Chapter 2
Building the Social into Systems Design

Abstract This chapter lays out some necessary context for the book by examining how the problem it addresses first came about as systems design encountered the need to engage more concretely with the social. We start by looking at the interdisciplinary character of work in systems design and how Human Computer Interaction (HCI) arose as an area of interest within it. A point of particular focus here is how systems design has mistakenly presumed social science to be a relatively univocal affair whereas, in fact, it contains a concatenation of different voices. A naïve conflation of ethnography and social science therefore overlooks the contested character of ethnography within social science itself. Thus, when called upon to consider 'new' approaches to ethnography design is therefore confronted with a choice between a number of *divergent* perspectives upon the social. Much of design's engagement with the social to date has been through collaboration with ethnomethodologists, who locate expertise in the social milieu. This contrasts with 'new' approaches, which locate expertise in the long-standing traditions of social science. This being the case we seek to highlight the real nature of the choice designers are being asked to consider. In the ethnomethodological approaches that characterise much of design's early engagement with the social, the expertise design is being asked to engage with is the expertise of the members of society themselves who populate the settings that are investigated for design purposes. By contrast 'new' approaches, built upon traditional understandings of ethnography within social science, invite design to engage with the *social scientist as expert*, where the goal is to replace members' expertise with the theoretical and conceptual machinery of social science.

2.1   Systems Design and Social Science

Systems design is one of those few academic areas in which interdisciplinary work is routinely conducted. Collaboration between disciplines is encouraged by research councils and funding agencies, who stress the advantages of working together, though much of what passes as interdisciplinary work involves cognate disciplines within engineering, or involves disciplines that have a relatively established relationship, such as programming, operating systems, networks and distributed

systems, and other areas of expertise that 'naturally' go together. However, systems design has also occasioned the coming together of very different disciplines, which are not necessarily cognate or 'naturally' associated, and it has often been creative in its development of different disciplinary design mixes. Today the development of computer systems is shaped not only by computer scientists, mathematicians, and engineers of different hues, but also by social scientists, psychologists, artists, graphic designers and others who have been drawn in different proportions and at different times into the design mix. This holds true across the different contexts within which systems design takes place, be it in large corporations, small and medium-sized enterprises, universities, or even peoples' homes.

As computing has developed over the decades, the disciplines involved in systems design have grown. The advent of the programmable computer occasioned collaboration between those who built hardware and those who built software, and this gave birth to particular, closely allied, disciplines and areas of expertise. However, as interest in computers developed beyond those who created them, and outside of the rarefied circles in which they were initially used, attention shifted towards understanding those who might want to make use of computer programs. This was driven by commercial and research interests, commercial in the sense that an understanding of what a customer might require from a commercially available program might support sales of that program if it could build in their requirements, and research in the sense that researchers became interested in how to build some appreciation of the non-expert users of systems into their design.

The field of Human Computer Interaction (HCI) institutionalised 'the user' in the design of computer technology. In its early years, HCI was strongly associated with ergonomics, itself an interdisciplinary collaboration drawing off disparate disciplines which emphasised the design of hardware around the anatomical features of the human body. HCI sought to design software not just around the physical characteristics of humans but also their imputed cognitive features, on the premise that human-computer interaction is essentially a matter of communication between man and machine (Grudin 1990a). Incorporating the user therefore centred on the design of the 'interface' between the user and the computer. The enterprise was founded on cognitive theory and interfaces began to be designed with an understanding of what was generally referred to as human 'mental models' and 'information processing' and the engineering challenges involved in creating the 'software control dialogue' to support these and facilitate effective communication between man and machine. Through the design of the computer interface HCI introduced *human factors* into thinking about the development of computing systems. In so doing the human sciences started to be incorporated into the design mix.

Jonathan Grudin (1990b) describes the history of the interface in five stages, each characterised by different users and different disciplines being drawn into the mix. He describes stage one as being where hardware constituted the interface and interaction centred on the ergonomics of switches, dials and panels. Stage two was the development of software programming interfaces. Stage three introduced the idea of the 'end user' and saw the terminal as the interface, drawing off the disciplines of human factors, psychology and graphic design. The 'end user' is preserved in the

fourth stage – the 'interface as dialogue' stage – which draws heavily off cognitive psychology and cognitive science. The fifth stage of the interface is the interface as work setting. This involves groups of end users and inevitably draws the *social and organisational sciences* into the design mix. We neither want to endorse nor dispute Grudin's history of the interface but note two matters of significance in it for our present undertaking. First, that taking account of the work setting in design introduces the idea that disciplines to do with *the social*, and not just humans or human factors themselves, should be incorporated into the design mix. Second, that this 'turn to the social' in design does not address *how* the social should be factored into design. It is assumed to be a non-problematic matter to introduce the idea of designing with the social in view. However, in practice this is not turning out to be the case.

One of the reasons for this is that the disciplines investigating social matters are drawn from the social sciences, such as anthropology, sociology, management and organisational sciences, etc., and their ways of proceeding are unlike the ways in which the disciplines involved in systems design had proceeded before they entered the mix. Within the engineering disciplines, for example, there is a more or less agreed upon *consensus* as to how to proceed. A disciplinary paradigm holds sway over the disciplines' investigatory theories and methods. This is also generally true when the disciplines described by Grudin as involved in his third and fourth stages become involved. Although there is more flex involved in the theory and methods involved in human factors and cognitive science when compared to engineering, and even disagreement as to the best ways in which to do design, there is still broad agreement as to the principles of investigation and theory within cognitive science, human factors and psychology. All three areas would aspire to a unification of theory and method that, at least in received wisdom, typifies the disciplines of engineering and science. However, the social sciences are far from unified over matters of theory and method; indeed they often seem to revel in the differences between perspectives.

In stark contrast to the broad consensus within other disciplines involved in systems design, social science often seems to be driven by dissent, and its theories and methods are often sites of bitter contest. It sometimes appears that social science largely proceeds on the basis of argument about how the social world should be investigated, or what it is that drives and organises that world, rather than actually investigating social matters and social occurrences themselves. This is an ordinary and unremarkable fact of life for social scientists, and its taken for granted character may well have masked it from view in design's initial engagement with social science. Consequently, in elaborating the fifth stage of the interface's evolution and approaches towards its development Grudin refers to ethnography as if it were a unified approach. It might have appeared that way as well to the computer scientists at Xerox's Palo Alto Research Centre (PARC), where ethnography was first drawn into the design mix (Syzmanski and Whalen 2011). It might well have been the case that the PARC scientists, and those outside of PARC who followed this initial engagement with the social, viewed ethnography as what investigating the social amounted to, and as something that provided an uncontroversial approach to uncovering it. This is not the case.

Ethnography is as contested as any other matter within social science. There are arguments that it is not a method, for example, just a loose assembly of data collection techniques. There are arguments with respect to how the data gathered is used in descriptions of social life and its organisation, and arguments as to the quality of those descriptions and the quality of the data gathered. As systems design's engagement with the social has gathered steam, and as ethnography has become more entrenched in design activities, these sorts of divisions within the social sciences have started to surface and the issues that are raised within the social sciences are now being raised within design (e.g., Crabtree et al. 2009; Irani et al. 2010; Taylor 2011). This may well baffle designers, especially those who appreciate the merit of what may initially be seen as a way of bringing in matters to do with the social in descriptions of the activities they want to design systems to either automate or support. Nevertheless, the question of how disciplines involved in systems design are to react to this division in social science over what they might have reasonably supposed was a unified method is a timely and an important one as design's engagement with the social begins to mature.

