Making Sense: using Conversational Analysis in requirements gathering for an information system

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Abstract:

This paper investigates the scoping and defining problem of IS development, in a local government IT department as it undertakes the first tentative steps into e-government. Specifically, it seeks to understand the context of inter-relationships and multiple interpretations that are at work, focusing on the often-overlooked aspects of the 'tacit' understanding of interactions. The research investigation seeks to distinguish and highlight decisions that can be deferred, asking; do deferment points naturally occur in social IS dynamics? We selected conversational analysis (CA) as our primary data collection and analysis tool, which enabled us to take a closer look at the early requirements gathering stages.

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Conversation Analysis, Deferred Systems Design, Deferred Decisions, Deferment Points, Methodology, Systems Development Life Cycle, Emergent Organisational Behaviour, Requirements

1. Introduction:

The problem addressed in this paper concerns the process of the scoping and defining of an Information system (IS) in a local government organisation in the UK as it seeks to develop and extend IS functionality into a web based resource. We adopted an qualitative approach, studying the early stages of specifying requirements as they emerge for the web-based casework IS in the local government authority, referred to as Bar (a pseudonym). The objective of this paper was to seek to understand the context, the interrelationships and the multiple interpretations that are at work.

The research presented in this paper follows the consideration that IS's are emergent (Avgerou 2000). And in IS terms, emergent organisational behaviour has been identified as resulting from the social dynamics (Ciborra 1991; Orlikowski and Walsham 1996). Conceptualising IS development in terms of social dynamics has led to many authors to draw upon social science disciplines, which are especially prevalent in the initial system design stages of scoping and defining.

Specifically, we focus upon the perceived difficulty that IS has in handling continual and changing demands in the initial stages of an IS development. But our research area contributes to a wider dimension in seeking ways in which an IS development could cater for handling a continual change of approach. Characterised by Hirschheim et al, of having to deal with three issues, a) IS's are tied to action, b) an IS is contextualised and, c) IS's are purposefully developed for continual change (Hirschheim, Klein et al. 1995 pg, 209).

There are many potential solutions that seek to offer change and flexibility for future or ongoing development in the design process; EUC (End User Computing), adaptive systems, tailorability, RAD (Rapid Application Development) and component based design, are only a few approaches that are on offer. However, the potential solutions assume that previously made decisions on the problem of 'what to build' have been largely solved, and the issues are further muddied when the intended IS partially utilises existing 'brown-field' systems with the inclusion of different social or new technical practices. Previous research has recognised the issues of 'not knowing what to build' suggesting that there is a need to defer the system design (Land 1982; Patel 1999). This paper develops the approach proposed by Deferred System's Design (DSD) concepts (Patel 1999) and extends the research enquiry to seek to recognise if deferments naturally occur in social IS dynamics within the requirements gathering stages, and if they do, if it is possible to distinguish them as such. If this is so, we feel that it would lead a better understanding in the IS decision-making process of 'what' gets made or done and when.

We introduce the case study here as an interim progress report of larger fieldwork research project investigating possible approaches to requirements capture for DSD. The paper is organised as follows. The following section reviews the nature of our research approach, ontological position and the development of research protocol.

This is followed by a discussion of the case study in section three. This looks at the aspect of decision points in some depth, from which we develop and present data samples and present graphical representation that assists in exploring the process. The final section presents the conclusions.

2. Interpretivist research and the adopted approach

Orlikowski commented that only 5% of IS research in the late 1980's used interpretive research methods (Orlikowski and Baroudi 1991). Nandhakumar and Jones using the same classification of recently published papers 1993-1996 showed a modest increase to 19% (Nandhakumar and Jones 1997), yet despite its only acknowledged modest increase, Klein and Myers (1999) argued that the interpretive research method is particularly appropriate for the study of IS development, implementation and use within organisations.

Interpretative data collection techniques commonly used in IS practice can be collated into two distinct camps. One, to be used in the initial problem formulation stages, whereby multiple perspectives can be incorporated into one design, as in Holzblatt and Beyer's ethnographic approach (Holzblatt and Beyer 1993), or the socio-technical approaches such as Checkland's soft systems methodology (Checkland 1993) reflecting many current methodological approaches that lead to a single objective meta viewpoint. Secondly, interpretative tendencies are to be found in many of the user centred design

approaches; these are often utilised and restricted to the interface design stages using pre-formulated, reinterpreted and pre-existing processes such as templates and models. Such approaches are seen in the use of prototyping, case tools, and case based reasoning tools.

