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From Findings to Theories: Institutionalizing Social Informatics

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ABSTRACT

We focus here on the history, status and future of social informatics. In doing this we build on the visionary work of the late Rob Kling. Social informatics research contributes insights and perspectives to the study of computing in our society that other approaches do not. We make the case that social informatics is on its way to becoming a scholarly institution: accepted as one of the several approaches to study computing, and in particular, the approach best suited to engage on computerization. In making this case, we highlight the value of social informatics, summarize its principles and common findings, point to current work and issues, illustrate the three perspectives through which to pursue this scholarship, and identify several current activities remaining for social informatics to institutionalize.

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From Findings to Theories: Institutionalizing Social Informatics

We speculate here on the future of social informatics. We do so because information and communication technologies (ICT) are challenging our understanding of what roles these play in our work, family, school, and social lives. As Kling (1999) made clear, social informatics provides insights into the value choices and social conflicts regarding the take up and uses of such ICT which alternative approaches do not consider.

For example, the rapid growth of social networking via activities at www.myspace.com and www.facebook.com may be altering the nature of social relationships. At the same time, online scams, privacy issues, and security breaches (and concerns) are juxtaposed with the substantial number, and continued growth, of people who engage in commerce and social interaction via the Internet. Further, the attention to online voting, the use of web logs (blogs) as new venues for political discourse, and the use of other online resources to help organize and sustain political campaigns (such as the work done by moveon.org) raise questions about what it means to be a citizen in a community and what roles government should be playing. These are examples of large scale ICT-based systems whose analysis and effects are not easily engaged within many of the current approaches common to computing, human-computer interaction, and social and political analyses. These examples span levels of analysis, reflect both social and individual actions, and involve particular and common uses of ICT. These ICT are, themselves, parts of large-scale networked infrastructures which cross existing social and institutional contexts in too-often unexpected ways.

These examples also illustrate what we and others call computerization – the processes and effects due in part to the take up of new ICT and concomitant changes in social and economic arrangements (Burris, 1998). As Kling (1999) notes, social informatics is "… a body of research that examines the social aspects of computerization. A more formal definition is 'the interdisciplinary study of the design(s), uses, and consequences of information technology that takes into account their interaction with institutional and cultural contexts.'"

Social informatics provides organizing principles and perspectives[1] for scholars to pursue computerization studies that span a diverse set of ICT and domains. For example, social informaticians have studied computerization activities in a range of domains including mortgage banking industry (Markus, et al, forthcoming); large-scale ecological science (Karasti, Baker and Halkola, 2007).), and open source software (Scacchi, forthcoming). The span of interests help to emphasize both the scale of computerization, the need to engage across these spaces, and the value that social informatics provides in its focusing attention to the situated and socio-technical activities being pursued.

The late Rob Kling was an iconic figure and outspoken champion for social informatics and, more broadly, the social analyses of computing. Others have observed that in these roles as icon and champion, he worked with many to both articulate social informatics' core concepts and to mobilize the network of scholars who pursue this approach to scholarship (Lamb and Sawyer,

1 For more on this, see the Appendix.

2005).

Kling (2004) noted that the conceptualization of "social informatics" arose in part as a means to help convey the broad sweep of activities regarding social analyses of computing and to help convey central concepts in this work to computer scientists. He did so because few computer scientists have or get academic training in the vibrant scholarship relative to the social analysis of computing (Kling, 2004; Kling, Rosenbaum and Sawyer, 2005)[2].

The early roots of social informatics may have been in and towards computer science. Now, however, social informatics work is pursued in by scholars in education, communications, management, sociology, information science and information systems. Thus, social informatics serves to give form and substance to those computer and information scientists who engage in social analyses of computing and those social scientists who take seriously the roles that ICT play as part of the larger social milieu. Moreover, social informatics provides form and identity for the steadily growing numbers of information and social scientists who study what Kling and Scacchi (1982) called the "web of computing."

The basis of social informatics is that ICT are inherently socio-technical, situated, and socially-shaped. The common-sense nature of this premise belies the difficulties faced by scholars who have pursued this work. These difficulties have included engaging others in the findings and concepts that reflect a socio-technical view of ICT, gaining financial and academic support for doing this form of research, improving the methodological tools and publishing this work. Over time, these difficulties seem to have lessened, perhaps reflecting a growing awareness of--and increased acceptance for--social informatics.

We want to ensure that social informatics continues to develop its role as one of the viable approaches from which to pursue scholarship on computing and computerization. In this essay, we first present an historical perspective on the growth of social informatics, ending with a summary of its current status and some observable trends. Second, we develop what it means for social informatics to "institutionalize." In the final section, we discuss five issues and opportunities for social informaticians as they seek to institutionalize this approach to the study of computing.

SOCIAL INFORMATICS: A BRIEF HISTORY

The origins of what we now call social informatics can be traced to the 1970s. As Bill Dutton notes in his preface to Kling, Rosenbaum and Sawyer (2005), members of the faculty at the University of California at Irvine (UCI) came together out of common interests in the social aspects of computing. In evolving and expanding discussions, they involved their professional social networks to examine approaches, principles, and venues for showcasing social analyses of computing. This network of social relations centered on the UCI group plays played a central role in the contagion and dispersion of social informatics – both in the U.S and internationally.

