Lost in Translation?

Critical Reflection on Qualitative Approaches for Informing Information Systems Design

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Abstract

While information systems (IS) researchers continue to debate over the most appropriate qualitative approaches to inform IS design, an underlying concern remains over the process of translation from the rich insights generated by these approaches to the systems that are finally built. This paper critically reflects on this concern and points to the need for IS researchers to be more sensitive to the assumption that technology will always be the end-point of their activities. It also argues for more professional and ethical consideration over whether information systems insights are ultimately contributing positively or negatively to the evolution of contemporary organisations and society.

INTRODUCTION

Widespread acceptance within academic and business domains of qualitative approaches for informing the design, development and implementation of information systems highlights the 'coming of age' for user-centred approaches. These approaches have been proven to improve technology adoption and use by variously influencing design in a way that increases users' satisfaction, trust and ease of use with particular technologies/systems. While these successes are laudable, there remains an underlying concern amongst many IS researchers using these approaches, about the process of translation that occurs from the rich insights generated to the systems that are finally built. There is a growing recognition that implicit techno-centrism inherent within IS design processes often tend to relegate such rich insights to mere adjuncts of conventional usability testing and marginalise opportunities to open up dialogue on new ways of thinking and designing (Gasson, 2003). This 'failure in translation' is partly because IS design activities are uncritically framed as problems with technological solutions and partly because business/career imperatives encourage and/or reward designers for feature and functional complexity whether users require it or not.

While doing user-centred design is evidently very complex and difficult, this on-going 'failure' presents a challenge to the use of sophisticated qualitative techniques to understand and explain the rich socio-cultural complexities of organisational life (Kelder & Turner, 2005). Put crudely, unless the insights generated by these techniques can be translated more meaningfully than as a means to make techno-centric design decisions more palatable (Kujala, 2003), there is a danger that in the name of technical, financial or other factors these research insights can be used to subvert, marginalise or even obscure the very user issues they raise.

In this context, while IS researchers continue to debate over the most appropriate qualitative approaches to inform information systems design, this paper critically reflects on a more fundamental question implied by the 'failure in translation' – **Can these approaches ever lead to an IS analysis recommending that no technical information system be designed or deployed?** At the broadest level, this question is stimulated by two factors. Firstly, the range of qualitative methodologies and techniques IS draws on to inform design were not originally developed to produce outputs suitable for translation into functional specifications. This factor poses questions about how the adaptation of these techniques to sensitise our gaze to informational aspects of phenomena being studied artificially prioritises these elements over others within the system. Secondly, in a very real sense, information systems involving people, places and things pre-date contemporary information systems supported by digital information and communication technologies. As qualitative researchers we are aware that many of the most important aspects of information systems are tacit, intangible and unsuitable for formal representation or codification (e.g. personal, emotional & socio-cultural dimensions), as a result questions need to be asked about what the consequences are of marginalising these insights in the process of translation to technical design.

This paper critically reflects on these concerns and points to the need for IS researchers to be more sensitive to the assumption that technology will always be the end-point of their activities and the tendency for the criteria for 'successful designs' to be technologically and/or economically biased. More broadly, the paper argues that with the ever-increasing penetration of information technology into every aspect of our lives (Hassan, 2003), qualitative IS researchers have a growing professional and ethical responsibility to consider whether their activities ultimately contribute positively or negatively to the evolution of contemporary organisations and society more generally (Wright, 2005).

QUALITATIVE RESEARCH AND INFORMATION SYSTEMS DESIGN

Qualitative research approaches have been shown to deliver financial and user-related benefits when deployed to contribute to information technology designs (Kujala, 2003; Singh et al., 2003). This is particularly so in situations where technology is being designed and implemented in rich, complex, social domains (RCSDs). At the broadest level, qualitative IS research approaches are clearly many and varied (Halverson, 2002; Kujala, 2003), and draw on the social sciences of sociology, psychology, cognitive science and anthropology. Philosophical insights and methodological processes and techniques of these social sciences are applied to draw out the complex and dynamic interplay between social, cultural, political and technical factors available for observation and analysis. Unsurprisingly, this diversity of different approaches has lead to numerous debates within the discipline on the best approaches and also on how IS researchers using them to produce complex descriptions can meaningfully translate these insights within technological design paradigms. Design paradigms that are underpinned by technological assumptions about the benefits of generalisability, standardisation, verification and the benefits of simplification.

