

Lest we forget

The European field study tradition and the issue of conditions of work in CSCW research

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Abstract. The paper intends to direct attention to the rich and variegated European field study tradition. Focusing on the Francophone ergonomic tradition and especially the German studies of work and working conditions, both based on in-depth field studies in ordinary work settings, the paper attempts to situate these traditions vis-à-vis the research program of CSCW.

It is not a historical accident that ethnographic and other in-depth forms of workplace studies play a dominant role in ECSCW and have come to play an important role in CSCW and HCI at large. Ethnographic studies of cooperative work settings have a central role in CSCW for the simple reason that it is of critical importance for the development of appropriate (and appropriately flexible) coordination technologies to develop a systematic conception of the logics of coordinative practices. And in this regard, the overwhelming challenge is to cope with the enormous variety of work practices. Thus, in the history of CSCW research, a major issue has been to overcome theoretically derived, ideologically postulated, or otherwise preconceived notions about the research phenomenon: cooperative work.

This has involved, first of all, questioning many notions about work, derived from popular management literature, such as the putative advantages of ‘group work’ or ‘team work’ and the desirability of more ‘cooperation’ in the work-

place.¹ Notions of ‘cooperation’ or ‘collaboration’, understood as unselfish or altruistic behavior or as ‘mutual help’, were also suggested (often hinging on exhortations of combinations of the word ‘shared’), and so was the notion of ‘co-operatives’ in the sense of communal forms of property (Robinson, 1991). In a rather similar vein, it was sometimes suggested that CSCW be seen as a research area devoted to the ‘empowerment’ of ‘end users’ or workers (e.g., Clement, 1990; Agre, 1995). While all of these topics may have some intrinsic interest, basing the field of CSCW on these notions of ‘cooperative work’ was never widely accepted in CSCW and many of these conceptions were explicitly criticized for lacking in realism and for being intrinsically normative (cf., e.g., Howard, 1987; Bannon and Schmidt, 1989; Kuutti, 1991; Hughes, *et al.*, 1994).

Instead, CSCW, especially in its European instantiation, ECSCW, focused on actually observable cooperative work practices: socially organized work activities that are interdependent in a multitude of ways. Thus, instead of imputing criteria derived from pre-conceived theoretical or evaluative frameworks to actual work practices, CSCW researchers have focused on (or have been encouraged to focus on) identifying and articulating the ordering principles inherent in specific cooperative work practices.

This was expressed with great clarity, in one of the first attempts to delineate the role of field work in CSCW research, namely, in 1994 in a very influential and widely cited paper by John Hughes, Wes Sharrock, Tom Rodden, and others:²

‘Many of the early writings in CSCW attempted to identify “co-operation” as a distinct, discrete type of activity whereas, and as many studies of the social organisation of work show, matters are much more subtle, and more complicated, than this assumes. [...] The association, for example, of co-operation with synchronously, co-located persons working in a team, tends to ignore the pervasiveness of a variety of interdependencies within work settings which are immensely relevant to CSCW design. In other words, the relevant properties of the social organisation of work do not appear as “readily packaged” within work domains but need to be brought out by an analysis of the ethnographic materials.’ (Hughes, *et al.*, 1994, p. 130)

Thus, the authors argued, ‘one of the major problems of requirements elicitation, especially as far as the development of CSCW systems is concerned, is the variety of work domains’. Therefore,

‘studies of the social organisation of work will need to proceed in a manner which recognises this heterogeneity of domains and develops analytic tools which are capable of exhibiting the relevant scope of this variety. [¶] In significant respects, it is this objective which underpins the use of ethnographic fieldwork and case studies within CSCW as a promising means of design-

¹ Indeed, there was a time when it was suggested that CSCW was committed to a notion of ‘cooperative work’ defined by being informal, non-hierarchical, relatively autonomous, devoid of competition, etc. (cf., e.g., Sørgaard, 1987).

² This paper, entitled ‘Perspectives on the social organization of work’, was produced and published as part of a ‘deliverable’ in the Esprit Basic Research project COMIC (1992-95). The first major European CSCW project, COMIC brought together the bulk of European researchers in the field at the time and has had a profound and lasting impact on the ECSCW field.

ing systems which are more responsive to the needs and the skills of users.’ (Hughes, *et al.*, 1994, p. 129)

The conclusion of this is that ‘an analytic framework of some generality needs to be developed “from the ground up” as it were, and capable of retaining a sensitivity to the details and the variety of work domains’ (Hughes, *et al.*, 1994, pp. 129 f.). In other words, in order to be able to grasp the manifold forms of cooperative work, one should not stipulate specific forms of cooperative work (e.g., ‘group work’, ‘team work’, work over ‘distance’), a specific moral disposition (e.g., ‘team spirit’), or some presumptive ‘shared’ mental representation (e.g., ‘shared understanding’, ‘shared goal’).