This group of like-interested colleagues at UCI began working together on a series of courses,

2 The number of scholar engaging in social informatics research has been growing steadily in the past decade (Sawyer, 2005a).

studies and projects regarding the design, take up and uses of ICT[3]. The membership of this group varied as faculty and students came and went from UCI. However, the discussions continued, and the network of colleagues who were involved at UCI and at other places grew through the 1980s and into the 1990s. The UCI group came to include scholars such as Mark Ackerman, Lisa Covi, John Danziger, Bill Dutton, Les Gasser, Jonathan Grudin, Suzi Iacono, John King, Ken Kraemer, Roberta Lamb, Walt Scacchi and many others[4]. These colleagues engaged their colleagues, and in turn were involved in a large set of professional networks of scholars who were involved in social informatics scholarship. In or near the nexus of this evolving web of people was Rob Kling.

At UCI, the Urban Research in Information Systems (URBIS) study became a springboard for engaging social analyses of computing (Kraemer, 2004). Kling and colleagues, drawing on symbolic interactionism, framed the study of local government in terms of social conflicts and value choices, and depicted computing as a negotiated set of arrangements[5]. Through a series of projects, Kling and the UCI group developed and refined conceptual positions such as the web of computing concept, computerization movements, value choices and social conflicts.

The network of faculty and students centered in UCI were not the only scholars actively pursuing social analyses of computing. At about this same time, scholars in the UK and in Scandinavia were engaging in discussions on social analyses of computing[6]. These group's activities focused, in part, on engaging social analyses of computing within the various academic units in their national context. During this period, the information systems research in Scandinavia (IRIS) and the UK association of information systems (UKAIS) communities were formed, and these had social analyses of computing as central themes. By the early 1980s, the scholars at UCI; in the UK and in Scandinavia were both known to each other and involved in collaborative projects, conferences, and scholarly debate.

The United Kingdom

Scholars interested in the social analysis of computing located in the United Kingdom were taking notice of this activity in the US. Horton, Davenport and Wood-Harper (2005, p. 51) note that Kling and Scacchi (1982) made the case for computing as a web by building on the work of a number of scholars well known in the UK, directly referencing the socio-technical writings of "…Mumford and Pettigrew and Burns, implicitly acknowledging their contribution(s) …." Many of the UK scholars drew from the Tavistock[7] tradition of socio-technical systems for their social analyses of computing and this 1982 paper and subsequent work by Kling and his students (e.g., Gasser, 1986) extended and cemented this connection.

The U.K. continues to be a home to active centers studying the social analyses of computing, and these scholars build on and extend the Tavistock tradition. Contemporary work in this areas

3 For more on this see UCI's Computers, Organizations, Policy and Society (CORPS) program site at http://www.ics.uci.edu/~corps.
4 This list is alphabetical and illustrative (not exhaustive). Any such list leaves out many salient participants: out apologies!
5 See Robbin and Day (2006) for a detailed depiction of Kling's theoretical activities and interests.
6 Institutional locations relative to professional affiliations are worth noting. Kling engaged with scholars across a range of disciplines in discussing concepts of what was to become social informatics. At first this effort, while broad in engagement, was often focused towards computer scientists. They proved to be an unsympathetic audience, as he notes in Kling (2004).
7 For more on the Tavistock tradition, see Trist, E., & Murray, H. (1993).

draws on a range of perspectives such as the social shaping of technology (Williams and Edge, 1996), theories of actor-networks (e.g., Latour, 1987), and social constructionism (e.g., Pinch and Bijker, 1986). Places like the London School of Economics, Oxford's Internet Institute, The Judge Institute at Cambridge and Edinburgh universities are home to a large number of scholars focusing their attention towards social analyses of computing[8]. Both Napier University and the University of York have centers for social informatics (with Napier's center located in their School of Computing and York's center housed in sociology). There are social informatics scholars, and scholars interested in social analyses of computing at many universities in the UK. Some of these scholars are in information systems groups; some in new media programs; many are in sociology and communications (e.g., Mansell, 2005).

Scandinavia

Beginning in the 1970s, and led by iconic figures such as Kristen Nygaard [9] – and more recently Pelle Ehn, Erik Stolterman and Bo Dahlbom – the Scandinavian approach to the social analyses of computing reflects an orientation towards designing systems. The Scandinavian approach is distinctive, grounded in a deep appreciation for workers' rights, social theories, and socio-technical concepts[10]. These are reflected in the principles of participatory design and, more recently, activity theoretic approaches. Across these countries, social analyses of computing underpin much of the work done in and around ICT.

Scandinavian scholars continue to be at the vanguard of social analyses of computing. They pursue participatory design and activity theory as they theorize on the emergent and dynamic nature of IS. Social informatics research units, academic departments, and courses/curricula are commonly found in universities across Scandic and Nordic countries. Scholars steeped in the UCI perspective, and those from the U.K. and Scandinavia who also are pursuing the social analyses of computing, were also jointly engaged in initiating international-focused groups within the International Federation of Information Processing (IFIP) (see Working Group 8.2[11], on information systems in organizations and society, and Technical Committee 9, on relationships between computers and society[12]).