Rich, Complex, Social Domains (RCSDs)

Increasingly qualitative research projects in information systems space are drawing on assumptions that reality is socially constituted, and that acquiring an adequate understanding of reality for technology related decisions relies on investigating these RCSDs from within conceptual frameworks that are sensitive to the socio-cultural, political and dynamic aspects of how people and their artefacts interact (Østerlund & Carlile, 2005). Clearly in deploying these frameworks, IS tends to focus on the role of information, and particularly the processes by which it flows. Qualitative IS research is then in a position to reflect on and articulate the implications of the insights generated for the way in which technology might be used to enhance or even inhibit information flow (ie. sometimes there are things people don't need to know, to prevent information overload).

These research activities aim to support 'better' IS/IT system designs that can reliably replicate and support work practices incorporating the nuances that people experience in daily life. General examples include ethnographic approaches such as Susan Leigh Star's work focussing on technology; Susan Gasson's work on socially situated cognition (2004) and her framework for human-centered design that aims to reduce technology bias in IS design (2003); Hollan, Hutchins and Kirsh's distributed cognition (Dcog) approach (2000); User Centered Design (UCD) and its adaptation, the Discovery UCD methodology (Singh et al., 2003).

The next sections examine some of these approaches in more detail.

User Centered Design (UCD) Approach

The philosophy of user-centered design has generated a fruitful stream of IS qualitative research and employs qualitative techniques and methodologies derived from the social sciences. Following (Singh et al., 2003), user-centred design has been conceived as universal design, usability, interaction design, computer-human interaction and human-computer interaction. It is linked to broader perspectives of universal design and participatory design (Astbrink & Beekhuyzen, 2003; Beekhuyzen et al., 2003). The best known texts of these UCD approaches are Jakob Nielsen, Donald Norman, John Seely Brown, Dertouzos and Vredenburg (Brown & Duguid, 2000; Dertouzos, 2001; Nielsen, 2000; Norman, 2002; Vredenburg et al., 2002).

User-centred design claims to increase user productivity and satisfaction. Its focus is primarily on the individual users, their needs and characteristics and how these generate design insights for potential technologies or systems. Studies of the adoption and use of technologies have shown that successful technologies are characterised by being easy to use; providing relative value – in terms of cost, convenience, mix of channels or better ways of conducting the activity; allowing a person to try the technology or observe it before committing to it; having acceptable social and cultural meanings; and having the quality of trustworthiness (Singh et al., 2003). These characteristics are developed with early and sustained user involvement in the design process and Singh et al. (2003) report quantifiable benefits of UCD documented in the literature. Measurable benefits include increased sales, reduced development time, time saved on redesign, reducing the costs of help desks, and user productivity and satisfaction. One example given in Singh et al. (2003) was that design changes due to usability

work at IBM resulted in an average reduction of 9.6 minutes per task, with projected internal savings at IBM of $6.8 Million in 1991 alone ((Karat, 1990) quoted in Singh et al. 2003).

Distributed Cognition Theory (Dcog)

Distributed Cognition theory (Hollan et al., 2000; Hutchins, 1995) has been used to deal with complex work domains where information and decisions are distributed across people and artefacts, for example weather forecasting and air traffic control (Halverson, 1994; Kelder, 2003a, 2003b). Dcog examines people interacting with each other and with artefacts from the perspective of cognition as a distributed phenomenon and artefacts as mediating cognition. Dcog is useful to alert the researcher to the ways that people use their environment to help them think. The environment contains people, the physical space, the cultural understandings and things (technologies to aid cognition), each of which reciprocally acts upon and are acted on by the other elements. This sensitizes the researcher to be aware of the ecology of the workspace and its wider environment and to seek to understand and faithfully describe it. This in turn helps to consider the consequences of changes in the environment by illustrating the nature of the interrelatedness of the people, place and things connected to cognitive activities.

