EXPLORING SOCIOTECHNICAL INTERACTION WITH
ROB KLING: FIVE ‘BIG’ IDEAS

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INTRODUCTION

A recent obituary of Rob Kling (Lamb, 2003) describes him as ‘a scholar on a ‘mission’ (Lamb, 2003, p. 196): the methodical exploration of what he labeled ‘computerization’, or the transformations in human activity that follow the introduction and use of computers in a number of contexts. Kling’s primary area of interest was organizations, because that was where computerization was most pervasive during the period of his research. A growing corpus of work from Kling and his colleagues over a period of more than twenty years highlighted the variety and complexity of the choices that are involved, and, concomitantly, the dangers of a simplistic approach to commissioning and design. This led Kling to embark on a long-term project – to establish an appropriate disciplinary framework that would consolidate the required ‘rich’ understanding of computerization – to be supported by a consistent body of robust and accessible empirical work. This domain, social informatics, though multidisciplinary and methodologically diverse, can be considered to be distinctive through the common focus on a complex problem area; namely, computerization as socio-technical complexity. Kling worked systematically to establish the new field, working with the NSF to secure grants for projects, running ‘foundation’ workshops that scoped out the discipline and assembled appropriate graduate syllabi, running the graduate MIS programme at the School of Library and Information Science at Indiana.

Kling’s work touched on socio-technical research in the UK early on in his career. The co-authored 1982 paper, the ‘Web of computing’, (Kling & Scacchi, 1982), references texts by, for example, Mumford and Pettigrew, and Burns, implicitly acknowledging their contribution to a tradition of workplace studies that underpins Kling’s own work. Reading this paper, we can see the foundations of what would later be labeled as social informatics. We are presented with four focal points (p. 167) for any meaningful investigation of computers at work: the lines of work and ‘going concerns’;
infrastructures; production lattices; macrostructures of computing environments. These are the basis of detailed case studies, out of which Kling pulls twelve propositions that are likely to apply in a number of computerization projects (Kling & Scacchi, 1982, pp. 39 – 40) which we outline in Table 1 below. The case studies, focal points and propositions are discussed in terms of four current theoretical ‘languages’ (p. 23) or perspectives (i.e. Rational, Structural, Interactionist, Organizational politics), and we are offered an exhaustive analysis of the fieldwork that draws on insights from proponents of these different perspectives. The theoretical framework is then ‘revisited’, and the paper ends with a cogent defense of web models of computing that ‘view computing developments as complex social objects constrained by their context, infrastructure and history’ (p. 69). These have greater explanatory power than the prevailing ‘discrete-entity’ model.

[TABLE 1 GOES ABOUT HERE]

The ‘web of computing’ paper may be seen as a foundation text: Kling, in subsequent studies, amplified and refined the field methodology, conceptual framework and forceful articulation of an alternative point of view that are present in this 1982 work, in many ways a prototypical example of the approach to social informatics analysis that characterizes later work undertaken under that rubric. To some of us in the UK, teaching systems analysis and design in the 1980s, Kling’s co-authored ‘web’ paper, and later book chapter on the boundaries of computing in complex organizations (Kling, 1987) consolidated and extended our grasp of what socio-technical research might achieve. These texts provided an example of deep and far reaching analysis, grounded in workplace observation, and anchored in theory, thus offering the possibility of further studies that might, over time, constitute a consistent corpus of robust research. They allowed us to place local analyses based on socially oriented approaches (like Soft Systems Thinking) in a broader frame, and see that they might improve understanding of computerization at a higher level of social analysis than that of local prescription.
In the text that follows, we present our view of Kling’s contribution to socio-technical studies of work. Why present a ‘UK’ view at all? We believe that we can offer an account of Kling’s influence that differs from that of his US students and colleagues, where our thinking has been shaped extensively by a homegrown tradition of socio-technical research that emerged in the UK independently of any US initiatives. We were all active within that tradition, albeit in different domains active within strands of that tradition – soft systems, social studies of science, information studies; Kling’s work was thus received on fertile ground.

It is tempting to offer a narrative of who has done what, where and with whom, but Kling’s scholarly network was extensive and complex, and our own attempts to chart his UK affiliations and encounters would be pitifully inadequate. We have chosen instead to convey something of Kling’s presence in our professional thinking by focusing on a number of ‘big’ ideas – ‘multiple points of view’, ‘social choices’, ‘the production lattice’ (and its corollary, the problematization of the user), ‘socio-technical interaction networks’, and ‘institutional truth regimes’. Kling’s articulation of these ideas allowed us in some cases to broaden our explorations, and in others to sharpen our approach to systematic socio-technical analysis in the local context of ICTs as distinct from other technologies explored by sociologists such as Latour or Mackenzie. The five ‘big ideas’ that we have listed are signature themes in Kling’s own work in the informatics domain, and of his intellectual legacy. We stress that our account is highly personal, and that UK colleagues from other institutions, such as at Edinburgh, Lancaster University, or The London School of Economics might take a different line.

