# SOCIAL INFORMATICS

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## WHAT IS SOCIAL INFORMATICS?

Social informatics (SI) is the systematic, interdisciplinary study of the design, uses and consequences of information technologies (IT) that takes into account their interaction with institutional and cultural contexts. Thus, it is the study of the social aspects of computers, telecommunications, and related technologies, and examines issues such as the ways that IT shape organizational and social relations, or the ways in which social forces influence the use and design of IT. For example, SI researchers are interested in questions about the future consequences of IT developments. However, unlike common lay speculations, SI research strategies are usually based on empirical data. SI researchers use data to analyze the present and recent past to better understand which social changes are possible, which are plausible and which are most likely in the future.

The term IT usually refers to a wide variety of applications, such as e-mail, word processors, video-editing programs, and Web browsers, as well as technologies that support many different applications, such as fiber-optic networks. For most individuals, IT use involves using a set of specific IT applications, such as a database or the Internet. In North America, the term IT is often used rather loosely to refer to specific applications or to the broader underlying technologies.

One of the key concepts of SI is that IT are not designed or used in social or technological isolation. From this standpoint, the social context of IT influences their development, uses and consequences. Consequences can be very indirect and may be most visible over periods of years and decades rather than over months. From an SI perspective, IT applications may be viewed as "socio-technical networks," that is, systems that include many different elements, such as IT hardware, software, legal contracts and people in relationship to each other and other system elements.

Non-SI perspectives on the uses and effects of IT focus almost solely on technical characteristics (such as a computer's information processing features), and posit specific effects due to those features. This position is called technological determinism. These perspectives overlook many important elements, such as the social and organizational contexts of the technologies and the people who use them. Such perspectives also make faulty assumptions, such as assuming that an

IT application has the same meanings for all who use it and will have similar consequences for all.

In this era, for example, many people are enthusiastic about the possibilities of Internet use improving the quality of public education in the U.S. In the late 1990s, many public high schools were given Internet connections and new computer laboratories. However, many politicians and parents did not realize that how students use Internet services to support new kinds of research is influenced by the ways that teachers incorporate Internet resources into their teaching. In all too many cases, although schools were given technical access to the Internet, teachers were not assisted in developing interesting and useful ways of teaching with Internet services. SI researchers expect that there will be major differences in the educational value of the Internet in the schools where teachers have such support for devising and applying new ways of teaching than in the schools where they do not. Thus, SI researchers would not expect to find similar consequences across all the schools that have received Internet connections.

SI researchers have found that people often interpret and interact with IT applications in complex and varied ways. Social contexts play a significant role in influencing the ways that people use information and technologies, and thus influence the consequences for work, organizations and other social relationships. People's interpretations of IT applications (based on such things as prior beliefs, current incentives, and perceived demands) will differ and will lead to differences in how they adopt and use IT applications. (Many high school science teachers might view a computer laboratory with Internet access as a means for scientific inquiry. In contrast, some of their students may view the same laboratory as an opportunity to participate in multiplayer games or Internet chat rooms.)

In the mid-1990s, the public gained increasing access to the Internet and there was a great deal of speculation about the ways that Internet use would transform many areas of social life, including education, commerce, science, government, and community life. Certainly new social possibilities were opened, and some interesting and modest changes have been realized by the early 21st century. However, technologists, journalists, public officials and managers made oversimplified predictions about the effects of computerization that were not based on the growing body of systematic research. Many of these predictions were overly optimistic, costly for some participants, and created unrealistic expectations. In the U.S., the rapid decline of the "dot-com" stock market in 2001 was for many investors a painfully expensive lesson that they should think more deeply about how businesses can make or lose money with Internet services. But similar kinds of deeper analytical thinking about IT and social change are important in all areas of social life, not just commerce. SI is becoming the field which develops, integrates, and helps to apply research-based knowledge about IT applications and social change.

SI is an alternative to romantic (or anti-romantic), non-research-based approaches to IT and social change. There are numerous popular accounts about the ways that IT will change society and lead to a greater good for all through such things as new forms of civic engagement, richer educational opportunities, new forms of commercial opportunities, and the removal of geographical limits. Some of these writings are tied to broad labels such as "information age," "information society," and "knowledge societies." There have also been contrasting anti-romantic accounts which tie the widespread use of IT to social evils such as higher levels of

surveillance and lack of personal privacy, intensified isolation of individuals, and the "dumbing down" of public education. These types of accounts can use vivid examples and intriguing kinds of speculation but are rarely research based. Much of the writing readily available on the social aspects of IT is produced by journalists and technologists, without regard for the available research. Popular discussion of thje social aspects of IT is usually separated from the systematic and rigorous body of research on the subject, partly because of difficulties accessing it.

