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# Strategies for Conversation and Systems Analysis in Requirements Gathering: A Qualitative View of Analyst-Client Communication

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This paper describes how strategies for conversation and systems analysis may operate in requirements gathering. The emergence of these concepts, whilst using grounded theory techniques to analyse a case study of analyst-client interaction is discussed. The topics of conversation in the case study are analysed and grouped into themes and examined with reference to strategies for conversation and systems analysis. Methodological issues that occur when undertaking qualitative analysis of discourse are also discussed. Finally, some implications for systems analysis practice are outlined.

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# **Strategies for Conversation and Systems Analysis in Requirements Gathering: A Qualitative View of Analyst-Client Communication\***

by  
**Cathy Urquhart<sup>±</sup>**

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## **Abstract**

This paper describes how strategies for conversation and systems analysis may operate in requirements gathering. The emergence of these concepts, whilst using grounded theory techniques to analyse a case study of analyst-client interaction is discussed. The topics of conversation in the case study are analysed and grouped into themes and examined with reference to strategies for conversation and systems analysis. Methodological issues that occur when undertaking qualitative analysis of discourse are also discussed. Finally, some implications for systems analysis practice are outlined.

## **Introduction**

Very little research has been carried out into the early stages of requirements gathering in information systems, yet issues of human communication have been found to affect project success in different studies (Edstrom, [1977](#); DeMarco & Lister, [1987](#); Rothfelder, [1988](#)). In addition, a need for communication skills training for IS professionals has been identified as an ongoing issue in the last decade (Dengate, Cougar, & Weber, [1990](#); DEET, [1992](#)). Anecdotal evidence from the profession would also seem to confirm that poor communication in information systems practices is both endemic and problematic.

Given that the starting point of all requirements gathering is a verbal interchange between analyst and client, it is not unreasonable to assert that how communication skills are employed will have a significant bearing on perceptions between client and analyst. The systems requirements verbalised by the client will be encoded into a set of system requirements by the analyst. This in turn becomes the reality of the new system. If the initial precepts on which the system is based are false or inaccurate, then there is every possibility of system failure.

It is typically during the requirements gathering phase that a working relationship between the analyst and his or her client(s) is formed. The quality of this working relationship and the degree of rapport between client and analyst can have a considerable impact on the progress of the project. A number of projects are cancelled because of 'political' reasons (DeMarco & Lister, [1987](#)) – in other words, the sociology of the project. It is not unreasonable to suppose that difficult relationships or lack of understanding between analyst and user groups can lead to a climate where cancellation is a possibility, especially if there are problems with system specification (Bussen & Myers, [1997](#)). The relationship between analyst and client also reflects

wider organisational practices and perceptions of the information systems role. For all these reasons, the social aspect of the process of requirements gathering is as much of interest as the accuracy with which systems concepts are formulated. It is also not unreasonable to speculate on how much the social aspects of communication in requirements gathering hinder or enhance the development of initial system concepts.

Those studies that have previously explored analyst-client communication at a detailed level, by studying dialogue of analyst-client pairs (Guinan, [1988](#); Tan, [1989](#)), have variously identified rapport, client communication skills, analyst performance skills, communication competence and frame flexibility as factors in successful interactions. Tan ([1989](#)) found that communication satisfaction was determined by perception of rapport rather than goal achievement. Goal achievement was not found to be positively linked to communication satisfaction. For example, both parties may have found the communication successful even though it did not achieve their original goals.

The case study described in this paper takes a qualitative view of analyst-client dialogue and is designed to explore analyst-client interaction from a processual perspective. Previous studies (Guinan, [1988](#); Tan, [1989](#)) attempted to measure certain analyst-client behaviours and link them to outcomes. As both of these studies were quantitative in nature, there was little opportunity to examine analyst-client dialogue at the micro level or to consider how shared understanding might develop over the lifetime of the interaction. The case study has as its general focus the question – *How* do analysts and clients reach a shared understanding of system requirements? It also aims to explore how conversational strategies and systems analysis strategies utilised by participants assist in building up a joint picture of the system under discussion.