Over the past decade significant progress of interpretive analysis research is found at the union between the business organisations and the 'fit' of IT IS technology. Various authors (Suchman 1987; Zuboff 1988; Walsham 1993; Orlikowski 1996) have shaped much of this thinking. However, with the growing use of web-based technology, integrated web programs, and the emergence of the paradigm of interconnected web weaving (Berners-Lee and Fischetti 1999), an alternative approach is needed, that is, one defined by hypertextual characteristics (Scharl 2000), together with a convergence of interpretive theory, technology and contextuality (Jones and Spiro 1995). This has led to authors suggesting a new interpretation of IS design based upon an action-centred ontology that encompasses 'the domain of action' (Denning and Dargan 1996). This move towards pervasive or ubiquitous computing (Hansman, Merk et al. 2001) based on connectivity has as its basic ontological premise continual change and development, not only in the sociological sense of the human condition, but also in the need to reflect IS design as action based systems. Our research approach and research methodology design needed to reflect this, and we have adopted a procedure for data capture and analysis that seeks to understand the domain of decision making in requirements of scoping and defining design requirements which are composed from the individuals and groups' needs, and which capture intersection points in a ‘web’ of IS design.

Various techniques have been developed to aid and elicit analysis of the research interpretation upon the data collected in case based fieldwork research. ‘The most important sources of case study information is the interview’ (Yin 1994 pg, 84). We used interview data in order to aid our own understanding of the background context, however, our research endeavour went on to address two issues. Firstly, to focus on the major problem related to participant-observation and the potential biases produced (Yin 1994). Secondly, to find a method to accurate portray a representation of the primary data as an inscription and translation of how the participants recognise and use of their own contextual situationess in their activities. In other words, to be able to explicitly capture the set of ambiguous goals and disputable steps involved in scoping and requirements gathering stages of an IS from personal perspectives.

We selected as our primary data analysis and collection tool conversational analysis (CA), which has been aptly termed the study of talk-in-interaction (Schegloff 1987; Psathas 1995; Hutchby and Woolffitt 1998). The research approach and method is based on transcribed tape-recordings of actual 'naturally occurring' interactions of talk and utterances between people in the 'ordinary *unfolding* of people's lives' (Hutchby and Woolffitt 1998, emphasis added). Specifically we have focused upon Harvey Sacks' ethnomological membership categorisation methods (Sacks 1992 Lecture 1 (R) pg, 243-251), which facilitate family grouping of related sequences of interaction.

The objective of CA is to uncover the tacit reasoning procedures of speech and utterances, such as laughter, murmurs, errs and ums, interruptions, tone etc, which may be viewed as objects, which speakers use to accomplish particular things in their interactions with others. Using the Hutchby and Woolffitt (1998) synthesis upon the work of Sacks, two more fundamental qualities are highlighted; firstly, the idea that talk can be seen as methodic, not in the sense of rule defining but given as methodical in the sense of interactional context and as situated, that is dependant upon how the actors are interpreting the social situational context, and how the actors choose to use the contextual rules. This concurs with recent developments in sociology especially in the works of Giddens and Structuration theory (Giddens 1979; Giddens 1984; Giddens 1991). Whose theory has also influenced the work of many academics operating in the domain IS (See, Orlikowski and Robey 1991; Walsham and Han 1991; Rosenbaum 1996; Brooks 1997; Myers and Young 1997; Barrett and Walsham 1999; Champion 1999; Hussain and Flynn 1999; Rose and Scheepers 2001). Basically, the theory recognises that people act in situated contexts and react reflexively drawing upon their experience, their own position, status, and their willingness or desire to act or participate in the process of the interaction.

The second aspect that Hutchby and Woolffitt draw out of Sacks work is that talk-in-interaction can be treated as an object of analysis in its own right, rather than simply as a window through which we can view other social processes or broader sociological variables. This challenges the standard perspective in socio-linguistics, which attempts to show causal relationships (Hutchby and Woolffitt 1998).

The goal in the analysis of the data is therefore is to find some orderly phenomena, using the CA analysis tool kit of; "both an ‘inductive’ search for patterns of interaction, and an explication of the emic logic that provides for their significance" (Have 1999).

