Social Informatics: Principles, Theory, and Practice

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Abstract. Through this paper we make two contributions to social informatics: the interdisciplinary study of the design, development, uses and consequences of information and communication technologies that takes into account their interaction with institutional and cultural contexts. Our first contribution is to make a connection from social informatics to general principles of socio-technical theories. We do this to both connect social informatics scholarship more directly to the large and growing literature(s) that engage socio-technical theorizing and to advance these principles more directly through social informatics. Our second contribution to social informatics is to engage two contemporary theoretical approaches that draw on social informatics principles: socio-technical interaction networks and principles of social actors and apply them to current practice. We do so to demonstrate that these analytic approaches are the needed tools to help scholars and reflective professionals in practice engage social informatics analyses. By doing this we highlight the potential of social informatics while honouring Rob Kling's legacy in helping to establish this transdiscipline.

Keywords: social informatics, socio-technical principles, social actors, socio-technical interaction networks, integrated criminal justice information systems

1 Introduction

In this paper we advance the work of Rob Kling and in doing so continue the empirical, theoretical, and critical engagement of social informatics. By social informatics we mean "...the interdisciplinary study of the design uses and consequences of information technologies that takes into account their interaction with institutional and cultural contexts [Kling, 1999]." Through this paper we make two contributions to the ongoing efforts to engage social informatics principles, concepts and analyses. First, we make a direct connection between social informatics

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and general principles of socio-technical theories. We do this to both connect social informatics scholarship more directly to the large and growing literature(s) that engage socio-technical theorizing and to advance these principles more directly through social informatics.

Our second contribution is to identify nascent theories that draw on social informatics principles. We do so because these theories present an opportunity for scholars and reflective professionals in practice engage social informatics analyses (e.g., Lamb and Sawyer, 2005). Pursuing this second contribution we contrast two emerging theories – socio-technical interaction networks (STIN) and social actor approaches – that reflect these socio-technical principles and build on social informatics[i]. The STIN approach provides a system-level framework for analyzing socio-technical networks / systems that views the social and the technological as fundamentally inseparable components of the system [Kling, McKim, & King, 2003]. The social actor approach models users as social beings, embedded within an enabling and constraining social context but with individual agency to shape that context [Lamb & Kling, 2003]. Both the STIN and social actor approaches represent current theorizing activities within social informatics. In our study of integrated criminal justice systems (ICJS), we have found that these theoretical frameworks inform our understanding of design, deployment, and use of ICJS. More importantly, STIN and social actor theories point us to relevant issues in the design of technologically and socially complex interorganizational ICT.

This paper continues with a discussion of socio-technical principles. Building on this foundation we then tie the principles to both STIN models and social actor theory, followed by an application of those theories to the study of ICT in practice. We conclude by discussing future directions for social informatics research.

2 Socio-technical Principles

Social Informatics is grounded in the principles that guide socio-technical theory. We build here on Bijker's [1995] argument that socio-technical theories reflect four principles: (1) the *seamless web*, (2) the *change and continuity*, (3) the *symmetry*, and (4) *action and structure*. In doing this we note that in engaging these principles we are not engaging a particular theory: we are arguing that social informatics reflects principles seen as common to theories of socio-technical change and action.

The *seamless web principle* states that any socio-technical theory should not *a priori* privilege the technological or material explanation ahead of the social or vice versa. In the parlance of academic disciplines, neither the computer science nor the sociology views should be privileged. In social informatics, we focus on the web of computing, treating the material artefacts and social practices as bound up together in situated and mutually-constituted activity.

The *principle of change and continuity* states that socio-technical theories must account for both change and stability and not one to the exclusion of the other. Socio-technical phenomena are at once both continuous and evolving, retaining an inherent structure while adapting over time[ii]. In social informatics, the temporal and

historical trajectories of both human activity and technological development are intertwined and continuously evolving.

The *principle of symmetry* states that the successful working of technology must be viewed as a process rather than an end-state (this relates directly to the principle of change and continuity). Focusing on the workings of technology as a process rather than an end-state, avoids the trap of technologically deterministic analyses that are too often found in other perspectives. In social informatics, this principle also steers us towards engaging situated empirical studies as part of the research.