## PERSPECTIVES ON INFORMATION TECHNOLOGY APPLICATIONS AND THEIR USES

Many people tend to speak about IT applications as though they are standard and interchangeable, but this view is too simplistic. Because IT applications are customizeable, most represent unique configurations -- a complex combination of standard and customized elements, many aspects of which may be specifically tailored by particular groups or individuals. Thus, even if different organizations acquire what appear to be very similar sets of equipment, the organizations will most likely develop socio-technical systems that differ substantially from each other. In order to understand the uses or consequences of an IT application in a specific setting, you have to first understand the unique socio-technical network. For example, the particular character of an organization will profoundly influence the kinds of uses made of an information system.

Further, contrary to how they are often spoken of, IT applications do not simply "open new possibilities" for people or organizations. Rather, they restructure information processing and social relationships. Sometimes these restructured opportunities prove to be advantageous for most of the groups involved. For example, since the 1980s, many colleges and universities have implemented information systems for students to register for courses with touch-tone telephones or by Web-based applications. These on-line registration systems have provided many benefits for staff and students; long, slow registration lines are much less common and students can learn about which class sections are full and seek alternatives before classes start meeting. However, restructured relationships can sometimes cause major problems for some participants. Many people set up e-mail accounts to improve their communications with a select group of other people. Professors, for example, often use e-mail to improve communication with their students. However, professors can also become overloaded with numerous requests for help and or information from students worldwide, and therefore end up paying less attention to their own students.

Many people view IT applications simply as "tools," and expect them to have direct, easy-to-predict effects. However, SI researchers have found that this view often leads professionals and managers to make inaccurate predictions about the ways that people will use IT applications. Thus, it is common to find that the social consequences often do not match the predictions made by the IT applications' developers and promoters.

For example, some predictions were made that the widespread use of automated teller machines and credit cards in industrialized countries would dramatically increase many people's flexibility in obtaining money or credit when they travel. While these predictions have been valid, there are a wider range of consequences than were anticipated. The use of credit cards in the U.S. has also

had some important unexpected negative consequences: some credit card companies have aggressively issued easy credit to people who cannot readily repay their loans and thus end up in bankruptcy court; the sheer amount of money that circulates through credit card accounts makes it harder for the U.S. Federal Reserve Board to regulate the economy through interest rate changes.

As a second example, in the 1980s, many IT professionals expected that the increased use of computers would lead to paperless offices, because computer users would use primarily electronic documents instead of paper ones. However, while some IT applications do reduce paper use, overall paper use seems to be growing, not declining. People frequently print out many online documents such as web pages, e-mail, or airline tickets. Paper is often seen as being more durable and easier to take from place to place than are online documents. Also, paper is often more useful for certain kinds of tasks, such as annotating or comparing documents. Thus, the expected "paperless offices" have not generally appeared.

A third example of an oversimplified and inaccurate prediction can be seen in the area of mass media and entertainment. In this area, a few authors, publishers and musicians tend to dominate their markets, and other fine artists get little public exposure. Some analysts argued that traditional stores emphasize just a few top sellers because physical shelf space is limited. These analysts hoped that the Internet, where "space" is unlimited, would enable a much larger number of talented artists and publishers to reach their audiences and make a living from their creative work. However, this does not seem to have occurred, mostly because many people who use the Internet expect online writings and music to be free of charge, and thus are not willing to pay for this kind of entertainment.

A final example of how use of an IT application may not produce the simple, direct effect that was expected is that of the computerization of arrest warrants. In the 1970s many police agencies computerized their arrest warrant records and connected these information systems through nationwide computer networks. Overall, the consequences of these computerization efforts were expected to benefit the general public by increasing the arrest rates of suspected criminals. In the decades of use, these computerized warrants systems have helped U.S. police to identify thousands of people who were charged with or convicted of serious crimes and who avoided court appearances or escaped from jail.

However, there has been less evidence of a clear overall benefit of the networked arrest warrants system than was expected. One reason is that warrants for more serious crimes are only a small fraction of the overall total of crimes committed. For example, in 1999 the state of California had about 2.6 million outstanding warrants, while only 2,600 of these were for murder suspects. The warrants system helps to increase the overall volume of arrests, which may have become counterproductive. Many police believe that if a warrant is issued, then it must be served. However, many judicial systems are already overloaded with cases. The more arrests that are made, the more the police and courts become overloaded.