For CSCW’s research program, with its technological commitments and its focus on computational support of coordinative practices, the requisite ‘analytic framework’ cannot simply be imported from anthropology, sociology, psychology, business studies, etc., and then applied. The requisite ‘analytic framework’ must assist in providing answers to the specific questions (to be) raised by CSCW’s research program. For the purpose of developing this ‘from the ground up’ a ‘disinterested’ focus on actual working practices is essential.

This ‘disinterested’ approach has proved immensely fruitful. Although a stable ‘analytic framework of some generality’ or a ‘systematic conception of the logics of coordinative practices’ is not imminent, this research program has produced a corpus of workplace studies and some essential elements of an analytical framework.

Now, the social, economic, and organizational context of these practices as well as the whole issue of *working conditions* cannot be bracketed out indefinitely.

First, it certainly belongs to the picture of CSCW that there has been explicit socio-political critiques of existing socio-technical regimes (e.g., Wagner and Clement, 1994). It would also be misleading to ignore the strong influence from Participatory Design on CSCW, generally in the form of a noticeable respect for practitioners’ skills and competencies and sometimes also articulated as a commitment to certain systems development principles (e.g., ‘end-user development’, Pipek, *et al.*, 2009). Although it would be fallacious to categorize the major part of current CSCW research as somehow related to the emancipatory aspirations that, at least historically, have motivated the Participatory Design movement, it is nevertheless characteristic of CSCW, especially ECSCW, that there is an obvious overlap in personnel and a cross-fertilization of ideas between CSCW and PD (e.g., the use of ethnography in PD and the use of various techniques of involving practitioners in design considerations in CSCW).³

³ The confluence of CSCW and PD was greatly enhanced as a result of the ACM CSCW’88 Conference, where a number of invited and presented papers were given by members of the Scandinavian PD tradition (Greif and Suchman, 1988).

But most importantly in this context, issues of working conditions, broadly understood, are intrinsically involved in the design-oriented discourse in CSCW. There are, for example, Lucy Suchman's critique of speech-act theory and its application in the design of *The Coordinator* (1993, 1994), Terry Winograd's response to this critique (1994), and the subsequent series of commentaries (Bannon, 1994, 1995).

However, issues of working conditions are typically only *implicitly* present in design-discourses in CSCW. For example, issues such as control of workload and workers' ability to maintain and develop skills and competencies were and have remained a subordinate theme in the recurrent critique of 'office automation', 'workflow-management systems', 'business process modelling', and so on. Similarly, issues of interruptions, 'mental workload', and stress are implicitly involved in studies of practices of mutual awareness and in related design-oriented studies, but have often not been made a major topic of concern.

At this stage in the evolution of the CSCW field, we believe that the time is ripe for a re-assessment of these background assumptions. An 'analytic framework of some generality' that does not, in some systematic way, address issues of working conditions in existing socio-technical regimes would be so abstract as to be of little actual use in the face of the realities of working life. However, in that regard we are in the fortunate position that a vast and rich array of research traditions has evolved – both in Europe and elsewhere, both in the decades before but also simultaneously with CSCW — that is also based on in-depth field studies of work activities in natural settings. The purpose of this paper is to point to certain of these bodies of literature.

The aim is not to move CSCW's focus away from coordinative practices in cooperative work but simply to say, as it were, that we do not have to start from scratch in building an 'analytic framework of some generality'; that there are blocks, slabs, and beams out there already that we might want to consider.

1. The 'European field study tradition'

In a recent paper on decision-making in technically complex domains, Emilie Roth and Emily Patterson (2005) make some cogent remarks on the role of 'naturalistic observational studies'. Using two field studies as their cases — a study of the 'function of the current communication technology in railroad dispatching' and a study of communication among operators in a nuclear power plant control room using 'advanced displays' — the authors argue that 'naturalistic observation studies' are essential in that they support the 'discovery phase' of scientific research: 'One of the primary strengths of naturalistic observations is that they support a discovery process' in that they 'serve to draw attention to significant phenomena and suggest new ideas whose validity and generality can then be evaluated through additional studies'. This conception of the role of field studies in

technological research is rather similar to the conception outlined by Hughes *et al.* in 1994.

Now, when introducing this concept of ‘naturalistic observation studies’ Roth and Patterson make an interesting distinction:

‘Naturalistic observation studies employ a methodology similar in approach to other ethnographically derived methods (e.g., Jordan & Henderson, 1995; Nardi, 1997) and the European field study tradition’ (De Keyser, 1990; Heath and Luff, 2000).’