Europe, Japan and other places

Concepts, principles and perspectives of social informatics have also been actively pursued by scholars through Europe and Japan. This interest was embodied in developing programs of study, the naming of faculty units, and research efforts[13]. As Vehovar (2006) notes, in central Europe, social informatics also includes a specific focus on social science tools and methods (a precursor to the current e-social sciences activities in the European Union). In Japan, social informatics evolved more directly from informatics, with a focus on designing and deploying information systems that exist explicitly within social units and that support exchanging

8 The degree to which the material artifact is engaged varies across these centers of scholarship, suggesting that not all of these places would see themselves as desiring to be called, or identifying with social informatics

9 For more on the late Kristen Nygaard, see: http://heim.ifi.uio.no/~kristen/

10 For example, in Sweden informatics (the study of computing) is a social science.

11 See: http://www.ifipwg82.org/tiki-index.php

12 See: http://www.info.fundp.ac.be/~jbl/IFIP_tc9/index.html

13 See http://social-informatics.org for more details. Vehavor (2006) notes that some of the earliest uses of social informatics were by faculty in the social sciences at Slovenia's Ljubljana University.

information.

The 1980s and 1990s

Over the past 30 years, social informatics has evolved from these disparate discussions, early visions and half-formed ideas to the current phase as a visible and vibrant intellectual movement regarding computerization. Kling began to interact with this community in the 1980s and this association continued until his death[14].

During the 1980s, scholars pursuing social analysis of computing created several communities and several venues for their work. In Scandinavia, the annual IRIS conferences attracted many other Europeans and a few from the United States. The IFIP 8.2 and IFIP TC9 groups were formed and held regular (and almost annual) conferences which grew rapidly to attract several hundred participants from across Australasia, Europe and North America[15].

In the 1990s, social informatics gained momentum in the U.S. through an expanding series of informal discussions and an increasing number of scholars. The 1997 NSF-sponsored Indiana workshop on social informatics provided both a formal venue and increased visibility to this work[16]. The efforts at this point were to understand and document the common findings and concepts derived from socially grounded research into the design, uses and effects of ICT.

More broadly, the value of – and insights drawn from – social analyses of computing were showcased in activities such as the U.K.'s ESPRIT and PICT funding programs (with Bill Dutton, one of the UCI group, involved). In the U.S., the President's Information Technology Committee (PITAC) developed an influential report highlighting the value of more inter-disciplinary scholarship on computing, the importance of societal impact, and the potential value that social scientists could bring to study computing. The U.S. National Science Foundation (NSF) supported this in part through their large-scale and program on information technology research (ITR).

Current Status, Connections, and Extensions

Beginning in the late 1980s, and more commonly in the 1990s, an ever larger number of venues began to feature social informatics work. These include journals such as *Information Society, Information Technology & People, information, Communication and Society, New Media and Society*, the *Journal of the American Society of Information Science*, and the *Annual Review of Information Science and Technology*. At the same time, annual conferences began to accept and showcase social informatics scholarship. These included both the European and Americas Conferences on Information Systems (ECIS and AMCIS), the International Conference on Information Systems (ICIS), IRIS[17],the Association of Internet Research (AoIR), International Communications Association (ICA), American Society of Information Science and Technology (ASIST), American Sociological Association (ASA) the Society for the Social Studies of

14 For example, in 1996, Rob was a keynote speaker at, and in 1997 social informatics was the theme of, the Information systems Research In Scandinavia (IRIS) conference: http://www.ifi.uio.no/iris20/.
15 For more on IFIP and IFIP8.2 see http://ifipwg82.org.
16 For more on this workshop, see the report at http://rkcsi.indiana.edu/media/SI_report.pdf.
17 The 1996 IRIS conference was themed for Social Informatics.

Science, the Association of Computing Machinery's Special Interest Group on Computers and Society (SIGCAS), the IEEE society's special interest group on Technology and Society. In 2001, the London School of Economics' Information Systems Department began hosting an annual workshop on social studies of information technology (SSIT). Collected works from these workshops have been published in Avgerou, Ciborra, and Land (2003). And, in 2005, ASIST chartered a special interest group in social informatics (see www.asist.org).

As he notes in Kling (2004), Rob left UCI (and to some degree computer science) in 1996, moving to Indiana University's graduate school of Library and Information Science. By then, social informatics scholars were to be found in several of the larger information science programs. Over the next decade, a number of new "I-Schools" were started in the U.S. (at places like Penn State and Indiana) while existing U.S.-based library and information schools continued to evolve and broaden (following the lead of Syracuse's School of Information Studies, which had begun this trend in the 1970s). Some leading schools of computer science followed UCI's lead into social informatics (such as Georgia Tech's College of Computing and Cornell). Each of these many forms of computing and information science schools -- currently numbering more than 20 and increasing each year -- embraced social informatics as part of their scholarly activity. While Indiana University's Center for Social Informatics was the first named unit, others have followed. For example, in 2002, UCI created a Department of Social Informatics in the newly formed (and named) Bren School.

Outside of the "I-school" space in the U.S., academic units such as communications, sociology, management and information systems as well as new media began to both explicitly pursue social informatics as one of the viable approaches to social analyses of computing. As we noted earlier, there are centers of social informatics hosted by sociology departments, while other departments offer a minor in social informatics in the social sciences.

INSTITUTIONALIZING SOCIAL INFORMATICS

The scholarly activities of social informatics are at a point where both the central elements of the approach and some basic principles and values in the social analysis of computing can be identified (see the Appendix and also Sawyer, 2005b, Lamb and Sawyer, 2005; King, Rosenbaum and Sawyer, 2005; Berluer, Nurminen and Impagliazzo, 2006). Social informatics scholars -- individually and collectively – are engaging in actions that institutionalize "social informatics" as a legitimate approach to the study of computing. This desire leads to asking: what are social informaticians doing, and what should they be engaging in, to assure legitimization and institutionalization? To answer the question(s) we need to draw from the literatures of institutional theory to help us understand and evaluate actions toward institutionalization.