## **Methodology**

The case study described below is one of a series of six case studies employing multiple data sources. All the case studies were carried out in various public service agencies in Tasmania, Australia. The data sources include a videotaped interaction between the client and the analyst, a review of that interaction (also videotaped), audio recordings of individual interviews with both the client and analyst (pre and post the interaction), and two questionnaires. According to Yin ([1984](#)) case studies can involve single or multiple cases and numerous levels of analysis. Case studies are especially useful for building theories by virtue of an intimate connection with empirical reality that permits the development of a testable, relevant and valid theory (Eisenhardt, [1989](#); Glaser & Strauss, [1967](#)). The case study design incorporates triangulation and has as its main focus the interaction which takes place between analyst and client. The interaction in each case discusses a real life case of systems requirements.

This paper focuses on successive analyses of the videotaped interaction: how application of grounded theory techniques yielded concepts (Urquhart, [1997](#), [1998](#)) which were subsequently modified during further data analysis; and how analysis of conversation topics, grouped into themes, gave insight into the dynamic nature of the dialogue.

## **Conducting the Case Study**

All six case studies were carried out in the public sector in Tasmania. IS managers were approached and asked if systems analysts in their employ were carrying out development work and would be willing to participate in the research project. The criteria for inclusion in the project were that the development work had to be at an initial stage (generally the first or second meeting between analyst and client about the development work in question) and that the interaction to be video taped should either be about the development of a new system or a substantial amendment of an existing system. Several potential cases were rejected on the grounds that all the initial requirements had already been gathered.

Participants were asked to furnish a one page description ahead of the planned discussion. The purpose of this was to both ensure that the interaction fell within the definition of informal requirements gathering, and to give insight into initial individual perceptions. The objectives of the study - to investigate how analysts and clients reach agreement were clearly spelled out as were assurances of confidentiality. Video taping of interactions seemed to present no difficulty from the participants point of view - in practice those who were initially nervous soon forgot the camera's presence. Video taping seems to have little impact on anxiety and responsiveness, as evidenced by non verbal behaviours generally held to be beyond interactants control (Weimann, [1981](#)).

Motivations for joining the study varied. Some analysts were encouraged to do so by their managers, and others felt they would benefit by examining their communication style. Clients were attracted by the opportunity to review the videotape and discuss the process from their perspective.

## **Applying Grounded Theory Techniques**

Grounded theory method (Glaser, [1978](#); Glaser, [1992](#); Glaser & Strauss, [1967](#); Strauss, [1987](#); Strauss & Corbin, [1990](#)) is a "qualitative research method that uses a systematic set of procedures to develop an inductively derived theory about a phenomenon" (Strauss & Corbin, [1990](#), p. 24). Because it does offer well signpost procedures, it has some attraction for a researcher using qualitative techniques for the first time. More importantly, it is a general style of doing analysis which does not depend on particular disciplinary perspectives (Strauss, [1987](#)), and, therefore, would seem to lend itself to information systems research which can be described as a hybrid discipline. The goal of grounded theory in seeking a theory that is compatible with the evidence, that is both precise and rigorous, and capable of replication (Neuman, [1994](#)) is also an attractive one. It also has the benefit of producing theory intimately tied with the evidence, so that the resultant theory is likely to be consistent with empirical observations (Eisenhardt, [1989](#); Orlikowski, [1993](#)).

As use of grounded theory analysis is founded on the premise that theory at various levels is indispensable for a deep understanding of social phenomena (Glaser, [1978](#); Glaser & Strauss, [1967](#)), it seems particularly suitable for a case study aimed at exploring how systems analysts and their clients reach agreement. It is also useful for understanding contextual and processual elements (Orlikowski, [1993](#)) that constitute the main focus of this case study.

## **Applying Grounded Theory Techniques to The Case Study**

The purpose of this section is to describe how grounded theory techniques were applied to the case study and how emergent core categories were adapted and modified in subsequent analyses.

Firstly, the transcript of the interaction was subjected to *open coding*. This is essentially a line by line examination of the data to generate concepts or codes. The exercise is extremely time consuming but yields many rich concepts for the next phase. Open coding quickly forces the researcher to break apart and fracture the data analytically, leading to grounded conceptualisation (Strauss, [1987](#)).

*Axial coding*, examining codes in terms of the coding paradigm of *conditions, interaction among the actors, strategies and tactics, and consequences* (Strauss, [1987](#)) was then carried out. The use of this paradigm enables the researcher to link subcategories to a category in a set of relationships and also enables further dimensionalisation of categories (Strauss & Corbin, [1990](#)).