**MULTIPLE POINTS OF VIEW**

The idea that the introduction and utilization of technology in organizational settings may be more complex than technologically deterministic accounts intimate has been informing academic work in the UK for fifty years. The notion that technology comprises more than artifacts (Woodward, 1970) is widely accepted. The ‘mutuality’ (Child, 1987) of technology, that is the inseparability of technological and social practices of organizations, and the indeterminacy of technology related change in organizations
(Wilkinson, 1983) are concepts informing much empirical work. Hence the impetus for researchers to consider both social and technical aspects as mutually constitutive as a means of understanding technology introduction and use had a growing audience amongst UK academics at the time of the publication of the Web of Computing paper in 1982. As we note above, what was particularly interesting about Kling’s work from our perspective was both the specific focus on ICTs, and the presentation of an intellectual framework to guide methodological practice with an institutional level focus. The publication of the Web of Computing paper (Kling & Scacchi, 1982) and the Defining the Boundaries chapter (Kling, 1987) provided additional, and welcome, material that helped shape our own accounts of institutional use of ICTs from a socio-technical perspective. We use these papers as points of comparison with two other theoretical perspectives (Soft Systems Thinking, and the Social Shaping of Technology) that were familiar to us in the UK, and that have been particularly influential upon our own thinking (to varying degrees) about the introduction and utilization of ICTs in institutional settings.

But what do we mean by multiple perspectives? It has to be more that merely a desire to consider both social and technical perspectives, which could quite happily be accomplished from within a discrete-entity model of computing (Kling, 1987). We start then with a tradition of analysis that emerged from the Tavistock School in the 1950s – based on direct observation in the field, with a social slant. While Mumford and Beekman (1995) trace the early days of socio-technical thinking in the UK to the 1930’s, significant developments in this area are often closely associated with the work that followed the end of the Second World War at the Tavistock Institute of Human Relations in London. Here people such as Fred Emery and Eric Trist developed their interest in the ‘joint optimization of the social and technical systems’ (Sirianni, 1995), with a preferred methodological approach based upon action research being adopted as a means of hearing the workers (ibid.). This paper is not however the place for an historical account of socio-technical thinking. Instead, we will pause to consider two strands of research which have been influential in our own work in considering multiple perspectives, and which we think make for interesting comparators with Kling’s contribution. The two areas of theory
we now consider are those relating to soft systems thinking, and to the social shaping of technology. The former is particularly associated with the work that emerged from a group at Lancaster University (e.g. Checkland 1984; Checkland & Scholes, 1990), while the latter is, for us, associated with work emerging from Edinburgh University (e.g. Mackenzie & Wajcman, 1985; Williams & Edge, 1996), both in the UK. Neither area of theory remained the exclusive preserve of the respective institutions.

Their treatment of the inter-relationships between the social and the technical make for an interesting point of comparison in considering multiple perspectives. The Lancaster school’s focus upon human activity systems acknowledges both the interrelationships between people and technology, and also the differences that may exist between individuals and groups as they seek to make sense of the ‘problem-situation’. Attention is given to uncovering the multiple meanings from the various people identified as being a part of each ‘relevant system’ (Checkland, 1984). While multiple perspectives are sought, and the opportunity for choice encouraged, the focus tends to remain at the localized level as problem situations are resolved. While soft systems thinking draws our attention to the interpretive flexibility surrounding institutional practice involving ICTs and the need to engage with multiple meanings, perhaps a significant contribution has been to challenge the social neutrality of computer technology.

Social shaping of technology as an area of theory reflects an acknowledgement of the interpretive flexibility that surrounds the application and usage of information technologies in organizations (Williams & Edge, 1996), while proposing that information technologies and institutional based practices are mutually constitutive (Mackenzie & Wajcman, 1985). Social shaping of technology (SST) articulates a different agenda to soft-systems thinking in so far as it is less concerned with resolving localized problem situations. The concern of those promulgating SST (e.g. Mackenzie & Wajcman, 1985) is at a macro level, that being to challenge the dominance of a technological determinism that views technology and society as separate spheres with the former having effects upon the latter. The next edition of their text, The Social Shaping of Technology (1999), reinforced the view that while the idea of social shaping of technology was well accepted
in academic circles, it was not nearly so well embedded in wider cultural understanding. Their aim remained to encourage the detailed studies that would “throw light on the nature both of ‘society’ and of ‘technology’ in the particular outcomes that result” and encourage “opportunities for action to improve these outcomes” (p.xvi). One particular concept that struck a chord with us was the indeterminacy of technology, and our own studies sought to make some sense of the choices in “the garden of forking paths” (Williams & Edge, 1996, p.857), as well as the nature of the various shaping influences. Hence, Kling’s (1987) desire that those developing accounts of computerization utilize web models “to better account for the major social relations which influence the development and use of computerized technologies in complex organization” (p.350) struck us as an audience in the UK as being in sympathy with strands of theory with which we were familiar. That said, Kling does address what we consider to be a weakness in the soft system thinking literature; namely the attention that he draws to the need to identify the ‘critical social relationships’ between different participants, as opposed to simply identifying a set of participants (1987, p.316). Nonetheless, although not overtly referenced within his 1980’s contributions, the influence of these strands of UK work theory within the UK were later was fully acknowledged by Kling in subsequent studies (for example, Kling, 2000; Lamb & Kling, 2002).