The European field study tradition! What is *that*? The reference to the book by Heath and Luff is of course a gesture at the rich lode of workplace studies in European CSCW research and will be well known to a CSCW audience. On the other hand, however, the reference to Véronique De Keyser’s ‘Why field studies?’ (1990)⁴ is a gesture at a large and rich body of literature that may not be well known to most CSCW researchers. Since it has influenced especially European CSCW research and addresses issues of working life and working practices far more directly than the ethnographic tradition, we consider it relevant for the European CSCW community to know about and consider this legacy.

De Keyser begins her article by sketching the socio-political setting in which the ‘European field study tradition’ evolved:

‘For more than thirty years a trend for field studies and work analysis methodologies has been developing in Europe. In order to understand this movement well, it must be placed in its socio-political context. [...] The socio-political situation in Europe, in the 1960s, was characterized by economic prosperity, by the establishment of supra-national European structures and by active social protest. Demands for improved quality of living and better working conditions appeared in industries along with demands for more democratic organizational forms. Safety, working conditions and work organizations would be dominant research themes for the following twenty years.’ (p. 305).

In 1962, De Keyser points out, the European Coal and Steel Community (ECSC), the precursor of what has developed into the European Union, launched an international research program on safety in the mining and iron and steel industries:‘

‘This shed crude light on structural factors — absence of coordination, poor communication systems and failures in equipment design — which influenced human reliability. It called for ergonomic systems of which would not only improve work stations but also effect a global revision of organizations.’ (ibid.)

De Keyser adds that there, in addition, were movements in the Scandinavian countries and in other parts of Europe that tried, with some success, to promote Industrial Democracy. Again, de Keyser points out, researchers were involved in on-site studies of work practices.

On closer inspection, however, the European field study tradition turns out to be far broader and far more complex than De Keyser’s brief remarks suggest. In fact, the European field study tradition is more like a widely ramified web of re-

⁴ The proceedings in which De Keyser’s paper was originally published may be difficult to get hold of but it has been republished under a new title (De Keyser, 1992).

search traditions addressing a wide array of social and research problems. Moreover, the web of research traditions is complicated by the influence of different national political and research agendas and, of course, language differences.

In general, however, the first wave of studies was motivated by the need to increase the productivity of European industry after the debacles of the first half of the twentieth century, while at the same time improving working conditions (occupational health, safety). The strong working class movements in Europe after the Second World War influenced these efforts considerably, both directly and indirectly.

The so-called ‘socio-technical school’ in organizational and workplace studies developed, from the Second World War and well into the 1960s, from similar motivations. Sometimes explicitly related to the Industrial Democracy movement, it grew out of attempts to find work organizations and job designs that would give ordinary workers more autonomy in carrying out and organizing their daily work activities (e.g., Trist and Bamforth, 1951; Engelstad, 1970). Related research attempting to determine the constraints and thus also the degrees of freedom in the design of work organizations undertook carefully conducted, sometimes large-scale and longitudinal, field studies of work organizations in their (presumptively ‘causal’) relationship to the production technology as represented by existing technical resources and the temporal characteristics and scale of production (cf., e.g., Emery and Trist, 1965; Woodward, 1965).

The early ergonomic field studies, such as those initiated by the ECSC in the early 1960s, developed into and were largely superseded by a second wave, in which the effects of increased mechanization and especially automatic control systems in industry became a key topic of concern. Focal points in these investigations were not only issues of working conditions in highly automated control systems but also and increasingly the issue of the cognitive and organizational requirements of supervisory process control: the skills and strategies involved in decision-making in time- and safety critical work. Field studies of actual work practices, focused on decision-making in technically complex work settings (such as, initially, furnaces and steel plants), have been especially strong in Francophone parts of Europe (see section 2 below). Parallel to this, a related research tradition also largely based on field studies unfolded in the United Kingdom (for a collection of early contributions, cf. Edwards and Lees, 1974). In a very early study, Crossman for example notes:

‘Although workers in an automatic plant seem at first sight to be isolated, closer study reveals a surprising amount of inter-communication between individuals operating the machinery: Each member of the team—operators, maintenance men, engineers and laboratory staff—frequently gives and receives information or instructions about the plant from the others, by word of mouth, in writing and even sometimes by hand signals. It seems that the efficient running of a plant depends a great deal on the effectiveness of these interchanges. Therefore, each member of the team must be able to communicate easily with his fellows, understand their

points of view and put his own across. In other words, they must exercise *social skills*.’ (Crossman, 1960, p. 21)

The European field study tradition is rich and diverse. In fact, it is a family of traditions, and we can only offer a glimpse of it. We focus strictly on field study traditions that focus on working conditions in cooperative work settings, knowing very well that there are other traditions that could also be quite relevant for a CSCW audience in that they, based on naturalistic field work, contribute systematically to the design of large-scale technical systems and technological development.⁵

2. ‘Francophone’ ergonomics

A distinctive Francophone approach to ergonomics emerged after the Second World War and was given further impetus by the founding of Société d’Ergonomie de Langue Française (SELF) in 1963.