The millions of nationally shared warrants range from numerous relatively minor misdemeanors (such as driving without a license and not appearing in court) to serious felonies, such as rape and murder. Some police officials believe that the relatively small fraction of serious felons

become lost in an ocean of arrest warrants for relatively minor offenses. Thus, although on the face of it the new system seemed like a good idea that would produce a simple, direct, and positive consequence, this system has not necessarily increased the public's protection from criminals on the scale that was intended.

Information systems are an important class of IT applications that can enable users to store, search for, retrieve, and report information in a variety of formats. SI research has found that these kinds of IT applications can also shift the balance of influence and power in organizations by restructuring access to information, technical staff, and the kind of authority that informational resources can bring. Thus, information systems have "political outcomes" in that they may lead to some people gaining influence and resources while others do not. People's responses to the political outcomes they anticipate sometimes explains why some groups support or oppose the development or use of a particular information system. This kind of political explanation differs from other, more common, "folk explanations," that focus on the personalities of the people who support or oppose the use of specific information systems (or other IT applications).

In addition, new IT applications often have negative consequences (for at least some of the people involved) which were downplayed or overlooked by those promoting them. Information systems may have negative effects on a whole group or organization, or may benefit some groups at the expense of others. This creation of "losers" may be purposeful, an unavoidable side effect, or completely unforeseen.

One example of a negative effect produced by the use of a new information system -- and the policies that shaped its uses -- was seen in early 2001. At this time, one's state's Department of Motor Vehicles (DMV) administrators were seeking ways to reduce the number of forged drivers' licenses in use. The DMV staff developed an electronic link to the Social Security Administration's (SSA) database. Soon after this development, the DMV began denying all requests to renew driver's licenses if the name given on the license did not exactly match the name in the SSA's database. Thus, if a person's Social Security number was registered to "Michael" but the driver's license issued to "Mike," the person was denied a new license, and might be told that he was possibly engaged in identity theft. In the months after the DMV began linking to the SSA database, the SSA offices were flooded with people who were told by the DMV that they could not renew their licenses until they officially changed their names with the SSA. Thus, in order to receive a new driver's license, people with SSA names such as Katherine and DMV names such as Kathy (or Gregory and Greg and William and Bill) had to personally go to an SSA office to have their official records changed. The final irony of this case is that the identification required by the SSA in order to proceed with the record change was a driver's license!

The research in SI has found that the ways that many IT applications are configured, regulated, and used often have consequences that their designers and supporters did not anticipate. In addition, SI research shows that an IT application's consequences can appear contradictory because the effects can vary considerably across the different situations in which the application is being used. The most advanced SI research emphasizes theories that allow for complex, ambiguous, or varied outcomes, and helps to anticipate seemingly contradictory

consequences. For example, e-mail use sometimes improves communication, while at other times seems to complicate interpersonal communication. In addition, good theories of IT design and use should also help to predict the conditions under which systems will fail.

## DESIGN AND CONFIGURATION OF INFORMATION TECHNOLOGY APPLICATIONS

The increasing complexity of IT applications is both part of their usefulness and appeal and an obstacle, especially to “ordinary” or non-technically trained people. Unless the design and configuration of an IT application is handled extremely well, many people get less value from it than they should.

Some common misperceptions of IT in both popular and professional discussions may lead to the design of unworkable or useless systems. Common misconceptions include those that treat IT applications primarily as standardizable artifacts or "things" rather than systems which should be specifically configured for the needs of specific groups. An IT application’s use is unavoidably linked with social and organizational factors; however, this is often overlooked or not understood by designers.

Further, IT applications are often designed by outside vendors who define for themselves the “best practices” for the organization that the applications will become a part of. Thus, the organizations using the IT application may need to adapt, re-work, or compromise their actual practices in order to work with its design. It is unfortunately rare for IT designers to substantially appreciate the work and working conditions of the people who will be using the systems that they design. One major cause of IT application failures is the exclusion from the design process of the people who will be using the application. If a use-oriented perspective is not applied during its design, an IT application may be ineffective or actually have an effect that is opposite of what was intended. However, standard design practices often involve IT applications professionals trying to design the "right" technology when they know very little about the actual work practices of the people they are designing for. These design problems have become more challenging as networked IT applications become more common throughout large organizations and are used by more diverse. Two case examples illustrate this point.