A further area of comparison arises when we stop to consider the degree of interaction with the perceived area of interest that the various approaches advocate. Within the soft-systems movement we clearly see an active desire to move away from a position of social inquirer as 'a platonic philosopher-king' (Mansell, Samarajiva, Mahan, 2002, p.11). Instead we see within the soft system community an argument that to be meaningful, both inquiry and change have to be viewed as inseparable components of an interactive process; that is problem solving as "a broad, diffuse, open-ended, mistake-making social or interactive process, both cognitive and political" (Lindblom, 1990, p.7). It may not be the case that the one person (or group) seeks to influence both, but there should at least be some acknowledgement that the process of inquiry is but a precursor to change, albeit it resting in the hands of others. The point is to reflect upon the degree to which inquiry into
the role and utilization of ICTs is perceived as a task in and for itself, or as a part of an interactive, dualistic, and necessarily incremental process of inquiry and change.

It could be argued that the social shaping of technology is predominantly a process of inquiry. While there is desire to contribute to the body of knowledge, an explicit desire to influence the process of change is very much left for others to take up. This desire for inquiry to influence policy can be seen manifested through association with research programmes such as the UK's ten year ESRC research Programme on Information and Communication Technologies (PICT, 1985-95). However, one facet of this approach to inquiry has been to highlight the importance of locating what takes place in its historical context as a means of better understanding socio-technical trajectories. One consequence of this is that the range of so-called actors (artifactual and non-artifactual) to be considered increases significantly. Methodologically, decisions surrounding what should and what should not be included in the course of a study are by no means trivial.

Which brings us back to Kling. On the one hand, the position of Kling is a little more ambiguous in relation to the interaction between inquiry and change. There is an implicit hope (2000) that the detailed analyses developed under the banner of social informatics will provide “increased understanding” that will result in ICTs that are “actually workable for people and can fulfill their intended functions” (p.228). On the other hand, there is no ambiguity at all surrounding the importance of considering studies from their historical perspective, with an explicit call to investigate the ‘temporal relations’ (1987, p.317) and processes amongst participants in ICT initiatives. Another feature of Kling’s work that resonates with us is the setting out of the assumptions of web models, which provided us with an ICT related construct with which to approach investigations. The value of this to us as a both a methodological aid as well as providing an intellectual focus for reflection cannot be overstated. For example, the way in which the relations between a situation of interest and what may be considered as context to that situation is, for us, typical of the detailed, and methodical work that was evident in so many of Kling’s publications.
A final point of comparison concerns the metaphors employed in the approaches we have considered above. Whether used intentionally or not, metaphors can be influential in the ways in which intellectual frameworks are received, and utilized (Morgan, 1986). In this light our three theory-based spheres of influence make for an interesting comparison. The soft systems movement, as applied to ICTs, for all its desire to foster socio-technical thinking (e.g. Checkland, 1984; Mumford, 1983) cannot escape the 'systems' metaphor. For better or for worse, the systems metaphor carries with it a degree of formalism, something governed by rules, be they human inspired or natural. The implication is that a 'system' can be understood ... if only one can get to the bottom of the relational properties governing the interaction of the constituent elements. The argument as to whether the concept of 'system' is to be considered from an epistemological or an ontological stance (Checkland, 1984) does not diminish the inference of the metaphor. The concept of 'system' has been widely embraced by many academics concerned with ICTs, rendering the possibility of the (socially?) engineered solution, and reinforcing the separation of the social and the technical - perhaps socio-technical at best (i.e. where the hyphen matters). Whatever the case, the role of technology as something that impacts upon work practices and other social processes does not seem to be explicitly challenged by this metaphor; if anything, technologically deterministic thinking is reinforced by it.

The social shaping of technology (SST) as a theoretical perspective also offers us a metaphor to interpret, one that is a striking rejoin to technologically deterministic perspectives. Here the idea that ICTs are shaped through a variety of social, cultural, institutional, and economic interactions provides new opportunities for research. The idea of shaping we find valuable, but it is necessary to recognize that SST is careful to argue against substituting one form of determinism (technical) with another (social) (Williams & Edge, 1996). SST studies seek to “show that technology does not develop according to an inner technical logic but is instead a social product, patterned by the conditions of its creation and use” (Ibid, p.856). It is important to observe that social shaping for these researchers is a mutual process, although there is a danger that a naive encounter may misinterpret the wording of the theory to imply the primacy of the social over the technical. We can see that the metaphor reflects aspects of Actor-Network Theory (ANT)
to the extent that just as outcomes in the social world are not to be seen as being
determined by technology, equally the artifactual world is not to be perceived as a
’simple reflection of human will’ (Mackenzie & Wajcman, 1999, p.24). Indeed, this view
of ‘shaping’ brings to our notice the idea of agency in artifactual ‘componentry’ – again,
the similarities with ANT are striking.