The initial overriding concern was, as already indicated, to enhance the productivity of industry. In contrast to Scientific Management and related traditions in Industrial Psychology and Human Factors, where the emphasis is on adapting the worker to the work and the available technical resources (through conditioning, training, and selection), workers, in the emerging Francophone Ergonomics tradition, ‘were seen to be at the centre of work, and, therefore, at the centre of work design’ (Laville, 2001, p. 3).

The book *L’analyse du travail* by André Ombredane and Jean-Marie Faverge (1955) is by many considered the initial expression of the specific Francophone approach to ‘work analysis’. Other notable pioneers extended this approach, notably Alain Wisner, Jacques Leplat, and Maurice de Montmollin.

In the introduction to the 1955 book, Ombredane noted:

‘Two perspectives are to be distinguished when analyzing work: the *What* and the *How*. What is to be done and how do the workers in question do it? On one hand, the perspective of requirements *the task*; and on the other the *operational attitudes and sequences* by means of which the individuals observed *in actual fact* meet these requirements’. (Ombredane and Faverge, 1955, p. 5).

The approach was termed ‘work activity analysis’, and paid particular attention to field studies of work, to the observed differences between actual and prescribed work, and between task and activity. So there was a strong emphasis on the situated nature of activity, on working procedures and the ways operators carried out

⁵ An obvious example is here the tradition of Cognitive Engineering. Historically, it developed in response to the extraordinary safety issues involved in designing control systems for nuclear power plants, and for many years this research centered on Jens Rasmussen’s research group at Risø National Laboratory in Denmark. This research program has developed into an international movement and among leading researchers in this area, in addition to Rasmussen, one should mention Len Goodstein, Morten Lind, Erik Hollnagel, David Woods, and Kim Vicente. (For a historical account of the early years, cf., Vicente, 2001).

their work in specific spatio-temporal settings. In accord with this approach, and in contrast to the US Human Factors tradition, Francophone Ergonomics ‘centered on activity analysis that is conducted in real work situations, that is, in a technical and organizational context that includes the production constraints’, and in which workers are seen ‘as active subjects’ in the analysis (Laville, 2001, p. 3).

While this work had a strong focus on actual worker conduct, over time more attention was paid to the operators’ reasoning processes and to the influence of the workplace setting. (For brief accounts, cf. Laville, 2001; Neboit, 2006).

In a programmatic paper written decades later, in 1991, Montmollin summarized the basic tenets of the Francophone tradition in ergonomics as follows:

‘(1) Operators’ actual activities have to be distinguished from the tasks they are requested or supposed to perform; (2) operators working in natural life environments have to be distinguished from anonymous and universal human beings; (3) complex natural life environments have to be distinguished from the [computer] interfaces, as the whole has to be distinguished from one of its parts.’ (Montmollin, 1991, p. 95)

De Montmollin then spelled out these three principles as follows:

(1) ‘The overwhelming conclusion of all the ergonomic studies of work analysis studies which, in contrast to the normative ones, try to model the natural activities of the operator, is that these activities never conform to the prescribed tasks.’ (p. 96 f.)

(2) ‘Operators are not to be considered as universal human beings, whose universal characteristics and limits could be discovered and measured from any *homo sapiens* (for instance an undergraduate student), allowing the construction of general “laws”. [...] The methodological conclusion of this assumption is that ergonomic analysis and modelling of activities cannot be anything but natural field analysis, in an ecological perspective. Laboratory experiments are considered here as analysis of the experimental situation itself, and nothing else. Experimental situation is almost never real work situation. Therefore, data from laboratory experiments are useful, but in the same way that data concerning the behaviour of monkeys in cages are useful for the explanation of the behaviour of wild monkeys in the wild. There is no industrial environment where workers have to solve the Tower of Hanoi problem eight hours a day, every day, and get paid for it. [...] In the laboratory, complexity has to be avoided to allow for the control of very few independent and dependent variables; in contrast, complexity has to be respected in field work.’ (p. 97 f.)

(3) ‘Experienced operators are not naive users who have to be convinced to buy or to use a friendly microcomputer; they are people who have to solve problems not directly concerning the interface, but rather, a complex environment, for instance an unusual incident in a chemical process, or a conflict between the planes above an exceptionally overcrowded airport. Natural life environments cannot be reduced to interfaces, even when interfaces are the only windows between the operator and the environment (which is seldom the case). The more complex the environment, the more this ecological approach is relevant.’ (p. 99)

The Francophone ergonomic tradition has produced an overwhelming body of field studies, reporting on studies of work in blast furnaces and steel mills, in aircraft cockpits and air traffic control centers, in operating theaters, and so on. (For a collection of key texts, cf. Leplat, 1992, 1993).⁶

⁶ Much of it has been published in the journal *Le Travail Humain* that has been published for close to 75 years and at the annual Francophone ergonomics conference sponsored by SELF. The SELF 2009 con-

As with Anglo-American human factors research, until the early 1990s the Francophone ergonomic research largely focused on individual operators' understandings and activities, but then more explicit concerns with various forms of cooperative work and team work emerged and have become an important thread (De Keyser, 1988; De Keyser and Nyssen, 1993; Samurçay and Rogalski, 1993; Leplat, 1994; Rogalski, 1996). The conference series COOP, located *au principe* in France, has been a site where a mix of Francophone and other European traditions in both ergonomics and CSCW have converged.

