1.2 Defining Social Informatics

Since the deployment of the first commercial digital computers in the 1950s, their potential power to extend human and organizational capabilities has excited the imaginations of many people. Their potential has also evoked fears that use would lead to massive social problems, such as widespread unemployment. In the 1950s and 1960s, digital computers were relatively expensive (often costing hundreds of thousands of dollars) and relatively few were in use. Consequently, it was difficult to observe their effects, and the writing about computerization was primarily speculative. For example, the concerns about computerized systems becoming efficient substitutes for human labor led to speculation about mass unemployment, radically reduced work weeks, and the "problem" of how millions of people would be able to manage huge amounts of leisure time. From today's perspective, in which computer systems have become ubiquitous and professional work-weeks seem to have expanded, these speculations may seem quaint.

In the late 1960s and early 1970s, some social scientists began empirical observational studies of the consequences of computerization inside organizations. During the 1970s and 1980s, this body of research expanded to cover topics such as the relationship between computerization and changes in the ways in which work was organized, organizations were structured, distributions of power were altered, and so on. Most of the empirical social research was conducted within organizations because they were where the computers and the people who used them most intensively were located. We will discuss the findings of some of these studies in other chapters of this book. Even though these studies may seem to be dated and of limited relevance in the era of the Internet, they can help us understand some key aspects of contemporary issues. Here, it is sufficient to say that some important studies contradicted the prevailing expectations about the effects of computerization that were seen in the books and articles written for ICT specialists, managers, and the broader public.

By the 1980s, research about the social aspects of ICTs was conducted by academics in a number of different fields, including information systems, information science, computer science, sociology, political science, education, and communications. These researchers used a number of different labels for their specialty area, including "social analysis of computing," "social impacts of computing," "information systems research," and "behavioral information systems research." For over thirty years, these research studies were published in the journals of the diverse disciplines, and were written in the researchers' distinctive disciplinary languages. As a consequence, it was hard for many researchers, let alone nonspecialists, ICT professionals, and ICT policy-analysts, to easily track relevant research.

In 1996, some participants in this research community agreed that the scattering of related research in a wide array of journals and the use of different nomenclatures was impeding both the research and the abilities of "research consumers" to find important work. They decided that a common name for the field would be helpful. After significant deliberation, they selected "Social Informatics." (In Europe, the name informatics is widely used to refer to the disciplines that study ICTs, especially those of computer science, information systems, and information science.) Some members of this group held a workshop at Indiana University in 1997, and agreed upon a working definition: *Social Informatics refers to the interdisciplinary study of the design, uses, and consequences of ICTs that takes into account their interaction with institutional and cultural contexts*. Social Informatics analyses that are bounded within organizations, in which the primary participants are located within a few specific organizations, are referred to as organizational informatics. Many studies of the roles of computerization in shaping work and organizational structures fit within organizational informatics.

This definition of Social Informatics helps to emphasize a central principle: ICTs do not exist in social or technological isolation. Their "cultural and institutional contexts" influence the ways in which they are developed, the kinds of workable configurations that are proposed, how they are implemented and used, and the range of consequences that occur for organizations and other social groupings.

Social Informatics is characterized by the problems being examined rather than by the theories or methods used in a research study. In this way, Social Informatics is similar to other fields that are defined by a problem area such as human–computer interaction, software engineering, urban studies, and gerontology. Social Informatics differs from fields such as operations research, where methodologies define their foci and boundaries. Social Informatics research is empirically focused and helps interpret the vexing issues people face when they work and live with systems in which advanced ICTs are important and increasingly pervasive components.

