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Studying information systems at the organisational level: interpreting technology

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The aim of this paper is to discuss the objectives of 'organisation-level' research into information systems in technology-anchored subjects, and to suggest why there is a need to bring such research closer to social sciences. 'Objectives' in our view encompass the nature of research questions postulated, the motivation for doing research, the research audience, and the utilities envisaged for the research findings. The main argument developed here is that rich and sustaining research into information systems practices cannot be based on solely positivist-objectivist approaches. Such approaches, mainly the legacy of natural science, have dominated research into technical aspects of information systems but are inadequate and ultimately ineffectual. On the other hand, purely organisational analyses, devoid of technological richness, are equally improbable, thus the need we articulate here, for an organisationally linked research approach that can encompass the sophistication and detailed nature of the technologies that we use. The natural place to find such an approach, we argue, is within the social sciences.

The discussion in this paper uses knowledge acquisition as an example of a research topic that demands such an analysis (Poulymenakou, 1995). Knowledge acquisition practices preserve most characteristics of requirements determination activities while they also strive to meet additional demands for 'knowledge based' processing in systems. In fact, the two streams of practices are seen to converge to an increasing extent (Byrd et al, 1992; Poulymenakou, 1995). Hence, the study of knowledge acquisition from the perspective discussed in this paper has direct implications for the study of requirements determination practices in the context of increasingly complexity and diversity of information systems. For the most part, knowledge acquisition research has taken as its point of departure technological and scientific themes including knowledge representation (e.g. Brachman & Levesque, 1985), techniques for knowledge elicitation (Gammack & Young, 1984; Schweickert *et al.*, 1987) and the development of computer based tools to support knowledge acquisition activities (Boose, 1989; Eriksson, 1994). Experiences gained from these efforts have called for further advancements in the study of "knowledge" and into its implications for the domain of knowledge based systems (but seldom human organizations). Yet, the organisational setting (people, project, cultural and political environment) has a critical impact on the suitability and potential of knowledge acquisition practices and technologies.

Considering knowledge acquisition as an organisational practice, rather than an technological phenomenon, gives rise to new questions related to how the process 'performs' in real life situations. This raises issues of *choice* of, and *guidance* on actions, but more critically, issues related to *understanding the implications* of actions. To pursue these as research requires the collection of evidence on practitioners' criteria for deciding which knowledge acquisition approach to follow in a project, as well as on how and with what results knowledge acquisition methods, techniques and tools are used. Beyond such concern with actual practice there is a need to understand how knowledge acquisition is perceived and shaped as a practice within organisations and, based on this understanding, to investigate factors that inform technological choices in a particular situation. Finally, there is the need to study the impact of knowledge acquisition practices 'in the large', on the projects, the people and the organisations experiencing them.

Such research can aim to shift the emphasis from 'developing new ways to carry out knowledge acquisition', which represents the thrust of work in technology oriented research, and towards 'understanding what happens when knowledge acquisition is put to work'. From this understanding more meaningful and relevant suggestions for knowledge acquisition practices can emerge, and more importantly, can be represented and judged within the information systems domain. A very similar argument can be presented in many other fields, for example in CSCW.

Relating to research approaches

One legacy of technology driven research into knowledge acquisition, as in most IS areas, is that the objectivist-positivist approach dominates. There are two levels in which this can be seen. The first, is the level of individual methods, techniques and tools. The second, is the level of organising technology-use practices within organisations, i.e. how methods, techniques and tools are selected, combined and used in practice, and what recommendations researchers make on these issues. This second level will be discussed here and can be seen as all too often leading to imperatives being placed on research for the *systemization* and *systematization* of practices. The systematisation imperative is manifest in efforts to build standard process models for knowledge acquisition to guide practitioners, such as CommonKADS (Schreiber et al, 1994), while systemization efforts are geared towards developing systems that 'automate' knowledge acquisition (Markus, 1988).