On becoming an institution

According to institutional theory, an institution is a representation of a social order or pattern, continually reproduced, which owes its continued existence to relatively self-activating or automatic social processes (Scott, 1994a, 1995; 2001 DiMaggio & Powell, 1991; Brint & Karabel, 1991; Zucker, 1977, 1983, 1987; Jepperson, 1991). Scott (1995) provides a

comprehensive definition of institutions as consisting of cognitive, normative, and regulative structures and activities that provide stability and meaning to social behavior. He discusses discerns institutions as multifaceted systems which incorporate systems of symbols - including cognitive constructions and normative rules – and regulative processes that are carried out through and shape social behavior. In this way, an institution is "a set of roles, graded in authority, that have been embodied in consistent patterns of actions, that have been legitimated and sanctioned by society or segments of that society; whose purpose is to carry out certain activities or prescribed needs of that society or segments of that society." (Mills, 1959)

Something becomes an institution when self-perpetuating internal social patterns reproduce themselves without the need of sustaining action or collective action by its members (Painter, 2002). Instead, routine procedures support and sustain the pattern, furthering its reproduction, unless collective action blocks or external shocks disrupt the pattern (Jepperson, 1991). Institutions arise due to enacted practices from which evolve stable sets of structures, with formalized rules and laws.

Drawing from contemporary literature focused on developing theories of professional institutions, occupations become professionalized or institutionalized when they are believed to require extensive formalized study and a mastery of specialized knowledge; are autonomous; self-restricted and self-regulated; and generally exclusive. A professional institution includes organizations for preserving the knowledge and the practices, enforcing the standards, and educating professionals (Tseng, 1992; Carter, Grebner, Seaman, and Foret, 1990). Drawing from and combining these, we argue for a working definition of a *Scholarly Institution* as one with the following characteristics:

1. Automatic: self replicating;
2. Autonomous: self-regulating;
3. Structurally stable: possessing formalized norms and cultures;
4. Visible: having a coherent outward appearance.

The constituent elements and processes that go into forming institutions are a very active area of scholarship (Frumpkin and Kaplan, 2005). Most institutional research has focused on the effect of institutions as independent variables, at the expense of an examination of the determinants and components of institutions and the process by which institutions become constructed remains a "black box" (Zucker, 1988: 104).

The development of institutions has been related to structuration theory by numerous authors (DiMaggio & Powell, 1983; DiMaggio & Powell, 1991; Scott, 1994a; Barley and Tolbert, 1997). Framed as a structurational process, institutionalization results as orderly patterns or interaction emerge out of loosely organized technical activities serving to infuse a normative order or set of normative values into the organization (Broom and Selznik, 1955). According to tenets of structuration theory, institutions emerge out of a dynamic in which individuals are shaped by institutional forces and then act upon their institutionalized environments to transform institutional arrangements (Tolbert and Barley, 1997). Change comes about in institutional environments when some event or development breaks the patterns established by previously recurrent actions and reflexive behavior of individuals.

Institutionalization requires drivers, entrepreneurs or champions who can respond to a critical event by bringing it to the attention of others and by proposing a response that carries weight (Frumpkin and Kaplan, 2005). Drivers lend legitimacy to the effort at hand. They can control powerful resources, but more importantly, they represent key players in the institutionalized landscape. They are often viewed as authorities and deferred to in matters of policy.

Summarizing the path toward becoming a scholarly institution, it takes concerted effort to:

(1) Define the core and peripheral elements of the institution.
(2) Identify leaders and fill critical leadership positions.
(3) Formalize structures and processes of participation and inclusion.
(4) Resolve (or accommodate) internal discord among key participants.
(5) Communicate organizing values, principles and contributions to others.

Contemporary scholarship on institutionalization often assumes that institutionalizing efforts take place at an organizational level. In contrast, social informaticians typically pursue this activity as individuals, not organizations. That is, we see social informaticians as a broad and growing collection of diverse individuals who come from diverse intellectual backgrounds, who work together or even exist in the same organizational space. Social informaticians are scholars who come from academic departments in academic colleges in which they may be the only (or one of few) social informatician(s) present. Until recently, there were few units, departments, schools or colleges of social informatics, so many early adherents became social informaticians as individuals, often at some risk to their careers. They did so because the approach provides useful alternative insights into computerization.

Working within and across a range of existing academic disciplines, current social informaticians have used available vehicles such as informal professional networks (supported with listservs and email interactions), journals, conferences, funding sources, research centers and formal education to engage peers in the value and legitimacy of social informatics work. These efforts have generally been done within the current academic norms and structures, even as they seek to alter them to allow for social informatics' growth.

SOCIAL INFORMATICS AS A SCHOLARLY INSTITUTION

We claim here that social informatics is beginning to exhibit characteristics of institutionalizing as one of several accepted approaches to studying computing. To support this claim we draw from our definition of a *Scholarly Institution*, noting that contemporary activities in and about social informatics show signs of being: automatic and self replicating; autonomous and self-regulating; structurally stable with formalized norms and cultures; and having some level of a unified outward appearance.

As we noted earlier over the past decade social informatics has emerged as a means of representing social analyses of computing to computer, information, and social scientists. We noted that there are now centers, research groups, departments, and schools of social informatics. We further notes that social informatics is one of the intellectual foundations of the "I" schools (as Kling noted in his remarks to the IFIP World Congress in 2002: Kling, 2004). Scholars who

claim to practice social informatics, and the department, schools, centers, in which they are housed, have multiplied. While this signifies some replication, it may be to early yet to be automatic in its growth and reproduction.