There are of course a number of possible reactions to the fissures within ethnography. First off, one could ignore them. Designers share some traits of the magpie, which on seeing a glittering object takes it back to its nest: it does not matter if the object is made of glass or is a jewel, it suits its purposes. Thus, a description of some aspect of the social world produced by a social scientist may spark the designer's imagination, and that spark is all they need. It does not matter for their purposes if the description is, from the point of view of another social science perspective, methodologically flawed. Secondly, designers know what they like and what they trust. Here, the relationship that is built up between particular people, or the continued use of descriptions and accounts derived from a particular social science methodology may be the important matter, and if it has worked before then it will more than likely work again. With respect to these two reactions, it may well be that designers do not need to follow very carefully methodological arguments within the social sciences; their work can proceed without becoming sucked into the mire of social science dispute and debate.

A third reaction could be to try and understand the strength of an account of the social that might appear to be relevant for design matters, and there is a major lesson to be learnt from not having done that in the past. The idea of Artificial Intelligence (AI), for example, has taken many engineers, computer scientists and designers up a blind alley. AI is based upon cognitive theory and although we will not elaborate the many problems it is afflicted with here, a proper appreciation of its arguments and an understanding of the arguments of its opponents (see, for example, Button et al. 1995) may have given some who merely accepted its premises and proceeded from there pause for thought. A fourth reaction could be to reflect upon the multidisciplinary character of systems design. Rather than it being seen as an arena within which a number of disciplines contribute, it could be viewed instead as an emerging discipline in its own right, a *hybridised* discipline. In this respect a social methodology might become an important ingredient in systems development methodology, transforming the social from something turned to and treated in a

piecemeal fashion into something turned to and treated in a methodical way. Understanding social science methodologies in themselves might then become an important step in developing a social methodology within and for the purposes of systems design.

Both the third and fourth reactions would require systems designers to understand at least some of the methodological issues within social science and the grounds of the various arguments which propel them. This book is aimed at people who fall into these categories, though it is hoped that other categories of reader might also reflect upon the fact that ethnography is not all of apiece and consider what might be an appropriate reaction to this. There is of course a fifth reaction, which is to just give up on social science, because there is just too much baggage to deal with. However, the option for that reaction has really gone by; the genie is out of the bottle, and the social *is* part of systems design thinking. The fact that designers and users are in social relationships with one another is a difficult matter to turn a back to and ignore, and the social is broadly recognised to now infuse systems design.

As the relationship between systems design and the social sciences matures an interesting aspect in the relationship has emerged. Once the social sciences might have hesitantly hovered around the design table but as the relationship has developed the social sciences have gained more confidence in what they might contribute to the design mix. In this respect another set of interests is now actively involved in understanding systems design in addition to those of system designers and developers: the interests of social scientist themselves. At every major design conference there will be found numerous papers situated in or derived from some study of the social. Major journals publish studies of social matters developed for design purposes, or descriptions of systems rooted in studies of the social, or speculations about systems that derive from studies of the social.

With developed confidence in what they can contribute, the social sciences may be able to reflect in a mature and critical way on how they can make their contributions to systems design without the fear that they will be banished from the table, even if it makes waves. Whilst design has turned to the social and the social has begun to be incorporated into design oriented conferences and journals, the reaction of some social contributors to other social contributions might well be different to what they would be if aired in social science conferences or journals. While it might have appeared initially to design that ethnography was a unified and unproblematic social science methodology, in the social sciences themselves not all studies of social matters rooted in ethnographic observation would be given equal weight: social scientists might contest the veracity of the observations made, for example, or the methodological and theoretical validity of the particular approach taken. Questions with respect to the strength of the relationship between the things a study might observe and the things it says about them are important matters within the social sciences. As the incorporation of the social into the design mix develops it becomes more important that *how* the social is incorporated is overtly considered if that mix is to result in a firm design platform. It might have served design for the social scientist sitting in a design-oriented conference to suppress the kinds of

professional concerns they would raise if they were sitting in a social science conference for the purposes of just getting the social into design in some way. But now that it is firmly part of the design mix does it still serve design for social scientists to continue to be mute and not offer critical reflection upon descriptions of the social? Would one programmer suppress criticism of another programmer's code for being clumsy or inelegant? Would one designer accept the output of another designer just because they were a designer?

Suppressing critique by social scientists of social science descriptions developed for design purposes would be to negate a significant resource for system design. Critique has been used widely within design circles in general as a method to assess systems or proposals for systems. It is used within systems design to propel the enterprise forwards. The emergence of the field of Computer Supported Cooperative Work, and associated calls for a turn to the social, was based upon critiques of systems that were problematic in their support of group work and collaborative activities in the workplace. In this respect, early ethnographic studies of systems in use provided critiques of systems. Case studies found that people had to work around particular systems to get the job done, or that particular systems interfered with work practices and organisational structures. Many of the initial studies that heralded the relationship between systems design and social science sensitised design to the problems for social interaction and organisational process that particular systems created when they were introduced into the workplace. Critique has, then, an important role to play in the interdisciplinary mix.

This book provides a critique of ethnography in design for the purpose of making its contribution stronger. It provides an examination of ethnography in the social sciences and different orientations to the social that characterise different ethnographic approaches and considers their ramifications for systems design. The point and purpose of the exercise is not to make social scientists out of designers, but to show that an understanding of these differences can actually support design practice and enable the social to be built into design in more methodical ways. The methodological focus of the book makes it relevant to a particular audience and it is aimed, as we have mentioned, at those design practitioners and researchers who fall into the third and fourth categories outlined above. Thus it is intended to be a resource for those in systems design who want systems design to be a methodologically grounded matter. Building the social into design can be no less methodical than any other aspect of system development. Achieving that requires the development of an appropriate social methodology for systems design, and the development of an understanding of what could be appropriate requires some understanding of methodology in the social sciences.

2.2   The Turn to Ethnography

Within the social sciences there are a range of ways in which the social is studied. Ethnography emphasises observational, participatory techniques, but questionnaires, structured interviews, social modelling, ideal type construction, typologies,

taxonomies and statistical surveys also figure strongly. Across anthropology and sociology the development of theories of society and culture have been stressed and, in recent social science history, feminist social theory, postmodernism and the lingering influences of Marxism have all propelled thinking around social matters. So given Grudin's developmental stages in interface design, we could ask the question: why is it that the method that is associated with the social in systems design is ethnography and not some other, more prominent method for investigating social matters such as a statistically driven method? Part of the answer to that question perhaps has more to do with the historical development of the personal computer and the introduction of computing technologies into the workplace, than it has to do with developments and trends in the social sciences. We are fully aware, given the nature of histories, that alternative historical accounts can be given, indeed await being given, and that engaging in them is a treacherous business. However, from our position within its history it seems possible to point to a number of key interrelated factors involved in the forging of a relationship between systems design and ethnography. These include research emanating from Xerox's Palo Alto Research Centre (PARC), the emergence of the field of Computer Supported Cooperative Work (CSCW), the Scandinavian School of Design, high profile system failures, and critiques of cognitive theory.