In cases where the conceptualization of the problem is technological, and the resolution consists of recommendations for a computational system, the insights obtained are easily translated into computational technologies. Dcog has been successfully used as a tool to identify representational activity in order to identify technological implementations for a chain of hair salons (Flor & Maglio, 2004). However, Dcog theory can also be used to identify cultural representations for complex and dynamic environments where simply tracing the computational aspects of forecasting was not sufficient. In one Dcog research project, the Bureau of Meteorology already had 400 process diagrams detailing the weather forecast work from many perspectives (Kelder 2003a) however many of the aspects of forecast work were not amenable to formal representation including internal mental processes using judgment and wisdom, cultural and social understandings and expectations. As a consequence, Dcog analysis was used not to simply trace the computational aspects of forecasting but rather to focus on the cultural aspects of the forecasting cognitive system. This analysis produced a rich and complex understanding of technological and non-technological aspects (the people and the place) of forecasting not previously articulated within the Bureau. These insights were validated by forecasters as articulating their work in ways they had not thought of themselves, but which they could see matched their experience. These insights were presented to the Bureau's systems developers for consideration (Bally, 2003).

Dcog also provides a framework for considering possibilities of interrelationships between different aspects of the environment (people, physical space, things, and work practices). This generates sensitivity to the conscious and sub-conscious uses actors' make of their environment to fulfill their cognitive needs. In particular, changes to the physical/technical environment will have direct and second order effects on individual and group cognition. These effects may militate against goals and objectives of physical or technological changes by transforming the landscape into which a new system solution is placed. Critically, this is because people are adaptable and often use technologies in ways unintended by the original design. Often these unintended uses are of considerable value to users and Dcog can assist capturing these uses as part of any new design process, uses which could otherwise be lost when a new solution is implemented (Halverson, 1994).

Practice Theories

Various practice theories have developed to accommodate the complexity of social relationships in work environments with technological implementations (Osterland 2004). Seminal research has been drawn on and developed further in an attempt to limit technology bias in IS design, and to avoid user rejection and information technology failure.

For example, Gasson's (2003; 2004) work has prioritised developing empirical lenses for understanding the complexities of real life organisation work that involves groups of people, and creating a way for IS researchers to build more complex descriptions and understandings of what is going on and how it is going on, even why. She deals with social cognition at individual, shared and distributed levels, acknowledging the complexity and evolutionary nature of business and IT design processes.

She deals with Rittel's (1984 [1972]) "wicked" problems: ill-structured, with vague boundaries, multiple perspectives and interrelated problems, the kind of problems that are systemic in organisations and that require a systemic solution and criticises IS research's focus on usability at the expense of defining the organizational possibilities and constraints of a system. Gasson attributes technology bias in user centered approaches to the power of technologically oriented members of design teams subverting and over-ruling the social and work goals of users, and the fact that design problems are formulated as technology problems with a technological solution. She proposes a dual-cycle model of Human-Centered Design separates *system inquiry* from *system implementation*. The *system inquiry* half of the Gasson model is used to "open up" and to define organizational

problems, and creates inter-subjectivity between the representative stakeholders that allows the *implementation* stage of the model (for technical or organizational change) to proceed according to well-established IS design methods. Gasson's methodology focuses on humans, and ameliorates the bias towards technology rather than human-centred solutions (2003).

Reflection

The examples of UCD, Dcog and practice theories above and exemplified in much of Susan Gasson's research demonstrate that IS qualitative researchers are utilising increasingly sophisticated approaches to accommodate and articulate the complexities of RCSDs. However all three approaches wrestle with the problems of translation of these insights into functional design specifications (Gasson, 2003; Hollan et al., 2000; Kelder & Turner, 2005; Singh et al., 2003). This issue is addressed in the next section.

The problem of translation is not the only issue facing those using qualitative research approaches. There is still an on-going argument about their utility with arguments often being made that the benefits of including people are limited when compared to the costs. As an example, Kujala (2003) reviewed the costs and benefits of three streams of user centred involvement design methods: field studies, qualitative and quantitative research further articulates this problem for qualitative IS research. The approaches she considered included user-centred design, participatory design, ethnography and contextual design. Her evaluation of user involvement concluded that the research practices she reviewed are not cost efficient for real product development contexts. The issues of particular concern were the complexity of gathering and making sense of the data; time taken to do the research; difficulty of quantifying the expected benefits and the difficulty in translating the resulting insights into something systems designers can understand or will use. She recommended further development of qualitative research approaches become more focused, rapid and produce less raw data. But this direction is contradictory to the trajectory of qualitative research approaches such as ethnography that have repudiated their alignment with colonialism and used the richness that comes from immersion, and self-reflective positioning of the researcher to become advocates for the vulnerable and giving voice to the marginalised.