While, social informatics cannot claim to be autonomous, social informaticians – often working as small groups – have made giant steps in becoming visibly identified parts of other, established organizations. There are groups focused on social informatics forming in several academic societies (such as the American Society of Information Science and Technology (ASIST), Association of Information Systems (AIS) and the Association of Computing Machinery (ACM)) that expand on the existing groups such as the IFIP WG 8.2 and the ACM Computers and Society Special Interest Group. Social informatics is comprised of like-interested individuals, research groups and departments from a wide range of academic settings. This trans-disciplinarity is both a central characteristic and a structural impediment to creating a singular academic organization, central association, or uniquely representative journal/venue. Here, however, social informatics may benefit from the increasing infrastructural support provided by enabling ICT such as the internet, cyber-infrastructure (or e-social science) and ICT-enabled form of virtual organizing[18].

There is evidence that social informatics is cohering into a set of basic principles and common findings (Lamb and Sawyer, 2005; Kling, Rosenbaum and Sawyer, 2005)[19]. We further note the social informatics is increasingly present in several academic disciplines' conference calls, editorial statements of journals, and is a name taken up by both research groups and academic departments (see Sawyer, 2005b). This suggests that doing social informatics-oriented research is being legitimated as scholarly endeavor. Over the past few years, social informatics has been included as a representative form of scholarship in the recruiting advertisements for faculty and research positions in several disciplines. And, there has been funding and other forms of resource/support for those engaging in social informatics research. This suggests funders and sponsors are deriving value from social informatics findings[20].

We see these indicators as precursors to institutionalization. They do not predict that institutionalization *will* happen: These precursors suggest that institutionalization is now *possible*. By saying institutionalization is possible we further note that the challenges to doing social informatics research, to being a social informatics scholar, and to engaging those who are not fluent with the concepts, findings and approaches to social informatics continue. But, these challenges are shifting from forming an identity and establishing legitimacy towards issues with making clear our contributions to the academy and society. And, increasingly, the challenges to publishing social informatics work are no different than those challenges faced by adherents to other intellectual perspectives on the study of computing.

The Role of Leadership in Institutionalization

18 In saying this we make no claims to the specific forms or particular ICT to support virtual organizing. We note that the organizing principles of Social Informatics are, however, likely to build on the computerization studies, findings and principles in which its adherents engage.

19 See the Appendix for more details.

20. For example, an earlier version of this essay was written in response to a workshop on Social Informatics sponsored in part by the United States' National Science Foundation (NSF), see: http://crito.uci.edu/si. Another version was included in Berluer, Nurminen and Impagliazzo, (2006).

With an iconic leader such as Rob Kling, no discussion of institutionalizing would be complete without addressing the theoretical impacts such a leader may have had on the future of social informatics. Institutional theory recognizes an incisive role for leaders in the processes of transforming collective actions into social institutions (Painter, 2002). Selznik saw a vital role for leaders in the definition, infusion, and defense of values (Shinn, 1996). He describes a major responsibility of leadership as infusing value and imprinting these into the institutional nature of formal social structures (Shinn, 1996) and monitoring the costs and benefits of the process of institutionalization (Selznik, 1996).

According to the imprinting phenomenon, an organization reflects the historical circumstances of its founding period throughout its existence (Boeker, 1988; Stinchcombe, 1965, Aldrich, 1979, and Scott, 1992). More recently organizational ecology theorists have explored the role of early executive leadership in the imprinting phenomenon (Painter, 2002). For example, Child (1987) has argued that organizational traditions frequently have their origins in "the ideology of an entrepreneurial founder who sets out both strategic perspective on the task of the organization and a philosophy on the form of labor process to accomplish it (p. 1971)."

Rob Kling's leadership efforts helped to both build a community and to pursue the conceptual, empirical (and at times methodological) bases of social informatics. This was Rob Kling's role and he performed it with unrivaled skill, passion and dedication. Publishing the second edition of *Computerization and Controversy* (Kling, 1996), moving from UCI to Indiana University, starting the Center for Social Informatics, and hosting the 1997 NSF-sponsored workshop on Social Informatics were embodiments of the vision he had spent 20 years developing.

Social Informatics: Next Steps

We see more opportunities for social informatics' increased role in shaping both science and society's views on ICT, are enthused by the possibilities ahead for those doing this work, and are encouraged by the incipient transition of social informatics to become a scholarly institution. Rob Kling's loss is profound, as many have noted (Lamb, 2004; Kraemer, 2004; King, 2004; Horton et. al, 2005; Mansell, 2005). In Rob's stead, and at this time, social informatics is moving towards becoming a scholarly institution. This institutionalization requires neither a reification of his approaches, or his words. Institutionalization requires the enthusiasm of talented scholars to pursue this work; resources to support their work; useful insights, theories and methods to thrive; a collegial and enabling infrastructure to support interaction, and leadership to guide and sponsor these activities.

Earlier we identified five challenges to institutionalization:
(1) Defining the core and peripheral elements.
(2) Identifying leaders and filling critical leadership positions.
(3) Formalizing structures and processes of participation and inclusion.
(4) Resolving internal discord among key participants.
(5) Communicating organizing values, principles and contributions to others.
For each of these, below, we suggest actions that will encourage institutionalization.