Research conducted at PARC made a decisive move in the introduction of the social into the design mix. As noted by Symanski and Whalen (2011),

> … in the late 1970s …John Seely Brown (JSB) brought a sensibility for social scientific research to the Palo Alto Research Centre … Before coming to PARC, JSB deepened his conviction that social scientific inquiry is powerful while working at BBN Technologies, where he realised that the challenge is not the building of technologies, but the *creation of technologies that fit into the workplace*. (our emphasis)

Part of PARC's research agenda became the need to understand the social context in which computing systems were to be placed, for while PARC had developed the personal computer and the work station there was still the realisation that these systems were not just being used by individuals but that they had to fit into the real time character of work and organisations. Although there was no lack of physiological and cognitive theory 'input' to the design of the interface for workplace systems, there was also the recognition that PARC designers knew little about the social character of the work that their systems were to fit into. Not only might they not know about it but the simple question that might provide for a useful answer – what do you want this system to do? – turned out not to be as simple as it seemed and PARC, for contingent, local reasons, therefore turned to anthropology and ethnography to start to understand how to answer it.

It is worth noting at this point that Bell and Dourish (2011) consign ethnographic interests in the workplace, and with it much of what ethnography has been for design to date, to that of the development of requirements, and propose 'new' horizons for ethnography in design instead. We take issue with this simplistic apportioning later. However, 'requirements capture' does well illustrate not only the need to understand social settings in designing for them but also the complexities involved for design in attempting to grapple with social matters. Within the area of require-

ments engineering, for example, the apparently simple and straightforward matter of asking (as above) the question "what do you want the system to do?" turns out to be a very complex one. In real world contexts, it is a question that has seen many large-scale developments flounder. Who are you to turn to answer the question? The people running the organisation would seem to be an obvious choice, but people in leadership positions do not always know what is going on in their organisations or how the work of the organisation actually gets done. 'Information seals' are rife in large complex organisations. Such information may not find its way up the organisational hierarchy and, consequently, asking about the nature of work in an organisation may not be as simple as posing enquiries to those occupying senior management positions.

Consulting organisational processes, workflow charts, job descriptions and other formal instruments may not result in clear-cut answers to questions about the way an organisation operates either. This is because, as anyone knows, formal specifications do not capture the ways in which they operate within actual contexts. Within organisations, there is what is supposed to happen and what actually happens, and while people might strive to align the two there are many examples in the literature which show that alignment is, at best, only approximate (see, for example, Rouncefield and Tolmie 2011). One might, then, turn to the purchasers of systems to elicit an understanding of the work the system will automate or support. However, purchasers are not the end-users, they do not understand the details of the work, the work-arounds that have developed, and actually how, in practice, the work is done. Purchasers might, at best, have previously done the work themselves before being promoted but again, as found in many studies, purchasers are all too often divorced from a detailed understanding of how the work is done now and the swarm of contingencies that currently play upon it.

Requirements engineers might instead turn to and ask the end-users. Again, this might appear to be a simple enough matter, but how is this to be done? Will a questionnaire do the job? The problem with this approach is that a questionnaire designed to make visible the work requirements for a system cannot be constructed without first knowing about that work. A pilot questionnaire might be put together in order to address the problem, to make visible what needs to be asked about in the proper questionnaire. However, now the requirements engineer is beginning to step into the murky waters of questionnaire methodology and the more they wade into those waters, the more the ground on which they stand might not seem as firm as it did at the outset as probabilities take hold. The end-users might be interviewed. However, interviews are a course of social interaction involving different parties with different interests. Some people are more skilled than others and those being interviewed may use the interview for their own purposes. Like the use of questionnaires, interviewing end-users to gain an understanding of the requirements for a system might not present the simple solution it at first appears to offer.

Furthermore, requirements engineers themselves work within an organisational structure and occupy a particular status position within it. Fujitsu, one of the largest interaction software houses, commissioned a study from PARC under the leadership of Jack Whalen to understand why 60 % of its developments failed. The study,

amongst many other matters, found that the problem resided in its requirements capture and analysis and was directly related to the relative status of the requirements engineers and customers. The requirements engineers were often of a lower organisational status than those in the customer organisation they were talking to. Within Japanese business dealings relative status can be important within an interaction, and the study found that these status disparities could account for the developed software failing to satisfy customer need. In short, the requirements engineers were not able to elicit requirements, but had to merely listen to requirements. They were not in a position to challenge, to search, to probe, but were merely there to record.

On top of this, as any large development house will confirm, one of the key problems encountered in software development is often the customers themselves. Customers change their minds as to what they want, even though they may have been confident as to their requirements at the beginning of the development. Trying to pin down what the customer wants through tightly worded contracts and sign offs does not always work because the meaning of the words and phrases can change depending upon the person articulating them. Thus, just by taking one example – requirements engineering – in the whole complex of designing, developing and building a system for complex organisations, it is possible to see that attempting to bring in social considerations is not in practice a simple matter for those doing the development. Defining user requirements is itself a socially organised matter and is, as such, often a much more complicated job than defining systems specifications. The required capacity of a particular wire can be specified through a mathematical calculation of resistance, for example, but there are no corresponding mathematical formulations that will yield the organisational or work requirements that a system must satisfy. Some form of social enquiry and analysis *has* to be undertaken.

PARC's initial engagement with social enquiry and analysis was through Eleanor Wynn, one of six anthropology graduates from UC Berkeley hired as summer interns in 1976, who stayed on at PARC to do her PhD thesis. It would not be inappropriate to characterise her work as 'ethnography' (Wynn 1991). Ethnography had come to epitomise the way in which anthropologists engaged in their research by collecting materials 'from within social life' – being present as social life unfolds and witnessing it directly. Wynn, and the other early ethnographic pioneers in design, demonstrated that an ethnographic approach could provide a way through for those who needed to know more about actual social settings, particularly office settings at that time, and could help them grasp what was actually occurring within those settings. In this respect ethnography helped designers understand, in part at least, the general workplace requirements a system might need to satisfy.

Running concurrently with developments at PARC, some within HCI were arguing that the real world, real time character of work was not reflected in prevailing design models. As Schmidt (1994) observed, for example,

> In the design of conventional computer-based systems for work settings the core issues have been to develop effective computational models of pertinent structures and processes in the field of work (data flows, conceptual schemes, knowledge representations) and adequate modes of presenting and accessing these structures and processes as represented in computer systems (user interface, functionality) … the issue of how multiple users work

together and coordinate and mesh their individual activities – 'through' the system or 'around' it – was not addressed directly and systematically, as a design issue in its own right. So far as the underlying model of the structures and processes in the field of work was 'valid', it was assumed that the articulation of the distributed activities was of no import or that it was managed somehow by whoever it might concern. It was certainly not a problem for the designer or the analyst.