In sum, the Francophone tradition of work analysis, with its rich tapestry of field studies, various forms of analysis, and conceptual frameworks, provides a very interesting perspective on forms of work activity and on the more general conditions of work which we believe provide a very useful addition to the corpus of ethnographic studies cited in the main CSCW literature. Any student of CSCW should be aware of this significant body of work, and in the context of the current paper, this work has many insights into more general working conditions.

3. Industrial work and workers' conception of society

The European field study tradition also encompasses a tradition that has been motivated by quite different issues than ergonomic ones. After the Second World War sociologists, especially German sociologists of a Marxist provenance, were concerned with the potential of the industrial working class as a force of socio-economic change. Simply put, their research was focused around whether the unfolding mechanization and automation of work processes would affect the workers' conception of society and their place in it. Similar questions were pursued in France (Andrieux and Lignon, 1960; Touraine, 1966) but the German research program addressing this issue is characterized by being grounded in meticulous and sophisticated field studies of work procedures and practices.

The idea that workers' conception of society and working class potential for social transformation could be more or less directly based on, and derived from, the nature of work in modern industrial settings is of course, in hindsight, somewhat naive. But the research itself is of impeccable quality.

In the 1950s a group of researchers around Heinrich Popitz and Hans Paul Bahrtdt conducted extensive studies of industrial work in the German iron and steel industry, which have been published in the form of two books: *Technique and Industrial Work* (1957a) and *The Worker's Conception of Society* (1957b). Their work had a strong analytical orientation on the one hand, and was based on field studies with a 'phenomenological orientation' on the other, producing de-

ference was devoted to *Ergonomie et Organisation du Travail* (Gaillard, Kerguelen, and Thon, 2009). For information, cf. the SELF website (<http://www.ergonomie-self.org/>).

tailed and concrete microanalyses of cooperative work in industrial settings. Analyzing a broad array of (technically constituted) ‘types’ of cooperative work, they concluded that ‘technical intelligence’ was of increasing importance, and they developed a differentiated notion of ‘mechanization’, identifying two trends: a fixation of work on low levels of skills and collaboration, and the emergence of complex coordination and control work. In their related study of workers’ consciousness, which they base on a series of ‘topoi’, they drew a ‘concrete, lively, and compelling’ (Beckenbach, 1991) image of the industrial worker in post-war Germany.

Much of German research in this tradition, which culminated in the 1970s and 80s, can be subsumed under the ‘automation debate’. A series of key studies has shaped the sociological debate on automation in the 1970s⁷. At the same time work psychologists (‘Arbeitswissenschaften’), notably Winfried Hacker and Walter Volpert, developed a conception ‘of the workplace conducive to personality development’ (Oesterreich and Volpert, 1986, p. 504). One of the most influential studies was a large-scale study of work in the automotive, tool industry, and chemical industries by Horst Kern und Michael Schumann, entitled *Industrial Work and Workers’ Consciousness* (1970). Based on a taxonomy defining ‘degrees of mechanization’, they identify a trend towards a ‘polarization’ of work (and the qualifications it requires) into certain highly qualified types of work on the one hand, and on the other, low-skilled types of work or ‘residual jobs’. Years later the authors reverted to the issue in a critical discussion of the key results of the original study from 1970, under the title *The End of Division of Labor?* (Kern and Schumann, 1984). Studies in the cement, petrochemical and electricity industries performed by Mickler *et al.* (1977) have provided additional and even more detailed empirical evidence of these developments, and have drawn attention to the role of work organization as an intervening factor between production technology and work practice.

Most of these studies cover a large number of workplaces within one industry or branch, or investigate work across branches. Hence, case studies are almost always comparative, allowing us to arrive at a better understanding of the conditions that shape work, as well as observe variations of work practices. The group around Popitz worked over nine months in the field, carrying out 600 interviews, as well as numerous observational studies of work practices. Kern and Schumann (1970) have performed 20 case studies in nine companies in eight industries. They analyzed documents, conducted expert interviews with managers, union representatives, and semi-structured interviews with workers (altogether 981), and produced 122 qualitative workplace descriptions, as well 32 descriptions of work organizations and industrial plants. Pongratz and Trinczek (2010) single out four characteristics of case studies: context-relatedness; multi-perspectivity – integrat-

⁷ It is important to mention that German industrial sociologists never engaged in the rather simplistic and empirically questionable ‘deskilling debate’, whose main proponent was Harry Braverman (1974).

ing the experiences and perspectives of different actors; triangulation of methods; and openness of the research design to additional ‘context factors’ that turn out to be relevant in the course of the empirical work.