Social Informatics research comprises *normative, analytical*, and *critical orientations*, although these approaches may be combined in any specific study. The *normative orientation* refers to research whose aim is to recommend alternatives for professionals who design, implement, use, or make policy about ICTs. Normative research has an explicit goal of influencing practice by providing empirical evidence illustrating the varied outcomes that occur as people work with ICTs in a wide range of organizational and social contexts. For example, some early research (e.g., Lucas, 1975) showed that information systems were much more effectively utilized when the people who worked with them routinely had some voice in their design. One approach, called participatory design, was built on this insight, and

researchers tried to find different ways that users could more effectively influence the designs of systems that they used. Further, some of these studies found that it was important to change work practices and system designs together, rather than to adapt work practices to ICTs that were imposed in workplaces. The recommendations from this body of research are rather direct: ICT specialists and managers should not impose ICTs on workers without involving them in shaping the new ICTs and the redesign of their work practices. These recommendations differ substantially from the strategies of some business reforms of the early 1990s, such as Business Process Reengineering (BPR), whose advocates preferred that ICTs and work be designed by people who were not invested in the workplaces that were being changed. Social Informatics researchers blame some of the failures of BPR on an ideology that undervalues workers' knowledge about their work.

The *analytical orientation* refers to studies that develop theories about ICTs in institutional and cultural contexts, or to empirical studies that are organized to contribute to such theorizing. Analytical research develops concepts and theories to help generalize from an understanding of ICT use in a few particular settings to other ICTs and their uses in other settings. For example, one line of analysis examines specific ICTs as embedded in a larger web of social and technical relationships that extend outside the immediate workplace (or social setting) where the ICTs are used (Kling, 1993; Kling & Scacchi, 1982). This line of analysis indicates that complex ICTs may be workable where technical support is available "in the environment." Thus, public schools in university towns may be able to use more complex ICTs when technically skilled undergraduates provide technical support through part-time jobs or independent study courses. The same ICTs may prove unworkable for public schools in cities where inexpensive technical talent is unavailable. The analytical approach, in this case, examines the way that the social milieu is organized to provide resources for training, consulting, and maintaining ICTs, rather than simply the technical simplicity/complexity of the ICT in social isolation.

The *critical orientation* refers to examining ICTs from perspectives that do not automatically and uncritically accept the goals and beliefs of the groups that commission, design, or implement specific ICTs. The critical orientation is possibly the most novel (Agre & Schuler, 1997; Schultze & Leidner, 2002). It encourages information professionals and researchers to examine ICTs from multiple perspectives (such as those of the various people who use them in different contexts, as well as those of the people who pay for, design, implement, or maintain them) and to examine possible failure modes and service losses, as well as ideal or routine ICT operations.

The critical orientation is exemplified by the case of some lawyers who wanted to develop expert systems that would completely automate the task

of coding documents used as evidence in civil litigation. Social Informatician Lucy Suchman (1996) examined the work of clerks who carried out this coding work and learned that it often required much more complex judgments than could be made by rule-based expert systems. She recommended that information systems be designed to help the clerks with their work rather than to replace them.

Ina Wagner (1993) examined the design of a surgical room scheduling system and found that major stakeholders (surgeons, nurses, and patients) had somewhat conflicting preferences. If a system were to be designed, the designer would have to take sides in a set of workplace disputes. Ann Rudinow Saetnan (1991) found that an automated surgical room scheduling system was being used only as a record keeping system because of conflicts between surgeons and nurses about when to make exceptions to the automated schedule. These studies indicate that a systems designer who tries to develop "a better automated scheduling system" may have trouble in designing for only one group, such as surgeons.

An important set of instances arises in the analysis of the safety and effectiveness of systems for people and the operations of organizations. For analysts who conduct post-mortems on ICTs that have failed, it is common to find that the designs or implementations of these systems were not critically examined for the variety of conditions under which people might use them or the ways that they could interact with other limitations in the technical or social systems in which they were embedded (Kling, 1996c; Neumann, 1995; see also Chapter 2, Section 2.1 for further discussion and examples). The findings of Social Informatics research would lead an informed analyst to frame the discussion of a new or changing ICT within a detailed depiction of the organizationally-situated social conditions of likely use.

1.3 The Value of Social Informatics

The empirical base of Social Informatics research provides valuable insights into the contemporary issues with computerization. Some examples that we will discuss later in this book include:

- How can we best understand the meaning of "access to the Internet" in ways that help to foster policies to reduce the "Digital Divide"?