The development of Computer Supported Cooperative Work emphasised that the issue of how multiple users work together and coordinate their individual activities needed to be a major focus in the design and development of workplace systems. What was known as the Scandinavian School of Design was a major driver of CSCW, and a particular concern was to develop workplace systems in a way that empowered 'the worker'. This meant bringing in people who were engaged in the actual work that systems were being designed to support, and *their* understanding of the organisation of the workplace. It also meant that designers needed to enter into their world of work.

This turning to the social was driven by very public and embarrassing system failures. For example, the "comedy of errors" that beset the London Ambulance Service (LAS) was often cited (Finkelstein and Dowell 1996). LAS introduced a Computer Aided Despatch (CAD) system in October 1992. The CAD system exploited an automatic vehicle location system (AVLS) and mobile data terminals (MDTs) to automate ambulance despatch.

> Immediately following the system being made operational the call traffic load increased (but not it should be noted to exceptional levels). The AVLS could not keep track of the location and status of units … multiple units were being assigned to some calls. As a consequence of this there were a large number of exception messages … exception messages generated repeated messages and the lists scrolled off the top of the screens so that … messages were lost from view. Ambulance crews were frustrated and, under pressure … could not (or would not) use their MDTs … The public were repeating their calls because of the delay in response … The entire system descended into chaos (one ambulance arrived to find the patient dead and taken away by undertakers, another ambulance answered a 'stroke' call after 11 hours–5 hours after the patient had made their own way to hospital). The CAD system was partly removed and aspects of its function (notably despatch decisions) were performed manually. This part-manual system seized up completely 8 days later … … … … there is a very strong message in the report about the attempt to change working practices through the specification, design and implementation of a computer system. (ibid.)

The prescient need to shape systems to the social contexts in which they would be deployed and used consequently resulted in a broad turn to the social sciences. But social science is a vast territory. What sections of it might best support design objectives of fitting systems into the workplace? One might think, for example, that management science would be a primary candidate to support the design of workplace systems. Nonetheless, systems designers gave it short shrift.

> … the field of management science and its offspring organisational theory are like the emperor with no clothes … Organisational theory acts like the magic cloth that keeps us from looking at the essential issues within the workplace … [it] throws us off that course, as it defines organisations and their behaviour as rational entities acting through managerial practices. (Knudsen et al. 1993)

Knusden is making visible a divide here between theoretical orientations to work and organisation and empirical goings on in the workplace. Recognition of this divide was importantly made for design in Lucy Suchman's (1987) deconstruction of theoretical models of cognition and the empirically based examination of photocopier use she provided. Descriptions of what people *actually do* were juxtaposed against theoretically generated models that provided for what they do.

These various factors occasioned the development of what was understood to be ethnographic explorations of work and the workplace to support design thinking with respect to workplace systems. However, as ethnographic work began to build momentum within Xerox's systems research, and within CSCW in general, we would argue that a sleight of hand occurred with respect to an understanding of what ethnography was. Really, and hopefully this will be come more clear as we examine ethnography and its various guises in depth, all that ethnography means is that we should orient ourselves to the study of society '*from within its midst*'. The idea of studying society from within is a radical departure from standard sociological alternatives, such as studying society through statistical representations, or theoretical constructs, and to say 'all that it means' is not to ignore the important move that ethnography takes in stepping inside of the social to witness everyday life at first hand. But that is all that the term ethnography describes. It says nothing about *what* it is that such a study would apprehend. Nor *how* it would apprehend it. Certainly ethnographic work done at PARC, and elsewhere, brought the social into design, but *what* it saw and *how* it saw it was not derived from the theories and conceptual frameworks to be found in the ethnographic accounts of anthropology, be those derived from classical or contemporary studies. In the next chapter we will explore the origins of ethnography and part of its development within anthropology. It will be seen that ethnographic observations were used to fuel particular theoretical accounts of society and culture, and were part of a theoretical and definitional approach to social matters. We will also explore in Chap. 4 how some calls for new approaches to ethnography are actually not new at all but calls to return to this old social science practice.

However, ethnography as it was developed at PARC, and to some extent in CSCW and HCI, could not be more removed from this classic way of apprehending social matters through the generation of cultural theories and the production of definitions and interpretations for and of social actions and interaction. Ethnography in design as it developed at PARC and as it made its early appearance in CSCW articulated *ethnomethodological* studies of work (Symanski and Whalen 2011). Ethnomethodology was a radical departure from traditional social science concerns and understandings. Harold Garfinkel, its founder, had provided a respecification of sociology in his book *Studies in Ethnomethodology* (Garfinkel 1967). We will be examining this respecification in detail in Chap. 7, but as a precursor we note here that in distinction to traditional social science, and included in this are undertakings that draw off ethnographically collected materials to generate theoretical and definitional accounts of social order, ethnomethodology instead does the job through describing the practices of those involved in its achievement. Social order is, in ethnomethodology's view, a members' matter, not a matter of sociology and

anthropology. In a way Garfinkel was putting sociology and anthropology out of business, because he was providing for an alternate social science. Unsurprisingly ethnomethodology has been marginalised by mainstream social science and is certainly organisationally dwarfed by the mainstream social science institution.

Ethnomethodological studies of work are key to Garfinkel's program (Garfinkel 1986; Rouncefield and Tolmie 2011). The idea of 'work' here, as we will explain later, does not just relate to what people do for a living, to 'jobs of work', but is more extensive and focuses on the work involved in doing action and interaction. This may involve studies of people's jobs but may also apply to the other non-paid activities that people engage in (see, for example, Tolmie and Rouncefield 2013). There certainly have been many ethnomethodological studies of 'jobs of work', and initial studies done for design purposes focused on the workplace. Lucy Suchman and her group put the study of work into high gear at PARC, which overflowed into HCI and CSCW. This research agenda was underpinned by Harold Garfinkel's ethnomethodological interest in how people order their activities in the course of doing them. This ethnomethodological influence is not only visible in PARC's lab studies (Suchman 1987), but also in studies of office procedures, airline operations, document retrieval, and broader reflections on 'studies of work' and their relevance to systems design more generally (Suchman 1983, 1995; Suchman and Trigg 1991; Blomberg et al. 1994). This body of work, as much as what happened within the labs at PARC, gave rise to the idea of 'situated action' and 'work practice' and came to epitomize PARC's interest in the social, an interest wholly grounded in ethnomethodology.

This initial ethnomethodological impetus in what were often just described as 'ethnographies' was strengthened by two further developments: the opening of a European PARC Lab in Cambridge in the UK (EuroPARC), and the development of a CSCW centre at the University of Lancaster, involving a collaboration between members of the sociology and computer science departments. EuroPARC recruited sociologists who were rooted in, and explicitly articulated, an ethnomethodological approach,[1] and although not all of the sociologists in the Lancaster CSCW Centre would own to ethnomethodology, one of the driving forces, John Hughes, and the graduate students around him, pursued ethnomethodological interests. Lancaster played a key role in a major European Union funded project called COMIC, which brought together a range of social scientists, computer scientists and systems designers, many from within the Scandinavian School of Design, who were concerned by the limitations of computing to support cooperative activities in the workplace. The COMIC project reinforced the usefulness of ethnography in closing the gap between systems design and the workplace (see the COMIC deliverables, particularly 2.1, 2.2, 2.3, 2.4 and 5.4). Again, however, the particular ethnographers involved employed an 'ethnomethodologically-informed' approach. Thus, the sleight of hand involved in the introduction of ethnography into systems design was to be content to have ethnomethodological studies labelled and called

---

[1] These included Bob Anderson, Wes Sharrock, Christian Heath, Richard Harper, Graham Button, Jon O'Brien and Peter Tolmie.