German Industrial Sociology always has studied work in the larger context of organization, production technology and societal forces, for instance the *working conditions* as shaped by the social division of labor as well as by the organization of work and technology at the level of the work organization, and the corresponding *work practices* (‘Arbeitshandeln’) and the *work capacity* (skills but also ‘interests’) of the individual worker.

Although their descriptions of work practices can be enormously detailed, they were produced in the context of a research project that involved analyzing the data within an elaborate theoretical framework, represented by sets of categories that shaped interviews as well as observational studies. This means that work is not only described as observed, but also evaluated according to a set of criteria that included concepts such as skill level, stress, and margins of disposition (discussed below).

We should mention here that, although the cooperative organization of work is often investigated intensely and in detail in the German tradition, it is generally investigated under the aspect of working conditions, that is, as characteristics of work organization and work setting that in different ways and to a different extent afford and limit the autonomy of individual workers and their ability to develop relationships and collective social resources. The overriding concern, as already noted, was the potential of the German working class — after the Second World War and subsequently under the impact of mechanization and automation — as a force of social change. For example, in their incisive study of the organization of work in the German coal and steel industry, Popitz *et al.* (1957a) found two forms of cooperative work: on one hand *team-cooperation*, that is, a form of cooperative work characterized by absence of tightly coupled interdependencies, although an indirect mutual dependency is constituted by the common task; the possibility of contacts among workers in the course of doing the work, and large margins of disposition. In contrast, Popitz *et al.* identified ‘*gefügeartige*’ cooperative work, that is, cooperative work constituted and mediated by technical systems (e.g., a hot-rolling mill in a steel plant) that imposes a strict technical order and tightly coupled work processes. The latter, Popitz *et al.* observed, were characteristic of (at least) the modern iron and coal industry (p. 46).

While, from a CSCW perspective, this lack of interest in cooperative work as a phenomenon in its own right is somewhat problematic, the value of the German studies of work is that they have developed an analytical framework of some generality, which is highly relevant when it comes to designing systems. The tradition focuses primarily on issues of qualification, stress, and margins of disposition — concepts which we now briefly discuss.

Qualification: A distinction is made between the skills needed to perform a particular work practice and the skills an individual has acquired ('Arbeitsvermögen'). A consequence of automation may be that both no longer match, as Litlek (1983) shows, using the example of a 'turner' who still has 'his knowledge in his head, the deftness in his fingers', both of which are no longer needed. Some studies of work include detailed observations of work processes. In contrast to many more ethnomethodologically-inspired field studies in CSCW research, these observational studies employ a categorical scheme, based on the 'action regulation theory' developed by German work psychologist Winfried Hacker. Hacker thinks of this theory, which he bases on the work of Vygotskij and Leont'ev, as not just 'a descriptive tool but also a normative guide to efficient and humanized work' — a tool for work design (Hacker, 2003). From the beginning Hacker was motivated by the idea of designing 'mentally demanding work', in contrast to low-skilled repetitive work.

Hacker explains the notion of *action regulation* – a core concept in his approach, as follows:

'The first stage is "action preparation". It includes "orientation to the task" and "redefining the task into a self-set goal" (...). The orientation stage focuses on the conditions under which the goal has to be accomplished, the availability of methods and strategies, and assessing the degrees of freedom to choose different methods. Furthermore, the co-ordination of one's own actions with colleagues is also part of this orientation process. The final phases are "implementation" and "evaluation". The implementation process is guided by continuous feedback on goal accomplishment and is completed with an evaluation of the final outcome in terms of economic task criteria' (Hacker, 2003, p. 108)

Industrial sociologists have used this approach for differentiating between different 'requirement dimensions':

- Sensory-motor skills that are enacted routinely (kinaesthetic cues, 'implicit knowledge');
- Perceptive routines that guide the perception and processing of situational clues, are based on schemata and enacted mostly consciously ('explicit knowledge');
- Intellectual diagnostic and planning skills, with the distinction between empirical-adaptive, systematic-optimizing, strategic-innovative;
- Motivational skills that apply to organizational norms and conditions.

Walter Volpert, another German work psychologist, developed a tool for work analysis (VERA) based on action regulation theory, which was tested by 'nineteen different investigators at 260 workplaces in nine industries' (Oesterreich and Volpert, 1986). Work analysis was carried out in the form of the 'observation interview'.

