Strategies for Thinking Socially about Technology

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1 Introduction

Much of the research in the ICT program attempts to understand technology in use from a perspective that combines both technical and sociological considerations. However, students enter our program for many reasons, as a result of many different experiences, and from a broad range of backgrounds. Many are trained as technologists and designers, and want to understand the contexts in which those technologies operate; some have been in industry for a while and have learned the importance of understanding social and organizational factors alongside technical factors; some are, for a range of political or practical reasons, interested in the social and cultural impacts of information technologies. One of my experiences over the past few years has been that a significant issue early in the program is making the transition from "being interested in the social issues surrounding technology" to "being able to reason sociologically about technology." There are many parts to this transition – turning from intuition to conceptual analysis, a turn from personal experience to frames of common discourse, recognizing what concepts are "social" and what ones are "sociological," and so forth.

One of the things that our classes try to do is to expose students to a range of ways of thinking socially about technologies, introducing a number of theoretical approaches commonly used in HCI, CSCW, and Social Informatics, and providing some meta-theoretical framework to help understand the relationships between them, though. At the same time, there is a second need, a more practical need – to be able to take a technical setting or situation and to get a sociological grip on it. In his (excellent and highly recommended) book, "Tricks of the Trade," Howard Becker discusses the importance of continually bringing an analytic stance towards data, generating and testing hypotheses continually. He suggests a number of "tricks" or stances that can be taken to help generate these hypotheses and relate them to bodies of knowledge that can help to provide answers. It is this connection that's key – finding a way to relate data and theory in a way that enables further inquiry. In the same spirit, this document suggests some simple strategies for taking technical settings and seeing in them not just the "social issues" but some kind of sociological concern which can relate them to larger theories, other studies, and relevant concerns. They are very broad-brush, but are intended to help people begin to formulate sociologically interesting questions about technology and inspire further investigation.

2 Types of Theory

Any account of a social setting is tinged with theoretical perspectives. Broadly, we can distinguish between three types of theories of social action.

Positivist theories derive from the empirical, scientific tradition. By analogy with the way that physical scientific theories seek to reduce complex observable phenomena to underlying idealized mathematical descriptions, positivist theories seek to reduce social phenomena to essences or simplified models that capture underlying patterns. Accordingly, positivist theories seek objective, independent descriptions of social phenomena, abstracting the detail of particular occasions or settings. Positivist theories are often (although not always) quantitative or mathematical in nature.

In contrast to the objective and quantitative nature of positivist theories, phenomenological theories are subjective and qualitative in orientation. They regard social fact as emergent properties of interactions, not pre-given or absolute but negotiated, contested, and subject to continual processes of interpretation and reinterpretation. Phenomenology was the name that Husserl gave to his attempts to create a rigorous science of individual experience, which turned analytic attention away from the idea of a stable external world which is unproblematically recognized by all, and towards the idea of that the world, as we perceive it, is essentially a consensus of interpretation. Phenomenological theories argue that abstract categories, for instance, are things that are need to be imposed on the world through our interactions with it and with each other, rather than things that exist within it. Because of this focus on interpretation, phenomenological theories are often termed "hermeneutic" (from the name for the ancient study of religious texts for hidden meaning.)

Critical theories tend to have a broader scope. Critical theory, particularly associated with the Frankfurt School and people like Adorno, Horkheimer, Marcuse, and Foucalt, is essentially an extension of Marxist analysis. The basis of Marxist Historical Materialism is that social and economic conditions are the outcome of a historical process of evolution and reflect an evolving, dynamic (and generally unequal) balance of power and control between social groups. Essentially, the nature of human existence is a product of social and economic conditions which themselves reflect the historical distribution of power and control in society. Critical theory extends historical materialism beyond the social and economic "products" of society and to its intellectual products too, arguing that ideas, language, and modes of thinking are similarly conditioned.

The strategies I outline here are not specifically targeted towards one form of theorizing or another. However, much research in social informatics (including my own) is broadly pheneomenological, looking at the ways in which technologies are invested with meaning in and through social interaction, and consequently, there may be a bias here towards these sorts of models.

3 Strategies

3.1 The "Culture" Strategy

How does a technology reinforce, support, threaten, or undermine the cultural practices of a group? Introducing the topic of cultural anthropology, Clifford Geertz (1971) notes that "Human beings are suspended in webs of significance, only some of which they have woven themselves." Culture, essentially, is these webs of significance – how objects, activities and practices become meaningful to people. Cultural anthropology distinguishes between two forms of value – the instrumental value of an object or practice, the basic value of the commodity, and it's symbolic value, or what it means as a symbol when placed in a cultural context. For example, a book's instrumental value might lie in what you can gain from reading it, but it may be invested with symbolic value because it is something that you have sought for a long time, because it marks you as a person interested in a certain kind of topic, or because it was given to you as a gift by a close friend now far away.