It should be noted at this point that Glaser ([1992](#)) has criticised the paradigm in particular and the publishing of strict procedures in general (Strauss, [1987](#); Strauss & Corbin, [1990](#)). Glaser ([1992](#)) regards the paradigm as 'forced conceptualisation' of data and says categories should be allowed to emerge naturally. Strauss ([1987](#)) does point out that the procedures outlined should be thought of as rules of thumb, rather than hard or fixed rules - and advises researchers to study these rules of thumb, use them, and *modify* them in accordance with the requirements of the research.

During axial coding, the application of the paradigm to the open codes was used selectively, and viewed not only as an aid to understanding the relationships between open codes and emergent categories, but also as a means of drawing some preliminary distinctions in the data. When examining the open codes generated from the transcript, using the paradigm, it was found that the open codes tended to fall into one of two areas: those associated with *interaction* aspects (interaction among the actors, strategies and tactics); or those associated with the *conceptualisation* of the information system (conditions and consequences). *Interaction* and *conceptualisation* can also be thought of as emergent core categories.

Obviously there was an element of choice in applying the paradigm in this way. For instance, some conditions and consequences could be found among interactional aspects, but it was found that the vast majority of conditions and consequences did apply to the conceptualisation of the information system (the topic under discussion), rather than how the discussion was managed vis a vis interaction. That the data naturally fitted the paradigm in this manner, rather than being forced, supports its selective application in this particular case.

Table 1 illustrates how the paradigm was selectively applied, with some sample codes that were generated during the open coding phase. Further explication of this coding process can be found in previous papers (Urquhart, [1997](#)).

**Table 1 - Application of paradigm to open codes (Urquhart, [1997](#))**

EMERGENT CORE CATEGORY	PARADIGM ITEMS	SAMPLES OF INITIAL OPEN CODES
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INTERACTION	Interaction among the actors  Strategies and tactics	acting out, imagining, vivid description, posited action, prop, reframe, metaphor, inclusion checks, posits, reflection
CONCEPTUALISATION	Conditions  Consequences	information source, information type, document ref, computer system ref, clerical system ref, information link, process identification, condition, client action

### Reconsidering the Core Categories

What occurred next with regard to the emergent core categories is probably a good example of the iterative nature of qualitative analysis. Tesch (1990), in a summary of principles used by the majority of qualitative researchers, states that categories are tentative and preliminary in the beginning and that they remain flexible. Glaser and Strauss (1967) state the lower level categories (or codes) emerge relatively quickly and that higher level categories tend to come later when integrating concepts. Thus it was with good reason that the initial core categories of interaction and conceptualisation were termed 'emergent'.

A second pass of the transcript, looking particularly at conceptualisation and how issues were introduced, revealed conceptualisation to be so firmly embedded in tactics it was difficult to separate the two. For instance, *keysearching*, where the analyst actively seeks links or keys between system information, was identified. Clearly, it is difficult to say whether keysearching constitutes a tactic or conceptualisation – it could be a tactic aiding conceptualisation, or could constitute conceptualisation in its own right. Similarly, looking at how the topic of the system was introduced, and by whom – *agenda setting* – could be said to fit in both categories. Therefore, labels of tactics and conceptualisation were not particularly helpful in this instance, and gave rise to the thought that what constituted the core categories should be reconsidered. If one wished to be true to the spirit of grounded theory by not 'forcing' the data into preconceived categories (Glaser, 1992), and, at a more fundamental level, ensure that concepts indicated by the data were actually represented by the data and truly grounded, then the original labels necessitated a rethink.

The following diagrams illustrate the difficulty of orientating some of the codes provided by the second pass (Fig 1), and the subsequent orientation of those codes after reformulation of categories (Fig 2).

[Go to Figures 1 & 2 Codes from second pass of transcript and subsequent reformulation into new categories](#)

It was at this point that the coding paradigm made a second useful contribution to the analysis effort, in that it not only mentions tactics, but strategies as well. If one considers the role of tactics as part of an overall strategy, one can see how various tactics might be part of a number of different strategies in requirements gathering. This idea provided a higher level of abstraction which was also commensurate with the concepts that had emerged on the second pass. How the reformulation of the categories proceeded, leading to the production of [Figure 2](#), is explained in the following section.