In the discussion of changing requirements of work, a distinction was made between process-dependent qualifications needed in specific work processes and process-independent ones, such as: habitualization, technical intelligence, and technical sensibility (Popitz, *et al.*, 1957a, b), flexibility, responsibility, as well as

what (Asendorf-Krings, Drexel, and Nuber, 1976) term ‘reproductive capabilities’, which encompasses the ability to recognize aspects of work that are bound to deteriorate the capacity to work and to collectively organize.

Stress: The German word ‘Belastungen’ captures the whole range of work-related factors that an individual may experience as ‘stressful’ and that may affect his/her health. Influential, again, was the work of Walter Volpert, who in the tradition of the socio-technical approach investigated the relationship between work and personality, arguing that work with little space for action and decision-making (‘margins of disposition’) negatively affects a person’s physical and psychological well-being and intellectual capacity, and leads to passivity and authoritarian behavior (Volpert, 1985). He defined stress as a subjective reaction, resulting from specific working conditions, a worker’s social situation (e.g. competition) and his/her personality. While this approach could be considered ‘psychological’ and more directed at ‘measuring’ than at ‘observing’, others, such as Hoff, Lappe, and Lempert (1982) used very detailed observational data to identify stress-relevant aspects of work, such as: the temporal structure of the work (e.g. repetitive work), the available space for movement; the social relations (the opportunity for informal contact, modes of collaboration); the space for responsibility and control; the level of required skills; and the opportunity to control the stress-relevant working conditions. Moldaschl (1991) added a set of ‘contradictory requirements’ at work, in particular serious mismatches between work requirements and available resources to this list of stress factors.

Margins of disposition: This is a term that is used in much of the work concerning changing skill requirements at work and has been identified as an indicator of stress at work. Kern and Schumann define this term as follows, arguing that a worker

‘has the option of disposition when having the possibility to plan and enact his own work process. There are different possibilities of practicing this design autonomy (‘Gestaltungsfreiheit’): in respect to the timing of an intervention, the work techniques and the speed of work; in respect to the quality and quantity of the product; in respect to the physical movement within space’ (Kern and Schumann, 1970, vol. I, p. 66).

The margin of disposition is a contested concept but much used in studies of work. Volpert (1974) has argued that conceptually it does not contribute anything new to Hacker’s concept of action regulation and, hence, should not be treated as an additional category. Mickler on the other hand uses the term, such as in his description of a NC machine operator:

‘technical knowledge and technical sensitivity are demanded, above all during the setting-up of a new series. Since, however, he works only with tested NC programs and may not alter these, he possesses only a comparatively narrow margin of disposition in the shaping of the work processes’ (Mickler, 1989, p. 216).

He stresses the importance of looking at the margins of disposition in areas of relatively low skilled work, since it is there that space for movement, the possibil-

ity to regulate the speed of work, and so forth, can make a big difference for workers.

What stands out in the German tradition is not so much their normative or their ‘sociological’ or ‘psychological’ orientation but its dedication to studying work in ways that may help improve working conditions, hence arriving at work practices that may be less stressful for workers and provide them with the possibility to not only utilize but expand their skills. These concepts are not necessarily imposed dogmatically, although they have a strong theoretical grounding and are in many cases also politically motivated. They are grounded in meticulous fieldwork that seeks to understand actual work practices (and the larger context of organization, production technology and societal forces), hence not simply ‘imposed’ but derived from observational and interview data and developed over time.

Finally, German studies of work is design-oriented but the focus is less on the design of technologies but on the design of work and organizations. Typical of this orientation are the attempts at generalizing findings, looking for trends that might be taken up – contradicted or promoted - by the unions, such as the notion of ‘new production concepts’. Many studies include union representatives and discuss consequences on the strategic level. A good example of this interest is the ambitious German program of ‘humanization of work’ that sought to support the development of new ‘humane’ technologies and models of work, with a strong participation of union representatives at all levels.

4. Conclusion

What can the CSCW research field take from the European field work traditions? First of all, of course, the tradition provides an enormous and enormously rich corpus of naturalistic studies of ordinary cooperative work settings. As a foundation for the comparative analysis, which is an essential part of building an ‘analytical framework’ ‘from the ground up’, this is of great value.

Secondly, the family of European field work traditions provides an array of investigative techniques that may supplement observation, interview, and video analysis: protocol analysis of reasoning in natural work settings, ‘auto-confrontation’, studies of skilled work in simulated environments (e.g., training simulators), and so on.