The culture strategy focuses on the relationship between technology and cultural practices. For example, consider the use of peer-to-peer file sharing and music swapping amongst teens. For teens, music is an extremely important part of everyday life – a familiarity with a broad range of music is critical for adequate social interaction, and preferences for different styles of music define patterns of allegiance and identity. Music is not a purely personal pleasure; it is a form of cultural participation. What's more, much of teen life is defined by the tension between affiliation with friends and peers and interaction with the adult world. Peer to peer music sharing, then, is

not only a way for teens to do the work of teen life (which is basically all about identity and socialization), through music, but simultaneously to mark their separate identity from the adult or commercial worlds – the antagonism between teens and the music industry only serves to reinforce this.

In Grinter and Palen's (2002) study of IM in teen life, another important cultural aspect comes out, which is how teens use the technology to support their sophisticated differentiations between groups of peers. Affiliations with one group or another – the cool kids, the nerds, or the jocks and burnouts (Eckert) – are extremely important, and must be publicly demonstrated and maintained because they are a critical element in identity management. Teens, then, have a strong vested interest in being publicly available to the "right" people and not to the "wrong" people, to ensuring and managing the separation of these different groups (even while participating in many, of course). Multiple identities, blocking, multi-chatting, etc, are used in sophisticated ways to reinforce these activities.

A final example comes from Orr's (1996) study of photocopier service engineers. The introduction of "structured documentation," essentially directive, step-by-step, how-to manuals for copier repair, clashed with the technicians self-image as engineers, which valued practical skill, problem-solving abilities, resourcefulness, and technical knowledge. The engineers would even get together in their own time on a regular basis to swap war stories and experiences that celebrated these technical skills; within the group, individuals were valued to the extent that they demonstrated or embodied these kinds of skilled practices. Their engineering skill came to have symbolic value within the group, but these skills were threatened or ignored by the way the new documentation the company was introducing. The Eureka system, on the other hand, was much more successful than the documentation precisely because it supported and reinforced this culture of practical knowledge, and provided a means by which individual and collective skill could be celebrated.

3.2 The Ecological Strategy

No people or technologies exist in a vacuum. Social settings are configurations of people, organizations, interests, roles, technologies, needs, conventions, etc. Each of these influences the others, and arguably, defines the others with relation to themselves.

For instance, imagine that we wanted to understand something about technology use amongst university professors. We could start off by thinking of the network that surrounds professors. So, naturally, we see professors in a context of students, and of university administrators, and a broader public (students' parents, potential employers) as well, of course, as other university professors, at the same institution or at different institutions. These relationships have different characteristics. Professors teach students, but also gain status from them, just as students can gain status from their interactions with particular professors. Similarly, professors gain status from their universities, and vice versa. These aspects tend to differentiate between professors and between students. On the other hand, other elements, such as university administrators, parents, and employers want to see standardization amongst students and the teaching that they receive. So teaching becomes formalized into curricula, and means of assessment must be introduced in order to measure the relationships between students. On one level, these serve to differentiate students from each other (according to grades), while on another level, they serve to homogenize students (any two students who've taken 234B must have learned the same stuff.)

Taking the ecological approach means looking for the set of structural relations within which a technology and its use are embedded. These structures may relate elements of different types – technologies, people, practices, etc. Their relevance is, first, that they serve to define and condition each other (e.g. we can look at the use of some communication medium, such as IM, by

placing it within a range of different media, such as the telephone, email, physical mail, text messaging, etc, and then analyzing the ways in which communicative choices are made); second, that the evolution of technologies is revealed by the forces that stabilize these networks (e.g. we can cast new light on technical debates about the value of packet switching versus circuit switching by considering the organizational demands of practically realizing networks based on each approach); and third, that a focus on the many different parties and processes that go to make up a social setting turns our attention to the ways in which these different groups communicate and coordinate.

One classic application of this approach is Becker's (1984) "Art Worlds," in which he shows how the quintessentially individualistic act of producing art is firmly tied up in a network of artists, art consumers, critics, museum-goers, curators, writers, each of which draw aspects of their identity from their position in the network, and each of which is defined with respect to the others. An example of this approach in the CSCW/social informatics literature is Star and Ruhleder's (1994) examination of the "Worm Community System." Star and Ruhleder uncover the complex of technologies and practices within which the WCS system is embedded, and, through these, account for the problems of adoption in different settings. In a different vein, writers such as Pinch and Bijker, working in the area of science studies, have applied this approach to understanding the range of forces that have shaped the design of technologies from Bakelite to synthesizers (Bijker et al., 1989; Bijker and Law, 1992), while Orlikowski and Gash (1994) have used this approach to understand information technology use in organizational settings.