'ethnographies', rather than making clear that they owed little to ethnography as conducted in anthropology and elsewhere in sociology, but had all to do with ethnomethodology.

Within our potted history of the beginnings of ethnographic research in design, and again we acknowledge the fragility and vulnerability of such histories to alternative accounts, it may not have mattered that the 'ethnography' systems designers encountered was ethnomethodologically driven. Indeed many might have supposed, if they actually thought about it, that when they heard the term ethnomethodology that it was just another word for ethnography, that the two were one and the same. What mattered was not the name but the practical utility for their undertakings of the observations that ethnomethodologists cum ethnographers cum anthropologists and sociologists generated.[2] It also probably meant little to the social scientists involved as well that they did not make it explicit that they would *not* present themselves as ethnographers in their home discipline, though they used materials that were collected ethnographically, that is, through fieldwork, through observing society from within its midst.

However, developments within systems design, and really the occasioning circumstance of this book, are proving that while it might not initially have mattered that it was ethnomethodology rather than ethnography itself that drove many of the early social science engagements with systems design, *it now does*. This is because as the computer has moved out of the workplace – a setting which shaped previous design thinking with regard to the social – there have been calls to re-think ways of incorporating the social into design, driven in particular by the various writings of Genevieve Bell and Paul Dourish over recent years (see Crabtree et al. 2009). However, these calls are rooted in confusions about what was being leveraged into design at the outset. These are not necessarily confusions on the part of systems designers however, but confusions on the part of those calling for 'new' ethnographies to incorporate the social into design as the computer reaches out into novel contexts.

These calls have accompanied the interest that systems design is showing in non-work activities. With the development of 'ubiquitous computing' (Weiser 1991) the computer started to move away from the workplace and the focus of design shifted to society at large and a myriad more playful and leisurely domains. This has occasioned, for some, a need for design praxis to reinvent itself and move beyond prevailing models of workplace design towards new and poorly understood settings and situations. As design moves out from the workplace so-called 'new' ethnographic perspectives have emerged in a bid to accompany it, supplanting the focus on understanding users and their practices with "alternative viewpoints on assumptions in the design process", which are intended to "help us rethink the opportunities" as the computer reaches into new development sites (Bell et al. 2005). In short,

---

[2] The title of an early paper in the development of the relationship between design and ethnography says it all "Sociologists can be surprisingly useful in interactive systems design" (Sommerville et al. 1992). However, the cited sociological ideas and work are those of ethnomethodology, not sociology at large.

the reinvention of design praxis has opened the door to what social scientists generally refer to as *reflexivity* in ethnographic praxis. Gilbert Brown and Doblin (2004) sum up the idea in saying that,

> … ethnography is discovering new sites for praxis, occupying new theoretical topoi, developing new signifying practices, articulating a new ethnographic subject, redefining its goals, reinventing its methodologies, and revising its assumptions in what constitutes a radical ontological and epistemological transformation.

This reflexive turn has been widespread, cutting across the social sciences and into systems design too as it turns towards novel sites and rubs up against new sociotechnical themes and new kinds of users, seemingly requiring new approaches, new conceptual frameworks, and new knowledge to make systems fit new social contexts of use.

On the face of it this might make sense to those in system design who do attempt to build the social into design. Ethnography as it has developed in systems design has largely concerned itself with work related activities and workplace contexts. In this respect it might seem a reasonable proposition that as systems designers have to adapt their development concepts and heuristics to handle design in novel settings and situations, then so too the methods of ethnography need to adapt in order to apprehend the social character of the new contexts that designers are reaching into. However, this line of reasoning begins with the wrong assumption that the ethnography 'traditionally' associated with design was itself designed for studying the sociality of work-related activities and the workplace. *Nothing could be further from the truth*. The original development of ethnography by Bronislaw Malinowski was done in studying the Trobriand islanders in the Western Pacific (Malinowski 1922), whose way of life was as far removed from the industrial conception of work and the workplace as is possible. Similarly, the ethnomethodological approach that has driven studies of work and the workplace originated in studies of what many social scientists, including those who studied work and occupations, considered trivial matters; matters such as walking, crossing the road, queuing, having a conversation and other mundane actions and interactions far removed from the work setting.

It is not ethnography per se that is the issue – i.e., observing social life from within its midst – but *bringing an appropriate understanding of how to describe the social into design*. It is in this respect that ethnography becomes problematic as it can be used by a whole range of different perspectives in the social sciences with very different results. Take, for example, the ground-breaking investigations of scientists' laboratory work by Lynch (1985) and by Latour and Woolgar (1979). Both studies exploited ethnography, witnessing first hand the matters they describe. However, both studies provide us with strongly contrasting understandings of how the actions and interactions of lab members are ordered and organised. Lynch's ethnomethodological examination elaborates the embodied practices through which scientists establish the situated intelligibility of their work as science. Latour and Woolgar, on the other hand, elaborate the idea that scientific work is a matter of inscription and can be inspected through literary practices. Both studies examined

the same type of work, laboratory-based scientific investigation, both were ethnographic in character in that they entailed the sociologists being party to the setting, witnessing the work first hand and collecting materials that detailed that work, but there the resemblance ends.

If we look across the social sciences we can observe that ethnographically collected material has been used to construe the social in different ways. Within anthropology, Malinowski, 'the father of ethnography', produced a functionalist description of Trobriand society, while for example, Levi-Straus (1963) produced an important 'structuralist' analysis. Generally, anthropology has been concerned with understanding society through a *cultural lens*, with ethnography only being a way of collecting material to do that. As the influential American anthropologist Clifford Geertz (1973) makes clear, it is not the setting that is of concern to anthropology:

> The locus of study is not the object of study. Anthropologists don't study villages (tribes, towns, neighbourhoods …) they study *in* villages.

What anthropologists study *in* a setting of any kind is not so much how that setting is organised in the actions and interactions of the people who inhabit it, as per the early ethnographies found in systems design with respect to the work setting, but the *broader culture* which is said to shape action and interaction in the setting. In this respect the setting, and the actions and interactions that animate it, are mechanisms through which the anthropologist can grasp the broader culture at work. This cultural lens, however, is not all of apiece but made up of (and fractured by) many different and competing social theories such as, as noted above, functionalism and structuralism and, more commonly today, post-modernism and feminism.