A school system in a major eastern city got funds to connect several classes and teachers to the Internet in the mid-1990s (Davidson, Schofield, and Stocks. 2001). The Internet hookups and system configurations were performed by the technical staff of an advanced computing laboratory that was associated with a major research university in that city. There were significant differences in preferences for the IT application between the technical staff and the teachers. For example, the teachers wanted to be able to print their e-mail, and to have the computers’ applications remain the same within a school year (and have the major changes take place over the summer). In contrast, the technical staff could not conceive of why anybody would want to print their e-mail. They also wanted to install new versions of software and “bug fixes” as they received them, rather than holding them off for months. Based on their own preferences, the technical staff did not originally provide e-mail printing, and they installed software upgrades and fixes when it was best for them. During the initial period, many teachers

who were expected to use the Internet did not because they wanted to read e-mail carefully before responding to it, and they got frustrated when they had to learn different procedures for using the software unexpectedly and in the midst of busy academic schedules. Only after the technical staff added printers and printing options were teachers able to take much better advantage of the system, and when the technical staff minimized their disruptive changes during the academic year then the teachers felt more confident in using the Internet applications.

As another example, sometimes there has been a strong emphasis on simply making interfaces more useable rather than making an entire information system more workable. In the late 1980s, one major computer manufacturer developed an information system to help their salesmen configure and price complex computer systems for their clients (Markus and Keil, 1994). Unfortunately, the configuration management system that was developed required an order to be completely specified down to every last set of cables before it would give a price. In practice, entering a complete order in this way took a large amount of time, while the bulk of a system's price was actually based only a few major components. Consequently, relatively few salesmen found the system helpful, and few used it. The information systems staff in this firm thought that the salesmen would use the configuration system much more routinely if the interface was redesigned, and they spent several million dollars in reengineering the interface. However, that was not the issue that was keeping the salesmen from using the system, and the new version was not used much more than the original one. The salesmen needed a "quick calculator" rather than a somewhat simpler way of specifying complete configurations with dozens of small components.

SI researchers have found that many types of IT applications are often abandoned, underused, or end up needing to be reshaped by the people who use them. The most useable and useful systems are generally those that fit more readily into the usual workflow of the people that are intended to use them. The best way for designers to understand the workflow of a system's users is to learn in detail about the work practices of their clients. There are a number of cases where millions of dollars have been spent on systems that the intended users don't use or underuse because designers have ignored basic concepts such as these.

## A BRIEF HISTORY OF SOCIAL INFORMATICS

It is often assumed that SI started with the Internet. However, it actually began with studies of computerization in workplaces and organizations that date back to the early 1970s, although the specific label of "social informatics" was not yet being used (Kling, 1980a, Kling 1980b).

The term "social informatics" first came into popular use in North America in 1996, and both integrated and built on bodies of research that were previously known by labels such as "computers and society," "social impacts of computing," "social issues of computing," "social analysis of computing," and "behavioral information systems" (Kling, 1999). These fields had their roots in research that began around 1970 in the fields of computer science, information systems and several social sciences. The computer science studies and some of the social science studies focused on societal-scale issues, such as the extent to which computerized information systems compromised personal privacy, and the ways in which governmental

services were being altered for better or for worse by different approaches to automation. The research in behavioral information systems was conducted primarily within business schools, and focused on strategies for designing information systems that would be more effective, as well as understanding the effects of information systems on work decision-making and the structure of organizations.

In the 1980s, the range of topics studied in this area expanded to include other types of issues. Examples include studies on the extent to which people would communicate more or less effectively with organizational e-mail systems, and the extent to which "expert systems" could improve the quality of decision making and services in organizations such as those providing medical services.

Through the 1980s, computerization was primarily taking place within organizations, and there were significant pressures for information systems professionals to design and develop systems that would be useful and useable by a variety of people. The research in SI was used in the education of information systems professionals through textbooks, workshops and some professional articles in magazine and journals.

In the 1990s, other significant themes emerged. For example, as the use of the Internet became widespread, the question of the extent to which Internet use will decrease or enrich the quality of local civic life in communities became important. An example of the other types of issues that arose is that of political participation, such as grassroots groups' use of the Internet to organize more effectively, online mobilization for groups that could not get access to mainstream press, the ability of voters to get more complete information through online sources, and the ability of campaigns or candidates to raise funds via the Internet.