With the web of computing (Kling & Scacchi, 1982; Kling, 1987) we are confronted with
a different metaphor, one that does not immediately carry with it sense of determinism,
but which does portray a sense of interlinkage or intertextuality, of mutual
interdependence, and especially of complexity. The visualization inherent in the concept
of a web offers us a potentially intriguing development from the imagery of Vickers' 'two
stranded rope' in his appreciative systems theory (Checkland & Casar, 1986), the two
intertwined strands representing ideas and events in flux over time. Thus the web of
computing model encourages us to confront not just the information processing, social
and institutional properties that characterize computer systems, but also to consider their
shape, the power relations inherent in aspects of their choice and use, the social relations
and action, and the history of the trajectory that accompanied any instance of ICT
development and use. For Kling, within a web model the artifactual componentry is seen
as being ‘highly charged with meaning’ (1987, p.312), or as ‘a catalyst’ to social changes
in working practices (p.332). An example of the influence of this perspective upon our
own work is in the development of the Multiview Methodology (Avison & Wood-
Harper, 1986), which specifically adopts a web-model based analysis as a part of the
process of specifying information systems that more adequately reflect organizational
requirements. Multiview draws upon a wider sphere of influence as well as looking at
historic relations, whereas Soft Systems Methodology (Checkland, 1984) encourages the
definition of boundaries, a consequence of which is that only those actors who appear to
have a direct relationship with the current and the desired problem situation tend to be
considered.

To summarize, it is not so much that ICTs are not socially neutral, but that there are
elements of agency within artifactual componentry that presents the greater challenge to
established discrete-entity views. That said, in themselves none of these observations represented new thinking for us in relation to the institutional and social utilization of ICTs. However, when brought together in a web model based analysis Kling (with Scacchi in particular) invoked a powerful image of interaction, interdependence, and inseparability of a complex of areas. While each of these areas may previously have been considered in isolation by us, the web model gave us a means of addressing the multiple perspectives required as we sought to make sense of ICT mediated action in institutional settings.

SOCIAL CHOICES
Kling’s 1982 paper emphasizes that computerization involves choices, and that choices lead to unforeseen consequences. This is sometimes due to lack of information, sometimes to lack of imagination, and sometimes to the fact that choices are not made consciously – it is only with hindsight that a particular action is seen as decisive. Many of Kling’s case studies are, in effect, a deconstruction or unraveling of the trajectory of choices. They have a typical form. The first ‘move’ is the posing of a question (the stimulus to research) such as ‘what are the effects of x?’ or ‘why do so many people suffer under y?’ (Kling, 2000; 2002). This is then followed by the presentation of a straw man of some sort – the ‘standard model’, or ‘the foil’, which provides a summary of prevailing (and misguided) conceptual and methodological frameworks that have shaped the situation of the case study. A historical narrative is then offered that reveals how these frameworks have under-informed or mis-informed those who make choices. The narrative then reveals the complexity of choice in an analysis the technology trajectory of the case in question by means of the ‘focal points’ approach and concludes with a number of observations on computerization in the case in question, more or less commensurate with the twelve points listed in the ‘web’ paper. The point of such an exposition is not to say ‘here’s how this implementation failed, but to provide a rich account of how things happen that does not simply document events, but ‘theorizes’ them (Kling, 1999, p. 8). Indeed, such a perspective has informed our own work in providing a rich account of organizational practices associated with information systems strategy formation in the UK Police Service (Horton, 2000). A Kling based web-model analysis fostered a
discussion of power relations amongst participants and across group/institutional boundaries.

Inevitably, the UK tradition of SST analysis, focusing as it does on social choices and the shaping of technology intersects strongly with this area of Kling’s work. Mackenzie (1993; 1998a), for example, explores trajectories of choice in studies of military technology. He offers extensive expositions of the development trajectory of nuclear weaponry that lead the reader into a deepening understanding of a series of imbricated social choices, demonstrating that a ‘technological trajectory is a self-fulfilling prophecy’ (Mackenzie, 1998, p. 59). Williams and his research group (colleagues of Mackenzie) follow similar strategies in accounting for choices about ICTs (Sorensen & Williams, 2002). Indeed, the title of an editorial by Williams in a special issue of The Information Society (TIS) (Williams, 2000) is ‘Public choices and social learning: the new multimedia technologies in Europe’.

The convergence of these two lines of inquiry is not surprising. Kling’s social informatics group and the SST group at Edinburgh developed commensurate research agendas (albeit influenced by researchers drawing on the work of colleagues that are common to both such as Dutton, or Monteiro who have been associates of each group at different points in their development). There is considerable conceptual overlap in the description of organizational informatics – Fleck (1994), for example speaks of ‘computer assemblages’ ‘configurational technologies’ and ‘technology complexes’ where Kling describes computer ‘packages’ and ‘production lattices’. Many of the studies undertaken by the UK group take a ‘highly intertwined’ position – that is they attempt to analyze technology as an integrated sociotechnical (sic) phenomenon, and they are thus highly compatible with the position taken consistently in Kling’s own oeuvre (Kling, 2000; 2002).