The ‘inductive’ first stage of CA employs the analytical methods of: turn-taking organisation; sequence organisation; repair organisation; and the organisation of turn-construction/design. The second stage, of emic logic and theory generation, activates the construct of building a machinery ‘to explain some phenomenon, to characterise how it gets done’ (Pg, 64, Silverman 1998 Quoting Sacks lecture 6 LC1: pg, 315). The goal is to be able to depict the mechanisms to describe the order, as Sacks described it “it's not this conversation as an object that we're terribly interested in, but we can begin to see machinery that produces this as a series of moves, and to appreciate it as a series of moves among the potential sets of moves…the machinery being what we're trying to find; where, in order to find it we've got to get a whole bunch of its products” (Sacks 1992 Part III, Lecture 1, Pg, 168 - 169).

As Hutchby and Woolffitt neatly summarise; ‘CA differs from other forms of linguistically oriented analysis in that the production of utterances, and more particularly the sense they obtain, is seen not in terms of the structure of language, but first and foremost as a practical social accomplishment. That is, words used in talk are not studied as semantic units, but as products or objects which are designed and used in terms of the activities being negotiated in the talk: as requests, proposals, accusations, complaints and so on’ (Hutchby and Woolffitt 1998).

Having outlined out our research position in this section, the general outline for the case study research proceeded using four phased stages:

1 Making recordings of natural interaction
2 Transcribing the tapes, in whole/in part.
3 Analysing selected episodes.
4 Reporting the research.

The prime data gathering event on which this paper focuses was the second meeting of the project team, the one previous meeting had established ‘issues’ and had identified areas of project team members' responsibilities. The data was gathered using a tape recorder, which was then transcribed and validated by a participant who had attended the meeting. In this paper we are concentrating on the final stages with specific emphasis upon reporting the research.

3. The Case Study Context and the Research Interest

In this Section we outline the local authority case study and some of the relevant background to IS/IT in local government. Bar provides a wide range of legally stipulated services to a local population of 272,500. Like other similar local authority organisations and civil service provisions in the UK, Bar has a functional relationship organisational structure, with a core corporate policy unit (corporate strategy unit) which is responsible for centralised strategy formulation and planning. The IT department and IT services underpin the majority of the services that the Council provides; the IT department itself is responsible for provision of the services and how they are managed.

During 1999/2000 a fundamental strategy review of Bar’s IT service provision was undertaken by an external consultancy resulting in two reports; ‘Information And Communication Technology Strategy' and 'Information Technology Service'. The reports generated were in part a response to the central government e-government strategy with the agenda to place full on-line services delivery by 2005. The department is starting to address the issues of how to move from the current 'marketing front end' web service, and how to start to adapt and use the web for servicing back office functionality.

There are several projects currently in hand, and the case study presented in this paper attracts interest to the researchers for three reasons. Firstly, that the IT department has recognised the need to re-conceptualise how services are going to be delivered in a web-based environment that in-part utilising multiple existing non web-applications. Secondly, there is a complex security issue of data transfer and user access issues. And lastly, the recognition that the new proposed services are going to be subject to continual and changing requirements and needs.

In outlining the project, the department is responding to a request to enable councillors to do their work in locations other than the council offices, this is a variation on the casework management system, and as a consequence this new IS demand empathises with the strategic reviews and recent IT reorganisation, in that it presents a challenge of not just the why, how and by whom a service is being provided but more importantly how the project potentially represents a 'change' in approach in addressing the business needs of the organisation.

It quickly became apparent from our initial investigation that we were unable to draw or look for an intentional and abstract boundary as in traditional IS development. As such, we adopted an approach of connectivity, of purposeful linkages and networks based on systems of communication that tend to form natural patterns. We describe this as the web-like structures of information and knowledge. The web structure does not necessarily lead to a consensus approach, with a specific start from a specific act of interaction. As such, the bigger picture of context spirals and contracts as connections are formed, broken, and re-developed.

Originally, Bar's IS brief had emerged from a pilot study in which IT equipment had been purchased and installed for four councillors, but not all were able to access directly to all of the available facilities. From this pilot study, a high level meeting involving the chief executive articulated a 'vision statement' document requiring further action.

Currently administrative control dictates that public enquiries are passed up and down the chain of command, filtered, edited, and then disseminated. The council members now seek to *manage* their own casework as opposed to it being "bureaucratically administered". Additionally they need to work outside the council offices and hours by using a web interface.