## Reformulating the Categories

It can be seen from [Figure 1](#) that none of the codes provided by the second pass fell purely into the category of *conceptualisation* – those things key to the conceptualisation of the information system. This is perhaps not entirely surprising, given the difficulty of analysing language forms. Candlin (1984) characterises language forms as "the *surface realisation* of those *communicative strategies* involved in the interactive procedures working amongst those various *social, contextual, and epistemological factors*" [italics added].

Note that here too, strategies are mentioned. In the case study, then it is not surprising that conversational tactics were much easier to detect than any epistemological factors informing them, because the data analysed is conversation. Conceptualisation can be seen as equivalent to the epistemological factors – the building of an epistemology of the system between analyst and client. However, conversation conveys underlying concepts imperfectly, and it seems impractical to construct a category of conceptualisation, if categories are to be truly grounded in the data.

Glaser (1978) signposts a core category as being a dimension of the research problem and indicates that it can also be a process. Given the processual nature of the research question – *how* do analysts and clients reach shared understanding – this would not seem to be an unreasonable proposition. Given also the previous use of the paradigm to focus on tactics used by analyst and client, this might be one of the dimensions of the problem. Returning to the *how* aspect of the research question, if conceptualisation was characterised in an activity central to requirements gathering, then this would overcome the difficulty connected with its degree of abstraction and facilitate analysis.

So, the categories were reformulated as one core category – *strategies and tactics in requirements gathering* (a dimension of the research problem- how do they reach shared understanding) with two sub categories – *conversational strategies* and *systems analysis strategies*. This is illustrated in Figure 3 below. The reorienting of the codes from the second pass of coding is shown by [Figure 2](#).

[Go to Figure 3 Reformulated categories.](#)

Formulating the categories in this manner recognised that some of the tactics previously identified could be used in a number of circumstances. For instance *metaphors* are a device used to aid understanding in a variety of conversational situations. In the case study, *metaphors* are clearly a tactic, as they occur both in *imagining*, and *reframing* and many other instances. The



following table gives examples of how the codes previously identified, together with lower level codes identified in the second sweep of the transcript, may be related to either category.

**Table 2 – Reclassification of Initial Codes Into New Categories**

<b>CONVERSATIONAL STRATEGIES</b>	Negotiation	posits, future action, forward reframe, problem identification
	Agenda Setting	conversation topic, issues
<b>SYSTEMS ANALYSIS STRATEGIES</b>	Keysearching	posits
	Process Identification	posits, process rule, process exception, problem identification
	Scoping	posits, information typing
	Imagining	metaphors, vivid description, acting out
	Reframing	metaphors, forward reframe

A question that might be legitimately asked at this point is as follows – if the core category is a dimension of the research problem, does a reformulation of the core category constitute a reformulation of the research problem? The answer has to be in the affirmative, as in qualitative research, problems become successively refined when moving through the research process. Dey (1993) puts it more elegantly – during analysis, the analytic focus needs to be reviewed and perhaps revised given the implications of earlier decisions for the development of the analysis.

### **Taking A Processual View of The Data**

It is unarguable that requirements gathering, or indeed any conversation, constitutes a process, with identifiable stages. Glaser (1978), when extending the notion of core categories to BSPs (Basic Social Processes) stated that the additional criteria for a core category constituted a feeling of change, process, and movement over time, where the changes have discernible breaking points. Therefore, one fruitful mode of analysis might be the detailed consideration of topics, and how these change over time.

### **Using topics as a unit of analysis**

Topics are readily identifiable in conversations. Planalp and Tracy (1980) demonstrated that this could be done with a high degree of reliability by most people. In their study, 20 subjects were asked to read transcripts and view videotapes, and 20 subjects to read transcripts. Reliabilities in their experiments for topic shift were quite high: .926 in the first case, .919 for the second. They concluded that videotapes did not assist much in identifying topic shift and that verbal cues from

transcripts seemed sufficient. They identified a typology of topic change strategies, given in the table below. The examples of topic change are derived from the transcript.