With much in common between SI and SST, what do we see as Kling’s specific contribution to our own engagement with the concept of ‘social choices’? Significantly, we think, the way in which he embeds his observations in a tradition of systematic and robust empirical work – what he sees is accounted for in terms of a corpus of existing
This corpus is not purely sociological, but draws, like our own work, on a number of cognate domains: information science, anthropology, and, yes, sociology. We feel ‘at home’ with Kling’s articulation of ‘social realism’ with its localized, often institutional focus. While many of the powerful insights into technology at work in the UK SST tradition are ethnomethodological, rich descriptions of social ordering in local contexts, these are often undertaken as part of macro-level social science programmes to stimulate transinstitutional, and in the case of the European Community, transnational plans for interventions that reflect high-level policy initiatives. A recent review of many such research initiatives is provided by Mansell and Steinmuller (2000). What we find is that as much of this research has been undertaken under macro-level ‘Information Society’ initiatives, the scope is broad – in addition to Kling’s chosen focal area of organizations, we also find contexts such as the home, medicine, government. (It may be noted that some of the resulting publications were published in TIS).

THE PRODUCTION LATTICE VERSUS THE PROBLEMATIZATION OF THE USER

Kling’s early articulation of the ‘production lattice’, a complex of interests and infrastructure was also important in shaping an approach to teaching and research in Information Management that emerged in the mid-80s in Strathclyde Business School, Scotland. (The driver was the Department of Information Science under the leadership of Blaise Cronin; DIS faculty taught extensively on MBA and associated programmes). The focus in Strathclyde was on organizational information, with an emphasis on socially oriented methods of analysis. (Cronin and Davenport launched a premature and thus short-lived journal at this time called Social Intelligence). Kling’s approach to achieving a ‘rich understanding’ of computerization (an understanding derived from observations of internal activities and interactions) provided a useful complement to externally focused and deterministic models for ‘competitive’ organizational computing (such as the work of Michael Porter) that were dominant at the time in many Business Schools. The idea of the production lattice requires an analyst, or a manager, to think in a different way about those (including themselves) who work with technology. Under what Kling would call the ‘standard model’, infrastructure is simply technical, and users are problematized as
‘factors’ in systems failure, rather than sets of actors who share a workspace with other actors, all of whom are implicated in the design and development of artifacts in the workspace.

Using the production lattice, we can uncover a series of power plays that can be explained in organizational and societal terms. The marginalization (by problematization) of the user allows engineering and operations research formulations of work to prevail – as a consequence, the systems that are built impose formal constraints on work processes that exclude details of local practice and reinforce the processes of manipulation and alienation of the user. Decisions about which engineer (or vendor) and what project technique (often proprietary) to select are deeply political, as are, by implication, the systems analysis and design methods that underlie such choices. (From this perspective, some of the systems analysis and design models that were prevalent in the 80s and 90s appear to be designed to suppress multiple points of view as a kind of armature against chaos). The production lattice helps us understand the extent to which systems analysis and design methodologies are social constructions that allow work to be done, with a sociological rather than an ontological warrant. Systems design does thus not need to be ‘aligned’ with business planning; it is a form of business planning in itself.

Kling and his colleagues (e.g. Lamb & Kling, 2002) provide examples of fieldwork protocols that support exploration of the production lattice in-situ. The production lattice is a powerful generic concept that can contribute to the design of appropriate fieldwork protocols. Davenport, working with colleagues and student research assistants in Edinburgh, based an investigation in the mid-90s into new media in Scottish households on what she called the ‘re-production lattice’ (Davenport et al, 2000), adapting Kling’s concept to contemporary work in cultural studies on home informatics by Silverstone and his colleagues (Silverstone and Hirsch, 1992). These researchers demonstrate that technology is not ‘used’ but is appropriated in the home; media, suggest Davenport and her colleagues, are not ‘produced’ but ‘re-produced’ as patterns of interaction are established by a round of routines activity that constitute home life. The notion of ‘re-production’ may also account for routinized ICT appropriation in organizations, and, by
implication, to resistance to change. Elsewhere (Horton & Davenport, 2004) this idea has been utilized to investigate resistance to ICTs in legal firms. This is an environment where routine or repeated protocols have a strong hold, and in this context production constitutes a disturbance to what is termed ‘social rhythm’, heightening the likelihood of resistance.

The production lattice has implications for the ‘standard’ user model in information science. If a sociological perspective presents ‘users’ as interactors, understanding their behavior in the face of ICTs requires observation and interpretation of their interactions with each other and with technological devices. This approach to exploring ‘use’ can provide a ‘rich’ account of information work. For example, Proctor and his colleagues (Proctor et al., 1998) offer an analysis of service provision in a university library using genre analysis, specifically modeling their study on the genre repertoire of Orlikowski, and interpreting the field case as an intersecting set of social repertoires. Though there have been attempts to address ‘collective’ or ‘organizational’ engagement with libraries and information services from a social informatics perspective (Elliott & Kling, 1997; Bishop et al., 2000) the prevailing approach to understanding ‘use’ in information science has not done this, but has emphasized the putative cognitive state of individuals. This formulation makes it difficult to address collective, or organizational use of technology in the workplace. Workarounds have emerged, such as ‘information use environments’ or ‘information-seeking seeking in context’, sub-domains of information science that attempt to embrace the social dimension. Context, however, is addressed in a ‘socially thin’ manner, construed as a set of tasks, supported more or less by an ‘information resource’. Kling’s engagement with the ‘user’ issue was longstanding, and most recently articulated in a substantial paper on re-conceptualizing the user co-authored with Roberta Lamb (Lamb & Kling, 2002). With meticulous care, they expose the difficulties of the ‘standard model’, and, using Actor Network theory, present a strong case for ‘social actors’ as an appropriate label for agency.