3.3 The "Practical Problem" Strategy

Social settings present themselves in a variety of ways. To the analyst, looking at the problem largely from outside, they may manifest themselves as arrays of participants, roles, responsibilities, relationships, problems, routines, etc. To participants, though, they manifest themselves as a set of practical problems – problems to be solved in order to get the job done. Focusing on the practical problems encountered by people in the course of routine activities casts a different perspective on social action. The "practical problem" strategy suggests that, rather than the regularity of some social setting being a consequence of its abstract structure, it is an achievement of the people involved. Some setting is regular, orderly, or structured only because people actively make it so, and their reasons are purely practical; there is some job at hand to get done. The achievement of regularity is a practical problem, routinely encountered and solved by people in the course of their activity, a problem to be "gotten out of the way" like any other. This approach is perhaps most closely associated with ethnomethodological analysis.

For example, consider Bowers et al's (1995) classic study of workflow in a print shop. The print shop workers face a series of practical problems – getting through the queue of jobs by the end of the day, keeping their machines busy (so that management doesn't complain), etc. They have a range of strategies that they deploy to achieve these ends – running multiple jobs at once, helping each other out, using the office photocopier as backup, breaking jobs into pieces, starting on anticipated jobs before they have actually arrived, etc. Bowers and colleagues argue that the smooth running of the print shop is not an external criterion that necessitates these actions, but rather is the outcome of the sets of practices that the print shop workers deploy. They contrast this with the effect of an information system that attempts to impose an order on the work (and, predictably, fails.)

The practical problem strategy throws a different light on social settings, and provides a way to look on it in terms of individual action rather than external structure. It emphasizes the importance the lived detail of the particular occasion of action rather than its idealized or generalized properties.

3.4 The "Dialectic" Strategy

All forms of reasoning and rhetoric (that is, ways of thinking and talking about things) embody particular points of view – whether conscious choices or tacit conventions. For example, think about how the terms "pro-life" and "pro-choice" are used to frame aspects of the abortion debate, and to frame both positions as positive rather than negative. An effective strategy for gaining insight into some setting can be to examine the paradoxical resolution of opposites that can be masked by these terms. This is similar to Hegel's form of dialectic analysis. Hegel argued that, while people struggle to understand wholes, they are unable to think without drawing distinctions. Distinctions separate phenomena into pairs or opposites, arguments and counter-arguments. Hegel's approach uncovers this relationship between thesis, antithesis and, finally, synthesis, which negates the distinction between the two.

As an example, Leysia Palen and I have lately been writing about the problems of privacy in technologically-mediated settings (Palen and Dourish, 2003.) Privacy is a persistent problem in the development of collaborative and ubiquitous computing, but we lack well-developed analytic models. We proposed a model, drawing on some research in social psychology, which focuses on privacy as a dynamic, dialectic process of boundary management. The dialectic aspect lies in the focus on the resolution of contradictions. So, for example, when we speak of "privacy," we generally think of one's need not to have information disclosed about one's affairs, activities, thoughts, etc. However, at the same time, as individuals in a society, there are certain things that we do need others to know about ourselves. We maintain public personae; we engage in professional and social interactions, we participate in society, and we achieve status through public displays. All sorts of actions, including publishing, advertising, displaying family photographs, driving nice cars, dressing for the office, selecting an email account name, and sticking cartoons on the cubicle wall, are forms of intentional, controlled, public statement. Privacy is not simply about social withdrawal; rather, it lies in the process by which the dual needs for withdrawal and engagement are resolved. The need for privacy coexists with the need for publicity.

As another example, consider the open source movement. Open source is a model for the community development of software systems. Openness is the watchword – processes open to all, source code available to all, and broad participation. Research studies of open source communities (e.g. Mockus et al., 2002) discuss the mechanisms by which large groups of developers coordinate their actions, and the contrasts between different approaches (e.g. Apache, FreeBSD, Linux.) Arguably, however, these processes are not about promoting openness, but rather closedness. In order to preserve the integrity of the codebase, the central concern for open source projects is to ensure that access is restricted. This may be achieved through processes of evaluation, credentialing and legitimation (e.g. membership of the "core team"), or through the creation of process checks and passage points (e.g. Linus, in the case of the Linux kernel.) The open model must inherently provide ways of maintaining closedness, too.

4 Caveats and Pitfalls

These strategies are offered not as ways finding answers about technology, but as ways of finding interesting questions to ask. The answers come from much more detailed and rigorous analysis. Consequently, it's important to bear in mind that there are very many questions that can be asked about a setting, and very many approaches that help us understand one or another aspect. The different strategies might fit better or worse in any given setting, but it makes sense to apply all of them if you want to get a rounded view of what's going on. They all reveal aspects of technical settings that can be important first steps towards getting a good understanding of what's going on.

I have a certain nervousness about setting these down and distributing them, for fear that they might lead to what Weick (in describing Davis' article, "That's Interesting!") describes as "flashy theorizing," or what Gerson has felicitously termed "research by bumper sticker." Finding a set of labels to hang on a setting doesn't explain how it works – naming and explaining are different things. Further, the interesting questions that we might want to ask about a setting should be asked while engaged with data. Qualitative analysis proceeds by continually questioning data, creating hypotheses and testing them against the data collected. Theorizing without data is empty; the goal of these strategies, then, is to help shape an engagement with data and show how it can begin to lead to broader patterns.

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