**Table 3 – Topic change typology with examples from transcript (Adapted from Planalp & Tracy, 1980)**

TYPE	DESCRIPTION	EXAMPLE
Immediate Implicit	Topic is most closely related to topic which precedes it.	"but to get to that sort of point" Previous topic – points of improvement
Immediate Explicit	As in immediate implicit, but the connection is explicitly designated	"Is it the schools that do the assessment?" Previous topic – information from schools
Earlier Implicit	Topic is most closely related to a topic which came earlier in the conversation	"What else do you input apart from the reference numbers?" Closely related topic – information input to database
Earlier Explicit	As for earlier implicit, but the connection is explicitly stated	"Does it also say if they are approved or non-approved this reference number?" Connected topic – Links from information input to applicant
Environmental Implicit	New topic introduced because of some cue in the environment	None Evident
Environmental Explicit	The environmental change which triggered the cue is stated	"I was just watching xxxxxx there" Environmental cue – researchers presence
Unspecified Implicit	No clear connections apparent	"that's if they've done their tax return, not like me"
Unspecified Explicit	Lack of connection is stated	None Evident

Examination of topic changes confers two advantages: Firstly, one can track the degree of relatedness between topics, and from this evaluate a degree of shared understanding; Secondly, one can get a feel for how the requirements are formulated by examining topic evolution over time.

## Using themes as a macro analytic device

Fifty topics were identified in the transcript – these topics were subsequently organised into themes. Using themes as an analytic device is a useful way of scaling up analysis – for instance, themes were used by Martin (1992) as a way of analysing organisational culture from diverse case study material.

In this case study, the organising principle of themes is used for two analytic purposes. Firstly, it allows a meta analysis of topics. Secondly, the grouping of topics into themes will allow a future comparison of those themes with conversational and systems analysis strategies identified in the transcript. The use of themes confers a further advantage; if the themes are at a reasonable level of abstraction, they can be used for analysis of other case studies. Similarly, they can be used for analysis of other data sources contained within each study.

## Findings

This section presents a brief overview of preliminary analyses of topics and themes found in the transcript.

**Table 4 Topics shifts and initiators of topics**

Topic Shift	Frequency		
	New topic introduced by analyst	New topic introduced by client	Total
Immediate Implicit	1	1	2
Immediate Explicit	19	8	27
Earlier Implicit	6	1	7
Earlier Explicit	11	0	11
Environmental Implicit	0	0	0
Environmental Explicit	1	0	1
Unspecified Implicit	0	1	1
Unspecified Explicit	0	0	0
Total	38	11	49

There are a number of observations that can be drawn from Table 4.

- the analyst makes the vast majority of topic changes.
- there is a great deal of backtracking on the analysts side, as illustrated by 17 Earlier Implicit/Explicit topic changes.
- the client confines their topic changes to immediate implicit/explicit changes.
- there are very few instances of environmental or unspecified
- topic changes, presumably because there is a professional focus on the task at hand.

Table 5 below illustrates the themes extracted from topics in the transcript and how topics fall into themes.

**Table 5 – Mapping of topics in the transcript to themes**

<b>Theme</b>	<b>Topic</b>
1. Issues to be Discussed	T1, T2, T3, T4, T6, T23
2. Scope of Current System	T5, T7, T8, T9
3. Personal Disclosures (Rapport building)	T10, T25
4. Information Input to System	T13, T15, T20, T22, T24, T26, T36
5. Processes Associated with System	T14, T30, T32, T35, T38, T39, T40, T41, T42, T43, T44, T45
6. Keys in Information System	T16, T21, T33, T35, T37
7. Future Action	T19, T46
8. Information Deficit in System	T27, T49
9. Information Output from System	T28, T29
10. Analyst's Understanding of Processes	T31
11. Future Solutions	T47, T48, T50

The grouping of topics into themes in this manner enables us to see that the vast majority of topics were focused on information input to processes, and the processes themselves. A number of topics are devoted to finding keys in the information system. Comparatively few topics are dedicated to system outputs, or future action. It is noticeable that the theme of Information Deficit has only two topics. However, the value in these themes probably comes from relating them back to the context of the case study and extending them to other case studies. If the purpose of the conversation was for the analyst to gain a good understanding of processes, rather than uncover system problems, then these particular topic groupings are probably appropriate.

When the themes are graphed against time in the interaction, it is noticeable that, as the interaction proceeds, analyst and client spend longer on themes in the middle of the interaction, as illustrated by Figure 4 below.