Although ethnography is strongly associated with anthropology, the sorts of 'studies of work' that have been done for systems design purposes, which designers familiar with early PARC and CSCW studies will recognise, are far removed from anthropology's diverse interests in 'culture'. For design studies it matters that the locus of study *is* the object of study. It also matters that *local* features of work, especially the particular activities and interactions through which the work is done, can be examined. However, from the point of view of anthropology, and for that matter sociology, the setting is a platform from which to view the operation of general cultural matters, such as class, or religion, or race, or gender, etc., rather than the setting-specific activities and their internal organisation in action. The reflexive turn in the social sciences masks different ways of apprehending the social. Within design, the reflexive turn masks just what is being introduced into the design mix – not 'new' forms of ethnography, but different ways of viewing the social to that which has been predominantly viewed in design to date. So while the term 'ethnography' might, on the face of it, seem to be a relatively straightforward matter, it is really an umbrella term sheltering a complex array of different views on, and different ways of viewing, the social.

In deconstructing ethnography, and producing our abbreviated history of its emergence in design, we must, however, be careful not to give the impression that all of the ethnographic engagements with design around work and the workplace

have been fuelled by ethnomethodological interest. Sheltering under the ethnographic umbrella in the past, as we will examine in more detail in Chap. 6, it is also possible to find ethnography driven by and serving different views on the social. For us this fact reinforces the point that the issue that is consequential for systems design as it grapples with the social is not ethnography per se but *how the social is apprehended and understood*. As design moves out into other areas of everyday life the call for the new is all too seductive. The seduction lies in taking and treating ethnography as if it were all of apiece, such that whatever description of the social is offered it is assumed to be appropriate because it has been derived from 'ethnography'. The term ethnography has become a way of legitimising a broad range of social scientific investigations. Thus, and although we have been strongly associated with the idea of ethnography in design, we now want to open that term up and make it available for critical scrutiny by those in systems design who are interested, as we are, in developing a social methodology for it. We want to open up 'ethnography' because it has become the default methodology for building in the social but it cannot be a methodology in that sense: the competing and conflicting viewpoints it harbours undermine the possibility of any such unified coherent method.

2.3   Why Should Systems Designers Care?

It was the recognition of the fact that systems are used within organised settings by people interacting with one another, and that understanding the social character of the design context is not an easy matter, that motivated PARC scientists to turn to the social sciences in the first place. In effect PARC recognised that social matters are important for the design of systems, but that the designers of systems may not necessarily be the best equipped people to develop understandings of them. 'Experts' in the investigation of the social were required and, in an attempt to build the social into systems design, PARC turned to the academy and the social science faculty staffed by people who spend their careers immersed in the study of social affairs and arrangements, and to anthropologists in particular. There was good precedent for turning to experts in other fields. The developments with respect to interface design were supported (as noted by Grudin) by 'experts' in the field of psychology and graphic design. Anyone who started to use word processors in the late 1970s and early 1980s will remember how command instructions had to be inserted into the text they were writing in order to introduce new paragraphs, italics and the like. The move to graphical interfaces, and the concept of 'What You See Is What You Get' (WYSIWYG) was a step change in design.

The development of the graphical interface design was, in part, driven by the concept of the user – an understanding rooted in cognitive theory and articulated particularly within psychology. While the position of psychology within the human and natural sciences has often been debated, some arguing that it belongs within the realm of the natural sciences, others maintaining that its scientific bed-fellows are to be found among the human sciences, psychology does share at least one thing in

common with the natural sciences that it does not share with other human sciences, which is that it is dominated by one particular paradigmatic theory: cognitive theory. Thus in having successfully turned to the experts with respect to interface design, underpinned by a unifying theory, it might have appeared that the same potential existed within the social sciences with respect to building the social into systems design.

However, as we have been arguing, unlike psychology, the social sciences do not have a ruling paradigm. Within the human and social sciences there are competing ways of grounding an understanding of the social. If there is any commonality amongst the social sciences then it lies not in a shared paradigm but in their interest, as noted in Chap. 1, in the Hobbesian problem of social order (Hobbes 1651); that is, in the question of how social order can be *accounted* for. The social sciences are predicated on the plainly observable fact that social life is organised or ordered. People are not just individuals, but individuals operating within an organised ensemble, a collectivity, a 'society', and in their dealings with one another display an orientation to that *fact*. As mentioned in the introduction, the way that anyone in the UK can go into a cinema that they have never been to before, in a part of the country they have never been to before, and ask a person they have never met before to purchase a ticket for a film displays and exemplifies not only that our mundane activities are orderly affairs but also, and to boot, that the social order is an unremarkable feature of everyday life for its members. Furthermore, the social order cuts across national boundaries. Thus, and for example, wherever the social institution of the cinema exists an orderliness of action and interaction will be involved in coming to watch a film. Of course there can be local variations in, for example, how people queue for a ticket, or pay for it, or find a seat, but there will, nevertheless, be some social 'system' at work.

There is then, a *universal phenomenon* for the social sciences – social order – and a universal recognition that social order involves a relationship between society and the individual. In place of a ruling paradigm, the social sciences have traditionally positioned themselves as falling into one of two camps with respect to the primordial question of how social order comes about and thus be accounted for. This is often framed in terms of a relationship between *social structure* and *social action*, or 'structure and agency' to avoid relativising the issue to a particular society and individual. At its most simple the divide has been construed of in *top down/bottom up* terms, sometimes as 'macro' vs. 'micro'. That is to say that, on the one hand, social structure is said to constrain and provide for social action thereby providing for a top down view on social order; on the other hand is the idea that structure is a product of agency, thereby providing for a bottom up view on social order. In these terms, social order is the product of constraining social structures that exist outside individuals and shape their actions, posed against the idea that social order is constituted through individuals and their actions. Within the social sciences the structure camp is exampled by Karl Marx, Emile Durkheim and Talcott Parsons, and articulated through theories of functionalism, consensus, and conflict, whereas the agency camp is exemplified through methodological individualism, interactionism and phenomenology. Ethnomethodology would be characterised within the social

sciences as falling into the agency and micro side of the proposed divide. It would certainly be true to say that the prevailing wind in the social sciences has always been the top-down view, with theories of patriarchy and globalisation being examples of current social science top-down thinking.

Why should the fact of this broad dichotomy matter to design? The answer is that until recently it has not mattered a jot, and really we would prefer that it continued not to matter. However, it is now being made to matter for design by the calls that are being made to develop 'new' forms of ethnography, ones that for example argue that cultural theories are needed to move design beyond a 'requirements' engagement with the social (Bell and Dourish 2011). Without probably realising it, design is now being confronted with the old divide in the social sciences with regard to structure and agency, and is being invited to see that the 'macro' concerns of structure can replace the 'micro' concerns of agency. Since ethnomethodology would normally be associated with the micro, agency side of this supposed divide, it follows that it too can be transcended by the traditional emphasis on structure and the macro.

So did the PARC scientists wrong-foot systems design when they turned to ethnomethodologically-informed ethnography as epitomising the practice of expertise in the social? Should they have looked elsewhere? Should they have turned to the predominant top-down theories and methodologies in social science for the expertise they sought? Certainly they should have asked the question, "What are we buying into?" If they had, the answer might have surprised them. They would have discovered that the expertise they were appropriating was not and is not at all typical in the social sciences. Further still, they would have found out that *that* expertise is not even typical in anthropology, for despite the fact that the discipline utilises ethnography in collecting its materials, the predominant focus of anthropological studies was and still is on social structure. Thus, in turning indiscriminately to anthropology and ethnography for expertise, and rather by chance picking up on ethnomethodology, PARC unwittingly created an interesting issue for systems design, for design's initial foray into the social was through what was and is considered by mainstream social science a marginalised, 'micro' interest in agency not typical of anthropology or sociology at all.