Thirdly, it provides valuable contributions to the much needed framing of CSCW’s empirical work. CSCW’s focus is not just any kind of ‘socially organized activity’ but *ordinary cooperative work*: work in hospitals and factories, administrative agencies and research laboratories, software engineering bureaus and lawyers’ offices, and so on. This means that issues of working conditions, issues of workload and stress, of dependability and safety, of the debilitating effect of monotonously repetitive work without scope for learning, of professional autonomy in making decisions — are, if not essential or ubiquitous, then *surely*

typical. Or to put it differently, these issues are *regular features of working life in contemporary society*. Therefore, issues of working conditions and related issues of dependability, complexity, stress, monotony, etc. are issues analysts and designers of coordination technologies, if their studies aim at any degree of realism and worldly relevance, *invariably* will come across and have to cope with. And when analysts and designers do come across such issues in addressing the specificity of actual work practices, they would do well to draw upon the outstanding scholarly work of generations of sociologists, psychologists, and engineers that has addressed these more general issues in the European field study traditions and have done so systematically. The point is not that these traditions should, or could, replace ethnographic studies in their critical role in CSCW. The point is rather that these traditions should, and can, enrich and qualify our efforts to develop ‘an analytic framework of some generality’ ‘from the ground up’.

5. Discussion

The aim of this paper has not been to discuss the role of ethnography or fieldwork in general in CSCW. However, it seems appropriate to relate the argument of the present paper to a debate that has gathered some momentum over the last ten or fifteen years (e.g., Anderson, 1997; Button, 2000; Dourish, 2006; Randall, Harper, and Rouncefield, 2007; Crabtree, *et al.*, 2009).

In this debate, the argument is being made that for CSCW and related research areas ‘fieldwork is not the point’, as Graham Button puts it: ‘The point concerns the analytic auspices that are brought to bear, and whether they preserve the practices through which those involved in work interactionally pull it off’ (2000, p. 327). He is concerned that

‘a number of CSCW practitioners are engaging in studies of work themselves, not just appreciating the studies produced by sociologists. These initiatives are, however, in danger of diluting the initial thrust of sociological studies of work for design purposes because although engaging in fieldwork may be important, it is not enough.’ (Button, 2000, p. 328)

More specifically, what in his opinion ‘dilutes’ this whole field of research is what he calls ‘scenic fieldwork’ (with a term that probably is not meant to be flattering): ‘fieldwork that merely describes and codifies what relevant persons do in the workplace’ (p. 319).

‘Fieldwork may provide data about the organisation of work and collaboration at work, and about the use of technology at work. However, the telling issue is how that data is [sic] analytically worked.’ (Button, 2000, p. 328).

Instead, Button is calling for ‘*analytic fieldwork*, using data gleaned from fieldwork as material for analysis’ to ‘explicate’ ‘what people have to know to do work, and how that knowledge is deployed in the ordering and organisation of work’ (pp. 319, 328).

Granted, there may be an issue with fieldwork that produces mere descriptions of observations but it is difficult to tell, for Button does not specify which studies he considers ‘scenic’. Anyway, Button’s objection deserves to be considered carefully. The fieldworker is not a passive ‘data collection’ vehicle. The fieldworker produces answers to questions he or she are pursuing. Which questions? Where they come from? How are they related? Or, as Button puts it, how are the data ‘analytically worked’?

This is hardly contentious. CSCW has benefitted from contributions from a host of conceptual frameworks: Ethnomethodology, Conversation Analysis, Symbolic Interactionism, Activity Theory, Distributed Cognition, Cognitive Engineering, etc., and they have all, in different ways and with varying success, served as analytical orientations in fieldwork. The problem with these contributions, however, is that they all have been developed for other research programs than CSCW’s. Is it not asking too much of these and any other research area or school of thought that it should provide ‘analytical auspices’ (pp. 336 f.) for fieldwork for CSCW purposes?

What we, in CSCW, are dealing with is not ‘action’, ‘activity’, or ‘socially organized activities’ in all generality but socially organized *interdependent work activities, cooperative work*, and our research interests are intimately coupled to our technological commitment. If CSCW is to contribute to the development of appropriately designed coordination technologies, then far more and far more specific ‘analytical auspices’ are required. Fieldwork, to be productive for CSCW purposes, cannot be conducted under other ‘auspices’ than those of CSCW’s own research program: the ‘analytic framework’ to be developed ‘from the ground up’: ‘Enter, and you must change’ (Schmidt and Bannon, 1992, p. 11).

This brings us back to the research program outlined by Hughes *et al.* in 1994. In order to be able to grasp the manifold forms of cooperative work, it is necessary abstain from stipulating specific forms and features of cooperative work; the required ‘analytic framework’ is to be built ‘from the ground up’. There is no other way. Now, while the research program outlined by Hughes *et al.* in 1994 has been quite productive, it would be foolish to hoist the ‘Mission accomplished’ banners right now. Conceptual progress has been made, but the ‘analytical framework of some generality’ is not imminent. Ethnographic and similar forms of investigation will continue to play a significant role in CSCW research. However, the research traditions we point to in this paper (and others too), will have a role to play in developing this research program further.

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