(1) Defining the core and peripheral elements. There exists a growing body of the work that

define and explain what is (and is not) social informatics (e.g., Kling, 1999; Sawyer and Rosenbaum, 2000; Kling, 2000, Horton, Davenport and Wood-Harper, 2005; Kling, Rosenbaum and Sawyer, 2005). This work does more than clarify what is core and what is peripheral to social informatics: It also helps to highlight the sources of member commitment and rewards. For participants in the efforts to institutionalize social informatics, this means that they should know they have a shared identity as well as gain some measure of personal success (such as more chances to get their work viewed, improve their scholarly skills, enjoy greater access to, or control of, resources). Given this, it now seems appropriate to more actively seek to develop better analytic models and theory-building.

(2) Identifying leaders and filling critical leadership positions. Rob's iconic position in social informatics is unquestioned. He worried whether others would step up into leadership roles. His passing forces this issue and it appears that the community is developing new leaders. A simple web search would show that there are a large and growing number of centers, schools and programs of social informatics in Europe, Scandinavia, the UK, the US, Japan and elsewhere[21]. This distributed and active leadership, via visible schools, programs and centers of vibrant social informatics work is represented in part by attendees to this workshop (and by many others who are not attending). It is still not clear that these activities are engaging the full spectrum of the professional social network of contacts that Rob developed and maintained. A second need is to advocate for visible positions (as journal editors, conference organizers and thought leaders for funding and issue development) for those doing social informatics. We see these leadership positions as critical to both supporting social informatics work and educating others of its value.

(3) Formalizing structures and processes of participation and inclusion. Engaging new scholars in learning about, conducting, and contributing to the collective body of social informatics empirical research findings, methods and principles must become a priority if social informatics is to institutionalize. This is the work of field-building and it takes place in graduate programs, through student/faculty interaction and via formal workshop activities, conference venues and collegial interactions that are the vehicles of science. There is growing evidence that the efforts to recruit new scholars into social informatics are becoming more visible. Workshops[22] are being held, important conferences are listing social informatics as a key area, and there are more formal courses on social and organizational informatics being offered at the graduate (and even the undergraduate) level. We see as one next step to be the creation of summer workshops on social informatics for graduate students and junior faculty as an important vehicle for institutionalizing and field building.

(4) Resolving internal discord among key participants. There are four issues relative to maintaining internal accord as social informatics moves forward. First, there is likely to be a number of viable scholars who step up as leaders in social informatics. The degree to which these leaders can overcome the tendency of social scientists to divide into schisms instead of work together into large scale research projects (as Dutton, 1999 has articulated) will impact the

21. We identified more than 30 of these as of October, 2004, as reported in Sawyer (2005a).

22 For example, at the 2004 Conference of the American Society of Information Science and Technology, about 10% of the 450 registered attendees participated in a half-day workshop on social informatics.

institutionalization of social informatics. Should these leaders overcome the schismatic tradition of collaboration that too often mars science (and social science particularly), then social informatics is likely to become a leader – not just another player – in studies of computing.

A second issue with institutionalizing social informatics is to avoid reification of Rob's work. As others have noted, Rob's thinking and writing were constantly in play as he explored the social implications of computing and the means through which people used computing to help alter their work, lives and interactions (Lamb, 2003; King, 2004; Kraemer, 2004; Mansell, 2005). Staying clear about the principles of social informatics even as the ways in which they are being applied from different and varying theoretical, methodological, analytical and empirical perspectives will be an ongoing challenge.

A third issue is sustaining the trans-disciplinary nature of social informatics. Social informatics scholars come from a variety of academic disciplines, work in a broad range of departments, schools and programs, and pursue a stunning breadth of research interests. The trans-disciplinary nature of social informatics means that it takes time and effort for a scholar in one area to become aware of those in other areas who share common approaches to, principles about and findings from their studies of computing. Moreover, each of these scholars must find intellectual and community value from a trans-discipline. Many of the early participants in social informatics were computer scientists or information systems scholars. Social informatics provided these scholars a way to pursue the study of computing from a social perspective. Scholars from a sociological or cultural studies background saw in social informatics a way to show to their colleagues a legitimate means to study computing. The ways in which social informatics is explained to their colleagues and the value it provides as an institution and identity differ. These differences are often subtle, real and very central to the value of social informatics for these scholars. Social informatics cannot be one view and one thing. But, it must represent a coherent set of principles.

Finally, it is important to connect social informatics to other perspectives. Many of the early discussions and papers on social informatics focused on laying out the principles and outlining common findings. More recently, social informaticians have begun to connect and contrast the findings and theories of other perspectives with those of social informatics (e.g., Kling and Lamb, 2000; Sawyer, Crowston, Wigand and Albritton, 2003). The intellectual effort to contrast and compare provides scholars with a means of connecting (or at least distinguishing) what is social informatics from what is not[23]. We argue that this trend (to compare and contrast social informatics with other ongoing research approaches) must continue because it provides a means of boundary setting and clarity.

(5) Communicating organizing values, principles and contributions to others. We first note that much of the activity over the past five years has been to articulate the principles of social informatics (Kling, Rosenbaum and Sawyer, 2005; Lamb and Kling, 2003; Sawyer and Eschenfelder, 2002, Sawyer and Rosenbaum, 2000). We further note that these are summarized

23. For instance, one of the issues raised by a colleague, Blaise Cronin, of the late Rob Kling has been to articulate what is not social informatics. See also the discussion in Sawyer and Eschenfelder (2002).

in the Appendix.