Directly prior to the project team meeting, two semi-structured interviews were conducted to gather background information. Although this was a single source perspective, the 'war-story' type narrative and personal anecdotes of the senior professional allowed a unique historical insight and a glimpse into what is normally regarded as a closed community. Additionally, this particular introduction facilitated acceptance and legitimacy of the researcher as part of the organisation and not as an independent observer (though non-contributively) of the subsequent project team meeting.

Further (post) meetings and interviews were conducted adding to the depth of analysis in respect of specialist areas, not covered here in any great depth because of space.

4. Conversational Analysis: Establishing Patterns of Information

For economy's sake, we focus here on a very coarse granular presentation of data and organise the observations in a simple account exemplifying the phenomenon of the research enquiry, namely, seeking to recognise if deferments naturally occur in social IS dynamics within the requirements gathering stages. Specifically we concentrate upon the finished analysis of the recorded and part transcribed data, validated by a participant who had attended the meeting that comprised of eight people.

As previously discussed the interactions take place within organisational setting and it is important to note that the focus of the analysis is on how the work of the organisation is carried out in and through the talk-in-interaction, characterised as 'talk in institutional settings' (Psathas 1995; Psathas 1999). We are particularly interested here in the Membership categories (MC) as defined by Sacks which, are classifications or social types that may be used to describe persons. A membership categorization device (MCD) defined by Sacks, is "any collection of membership categories, (containing at least a category) which may be applied to some population (containing at least a member) so as to provide, by the use of some rules of application, for the pairing of at least a population member and a categorization device member…A device is then a collection plus rules of application." (Psathas 1995). For example, the collection or MCD of 'family' may include such MC's as mother, father, son, daughter, grandfather, uncle, etc.

A number of categories were identified from the collection together with their respective members.

1.	M:	yeah, I think there was some reasonable confidence that with three people doing it we should be able to get out most of what we wanted //
2.	A:	// well (0.5) just saying so rather sounds like rather like pitting three rather articulate and technically aware people against a rather diverse set of people urr that might lead to some bias in what pops out in the end
3.	M:	I am in your hands because I'm rather [
4.	J:	] a facilitator is rather a good idea because (0.3) if you get somebody like S (1.2) Sxxxx is very good if you could not afford to buy one in (.=
5.	M:	Sxxxx (0.3) Sxxxx could do it yeah (0.2) okay (.) are you all right with that

Text Box 1: Part of the facilitator interaction sequence

In Text box 1, we have selected a problematical closing sequence ending with (line 5 - (0.2) okay (.)) This sequence demonstrates the interaction between three of participants that led to a selection and membership category of 'facilitator S'. The example also effectively demonstrates the institutional setting and the relationships between M, A, J, and their exposure through the use of CA analysis, for example, J, in line 4 acts 'purposely', interrupting the sequence and flow to support M from A's position of not wanting technical people to define the IS issues, J additionally supports his own position of wanting a (MC) facilitator and a particular person S, this also gives M the opportunity to close the thread of the conversation. Relevantly to our investigation, the conversation sequence closure also demonstrates an 'explicit' outcome, namely a decision point with an explicit action to follow: 'The buying in of the facilitator S'.

Rather than developing statistical tabulation, we present the data text collected in Table 1, which encapsulates the issues and the contextual domains of the scoping, and defining problem. The grouping and identification of the headings are emergent and aim to act as a generative heading from the individual instances and uses in the dialogue MC's. The groupings are made up from the constituents of family members, and the banner headline is an encapsulation of the MCD, giving an account of a potential structural or pattern meaning. Such a method of model building is sympathetic to Sacks's intentions of obtaining detailed descriptions of interactional phenomena (Travers 2001). Additionally, the purpose here is to convey not just the structural interpretations, but to expose the underlying social patterns and practices concerning information and the scoping and defining of the proposed IS. We have labelled the column 'Reflections' which are threads of interactional conversations to which there are no explicit outcomes, these are conversational threads with decisions and explicit outcomes upon which decisions could not be made. The next stage was to depict the mechanisms to describe the action.