REFLECTING ON PROBLEMS OF TRANSLATION

The information systems discipline has a strong practice of co-opting theories and methodologies from other disciplines (March & Smith, 1995). Qualitative research approaches have been co-opted and adapted within Information Systems to prioritise people (users) in an information system and provide insights that can be incorporated into technology design. But there is a danger in selectively adapting qualitative theories and methodologies from social science research domains which do not privilege information and technology and grafting them onto a primarily business-oriented organisational research domain where often social qualities are made invisible unless a dollar value can be attached to them and where power is frequently concentrated in hierarchies.

Clearly, qualitative IS researchers face many challenges as a result of the design to incorporate user insights in design as a means to mitigate or address the high failure rates of introducing technology into organisations. The barriers to success include unpalatable financial and resource costs of user focused approaches (Kujala, 2003), an implicit technology bias that subverts user centered approaches (Gasson, 2003) and the difficulty of translating hard-won qualitative insights into protocols for successful technology design (Kelder & Turner, 2005). However, a more fundamental issue for these approaches is that in translating the rich insights they generate into the requirements for technical design they tend to prioritise information flows that are easily articulated and codified. As consequence, tacit knowledge, that by its very nature, is not possible to codify (Polanyi, 1969), tends to be marginalised. This is problematic because these are the very insights that the qualitative approaches aim to illuminate. Thus, this failure of translation means that the rich, deep insights that we generate are not reflected in the designs built. Consequences of this failure include that technology designs and implementations end up reconfiguring social networks in a manner that introduces rigidity into these rich domains and potentially reduces the ability for users to open up dialogues on new ways of thinking and acting (Gasson, 2003).

For example, UCD is about technology design and its value has already been established by quantifiable methods defining time and cost savings produced by implementing it (Singh et al, 2003). Reported UCD based design implementation at IBM resulted in an average reduction of 9.6 minutes per task and saved IBM $6.8 million in 1991 (Singh et al., 2003). However, it is not clear what other impacts this time saving had at the broader system level. Were other tasks adversely affected by the time reduction? From a qualitative research perspective, there is a problem with only focusing on the informational aspects of the system because we know in RCSDs changes in one element of the system can have unexpected and sometimes disproportionate impacts on other, apparently unrelated elements.

Even in environments where users are exceptionally computer literate, such as weather forecasters there are potential problems. For example, the use of a user-centered design methodology for meteorological systems design at the Bureau of Meteorology was hampered by the inability of forecasters to articulate meteorological concepts into a form systems developers could program into software applications, and systems developers' inability to articulate the possibilities of technology for meteorological IS design into a form accessible for forecasters. This resulted in user-centred designs aspects being reduced to mere adjuncts of conventional usability testing and major socio-political concerns were bypassed (Kelder, 2003a).

REFLECTIONS AND RESPONSES

While doing user-centred design is evidently very complex and difficult, this on-going 'failure' presents a challenge to the use of sophisticated qualitative techniques to understand and explain the rich socio-cultural complexities of organisational life (Kelder & Turner, 2005). In this context, while IS researchers continue to debate over the most appropriate qualitative approaches to inform information systems design, there is a need to critically reflect on the more fundamental question implied by this 'failure in translation' – Could our use of these qualitative approaches ever lead us to conclude an RCSD analysis by recommending that no technical information system be designed or deployed? At its best, it would appear that our current utilisation of qualitative approaches takes a rich interplay of multi-dimensional information factors and modalities of expression, and then reduces them to a form suitable for quantification for technology design.

Put another way, the discipline does not recognise that there are embedded implicit assumptions about information and its use which allows IS researchers to prioritise 'information' over all other aspects of the RCSDs they investigate. Often other simplistic assumptions such as 'more information is better' and 'technology is the logical outcome of our activities' take precedence over rich insights we generate through our approaches. In a very real sense, we are aware that many of the most important aspects of information systems are tacit, intangible and unsuitable for formal representation or codification (e.g. personal, emotional & socio-cultural dimensions), as a result questions need to be asked about what the consequences are of marginalising these insights in the process of translation to technical design.

More practically, with the rich insights we generate are we ever currently in a position to say that the system is in the round better off without technology being introduced? If not, are we not implicitly making an assumption that has consequences for what we are actually doing? The question is very important: what criteria should we use to determine when or when not to recommend the introduction of a particular type of IS design? Practically, what are we really doing when our qualitative analyses produce rich and complex understanding of aspects the people and the things (technological and non-technological) in the place? If we are trying to develop and use theoretical perspectives and research approaches to prioritise or at least bring to the surface the social aspects of the RCSDs we characterise as information systems, our projects may be caught in a paradigm that has already prioritised informational aspects of the system. Thus the rich narratives that the original techniques generated are diluted, truncated, biased and devalued in the process of adapting them for a particular perspective (information for technology).