We argue here that for social informatics to become an accepted approach to study computerization there are three paths to pursue in parallel. These are:

(1) Developing analytic approaches and building theory.
(2) Engaging in large-scale projects to generate visibility and evidence
(3) Ensuring there are resources to support, and venues to showcase, social informatics work.

Developing analytic approaches and building theories. Social informaticians have now a common set of principles, a growing toolkit of research techniques and approaches, and a growing body of common (and commonly rediscovered) findings (Lamb and Sawyer, 2005). These seem excellent foundations to more seriously pursue sustained theory building on the socio-technical nature of ICT[24]. Examples of nascent theory-building – ones that involve both social perspectives on and the material nature of ICT – are beginning to appear. Two examples (and there are others) of this are (1) the work of Lamb and Kling (2003) and their social actor model of users; and (2) Avgerou (2002) and her institutional theory of ICT. Theory-building efforts in social informatics do three positive things for institutional adherents. First, theories travel through and across disciplines faster than do individual findings. So, theories focusing on the relations among people, information and communications technologies, and the situated context of their use, are likely to carry to other academic disciplines more quickly than summaries of findings. Second, these theories provide both an intellectual core for participants to act on and serve as a focal point for debate and research in the community (and for those outside and interested). Third, theories form the core of common knowledge shared with those who take up (or even consider) the approach.

Theory building is difficult. It demands scholars to focus on developing, demonstrating and engaging concepts and analytic approaches. These research tools are useful as they serve to bring theory and evidence together. Kling's socio-technical interaction network (or STIN) model is one example (Kling and McKim, 2000). We see this as the most viable near-term place to engage others because of the scholarly pragmatic value that analytic models provide.

Engaging in large-scale projects. Here we return to Dutton (1999), who argues that the scholars trained in social and economic sciences who are interested in the roles and effects of ICT have, to date, pursued their work without a coherent overall approach. We agree, further noting that other computing-related disciplines have begun to focus their collective attention to pursuing larger-scale questions such as the semantic web, technological interoperability, autonomous agents, and more recently cyber-infrastructure. Likewise, it seems wise for social informatics scholars to pursue larger-scale studies of computerization activities.

Engaging large-scale social informatics projects is not a new idea. For example, the URBIS projects at UCI ran for nearly 15 years. In the early 2000's the NSF funded several large scale social informatics-like projects via its Information Technology Research program. These forms

24 In arguing for this attention to theory building we explicitly note that we do not seek a single theory, or even a limited number of theories. We are arguing that theory-building should become a more central, if not explicit, focus for social informatics scholarship. Moreover, we expect this to lead to a range of theoretical developments and would actively discourage any discussion of uni-theoretical development.

of collective action provide a means to help institutionalize social informatics by focusing on sustained, linked efforts around issues such as privacy, mobility, ubiquity, etc. Again, this advocacy for larger-scale studies is not a suggestion that there should be one (or even a small number) of such efforts. Our goal is to push for collective scholarly activity regarding findings, to pursue theory-building via larger-scale projects, and to make such activities both visible to others and central to social informaticians.

Ensuring there are resources and venues for social informaticians. There must be explicit, assertive and concerted activity to both ensure and expand the resources and venues available to social informaticians. By resources we mean the financing to conduct research and the means to support those doing it. If large-scale research projects are to be a path forward then funding is critical. Through funding social informaticians will find both personal rewards and also likely new scholars. Leaders of these funded projects are likely to be key players in the institutionalization of social informatics[25]. Simply, increasing the resources available to social informaticians magnifies all other activities.

Along with resources to conduct the work there must be outlets and venues to present and showcase social informatics research and findings. Certainly the growing presence of social informaticians on journals' editorial boards, in the program committees of conferences and involved in the mechanisms of funding research activities reflects institutionalization reflect the increased visibility and viability of social informatics. Still, concerted effort to expand this presence is essential to future success.

More broadly, through this essay have made a case that social informatics is on its way to becoming an, institution: accepted as one of the several approaches to study computing, and in particular to focus on computerization. In making this case we have highlighted the value of social informatics as contributing insights and perspective to the study of computerization in our society that other approaches do not. And, we have also acknowledge the pivotal, visionary role of Rob Kling, and enthused on the future of social informatics due in large part to his ferocious determination and tireless community activism.

25 The U.S. National Science Foundation's programs such as Digital Society and Technology, and the recently completed Information Technology Research program supported several large scale social informatics projects.

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Appendix: Social Informatics perspectives, principles and common findings

In this appendix we summarize: (1) three perspectives used to pursue social informatics research, (2) principles that define or characterize this approach, and (3) common findings (see also Kling, Rosenbaum and Sawyer; 2005; Lamb and Sawyer, 2005; Sawyer and Eschenfelder, 2002).

Social Informatics Perspectives

The three perspectives used in social informatics are *normative, analytic* and *critical.*

The *normative perspective* embodies research, the aim of which is to recommend design alternatives for professionals who design, implement, or address policy regarding ICT. This type of research focuses on providing empirical evidence to illustrate the variety of activities and outcomes that occur as people work with ICT across a wide range of organizational and social contexts. For example, Karasti, Baker, and Halkola (2007) explore the issues with the design and uses of digital libraries that support ecological research.