- When does the reliance on weapons systems that use advanced ICTs risk escalating a war rather than reducing conflict?

- How can organizations effectively use computer networks to help their professionals share important information about expensive projects?

- To what extent and when have ICT developments fostered "paperless offices"?

- When can ICTs in K–12 classrooms replace traditional media, such as textbooks, and when are such substitutions likely to be costly and pedagogically troublesome?

One reason why many predictions about the social effects of specific ICT consequences have been so inaccurate is that they are based on oversimplified conceptual models of specific kinds of ICTs or of the nature of the relationship between technology and social change. For example, a simple and common way to view the role of ICTs is as a set of discrete tools. In this view, the computer is a machine that can help rapidly produce a thick book in a few minutes or rapidly solve a complex differential equation. ICT applications like these, wondrous as they are, take on an added transformative dimension when they are networked with other information technologies, such as those that enable people to use the World Wide Web to get up-to-date weather reports or make it easier for a team of scientists to work together even when they are located in different time zones. Further, assumptions about these relationships and models are often tacit, making them even more powerful because they are taken for granted. For example, many armchair analyses of computerization assume that:

- ICTs have direct effects upon organizations and social life.

- These effects depend primarily upon the ICTs' information processing features.

- The information processing features of new ICTs are so powerful relative to preexisting technologies that they effectively determine how people will use them and with what consequences.

For example, the U.S. national effort to "wire" K–12 public schools to connect to the Internet reflects a belief that students' access to the Internet will improve their educations. The motivation behind this reasoning is laudable. An analysis that pushes beyond the face value of this belief leads to questions about how this wiring will actually be done and what changes in the educational process will lead to improved learning. For example, many primary and secondary teachers do not know how to use Internet resources to extend their class activities (and will require both training to get prepared and ongoing support to maintain competence). Further, most schools' computers are

in special labs, so that the computing is not integrated into routine classroom practices. Instead, and by design, the computing is often isolated from the curriculum. Thus, the potential value arising from the technical triumph of wiring the school is overshadowed by the need for changes in teacher training and support and to the large-scale curricular (and floor plan) design in order to incorporate computing. And, even after these changes, the issue of exactly how Internet use improves learning has not been addressed. (We examine this topic in more detail in Chapter 3.)

The body of empirical research in Social Informatics does not make these tacit assumptions about the roles and uses of ICTs. In fact, this research has shown that many forms of ICTs, such as groupware, instructional computing, and manufacturing control systems, are often abandoned or reshaped to be used in new ways. In addition, many ICTs create problems that their designers and advocates did not effectively anticipate.

Further, the Social Informatics research literature shows that the consequences of ICT use can appear "contradictory" because they can differ across the various situations in which the ICTs are deployed. Some "distance education" courses taught over the Internet are found to be distressing to their student participants, whereas others develop more positive learning environments (Hara & Kling, 2002). Sometimes computerization leads to organizational decentralization and at other times to centralization of control. Sometimes computerization enhances the quality of jobs and other times jobs are degraded through tightened controls and work speedup.

This book identifies some of the ideas that have come from over thirty years of Social Informatics research—systematic and empirically grounded research about the design, development, uses, and effects of ICTs in social life. Because these findings draw from multiple disciplines and are couched in the specific and particular scientific languages of these disciplines, relatively few of these ideas have been disseminated effectively and, consequently, have not shaped the working practice of most information professionals. Further, much of the body of Social Informatics knowledge has not yet been integrated into many curricula to help better educate young ICT-oriented professionals, and has yet to influence research in related areas, such as digital libraries and new forms of organizing.

As we introduce you to Social Informatics research, we hope to provide you with a useful point of entry into this research world. In the chapters that follow, we discuss the meaning of the concept of Social Informatics and the theories, approaches, and findings that characterize Social Informatics research. We also explain how Social Informatics can be integrated into the curricula of programs and courses focusing on ICTs and social and organizational change.