In one sense, these issues take this discussion into the realm of ethical and moral questions about the role of qualitative approaches and their use in IS. Are we implicitly and uncritically committing ourselves to the perspective that technologically mediated communication is superior to unmediated human-to-human communication? More broadly, with the ever-increasing penetration of information technology into every aspect of our lives (Hassan, 2003), surely qualitative IS researchers have a responsibility to being reflecting on whether their activities ultimately contribute positively or negatively to the evolution of contemporary organisations and society more generally (Wright, 2005).

RESEARCH AT BREASTSCREEN TASMANIA (BST)

BST as Rich, complex social domain

BST is a suitable RCSD for exploring the utilisation of the research design methods described above (UCD, DCog, Practice). It is anticipated that this RCSD provides a context for examining the boundaries of translation and consideration of whether it is possible to develop a meta-framework for IS research.

BST is the primary unit within the Tasmanian Cancer Screening and Control Service and operates within the Tasmanian Public and Environmental Health Service. Public health is traditionally philosophically aligned with a rational scientific, positivist paradigm. Within this paradigm, activities are justified and evaluated at the level of evidence based on scientific studies (double-blind trials, population level) and statistical analysis used to guide decisions on policy directions, legislation and health interventions. However, paradoxically, public health as a whole has to deal with the tension of affirming individuals' freedom of action whilst implementing policy initiatives that constrain individual actions for public benefit. Aligned to this is the reality that public health

interventions are supposed to be driven on the basis of quantifiable benefits to the community as a whole, but on the ground necessarily involve interactions with individuals. Moreover, quantifiable benefits for most public health interventions involve delays (often of decades), and can often be attributed to complex, multiple causes that may problematise the public health initiative or its evaluation.

Significantly, in BST, this situation appears to have created a space worthy of investigation, in which patient-centred care has developed in a manner that more broadly is now being advocated as a way to address the looming health crisis faced across the developed world as a result of ageing population. This approach includes relating to people as co-decision makers in their own care and encouraging prevention and empowerment as part of taking responsibility for one's own health and well-being.

Breast cancer screening of well women is federally funded and implemented at State government level. The purpose is prevention of invasive breast carcinomas via screening to identify precancerous cells or small cancers located in the breast. Participation is voluntary and recruitment is a major component of BST's screening program. Mammograms are known by to be very painful and BST must balance encouraging participation by managing the quality and type of information and other care given to participants with an imperative to screen as many women in the target population as possible (which means less time for personalised care).

Of further interest to this research is that BST is an organisational unit in the health care sector which has characteristics which require interactions between people in multiple and complex sets of relationships at multiple levels (individual, intra-organisation and inter-organisation) and, especially in the case of medical and allied health professionals, delicate social relationships that need careful management.

Theoretical Framework and Methods for Research

In this context it is appropriate to use a range of methods and techniques to elicit a rich and detailed description of the setting. The researchers' involvement in the Smart Internet Technology CRC provide the opportunity for utilising User Centred Design and Discovery UCD, and also opportunities for developing rapport and skills in translation through attending in-house conferences, and potentially engaging in a translation process with technologists within the CRC.

Distributed cognition is a theoretical lens that provides a framework for data collection and analysis and a suite of techniques for moving beyond the individual in identifying how people think and act together in prosecuting the organisation's purposes. It also enables identifying and describing evidence of tacit knowledge and mental models (Kelder, 2003a).

In conjunction with this, the researchers are also exploring the utility of Wenger's (1998) unit of analysis, "community of practice" for exploring activities at the boundaries and peripheries of BST, in particular using an approach called customer trajectory analysis (Wales et al., 2002). This approach provides a mechanism for uncovering assumptions of customer perspectives that are embedded in an organisation's policies, practices and technical information systems, particularly those points on a trajectory of interactions where actual customer perspectives challenge the organisation view. It is a method for providing information to allow redrawing organisation boundaries and for identifying emerging customer perspectives which need to be taken into account in order to continue functioning and meeting actual customer needs that the organisation intends to meet.