The *analytical perspective* reflects studies which theorize on the nature and roles ICT play in institutional and cultural contexts and also empirical studies that are organized to contribute to this work. The goal of this work is to further conceptual insights regarding the evolution of ICT's. For example, Lamb and Kling (2003) conceptualize people as social actors who shape ICT in-use. For example, Allen (2004) uses actor-network theory to explore the ways in which hand-held computing evolved in the 1990s. In doing this he focuses attention to the structural relationships among various actors relative to the actions they took.

The *critical perspective* reflects research on design, deployment and uses of ICT which question the basic assumptions, goals and beliefs of the groups that commission, design, or implement specific ICT. As noted in Lamb and Sawyer (2005): "The critical orientation is possibly the most novel (Agre & Schuler, 1997). It encourages information professionals and researchers to examine ICT from multiple perspectives, such as those of the various people who use them, as well as people who design, implement or maintain them. The critical orientation also leads one to examine possible "failure modes" and "service losses" due to the take up and uses of ICT. For example, Mansell (2005) describes how a critical approach can challenge fundamental assumptions about how the process of technological innovation in ICT technologies is being structured, by whom and for whom is it being negotiated, and with what consequences.

Principles

While the range of computerization activities spans disciplines, social settings, technologies, those activities also are characterized by common principles. For example, social informatics work is *problem-oriented*. This work is defined by its interest in particular issues and problems with computerization and not by its adherence to certain theories or particular methods. In doing this *computing is conceived as a web-like arrangement of material artifacts such as computers and software, and the rules, norms, and practices of people.* These webs of computing are 'configurational' in that their specific forms change over time and are intimately shaped by the social milieu in which they exist. A web of computing is, however, path dependent in that previous actions and events can guide, but do not predict, future actions and events.

Context-dependency is a core principle of social informatics scholarship. The situated nature and uses of computing means that context and use are bound up through practice: to report on use is to report on the situations of that use. In social informatics research, *people are depicted as 'social actors.'* That is, people are depicted as having individual agency, acting in ways that reflect both informal social norms and formal rules of action. Perhaps most importantly, people are not depicted as primarily users of ICT.

This demands that social informatics research *be based on rigorous empirical work.* The strong empirical basis of social informatics work, however, is combined with both methodological and theoretical plurality. The work of social informatics typically includes an array of data collection approaches, both sophisticated large scale and detailed analyses, and complex conceptualizations. The rigor, empirical depth, and the plurality of theories and methods help to define social informatics work, but they do not suggest that a particular theory or method choice is necessary for this work.

Common findings

There exists more than 30 years of careful empirical research in the social informatics tradition. As noted, this work is found in a range of academic disciplines, reflects a mix of theories and methods, and focuses on different issues and problems with computerization. Here we highlight five observations that are so often (re)discovered that they take on the notion of common findings relative to computerization (drawing directly from Lamb and Sawyer, 2005):

1. Uses of ICT lead to multiple and sometimes paradoxical effects. Any one effect of using ICT is rarely isolatable to a desired task. Instead, effects of using ICT spread out to a much larger number of people through the socio-technical links that comprise context. An examination of this larger context often reveals multiple effects, rather than one all-encompassing outcome, and unexpected as well as planned events. For example, peer-to-peer file sharing over the Internet may be helping some musicians while hurting others.

2. Uses of ICT shape thought and action in ways that benefit some groups more than others. People live and work together in powered relationships. Thus, the political, economic and technical structures they construct include large-scale social structures of capital exchange, as well as the micro-structures that shape human interaction. An examination of power often shows that a system's implementations can both reinforce the status quo and motivate resistance. The design, development and uses of ICT will reshape access in unequal and often ill-considered ways. For example, course management systems may provide added benefits to some students, put added pressure on some faculty, and allow some administrators to use the system to collect additional evidence regarding the performances of both students and faculty.

3. The differential effects of the design, implementation and uses of ICT often have moral and ethical consequences. This finding is so often (re)discovered in studies across the entire spectrum of ICT, and across various levels of analysis, that ignorance of this point borders on professional naiveté. Social informatics research, in its orientation towards critical scholarship, helps to raise the visibility of all participants and a wider range of effects than do other

approaches to studying computerization. For example, characterizing errors in diagnosing illnesses as a human limitation may lead to the belief that implementing sophisticated computer-based diagnostic systems is a better path. When these systems err, the tendency may be to refocus efforts to improve the computerized system rather than on better understanding the processes of triage and diagnosis.

4. The design, implementation, and uses of ICT have reciprocal relationships with the larger social context. The larger context shapes both the ICT and their uses. Moreover, these artifacts and their uses shape the emergent contexts. This can be seen in the micro-scale adaptations that characterize how people use their personal computers and in the macro-scale adaptations evident in both the evolving set of norms, and the changing designs, of library automation systems. For example, library automation is not simply about recent developments of applications with sophisticated librarianship functionality, it is also about patrons' differential abilities to use computers, pressures on library budgets, internet access to libraries, and the increasing visibility of the internet and searching.

5. The phenomenon of interest will vary by the level of analysis. Because networks of influence operate across many different levels of analysis, relevant data on computerization typically span formal and informal work groups; formal organizations; formal and informal social units like communities or professional occupation/associations; groups of organizations and/or industries; nations; cultural groups; and whole societies. This common finding is exemplified by the tremendous positive response by younger users to peer-to-peer file sharing, the absolute opposite response by music industry leaders, and the many approaches taken by organizational and civic leaders regarding the legalities and responses to use.