[Go to Fig 4 Discussion change over themes](#)

The graphing of themes against time elapsed gives a feel for how the interaction might comprise a number of stages. The very early part of the interaction comprises themes of Issues to be Discussed (Theme 1) and Scope of the System (Theme 2) and are primarily dealt with in the first five minutes. Note though that there is a return to Theme 2, on two occasions up to 11 minutes into the conversation – these were initiated by the client. This may indicate that the agenda were not fully negotiated before proceeding into the themes which take up most of the interaction, Information Input to System (Theme 4) and Processes Associated with System (Theme 5). There is also some Rapport Building (Theme 3) before the interaction settles down to its preoccupation with Themes 4 and 5. There is a regular return to Keys in the Information System (Theme 6), until this is resolved until 20 minutes into the interaction. Future Action (Theme 7), and Future Solutions (Theme 11) take up comparatively little time in the interaction overall.

## **Conclusions**

This paper primarily concentrates on issues of qualitative analysis as they applied to the analysis of analyst-client interaction. It demonstrates how the concepts of strategies for conversation and systems analysis in requirements gathering emerged from reformulation of categories, using grounded theory techniques. It then presents an alternative mode of analysis, using topics and themes, to capture processual aspects of dialogue, and suggests future analyses. Some preliminary findings, using topics and themes have been presented. The following sections examine implications for the process of qualitative analysis of dialogue as it has proceeded in the study, and some wider implications of the study for systems analysis practices.

## **Methodological Implications**

One issue that emerges clearly from the account of how the analysis proceeded is the difficulty of scaling up a micro analysis of dialogue so that one can draw some meaningful conclusions about the nature of analyst-client interaction and how they might proceed toward shared understanding.

In this respect, the use of grounded theory techniques represented a two edged sword. The examination of dialogue at the word and sentence level yielded some rich concepts which provide true insight and have the advantage of being completely grounded in the data. However, organising these concepts, in way that truly reflect the data and the motivations of the participants has proven problematic. This is perhaps more a reflection of the nature of the phenomena and the aims of the investigation, as it is difficult to infer the thinking processes behind speech, however grounded the analysis may be. Using the notion of a core category being processual in nature (Glaser, [1978](#)) proved a way forward and necessitated the search for other units of analysis, which might prove helpful in understanding the process. Planalp and Tracy's ([1980](#)) topic definitions were helpful here as they not only provided a mechanism for

understanding the dynamic nature of the dialogue but also demonstrated the degree to which the topics were interrelated. This gives some indication of the coherence of the dialogue, which can be linked to other data sources in the study, such as the participants own assessment, of the interaction. This perhaps can provide a pathway from process to outcomes and outputs in the case studies.

The strength of using themes as an analytic unit is derived from two sources. Firstly, they enable a grouping of topics, which assist in understanding dynamic aspects of the dialogue. Secondly, they transcend processual aspects and will enable future cross comparison with the remaining case studies, and links with other data sources in each case study.

## **Implications for Practice**

The conversational strategies and systems analysis strategies identified in this paper come from detailed examination of the progress of one analyst and client toward a shared understanding of systems requirements. The value of such insights would come from their explicit use and teaching to systems analysts. Detailed consideration of social processes and settings are given scant attention in most information systems textbooks, with a few exceptions (Kendall & Kendall, [1995](#)). This is surprising, given that requirements gathering, as with most professional activities, is embedded in a social setting. However, it is less surprising when one considers all the technical aspects of modelling and building a system that have to be taught in an undergraduate course. The social processes that surround requirements gathering are assumed to be straightforward, a simple matter of gaining information. This does not square with the evidence in the IS profession of problematic communication, and is perhaps a contributing factor. All the analysts involved in the case studies, without exception, found the opportunity to examine their own communication performance, a valuable experience. They recognised communication as playing a supremely important role in gaining thorough analyses of the system, and were actively looking for enhanced ways to achieve this. The continuing shift towards client focused IS services seemed also to be a factor in their motivations to improve communication. Space here does not permit detailed description of how use of concepts like reframing, imagining and other concepts could be used to assist systems analysts. Interested readers are referred to a previous paper (Urquhart, [1997](#)), which provides a more detailed examination of how the concepts derived from the use of grounded theory could be used in practice.

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### **Editor Note**

\*In order to view the Figures in this paper you will need the Adobe Acrobat Reader.