This irony was not particularly apparent in the early ethnographic work. While occasionally discussed by ethnographers working in a design context (e.g., Jirotka et al. 1992) there was little interest or engagement from the broader social science community with design. Mainstream social science, as epitomised by fields examining the social 'shaping' and 'construction' of technology (MacKenzie and Wajcman 1985; Bijker et al. 1987) instead preferred to treat technology as an object of critical scrutiny rather than something that it would actually want to help develop. Within systems design research a growing band of social scientists interested in CSCW and ethnomethodologically-informed ethnography had the job to themselves to some large extent. Nonetheless, the turn to ethnography as an expert means of understanding the social has over time attracted broad interest in systems design, and the demand for expertise has brought more traditional or mainstream kinds of ethnographers to the table. With them, however, comes the top-down view of the social that

predominates in anthropology and sociology, as it does elsewhere in the social sciences.

What is also brought into play here is an interesting issue around the very idea of 'expertise' in social affairs. We will elaborate key issues raised by ethnomethodology with respect to the description of human action in Chap. 7, but one thing we note here is that ethnomethodology in its respecification of sociology took the idea of expertise in understanding and describing social matters out of the hands of social scientists as social scientists and placed it back in the hands of those who actually *do* social life. This is because, as we have touched upon in the introduction and will expand on later, social science accounts of social matters inevitably rely upon and build in everyday accounts, which makes them re-descriptions of what everyone knows. Ethnomethodology rather directs attention to what it is that everyone knows, making explicit the ordered features of common-sense knowledge and the ways in which people use that knowledge methodically to achieve their actions and interactions. Thus, although PARC scientists and others in CSCW and HCI might have turned to the supposed experts in social matters – anthropologists and sociologists – in as much as initial engagement with the social was heavily influenced through encounters with ethnomethodological studies, the expertise designers encountered was the expertise *of those studied* not the expertise of social science. It was what those who were working within particular settings knew about organising that setting and organising their work activities and interactions, not what the social scientist knew, that was being brought into design. Ethnomethodological studies of work brought *members' expertise* into the design mix, not social science expertise.

Calls for 'new' approaches to ethnography are placing the social scientist in the driving seat rather than those involved in actual settings, whatever and wherever they might be, by introducing a top-down view with respect to the social structuring of action and interaction. In doing so they track old confusions about the relationship between structure and agency into systems design. Although this dichotomy is one that has been consistently held to in the social sciences since their inception, and despite many attempts to synthesise them, we understand it to be one that rests in large measure on misunderstandings of those in the structure camp of the arguments being made in the agency camp (Sharrock and Button 1991). Rather than treating the dichotomy as an either/or proposition to be continually debated it needs to be recognised that agency arguments are not about the inappropriateness of understanding structural matters for how the social is ordered, but are ones that *relocate* the site for the production of structure. They are not about dismantling the idea of structure but respecifying it as something that is *internal* to the sites of its production (Garfinkel and Sacks 1970) to the effect that structure and agency are seen and understood to be *mutually elaborative*. As Sharrock and Watson (1988) put it,

> … we cannot conceive of an individual action except as an-action-in-a-structure, any more than we can conceive of a single word as other than a-word-in-a-language … The relationship between 'action' and 'social structure' is not to be conceived … as one between cause and consequence (whichever way the causal connection is supposed to run …). It is, instead, to be conceived as that of pattern and particular, where the articulation of the two provides

> for their mutual visibility: the particular is recognisable for what it is as part of the pattern
> but the pattern itself is made out of and manifested in the particulars (as the elements of a
> mosaic and the mosaic-as-a-whole comprise one another). The pattern and the particular are
> mutually constitutive …

Thus action (the particular) elaborates structure (the pattern) and vice versa. Nevertheless, despite such arguments, the dichotomy between action and structure remains as a fulcrum around which many contradictory debates in the social sciences revolve and, in calls to move design beyond the micro, beyond agency and into matters of social structure and culture, design is being lured into accepting an old confusion. The confusion results in designers being told that the understandings of social order they have encountered in studies of the workplace are not relevant to the sorts of social and cultural understandings that that they are being now presented with, and that approaches to studying work and the workplace are only good enough for design as generative of requirements and not grappling with grander social matters. But this is not so, for ethnomethodological studies of work are just as much concerned with the idea of social structure as any top-down perspective. It is just that they have respecified structure as a matter of *local production* and that, in these terms, understanding structural matters requires an understanding of the situated methods – members' methods – for *bringing them about*. This interactional interest in structure holds whatever the setting, be it at work, at home or at play.

The whole reason for turning to the social in the first place in systems design was the recognition that designers did not know much about what it was that people actually *do*. In turning to ethnomethodologically-informed ethnography, design was encountering first order understandings of social structures *in action* rather than the second order reinterpretations of the social sciences. Design really has an option: contend with what people do, their actions and interactions, be they in the workplace or elsewhere, and engage with social settings as they are organised, structured and understood by those who are party to them, or have understandings of the social mediated by social science through the descriptive apparatus of theory and interpretation. Of course social science will try to ascribe to ethnomethodology that it inevitably uses this apparatus itself. It will be argued, for example, that it is just as theory-laden as any other perspective, but as we hope to make clear when we turn to these matters in depth, this misunderstands the idea of ethnomethodological study and what it is that is studied.

It might seem, as we have gestured towards before, that design could consider itself to be above these concerns; that it can pick and choose what it cares for and whatever suits its purposes. However, if the point is not perspicuous by now, then let us be forthright. From our point of view, having worked with designers since 1990, we understand that the reason that ethnographic expertise has come to be valued by them lies in its ability to make visible how the orderliness of a setting is achieved *by those who are party to it*. We appreciate that designers themselves might not put it in these terms, but however it is worded it is a demonstrable fact borne out of long interdisciplinary experience. It is not the expertise of the social scientist that has been of value to systems design, but the conspicuous expertise of members in accomplishing their social affairs that has been made available to design reasoning

through 'ethnography'. This has involved focusing upon members' methods for achieving order in action and interaction and thus placing emphasis upon surfacing how those involved bring the social order about. However, the unwitting turn to the traditional and predominant concerns of the social sciences brought about by the call for 'new' approaches to ethnography brings in the theoretical and conceptual machinery of social science, which is used to *replace* members' methods. The replacement is being done surreptitiously, masked by the term 'ethnography' and the unquestioned acceptance of ethnographic expertise.