Such research efforts suggest a tendency to impose a 'tidiness' in the process and to promote assumptions and beliefs into general laws. Orlikowski & Baroudi (1991) warn us of the dangers of such approaches, "the quest for universal laws leads to a disregard for historical and contextual conditions as possible triggers of events or influences of human actions". As Nissen (1985) describes it, the scientific research paradigm attempts to "smooth out" human practices. The undisputable 'mess' of real life practices in knowledge acquisition is in direct conflict with this perspective. Information systems research then needs to consider this 'mess' of real life practices and to acknowledge the subjective nature of any purposeful action. The systems that knowledge acquisition assists in developing are made by people to be used by people. Thus, practices in the field need to be studied in conjunction with the perceptions of those who carry them out, by understanding the goals, values and constraints involved in this process.

One route to achieve this is through research based on an interpretivist approach. Interpretivism has been proposed by researchers in social sciences (e.g. Glaser & Strauss, 1967; Denzin & Lincoln, 1994; Lincoln & Guba, 1985) and information systems (Boland 1985, 1990; Zuboff, 1988; Lee, 1991; Orlikowski & Baroudi, 1991; Walsham, 1993, 1994). Interpretivist research approaches endeavour to describe, interpret and understand (social) situations from the participants' perspective. Any rigid, *a priori*, researcher-imposed formulations of structure, purpose, or attribution are resisted (Glaser & Strauss, 1967). Generalisation from a research setting to a population is not the objective of such research. Nor is such research concerned with the quantity or statistical significance of findings. Interpretivist researchers construct interpretations or explanations that account for the way that subjective meanings are created and *sustained* in a particular setting (Orlikowski & Baroudi, 1991, p.14). Guba & Lincoln (1994) argue, the findings of such research cannot be considered as "more or less 'true', in any absolute sense, but simply more or less informed and/or sophisticated".

Walsham distinguishes between 'weak' and 'strong' claims for interpretivist research. Weak claims position interpretive research as the forerunner for more 'rigorous', positivist research; A somewhat stronger claim in interpretive research is the 'complementary' claim which assigns equal status to positivist and interpretivist approaches. We follow Walsham in proposing a stronger justification, one based on appropriateness. 'Appropriateness' refers to its capacity to yield rich and relevant insights for multiple stakeholders. Appropriateness in this case means that we are able to support actors in utilizing technological capabilities to respond to organisational challenges. The concern is not with what technology has to offer *per se*, nor with an exclusively social conception of organisations at work, but rather with developing and sharing an understanding of how organisations see and respond to the technology that have available.

In our view, the objective of organisational level research in information systems is then not to construct theories or normative accounts of how things should be done, but to expand and deepen our knowledge and appreciation of the practices and phenomena we study, and to share that appreciation. As a result, interested actors may modify their behaviour to improve their individual and joint practices, but this will be through their own processes of interpretation and appreciation. Galliers & Land (1987) capture this view when they state, "Surely the measure of the success of research in an applied topic such as information systems is

whether our knowledge has been improved to the extent that this improved knowledge can be applied in practice".

Rethinking the research agenda

In the area of `analysis' in information systems, which embodies both knowledge acquisition and requirements determination, we find it hard to identify responses to the pressures of user communities and the challenges posed by developments in technology. What is required is a fundamental rethinking of the role of the analysis process within systems development, which can be aided by adopting the research perspective discussed here. Topics in our research agenda should also reflect these concerns. We would argue for more attention to be drawn to the following issues:

a. The (changing) nature of the analysis process: is analysis becoming more of a problem definition activity, or should it persist as a modelling and system definition activity? what are the implications for tools, methods and practices required for analysis today? Such issues - discussed for a long while in information systems (e.g. Checkland, 1981) - are now featuring prominently in the debate within the software engineering community (e.g. Siddiqi, 1996).

b. The changes in the professional role of the analyst: what kinds of skills should information systems analysts possess today? how should they be employed by organisations? how should skill requirements be reflected in educational contexts? It seems that analysts are implicitly expected not only to grapple with the complexities involved in defining technically rigorous and organisationally relevant systems, but also to successfully sell such systems (and the changes they bring with them) to their organisations (e.g. Allen, 1995).

c. The interplay among technology, analysis practices, and organisational context: Technological developments have resulted in dramatic increases in the variety of systems being developed today. Moreover, systems development is increasingly taking place away from the organisational context in which these systems will ultimately be used. Yet, most analysis tools and practices still reflect a much more `tidy', user/organisation-specific view of systems development. How should analysis practices reflect today's reality where a product (e.g. Lotus Notes, SAP) may replace a concept, or user requirements as the anchor point for systems development?

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