course in the overall computer science curriculum, 2) the quality of the Social Informatics instructor's teaching, and 3) the number (and frequency of offering) of Social Informatics courses.

5.3 Teaching Social Informatics

This part of the chapter is organized into four sections. In the first section, we outline key issues undergirding the teaching of Social Informatics (see Table 5.1). In the second section, we discuss how these issues may be tailored to emphasize points most germane to specific curricular needs. In the third section, we discuss the importance of developing a critical perspective on computing (and the use of debate to help achieve this). In the last section, we summarize issues relevant to teaching Social Informatics. The goal of this fourth section is to highlight concepts and techniques that should be a part of ICT-oriented curriculum, not to identify a general Social Informatics class. We focus on concepts and techniques for inclusion in a curriculum so that educators can design a number of classes in which these might appear.

5.3.1 Key Social Informatics Ideas

In Table 5.1 we summarize key Social Informatics ideas. These are discussed in the rest of this section.

5.3.1.1 The Context of ICT Use Directly Affects Their Meanings and Roles

As we say throughout this book, context matters. Designing, developing, deploying, and using ICTs are linked to social and organizational dynamics, and these dynamics are situated in specific contexts. This means that an ICT is always linked to its environment of use: It cannot be considered independently from the situation in which it will be used (Kling & Scacchi, 1982; Orlikowski, 1993; Suchman, 2002).

5.3.1.2 ICTs Are Not Value Neutral: Their Use Creates Winners and Losers

Given the contextual nature of ICTs, it follows that they are often designed, implicitly or explicitly, to support social and organizational structures (Kling, 1994). For example, management information systems are primarily designed to support managers, not the system's direct users. Another example is the development of personal digital assistants, which was first predicated on men using them, so that the resulting device was harder for the typical woman to hold (since the female hand is typically smaller than the

Table 5.1 Key Social Informatics Concepts

1. The context of ICT use directly affects the ICT's meanings and roles.
2. ICTs are not value neutral: their use creates winners and losers.
3. ICT use leads to multiple, and often paradoxical, effects.
4. ICT use has moral and ethical aspects and these have social consequences.
5. ICTs are configurable – they are actually collections of distinct components.
6. ICTs follow trajectories and these trajectories often favor the status quo.
7. ICTs co-evolve during design/development/use (before and after implementation).

design premise). This may also be as simple as those with electronic mail being able to communicate more easily than those without.

5.3.1.3 ICT Use Leads to Multiple, and Often Paradoxical, Effects

Because ICTs are contextually dependent, similar ICTs can have different outcomes in different situations (Sawyer & Eschenfelder, 2002). Thus, although many people believe that ICTs will lead to a paperless office or even to increased productivity, ICTs play out differently in practice. Paper use may increase in some places even as it decreases in others; productive efforts may be spent in places where the value added is difficult to assess. These effects may seem contradictory, depending on the level or perspective from which they are viewed. Among the multiple and often paradoxical effects of ICT use are the rise of both intended and unintended consequences (Tenner, 1996). For example, new ICTs were introduced to one department in a local government to improve organizational effectiveness and efficiency. This led to a situation where the work processes of that department's staff soon became enmeshed with the new ICTs. The departmental staff became dependent on the infrastructure to do their work (the intended effect). However, the lack of systematic maintenance and upgrading of this infrastructure led to the ICTs becoming unreliable. This lack of reliability meant that, over time, the office was actually less capable of achieving its mission (an unintended effect).

5.3.1.4 ICT Use Has Ethical Aspects

The contextual nature of ICTs means that development and use raises moral and ethical issues (Eschenfelder, 2004; Friedman & Nissenbaum, 1996; Introna & Nissenbaum, 2000). This set of topics often reflects the most well

known of the key Social Informatics issues. Many of these issues, such as an individual's rights concerning privacy in the use of e-mail, are being contested in contemporary society. More subtle issues include the coding and construction of systems that support assessing credit risks (where biases are built into rule bases) or the use of ICTs to remove entire classes of work (and workers) from an organization are not as broadly discussed. ICT-oriented students should be aware that these moral and ethical issues are often confronted as a series of small decisions whose outcomes are unclear and whose links are not easily seen. This leads to where chains of decisions and the value choices that they require are often made implicitly, sequentially, and without an awareness of the larger issues.