Research Timeframe

Data collection began in March 2005 with a familiarisation phase that lasted until June 2005. The researchers were given unrestricted access to all staff members and organisation documents, subject to ethics and privacy legislation requirements. During this period, BST was simultaneously preparing for national accreditation and undergoing a business analysis to inform decisions about a new database to be implemented December 2005. Everyone was very busy, and observations were undertaken largely ad hoc, and included attending meetings, collecting organisation documents, participating in informal conversations, and collecting newspaper articles and 'popular' media outputs regarding breast cancer. The researchers were placed on the BST program manager's email list and could observe and participate in 'conversations' that emerged in response to media events such as Kylie Minogue's breast cancer diagnosis. They also continued reviewing the academic literature on breast cancer and community education. Observation and familiarisation sometimes led to participation, and included helping run the Breast Screen cancer stall at AgFest, the Tasmanian agricultural festival.

The accreditation process was successfully completed in June, and the IS business analysis was also ready for review by the Steering Committee. Accreditation provided the researchers with observation-based data on staff members' participatory and reified (Wenger, 1998) experiences and a complete and current set of organisation documents including the policy and procedure manual, recruitment plan, data audit, an evaluation of BST's performance against over one hundred national accreditation standards and the organisation's response to unmet standards. At this stage several key staff members, including the business analyst were leaving and semi-

structured interviews were conducted before they left. The organisation has agreed to make the IS business analysis available when the process of evaluation is complete.

In August, a member of the team (female) began the customer trajectory phase of the research, and took notes while following fourteen women through the well women screening process. In September, the same team member was videoed experiencing the trajectory of having a screening mammogram to provide data suitable for a Dcog analysis. By December, it is planned that the researchers will have observed and interviewed the community education officer as she identifies and engages with potential clients of BST in an effort to achieve the organisation's target of recruiting 70% of the target age group (50-69 year old women). This will provide trajectory data at the boundary, information on perspectives and assumptions of women who have not engaged in the screening program.

Because the quantity of data collected is very large and very rich in detail, most of the preliminary analysis is necessarily on the surface. It focuses on the researchers' reflections on their observations of what was experienced, expressed, and enacted by the participants and includes self reflexive contemplation by the researchers on the ethical, social, political and cultural dimensions of what has been observed and information actively revealed by participants, as well as the impact of the researchers' own perspectives, assumptions and personalities.

While the research design is to iteratively analyse data as it is collected, the exigencies of taking advantage of one-off opportunities (such as accreditation) has meant that most data is collected, typed up with comments on context, possible connections with other data, questions to follow through later, and filed in a form that will enable it to be retrieved for deeper analysis. However the researchers' knowledge of and experience with the different theoretical lenses is guiding the data collected and keeping an informational perspective at the fore. The explicit record also functions as a record of the growth in the researchers' experiential knowledge of the RCSD (Agar, 1986).

CONCLUSION

This paper began by reflecting on the IS discipline's adoption of qualitative research theories and techniques for understanding social environments and adapting them to contribute to the design and implementation of technology. It articulated the perspective that there is a growing concern amongst many IS researchers using these approaches about the process of translation that occurs from the rich insights generated to the systems that are finally built. The paper also revealed that implicit techno-centrism inherent within IS design processes often marginalises the rich insights generated and reduces the opportunities that they provide to produce genuinely different ways of thinking about IS.

The paper has argued for the need for IS researchers deploying qualitative approaches to display greater sensitivity and take seriously the insights these techniques deliver and be wary of participating in using them as a 'shoe horn' to make the design or implementation of a technology acceptable in a given context. The paper briefly introduces the particular context and design for research the authors are conducting from within this theoretical conceptualisation of IS research. The implications of taking care with our approaches and taking seriously the research outcomes they produce are twofold. Firstly, we need to critically self-reflect on any technological determinism implicit in our design practices, and secondly, we need to remain open to drawing a conclusion from the rich insights we generate that one possibility could be a recommendation that 'no new technology' be designed or implemented. Far from leaving IS with nothing to do, adopting such an open approach will contribute to establishing the integrity of the analyses we undertake and the designs we recommend. In turn, this suggests that there is an imperative that we take responsibility for the designs that are produced based on our insights. It also suggests that while on-going attempts to make technology more amenable to social contexts are laudable, we may need to start our research before the design and be prepared to be unpopular by advocating alternative visions of information systems within a conceptual framework that allows for the possibility that a technology introduction will do more harm than good.

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