail, look at what created these scenarios and how the group collectively and, or, the individual reacted.</p> <p>Allows relationships, dominance, blocking, conflict, leadership, seating arrangements etc. to be assessed.</p> <p>Facilitates the use of other analytical methods.</p> <p>Can be played at different speeds, this often identifies behaviours not apparent at normal speed. In the fast forward mode it is easy to notice the members who remain motionless and others who fidget or move.</p>	<p>video and asked what their intentions, thoughts, beliefs etc. were during the specific episode of events.</p> <p>Whilst the data is rich and real, it is still difficult to capture every communication act, participants talk over each other and interrupt.</p> <p>Some utterances and statements may not make sense.</p> <p>Video observation is time consuming.</p> <p>Whilst emotion and body language can be observed, it can be very difficult to transfer non-verbal observations into the written form.</p> <p>Relying on video data without proper analysis can be too simplistic and subjective, lacks systematic rigor, no way of judging whether a group is typical or not.</p> <p>Subjects are aware of the camera and their behaviour may be affected.</p> <p>How does an observer record what is going on when it may not be clear to the group?</p> <p>Camera positions mean that behaviour is missed, multiple cameras may be required.</p> <p>Individuals may hide their interaction from the camera.</p>
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Quantifying communication acts, identifying the act, the sender and receiver

Strengths

Simple, accurate and relatively consistent statistics produced across different observers. Although quantities produced by the observers can vary, sample sizes are so large that the differences are not significant.

Reveals trends that are not apparent without it.

Useful for identifying pairs who work together and subgroups.

Provides indication of the participant’s willingness to be involved.

Allows the researcher to look at individual and group level communication and examine who sends the data and whom it is sent to.

The group can be split into sub-groups e.g. male and female and interaction examined within these categories.

Allows patterns to be identified, e.g. who contributed throughout, who interjected periodically, who appeared to dominate the proceedings and which members were reluctant to communicate.

Quantitative data can be examined over time (longitudinally),

Limitations

Recording communication acts is laborious and time consuming

Sometimes it is difficult to know who is speaking to whom.

Sometime difficult to identify an individual recipient, so it is taken that the whole group is being addressed, rather than a particular individual.

Can be more than one intended receiver, but not broadly directed at the group.

Impossible to capture all communication acts.

If the group divides into subgroups and separate conversations take place, it is difficult or impossible to identify all communication acts.

Frequency counts do not indicate the nature, quality, relevance or length of communication.

Does not show periods of no interaction takes place. However can be presented over time rather than cumulative to show who talks when and when nobody talks.

Does not recognize less frequent communicators that

<p>during different phases or time periods (segmental) or as one unit of data for a group, or individual (cumulatively).</p>	<p>nonetheless make a valid and possibly lengthy contribution.</p> <p>Fails to identify or discount verbal messages that are sent, but not received.</p>
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Coding and categorization of communication acts, e.g. Bales IPA

Strengths

- The group as well as the individual discussion can be broken down into different categories, which are easily analysed, in many different ways, once the data is collected
- Standardization: some methods, such as IPA, are widely recognized and can be compared to other research.
- Can be used alongside other methods for cross comparisons, e.g. Belbin's team role classifications.
- Codification correlates between different observers.
- Easy to categorise acts, after some practice.
- Methods, such as Bales IPA, that have survived from 1950s this suggests they are powerful data collection methods.
- Can just concentrate on one, two or all of the categories.
- The classification helped to identify points in the group discussion that could be investigated further using other techniques.
- Useful for identifying categories, e.g. questions and then, cross-referring to other data, e.g. video or transcripts, to look at whether participants openly gave information or whether it was coaxed out.
- Can check who dominates under different categories – can be quite different to who is most talkative
- Helps to understanding group dynamics.

Limitations

- Some interactions are difficult to classify, especially for the untrained researcher.
- Where understanding of a communication category starts out incorrect, they will probably continue to be incorrect.
- One act may seem to fall into two classifications and a decision needs to be made.
- Without training to calibrate observations, the results may be inconsistent and unreliable.
- Contributions from group members with different international origins can be difficult to classify, especially if their English is not always correct. Interpretation may be incorrect.
- Observer may have social and cultural expectations that mean that they can never be entirely objective.
- No way of recording whether the message was received and understood.
- The method is very useful, but has little relevance unless it is combined with other methods. Other methods help to explain what happens during occurrences and trends.
- Neglects the comments of what was said.
- Many comments have numerous purposes and meaning, classification relies heavily on the observers ability to judge and categorise.
- Can be misleading when not fully understood.
- If the meaning of the speaker is misunderstood the classification is incorrect.
- Takes time to develop natural understanding, the Bales IPA system recommends three months training.
- Where relationships between observers and researchers exist, there may be bias when analysing the data.
- Concentration levels can be difficult to maintain over long coding periods.
- Does not capture or categorise for every situation.

Behaviour management profiles (Conflict management profiles)

Strengths

- Allows a participant to consider a number of issues.
- Multiple perceptions important to understand group dynamics.
- Self-perceptions were often close to the perceptions of others.
- Gives a deep insight into a persons perceptions and personality.
- Individual strengths and weaknesses can be assessed, good for self recognition and improvement.
- Management profiles, can help interpret the intention of those being observed.