	Individuals and groups	**Intentions Plans**	**Resources (a) Provisions**	**Resources (b) Financials**	**Reflections**	**Artefacts & Equipment**
MCD	Members (line 23)	Project plan (line 61)	Support (line 23)	Expenses (Line 43)	Vision and realisation of the project plan (122)	Machines
MC	Council (line 29)	Meeting (line 15 -16 - 57)	Intake (line 26)	Money (line 54)	Scope of access to (line59)	Equipment
MC	J (line 31)	First meeting (line 57)	Team (line 43)	Cost (line 48)	The fits with existing IS applications (line 39)	IT
MC	The leader (line 21)	Pilot project (line 50)	Provision (line46)	Pounds (line 45)	Support for the councillors (line 30)	
MC	M	Timetable (line 69)	Resources (line69)	Budget (line 41)	Security Issues (line 172)	
MC	Facilitator Sxxx		Deliver (line70)		A bit ad hoc (training) (line 33)	

Table 1: Contextual Domains

5. A Model of Requirements Analysis: recognising Deferment Points

The research design schema that we have employed was derived and underpinned by social sciences' interpretive qualitative research. Scoping and defining the problem in IS is normally associated with traditional IS thinking, starting with the rationale of problem definition with the additional goal of arriving at a mutual understanding, facilitating the 'next step' and the subsequent development of a 'project plan'. However, instead of viewing this as a fixed reference point from which progress is made, we are able to put forward a different model shown as Figure 1, derived from our research.

In this model (Figure 1) interactions are seen as on-going instances initially between two people (A and B in the circles), and as we will go on to suggest, perhaps, even between a person or persons and an IS. Interactions are defined in the model as ‘Interactional frames’. For example, interactions in CA have an inherent natural time span, as do all conversations, which have a start and a finish.

The principle outcome, and the primary interest of this paper in the investigation of scoping and defining the problem of IS development, is the ‘tacit traces’ of an interaction. Rather than try to explain away the tacit outcome of an interaction, we develop and recognise it’s influence upon IS design, specifically it’s influence upon how an IS is scoped and defined. Venzin and Krogh (1998) have traced the concept of tacit knowledge back to Michael Polanyi 1958, who suggested that individuals know more than they can say (Venzin, Krogh et al. 1998). At first glance tacit traces are opaque or hidden, it is meaning that cannot be easily put into words. Zuboff’s conjecture that ‘explicit awareness has a relatively minor role in the performance of action-centred skills’ (Zuboff 1988, pg 187) implies that meaning is too layered and subtle to be fully articulated.

We further posit that the outcome of tacit traces is deferment, which we have identified as deferment points. The tacit traces also themselves have meaning, but are rooted more in the social meaning and in this case, in the meaning of interpreting technology. Tacit traces and deferment points only have direct relevance, and are quantifiable in relation ‘of the particular’ interaction and of action centred skills. A sculptor knows just when to stop carving; from the start of a process the artist cannot tell at what point he has to stop, the artist has deferred to stop at some point in the future.