## CURRENT STATUS OF SOCIAL INFORMATICS

Today there are many new practices where IT play a central role, such as distance education, knowledge management, the formation of online support groups, efforts to support "virtual teams" in organizations, development of "collaboratories" to support scientists who work at large distances from each other, and e-commerce. The simple models of these new technologies assume that if you simply provide the technologies, then the desired people will engage in the desired behavior after a short learning period. However, these assumptions often do not prove to be correct. SI researchers have learned that each of the type of practices mentioned above involves subtle social behavior that has to be understood and taken into account, in addition to providing the appropriate technologies. If this does not happen, the problems that may occur may not simply be that of use versus nonuse, but can also be ones of broader negative consequences of poor design, such as students in a distance education class losing interest in the whole topic due to frustration, or work teams underperforming due to miscommunication or misunderstandings.

In retrospect, SI was known only by relatively few people in the 1970s, and its significance was not widely appreciated. Today, many people, including business professionals, academics, information technology professionals and the general public, have experienced many social

complexities and complications of computerization, so the interest in SI is much more widespread. Colleges and universities are offering courses that examine SI issues (whether or not they use the label "social informatics"), there are some research institutes such as the Center for Social Informatics at Indiana University (http://www.slis.indiana.edu/CSI), and there now some degree programs in the field. However, SI analyses tend to be much more complex than other, simpler kinds of accounts of IT applications and their consequences. Because they are more complex, they are not as easily picked up by many members of the press who are looking for short and simple "sound bites" to make their stories quickly accessible to a large audience. Consequently, SI ideas may primarily circulate in research and professional literatures rather than in popular literatures during the next decades.

At this time there are no research conferences or journals that are wholly devoted to SI. But there are conferences such as the annual Association of Internet Research conference, and journals such as The Information Society (http://www.slis.indiana.edu/TIS), where a significant amount of SI research can be found. Because SI is so broad in scope, it often appears as a theme at conferences in a number of different fields. To find more information about SI, see the accompanying bibliography, or check the SI website at: www.slis.indiana.edu/SI . This web site includes information on SI courses, conferences, degree programs and research programs worldwide.

**References:**


Davidson, Ann, Janet Schofield, and Janet Stocks. 2001. Professional Cultures and Collaborative Efforts: A Case Study of Technologists and Educators Working for Change, The Information Society 17(1):

Kling, Rob. 1980a. "Social Issues and Impacts of Computing: From Arena to Discipline" Proc. Second Conference on Computers and Human Choice (Vienna, June 1979) Amsterdam, North Holland Publishing Co.

Kling, Rob. 1980b. "Social Analyses of Computing: Theoretical Perspectives in Recent Empirical Research" Computing Surveys, 12(1)(March 1980):61-110.

Kling, Rob. 1999. "What is Social Informatics and Why Does it Matter?," D-Lib Magazine, January. http://www.dlib.org/dlib/january99/kling/01kling.html

Markus, M. Lynne and Mark Keil 1994. "If We Build It, They Will Come: Designing Information Systems That People Want to Use" Sloan Management Review. 35(4)(Summer): 11-25.

**BIBLIOGRAPHY**

Dutton, William H. 1999. Society on the Line: Information Politics in the Digital Age (Oxford and New York: Oxford University Press).

Garson, G. David. 2000. Social Dimensions of Information Technology: Issues for the New Millennium. IDEA Publishing Group. Hershey, Pa.

Huff, Chuck and Thomas Finholt (Eds.). 1994. Social Issues in Computing: Putting Computing in its Place. New York: McGraw?Hill.

Jones, Steve. 2000. Virtual Culture : Identity and Communication in Cybersociety Sage Publications.

Kiesler, Sara (Ed.) 1997. The Culture of the Internet. Mahwah, NJ: Lawrence Erlbaum Associates

Kling, Rob. 1996. Computerization and Controversy: Value Conflicts and Social Choices. 2nd Ed: San Diego: Academic Press

Kling, Rob. 2000. Learning about Information Technologies and Social Change: The Contribution of Social Informatics. The Information Society 16(3)(July-Sept. 2000):217-232.

Kling, Rob, Holly Crawford, Howard Rosenbaum, Steve Sawyer and Suzanne Weisband. 2000. Learning from Organizational and Social Informatics: Information and Communication Technologies in Human Contexts. Indiana University, Bloomington. Center for Social informatics. ( http://www.slis.indiana.edu/CSI ).

Kubicek, Herbert, William Dutton and Robin Williams (Eds). 1997. The Social Shaping of Information Highways: European and American Roads to the Information Society. Campus Verlag/St. Martins's.

Smith, Marc and Peter Kollock (Eds). Communities in Cyberspace. (1998) London: Routledge.

Wellman, Barry. (Ed.) 1999. Networks in the Global Village. Boulder, CO: Westview Press.