Limitations

- It is difficult to know whether the self-perception and the perception of the group provides enough data to be useful.
 - Profiles only work when every member of the group provides a self-perception and perceptions of all other group members.
 - Can be difficult to extract useful information
 - often the multiple perceptions give contradictory results.
 - Where differences occur between self-perception and other members perceptions, very little can be said without further investigation and enquiry.
 - Need to be used in combination with other methods or followed up by discussion.
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Simple Multiple Level Observation Technique (SMOT)

Strengths

Simply makes use of different perspectives from different participants and researchers, using different research tools to collect data on the same topic or subject in a meaningful and manageable way.

Gathers multiple observations using both quantitative and qualitative tools and techniques.

Provides a reliable source of data (coming from multiple points, participants, researchers, observers, and evidence collected after reviewing the video footage).

Very useful to get a deep insight into a topic.

Provides a broader understanding of what is happening within the group.

In some cases views are supported and others the views are very different, providing a more meaningful perspective.

Reluctant communicators may provide deep insight into issues, even though they appear to distance themselves from group interaction.

Limitations

Initially, there is some difficulty understanding how multiple level observation techniques work. After some instruction and reading the difficulties are overcome.

If questions or topics are vague then participants may misinterpret them.

Timing of any personal reflection by group participants is crucial; reflections vary with time.

Good for specific focused investigation, but inevitably misses out other issues that may be important, but not considered.

Transcription

Strengths

Provides a general overview of the meeting.

Audit trail of all of the verbal messages sent. Every sentence and word recorded.

Benefits typing and capturing the data, the transcribing process allowed for a better understanding of what was said, helped to understand some group dynamics; this was considered an advantage during the later stages of the analysis.

The transcript and video can also be used with other data, such as Bales IPA, self-perception profiles and Belbin self perceptions.

Useful to focus in on the interaction trait, to analyse in depth. Detailed nuances of the video would be very difficult to follow without the support of the transcript.

Once the classification data identifies certain tendencies, these can be investigated in greater detail using the transcripts and videos.

Time frames should be recorded on all data so that they can be easily compared and cross-referenced to other data.

After repeatedly watching video footage, a general distinction of the contribution of each member can be made and evaluated, for example, the frequency of each speaker, arguments and other occurrences.

The method produces a qualitative piece of work that is a useful reference document, but it is sometimes hard to locate the piece of transcription that you are looking for. It is important that appropriate coding is used.

Video data and transcripts are useful for those who are less familiar with the language – foreign researchers, observers from different industries and professional backgrounds.

Limitations

Time consuming to transcribe

The distillation of video data into words varies. It took one research 5½ hours, another 9½ hours and further researcher 3 days to transcribe 30 minutes footage. One researcher employed a professional audio typist, but still found that it took hours to turn the type into a proper transcript.

Some transcribers record more than others. It is a difficult and confusing task to record transcripts, and it is impossible to track every nuance of the conversations.

It is difficult to transcribe muffled speech, people talking over each other, and attempted interruption.

Transcripts ignore how the message was sent, body language, eye contact, intonation, tone, emotion and humour.

Unless the research is strongly tied to the transcriptions, there may be a limited need for a transcript. Considering the time it takes to produce the transcriptions, some thought should be given as to whether this is a worthwhile exercise.

On its own the transcript does not really constitute a systematic study.

Transcripts fail to record who the message was sent to.

When analysing the data, looking for specific quotes or searching through the data can be a painstaking procedure.

Some observers add their own observations to the transcript, introducing an element of subject interpretation into the raw data.

Transcripts compiled by different researchers are often slightly different.

Transcripts should be used as a secondary tool, in combination with the video to see how the 'live' communication took place. It is easy to create the wrong picture by just looking at the transcript or video data.

DISCUSSION

Selecting an appropriate research method is fundamental to the development and completion of a good piece of research work, regardless of its scope. In their evaluation of different research methodologies Seymour and Hill (1993:121) claim that the most important question a researcher can ask is ‘what is going on here?’ This is particularly true of communication and group research. However, the physical size of construction projects, the length of time from inception to completion and the intricate social networks that develop during construction projects prove a formidable challenge to researchers.

Whilst not comprehensive, the review of research techniques by the post graduate students has provided a useful insight. Some of the strengths and limitations may seem basic; however, it is clear that other researchers often overlook such issues. It is useful to note that even the most basic data sets, such as transcripts and video data, experience some variation in the quality that may compromise the validity of the data. To improve consistency, processes must be clearly explained and followed.

Researchers must not lose sight of the complexity involved when attempting to research group interaction and behaviour. For any individual, or even group of researchers, it is an impossible task to attempt to capture all behaviours, every communication act and interaction sequence. So, rather than trying to investigate too wide an issue, which would compromise the relevance of the research, it is necessary to home in on a particular event, situation or chain of events. Notwithstanding, the limitations associated with missing some interesting and important phenomena, which are likely to be occurring within the wider context, focused studies using appropriate research methods can reveal some interesting trends, behaviours and occurrences.

CONCLUSIONS

When undertaking any research, the study should be transparent and defensible. The reasons for conducting the research, key issues, methods used, the problems encountered during the research and the limitations of the research should be clearly stated. With each study and research method there are limitations. It is obviously important to identify as many of the limitation before commencing a study, otherwise a considerable amount of time and resources could be wasted. Often assumptions that lead to the use of a methodology are misleading and the only conclusion drawn is that the method used to collect data is inappropriate for the situation studied. The systematic approach to research can be frustrating; however, reviewing studies that have used and tested research methods can save considerable time. A more comprehensive analysis of the methods available for researching groups is required.

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