The issue then is this: will traditional, disciplinary sanctioned, top-down views on the social do the job that designers want and expect them to do? Will designers be able to build the social into their systems if the local orderliness of action and interaction is no longer made visible and available to design reasoning? In surfacing these issues we seek to encourage those designers who are concerned to build a social methodology into the construction of computational machines to consider whether or not the 'new' breed of ethnographic expertise is sound and fit for purpose. In deconstructing ethnography we want to reveal how the term masks concealed understandings of the social. In doing so we want to create a space for reflection on the practical adequacy of mainstream, traditional, top-down, structural views on the social for systems design. In the following chapter we take a critical look at the classical roots of ethnography in anthropology and how the local orderliness of social action becomes a *surplus* phenomenon – something to be dispensed with – before moving on to elaborate how this plays out in calls for 'new' approaches to ethnography in contemporary systems design.

References

Bell, G., & Dourish, P. (2011). *Divining a digital future: Mess and mythology in ubiquitous computing*. Cambridge, MA: MIT Press.

Bell, G., Blythe, M., & Sengers, P. (2005). Making by making strange: Defamilarisation and the design of domestic technologies. *ACM ToCHI, 12*(2), 149–173.

Bijker, W., Hughes, T., & Pinch, T. (Eds.). (1987). *The social construction of technological systems*. Cambridge, MA: MIT Press.

Blomberg, J., Suchman, L., & Trigg, R. (1994). Reflections on a work-oriented design project. In: *Proceedings of the 1994 participatory design conference* (pp. 99–109). Chapel Hill: Computer Professionals for Social Responsibility.

Button, G., Coulter, J., Lee, J. R. E., & Sharrock, W. W. (1995). *Computers, minds and conduct*. Oxford: Polity Press.

COMIC Deliverables. www.comp.lancs.ac.uk/computing/research/cseg/comic/

Crabtree, A., Rodden, T., Tolmie, P., & Button, G. (2009). Ethnography considered harmful. In: *Proceedings of the SIGCHI conference on human factors in computing systems* (pp. 879–888). Boston: ACM.

Finkelstein, A., & Dowell, J. (1996). A comedy of errors: The London Ambulance Service case study. In: *Proceedings of the 8th international workshop on software specification and design* (pp. 2–5). Washington, DC: IEEE.

Garfinkel, H. (1967). *Studies in ethnomethodology*. Englewood Cliffs: Prentice-Hall.

Garfinkel, H. (Ed.). (1986). *Ethnomethodological studies of work*. London: Routledge.

Garfinkel, H., & Sacks, H. (1970). On formal structures of practical action. In J. C. McKinney & E. Tiryakian (Eds.), *Theoretical sociology: Perspectives and developments* (pp. 160–193). New York: Apple-Century-Crofts.

Geertz, C. (1973). *The interpretation of cultures: Selected essays* (pp. 3–30). New York: Basic Books.

Gilbert Brown, S., & Dobrin, S. (2004). New writers of the cultural sage. In: *Ethnography unbound: From theory shock to critical praxis* (pp. 1–10). Albany: State University of New York Press.

Grudin, J. (1990a). Interface. In: *Proceedings of the ACM conference on computer supported cooperative work* (pp. 269–278). Los Angeles: ACM.

Grudin, J. (1990b). The computer reaches out: the historical continuity of interface design. In: *Proceedings of the SIGCHI conference on human factors in computing systems* (pp. 261–268). Seattle: ACM.

Hobbes, T. (1651). *Leviathan*. St Paul's Churchyard: Green Dragon.

Irani, L., Vertesi, J., Dourish, P., Philip, K., & Grinter, R. (2010). Postcolonial computing: A lens on design and development. In: *Proceedings of the SIGCHI conference on human factors in computing systems* (pp. 1311–1320). Atlanta: ACM.

Jirotka, M., Gilbert, N., & Luff, P. (1992). On the social organization of organizations. *Computer Supported Cooperative Work: The Journal of Collaborative Computing, 1*(1), 69–94.

Knudsen, T., Bansler, J., Bjørn-Andersen, N., Greenbaum, J., Nurminen, M., & Thoresen, K. (1993). The Scandinavian approaches: Theories in use, of use and organisation of interdisciplinarity. In: *Proceedings of IRIS 16* (pp. 29–38). University of Copenhagen, Association for Information Systems.

Latour, B., & Woolgar, S. (1979). *Laboratory life: The construction of scientific facts*. London: Sage.

Lynch, M. (1985). *Art and artefact in laboratory science: A study of shop work and shop talk in a research laboratory*. London: Routledge and Kegan Paul.

MacKenzie, D., & Wajcman, J. (Eds.). (1985). *The social shaping of technology*. Buckingham: Open University Press.

Malinowski, B. (1922). *Argonauts of the western pacific: An account of native enterprise and adventure in the archipelagoes of Melanesian New Guinea*. London: Routledge and Kegan Paul.

Rouncefield, M., & Tolmie, P. (Eds.). (2011). *Ethnomethodology at work*. Farnham: Ashgate.

Schmidt, K. (1994). The organisation of cooperative work: Beyond the 'Leviathan' conception of the organisation of cooperative work. In: *Proceedings of the conference on computer supported cooperative work* (pp. 101–112). Chapel Hill: ACM.

Sharrock, W. W., & Button, G. (1991). The social actor: Social action in real time. In G. Button (Ed.), *Ethnomethodology and the human sciences* (pp. 137–175). Cambridge: Cambridge University Press.

Sharrock, W., & Watson, R. (1988). Autonomy among social theories; the incarnation of social structures. In N. Fielding (Ed.), *Actions and structure: Research methods and social theory* (pp. 56–77). London: Sage.

Sommerville, I., Rodden, T., Sawyer, P., Bentley, R. (1992). Sociologists can be surprisingly useful in interactive systems design. In: *Proceedings of the 7th conference of the British computer society human computer interaction specialist group* (pp. 341–341) York: BCS.

Strauss, L. (1963). *Anthropologie structurale*. Paris: Plon.

Suchman, L. (1983). Office procedures as practical action: Models of work and system design. *ACM Transactions on Office Information Systems, 1*(4), 320–328.

Suchman, L. (1987). *Plans and situated actions: The problem of human-machine communication*. Cambridge: Cambridge University Press.

Suchman, L. (1995). Making work visible. *Communications of the ACM, 38*(9), 56–64.

Suchman, L., & Trigg, R. (1991). Understanding practice: Video as a medium for reflection and design. In J. Greenbaum & M. Kyng (Eds.), *Design at work: Cooperative design of computer systems* (pp. 65–89). Hillsdale: Lawrence Erlbaum Associates.

Syzmanski, M., & Whalen, J. (2011). Introduction: Work practice analysis at Xerox. In M. Szymanski & J. Whalen (Eds.), *Making work visible: Ethnographically grounded case studies of work practice* (pp. 1–17). Cambridge: Cambridge University Press.

Taylor, A. (2011). Out there. In: *Proceedings of the SIGCHI conference on human factors in computing systems* (pp. 685–694). Vancouver: ACM.

Tolmie, P., & Rouncefield, M. (Eds.). (2013). *Ethnomethodology at play*. Farnham: Ashgate.

Weiser, M. (1991). The computer for the 21st century. *Scientific American, 265*(3), 94–104.

Wynn, E. (1991). Taking practice seriously. In J. Greenbaum & M. Kyng (Eds.), *Design at work: Cooperative design of computer systems* (pp. 45–64). Hillsdale: Lawrence Erlbaum Associates.