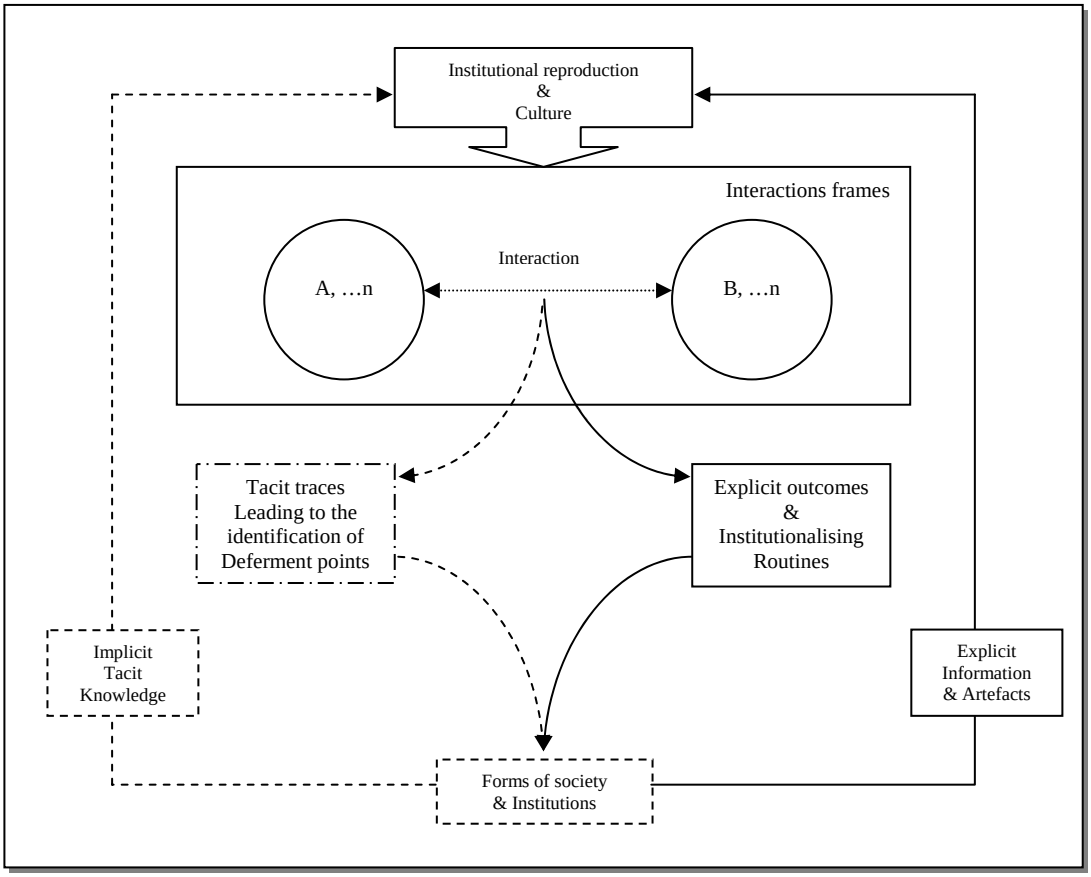

Figure 1: Interaction leading to Deferment Points

The analysis drew to our attention the fact that in order to recognise the deferment points we needed to further analyse the usage and the context of the column heading 'reflections' (Table 1). We concluded from the data analysis that deferment points have different complexity levels, an example being the deferment of the requirements and 'user needs' being deferred to the facilitator to uncover.

We suggest in our analysis that the planning model itself is largely tacit, and as such has strong empathy with Schuman's findings that plans neither determine action nor fully reconstruct it. Thus, she argued that the success of the Trukese navigators is not tied to 'conventional rules but to local interactions contingent on the actor's particular circumstances' (Suchman 1987, pg, 27-28). We have inferred in the model that the two outcomes of any interaction are not mutually exclusive. We suggest that the two are co-dependent in all situated action. Indeed, in exposing the tacit and explicit outcomes we are helped to come to a greater understanding of situated action informing 'Forms of society & Institutions'. Finally, the interactions and the connections of the interactions are a 'web' of connections. We are not able to predict the future, or the next interaction, and it is only by reflection that we can see clearly the explicit and implicit actions that facilitated the reproductive and cultural structures which enabled the action to take place.

To recap; interaction 'in-use' or 'in-action' is based on the theory of structuration using the modalities of interpretative schemes, resources and norms, which operate by enabling and restricting structural mechanisms (in Giddensian terms Signification, Domination and Legitimisation). This facilitates understanding and underpinning of theory-making in qualitative research. Our model of Figure 1 allows us to investigate particular interaction points and to assist in the understanding of the meaning of situated action, in this case using the methods and tools of CA in the scoping and defining the problem of an IS development project. Our future research is directed towards refinement of the model and integration into IS practice.

6. Conclusion

In examination of the 'what', we uncovered an endless web of connections and a variety of different perspectives on what this IS project meant. Only after reflection and analysis of the transcribed data did the linkages emerge. This produced a metaphor not unlike a child's kaleidoscope, as by twisting the data around new patterns and shifts in colour or patterns emerge.

The research design facilitated, and indeed the use of CA, encouraged us to look for and uncover differing interpretations; we had originally set out to focus on seeking to answer our original research question, which was to see if we could recognise if deferments occur naturally in social IS dynamics, and, more specifically in the initial stages of IS design, and if we could recognise deferment points within context. What surprised us in our findings was the number of recognisable deferment points that we did uncover.

From this modest research question, more questions have emerged than we are able to answer. The evidence would suggest that reflective practice is not unique to academics; the group left tacit traces in conversation for a whole host of reasons and with different motivations.

In trying to define and scope an IS project the perspective that we found is that IS is firmly embedded in the context of the organisation's day to day working practices and is not an adjunct union. The difficulties in drawing up specifications for scoping and requirements for Information System design can be seen in an alternative view as a series of deferment points.

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