Many of the insights that underlie this paper emerged over a period of years in a series of substantive studies of communication in science that expose the poverty of the prevailing
view of information use. The studies focus specifically on digital libraries and electronic publishing. Some of the vintage Kling hallmarks are there – the focus on activities and ‘going concerns’, and on micro- and macro-level infrastructures. These studies have resulted in a number of innovative proposals for electronic publishing: Kling suggests, for example, that a new institutional form has emerged, the Guild Model of Publishing, in some disciplines and that this has implications for the construction and maintenance of digital library infrastructures. Like many of Kling’s snappier rhetorical injunctions, the ‘guild model’ draws its strength from its applicability across a range of contexts. Guild models differ across domains, just as production lattices have different nodes, links and interstitial phenomena across organizations. But the guild model has distinctive features. It describes locally maintained publishing archives that are designed to enhance the visibility and reputation of a given institution: though access is open, input is rigidly controlled. The Guild, (like its medieval predecessor) nurtures apprentices, or young research affiliates who show promise. It ensures that interpersonal loyalty is reinforced with visible tokens of productivity, and supports multidimensional bonding: membership of the Guild is a form of social capital. In the longer term, the Guild Model may drive a shift in the value system of some disciplines, as status by institutional affiliation becomes the predominant focus of aspiration within a domain. Guilds are thus an instance of a phenomenon that has been recognized for decades in structural analyses of scientific communication – the Matthew effect, where status is accorded through association (Meyer and Kling, 2002). The publishing studies also led Kling to formulate the description of a novel organizational form – the socio-technical interaction network (STIN), a topic explored in the next section.

**SOCIOTECHNICAL INTERACTION NETWORKS**

In much of the management literature, a catch-all formulation of mediated group interaction – the community of practice – is offered as an institutional form that can promote collective problem solving, knowledge, sharing, trust and other collective virtues. Kling published a number of studies exposing, directly and indirectly, the problems that ensue from such utopian oversimplification. In 1996, he discussed the range of group formations that had emerged as a result of computer networks (Kling,
By 2000, his interest had deepened, and he co-authored a painstaking de-
construction of the term ‘community’ in the context of e-learning (Kling & Courtright, 2000). His on-going analysis of digital science (or electronic scholarly communication forums – e-SCFs) demonstrated the inadequacies of the standard framework of description (ICTs, users, mediated communication) that failed to capture the ‘highly intertwined’ (Kling, McKim & King, 2001, p. 12) socio-technical practice that is typical of the e-science domain. While acknowledging the historical impact (Tavistock) of socio-
technical systems models, Kling and his colleagues expose their limitations and proffer an alternative socio-technical network model, the Socio-Technical Interaction Network, or STIN:

‘A network that includes people (including organizations), equipment, data, diverse resources (money, skill, status,), documents and messages, legal arrangements and enforcement mechanisms and resource flows. The elements of a STIN are heterogeneous, The network relationships between these elements include: social, economic and political interactions’ (op. cit., p. 3).

The tight integration between social and technical in the STIN model provides richer explanatory power – demonstrated in the authors’ analysis of collaboratories and in their account of Monteiro’s re-construction of the building of IP standards. Kling et al. suggest that STIN modeling can be done before implementation (in comparison with actor network analysis which tends to be post hoc), where it has some predictive power (comparable to stakeholder analysis). In a way that is typical of much of Kling’s work, the article provides an 8-point activity list for those who wish to undertake STIN modeling. The STIN model led to further work on re-conceptualizing users, which we discuss in our earlier section on the production lattice.

The STIN concept is a useful foil in examining over-exuberant claims about CoPs. One such is the notion that a CoP can be created or engineered by managers; another is that an online CoP will be a stimulus to knowledge sharing and informal learning. In a 2002 paper co-authored with Hara, Kling explores these issues in detailed case studies of two
communities of legal professionals. The authors provide a typology of learning in these groups, which clarifies the scope of different accounts of the coupling of IT and practice. While ANT (and, we suggest, STIN as an approach analogous to ANT) can explain learning and knowledge sharing that is coupled with artifacts, CoP analysis is more hospitable to cultural accounting.

INSITUTIONAL REGIMES OF TRUTH

Discourse analysis was a long established part of Kling’s methodological repertoire. In the early 80s, he had explored the use of narrative in organizations (anticipating major exponents such as Boje, or Czarniawaska by several years). From specific explorations of discourse at work in definable locations, Kling developed a higher-level account of technological discourse in organizations in the paper on ‘utopian’ and ‘anti-utopian’ visions of computing jointly authored with Lamb in the second edition of ‘Computers and Controversy’ (1996b). Similar accounts (based on discourse analysis) are offered in his development of key concepts such as ‘computerization movements’, ‘institutional circuits’ and ‘institutional regimes of truth’. Examples of ‘regimes of social truth’ (the phrase is an adaptation of Foucault) are financial reporting, analysts reports, business press reporting, and scholarly research. Combined as appropriate to the workings of a specific sector, these shape institutional practice. The utility of Kling’s work is further evident here.