The *principle of action and structure* states that socio-technical theories should address both the agency of the social actor and the structural constraints. In this view, people have agency in shaping, changing, and enacting their social context and uses of ICT. But, they are also constrained by social institutions (Scott, 2001). In social informatics this steers scholars to focus on both the structural and agentic activities of both people and ICT.

The simply-stated (but difficult to engage conceptually or empirically) premise underlying these four socio-technical principles is that neither technology nor social context are isolated, isolatable, or unchanging. Instead the social contexts and technological artefacts are perpetually interacting and shaping each other.

2.1 Socio-technical Principles and Social Informatics

Some might see social informatics as a subset of socio-technical scholarship: one focused on particular forms of technology that directly engage information processing and communications technologies (ICT). This suggests that these ICT have particular characteristics that distinguish them from other forms of technology[iii]. That is, there must be particular characteristics that distinguish a computer and its applications from, say, a nuclear reactor, microscopes, or electrical power grids.

We argue that ICTs configurational nature is one distinguishing characteristic from other forms of technology. By configurational we mean that that in their design and use, ICT are interpretively flexible, multiply adaptive in use, and always evolving [Fleck, 1994; Quintas, 1994; Suchman, 1987, 2003]. Some may argue that these differential characteristics are but a matter of degree. We defer to other venues that discussion, and here claim that social informatics is premised on the study of ICT as a specific and volatile type of socio-technical ensemble.

The practice of social informatics is trans-disciplinary – spanning such diverse fields as computer science, sociology, communications, education, information systems, information science, and others. Social informatics is neither a theory nor a method: it is a perspective in the same way as are human-computer interaction and family studies. In action, social informatics is an approach to understanding, theorizing and engaging ICT that reflects five specific principles on social analysis of computing [Lamb and Sawyer, 2005]:

1. In social informatics ICT are seen as a socio-technical system: a web-like arrangement of the technological artefacts, people, and the social norms, practices, and rules. As a result, for the social informaticist the technological artefact and the social context are inseparable for the purposes of study and

analysis [Kling, McKim, & King, 2003]. It is this principle that most directly links to socio-technical principles.

2. Social-informatics is problem-oriented. This means that social informatics research focuses on the 'real-world' design, development, and use of ICT. The purpose of which is to inform the discourse on ICT to help individuals, organizations, and societies make better use of ICT. There is no correlate for this in the socio-technical principles.
3. The design, development and use of ICT are contextualised and socially-situated. The social and historical contexts pervade every element of ICT from conceptualisation to design to implementation and use.
4. People are social actors [Lamb & Kling, 2003]. People have individual motivations, interests, practices, values that influence how and why they use ICT. Though constrained and enabled by the social institutions in which they are embedded, people have individual agency that both shapes those institutions and influences their adoption and use of ICT.
5. The social informatics researcher adopts a critical orientation and prioritizes an empirical view of ICT. By 'critical orientation' we don not mean to convey synonymy with *critical theory* ands its orientation towards emancipation and Marxist theory [Orlikowski & Baroudi, 1991]. Here, critical denotes an orientation that challenges the accepted wisdom and taken-for-granted assumptions regarding ICT. It is through this challenging of assumptions that the social informaticists avoid simplistic technological determinism and gain deeper insight into the complexity of ICT's design, development, deployment and ongoing uses.

Using these principles, social informatics researchers have over time consistently revealed in their empirical studies a number of consistent findings (See for example: Kling, Rosenbaum, & Sawyer, 2005b). These common findings include:

1. The paradoxical effects of ICTs take up and uses,
2. That ICTs uses shape action and thoughts that benefit some over others,
3. That the design and implementation of ICTs have moral and ethical consequences, and
4. That the phenomenon of interest will vary with level of analysis

Given that these are so commonly found in empirical studies of computing's design, development, adoption and use, we argue that these are worthy to report, but do not constitute new insight. Indeed, the progress of social informatics must be based both on the constant presentation of these common findings and, more importantly, the additional detailing that reflects how these common findings are suppressed or magnified through particular actions, events or arrangements, the temporal sequencing of engagements, and the contextual differences (and measures) between better and worse computerization efforts. To do this, we and others have argued for analytic approaches that are grounded in social informatics principles [Horton, Davenport, & Wood-Harper, 2005; Lamb & Sawyer, 2005; Sawyer & Crowston, 2004; Wood-Harper & Wood, 2005].