5.3.1.5 ICTs Are Configurable

The term "ICT" actually reflects that any ICT-based system is a collection of distinct components. These components—many of which are nearly commodities—are assembled into unique collections for each organization (or social unit, depending on the level of analysis) (Sawyer, 2001). This leads to unique and socio-technical networks. These socio-technical networks, arising from the confluence of social use and similar components, may lead to different technical networks in each social system (see Brown & Duguid, 2000; Sproull & Goodman, 1989). Furthermore, the multiple functions and ability to reprogram (or alter and extend) these functions makes each technical network of ICTs highly re-configurable.

5.3.1.6 ICTs Follow Trajectories

The configurational ability of ICTs is underlain by the trajectories of the components. A trajectory means that any definable component can be seen as an evolving series of products (or versions) (Faraj, Kwon, & Watts, 2004; Fleck, 1994; Quintas, 1994). That is, ICTs have a history and a future. Thus, an ICT-based system's evolution is as much social history as technical progress (Allen, 2004; MacKenzie & Wajcman, 1999). For example, this concept of a trajectory underlies the debate about the functions of Microsoft's Windows and the company's efforts to fully integrate the operating system (Windows) with the browser (Internet Explorer). The U.S. Department of Justice showed that there was no technical reason for this integration. Instead, the U.S. Department of Justice lawyers were able to show that the integration gave Microsoft the ability to dominate the browser market by linking this function to the operating system (where Microsoft enjoys a near monopoly).

Computer programs are being shaped by social structures and political forces. These shaping forces are often both difficult to decipher and hard to anticipate due to the confluence and interaction of so many events. Further, this discussion regarding Windows and Internet Explorer has many parallels

with IBM's practice, up until the U.S. Department of Justice intervened in 1968, of enforced bundling of hardware and software. As this example suggests, trajectories tend to favor the status quo.[5]

5.3.1.7 Co-Evolution of ICT System Design/Development/Use

The configurational ability of ICTs also underscores the socio-technical process of ICT design, development, and use that is reflected in every stage of an ICT's life. Projects are selected based on the political and strategic perspectives of decision makers. ICT design reflects an ongoing discourse among developers as well as between developers, the people who will use the ICTs, and other stakeholders. Implementation is a social activity, centered on the re-orientation of work (or life) around a new system (Barley, 1986). A system's use unfolds over time in a form of mutual adaptation between the ICT and the social system into which it has been placed (Leonard-Barton, 1988). This ever-unfolding process, a "design in use," shows the variations in social power (Kling & Iacono, 1984).

5.3.2 Tailoring Social Informatics Concepts for Specific Curricular Purposes

Students involved in an ICT-oriented education reflect a variety of disciplines and each discipline has particular needs relative to Social Informatics concepts. This suggests that Social Informatics concepts must be tailored to meet the curricular needs of that discipline. Comparing the needs of computer science and information systems students highlights a philosophical difference. Most computer science programs are designed (often implicitly) to prepare students for graduate school while most information systems programs are housed in professional schools and are focused on industrial preparation. Given this philosophical difference, the two programs differ in focus. Computer science students' education is often focused on the technical and logical bases of computing. The most relevant Social Informatics issues would be those that help them put these issues in a broader context. Conversely, information systems students' education is focused on understanding and meeting an organization's needs for ICTs. Thus, the focus of their education is on bringing ICTs into organizations to support broad-scale (strategic or operational) needs. Social Informatics concepts can enable students to align ICTs with organizational goals. These same concepts, presented in a different context, can also help computer science students design and develop more useful ICTs. And, as fewer computer science students continue in graduate school, the ability of these programs to provide students with professional preparation becomes