In a recent co-authored paper on Knowledge Management and regimes of social truth (Ekbia & Kling, 2003), the concept of an ‘institutionally specific regime of social truth’ is explained as a ‘structured constellation of organizations, procedures, laws and techniques that produce statements about the social world that function as true’. This is explored in a highly original detailed analysis of Financial Accounting that focuses on notorious corporations of the 1990s such as Enron and Arthur Andersen. A regime of social truth can turn vices into virtues: truth, like any other system, is socially constructed. The paper raises a number of questions: how do regimes emerge? do they die or are they overthrown? what are the boundaries of a ‘regime’? does ‘truth’ permeate the boundaries of regimes? to what extent does a decision-making involve a complex of regimes? It is
thus a substantial contribution to the development of the theoretical concept of a ‘local truth regime’. The Ekbia and Kling paper is an instance of what Mackenzie (1998b) described as ‘ethno-accountancy – how people do their financial accounting’ (p. 59). His own recent work in this area (2002, 2003) demonstrates that ICTs were a significant actor in the nexus of events at Enron and other companies.

Kling was initially dismissive of knowledge management, stating in his first engagements with the concept that the term is misleading, and that is should be re-defined as ‘information sharing, belief sharing, knowledge sharing’. He suggests that the term ‘knowledge’ is used to ‘inflrate’ the status of the claims that are made. Drawing heavily on an (US-based) analysis of IS literature by Schultze and Leidner (2002) he suggests that knowledge management analysis has been naively optimistic, and failed to address power relationships, a key dimension in any claims that may be made for KM as a distinctive line of inquiry. He acknowledges, however, elsewhere in the 2003 paper that critical studies do exist (citing the work of Walsham, and Pan and Scarborough). It may be noted that Kling fails to take account of a number of UK critical management studies of the ‘darkside’ of Knowledge Management (e.g. see Prichard et al., 2000)).

The conjunction of knowledge management and regimes of truth in the 2003 paper is thus intriguing. It may be that Kling wished to provide an example of a serious KM analysis. The approach does present us with an uncompromisingly sociological account of ‘organizational belief’, an important addition to existing attempts to delineate an ‘organizational epistemology’. For Kling, knowledge management entails ‘managing the ways that a firms’ employees will share social knowledge, or knowledge whose revelation can have important social consequences for those who believe it’. (Ekbia & Kling, 2003, p. 10). By admitting the phenomenon of ‘social knowledge’, Kling opens up fresh territory to explore – are ‘social consequences’ an element in ‘social choices’ with added realpolitik? Is a sociological account adequate in addressing these dimensions? His formulation of KM, and the implied line of inquiry, provides a ‘third way’ in a domain that is currently divided. By focusing on consequences rather than antecedents, Kling provides an alternative view to that of social scientists such as Wilson.
(2002), who maintains that there is no social or organizational knowledge, only knowledge ‘inside’ individual heads, and that knowledge thus cannot be managed, only the ‘conditions’ under which knowledge is held. Kling advocates the exploration of consequences rather than antecedents. And by implying that the ‘social’ dimension of knowledge lies in the fact that it ‘has social consequences for those who believe it’, Kling provides an alternative view to that of analysts who have premised discussions of the ‘social’ dimension of KM on theories of distributed cognition.

CONCLUSION
Throughout this paper, as we have reflected upon Rob Kling’s contribution, we have referred to two other bodies of work that have had a substantial role in influencing our own thinking about IT in organizations over the past couple of decades, namely soft systems thinking, and social shaping of technology. In Table 2 we provide a summary of our thinking, comparing and contrasting these three areas in terms of the five ‘big ideas’ outlined above.

[TABLE 2 GOES ABOUT HERE]

Within Table 2 we suggest that there are many areas of similarity across the three perspectives when viewed in terms of the five ‘big ideas’ already discussed. But then, that is really the point of this paper – Rob Kling’s work (and we do not diminish the contribution of his many co-authors here) came to us as a further contribution to our thinking in the socio-technical genre. Yes, there were some differences in comparison to the areas of thinking with which we were most familiar, but largely in nuance rather than in fundamental ideas. Thus we argue that, to a significant extent, Kling’s arguments fell on fertile intellectual ground in the UK, in academic IS environs at least. Kling’s contribution to our research thinking is not in question. His contribution to our thinking about teaching is not really in question either. However, there are differences in our positions on the validity and prospects for Social Informatics (SI). In 2002, Kling published his thoughts on the transformation of computer science education by means of social informatics. His tone is rather pessimistic: few of the estimated quarter of a million
Computer Science graduates produced in the US in a decade are likely to be aware of, let alone, trained in social informatics concepts and methods. Though SI addresses an endemic problem – the lack of informed and critical judgment about organizational systems design and implementation - the existing resource in US academe appears to have achieved little in the way of thawing the ‘critical chill’ (Kling, 2002, p.13). Kling concludes his paper with three challenges. The third of these is, for us, the most interesting when we pause to contemplate the contribution that SI may yet make: ‘to seriously examine how much critical work we can expect routinely from working IT professionals. How much is the conception of a “critical technical professional” too romantic a conception for us to understand the typical workplace practices of IT professionals?’ (Ibid, p.18).

We suggest that the current policy climate in the UK (and in the European Community as it seeks to integrate and enlarged consortium of nation states) gives reason for optimism. Ambitious modernization programmes for government, education and health have released opportunities for public private partnership on a massive scale. Multisourcing at a level of complexity that is beyond the experience of many of the participants has resulted in systems that never deliver on what is specified, and which, in many cases, have led to degradation of service. In an unprecedented move, the National Audit Office in the UK has recently announced its intention to audit in advance the latest big spend on health information systems, in what is quite literally a pre-emptive strike (Computing, 2004). The Office is concerned that expectations vested in large and complex projects are unrealistic, and that instrumental specifications are not sufficient. The issues are compounded by the shifting parameters of design and implementation as distributed computing, and its institutional corollary outsourcing, give way to mobile and ambient computing, and as technological trajectories become more opaque.

The SI corpus, exposing the dangers of naïve instrumentalism as an approach to information systems design and management, and taking IT in the institutional world, and its interactions, as a starting point, can guide practitioners on how to unpack the history of what is in view. This may be a specific technology (such as a database in County
government), a social formation (the digital library or the community of practice), or a sociotechnical circumstance (the Enron paper). Such practitioners may draw on the type trajectories have been revealed as the corpus has matured. These accounts are not a prescriptive toolkit. They are effective, in part, because they are loosely defined; working as a sensitizing frame to assist those who wish to re-vision the workplace. It may be that the approach must be packaged in terms familiar to working managers – as a risk assessment framework, for example, rather than an academic research approach.

A growing research, and teaching, community (emerging partly from the network established by Kling and students whom he mentored such as Lamb, Covi, Hara) has demonstrated the power of social informatics techniques in understanding areas as divergent as merchant banking, instructional technology, and attorneys in county courts. It is essential that this body of work is sustained and developed, demonstrating how to undertake investigation and observation that is not driven by instrumentalism but is informed by and leads to ‘technological realism’. Central to this, we argue, is the continuing development of a portfolio of interpretive concepts (such as STINs, regimes of truth, production lattices) that can consolidate the ‘big’ ideas that are the core of this paper.

REFERENCES


### TABLE 1: The Twelve Propositions (Kling & Scacchi, 1982, pp.39-40)

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<tbody>
<tr>
<td>1</td>
<td>Computer based service is specialized</td>
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<tr>
<td>2</td>
<td>History of commitments constrains choice</td>
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<tr>
<td>3</td>
<td>Narrow incentives and opportunities motivate choice</td>
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<td>4</td>
<td>Macrostructural patterns influence local computing</td>
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<td>5</td>
<td>Computing systems evolve through fitting and packaging</td>
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<td>6</td>
<td>Adoption is selective</td>
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<td>7</td>
<td>Innovation is continuous rather than discrete</td>
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<td>8</td>
<td>Costs are often underestimated and economic payoffs overestimated</td>
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<td>9</td>
<td>Different technical arrangements reflect political and social value</td>
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<td></td>
<td>choices as well as ‘technical rationality’</td>
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<td>10</td>
<td>Weak infrastructure often impoverishes the quality of computer-based</td>
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<td></td>
<td>services and systems actually provided</td>
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<td>11</td>
<td>The infrastructure of computing services is often unevenly developed</td>
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<td>in organizations. The quality of infrastructure will also vary across</td>
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<td></td>
<td>applications within an organization and across modes of computer use</td>
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<td>12</td>
<td>Outcomes of computer use and strategies for computing management</td>
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<td></td>
<td>are context-sensitive</td>
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<td></td>
<td>Soft Systems Thinking</td>
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<td>-----------------------------------------------------------------</td>
<td>------------------------------------------------------------</td>
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<tr>
<td><strong>Multiple points of view</strong></td>
<td>Selected individuals as informants</td>
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<tr>
<td><strong>Social Choices</strong></td>
<td>Intervensionist. Choice not an issue – processual compromise belies need for choice. Transformative aspiration (e.g. SSM) at level of understanding project. Artifactual agency not an issue.</td>
</tr>
<tr>
<td><strong>Production Lattice Versus Problematization of the user</strong></td>
<td>User-Designer-Technology triad in place, and colludes in outcome (e.g. CATWOE elements important – Checkland 1984)</td>
</tr>
<tr>
<td><strong>Socio-Technical Interaction Networks (StiNs)</strong></td>
<td>No sense of socio-technical network; weak on interaction in concept maps. Socio-technical outcome is socially determined (by selected individuals)</td>
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<tr>
<td><strong>Regimes of Truth</strong></td>
<td>Covert attempt to define language through which systems specification occurs. Controlled vocabulary.</td>
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