Psyke & Logos, 2001, *22,* 572-587

COGNITIVE AND SOCIAL ASPECTS OF COMPUTER-MEDIATED WORK: Toward a framework for understanding working life

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Much IT research and practice attempts to understand and design for the interaction between human beings and computers. This paper focuses on the two most well-known approaches in this area, namely Human-Computer Interaction (HCI) and Computer Supported Cooperative Work (CSCW)2. I argue that HCI and CSCW reflect different aspects of human activity, which can be characterized as the cognitive and the social aspects of systems design. This paper examines these two approaches from a (meta)theoretical point of view focusing on their 'unit of analysis', as well as their underlying philosophical assumptions. It is argued that the two approaches draw on distinct and somewhat contradictory philosophical ideas and theories, and consequently suggest different solutions to the design of computer systems. Much HCI work adapts a cognitive psychological perspective, focusing on the cognitive aspect of systems design, whereas CSCW work takes on a sociological perspective dealing with social and organisational aspects of systems design. In order to achieve a more 'coherent' understanding of systems design and computer-mediated work we need to 'integrate' the cognitive perspective (internal thought processes) and the social perspective (external social behaviour). Based on a dialectical-materialistic philosophy and the psychological approach developed from such principles, that of Activity Theory, I situate cognitive and the social activity within a broader framework for working life.

1. The research object of HCI

Concerns with how to match tools and machines to human tasks are studied under such programs as 'ergonomics', 'industrial engineering' or the American expression 'human factors'. The specific field dealing with com-

1 This paper is based on doctoral dissertation research undertaken during an EU ESPRIT Basic Research Action project called AMODEUS (Assaying Means of Design Expressions for Users and Systems) (Aboulafia 1999). The project involved the development of systems and user models for supporting IT designers in their work.

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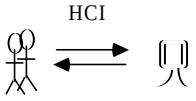
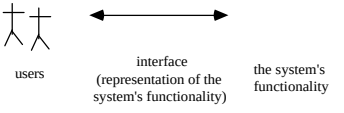
puter systems, called variously cognitive ergonomics or software psychology, became a distinct area of research in the early 80s, and was labelled »human-computer interaction« (HCI). The interest in HCI is not surprising, given that computers have many qualitatively different characteristics than previous tools. Broadly speaking, we can talk about automation of brainwork as distinct from the automation of handwork. As contrasted with Ergonomics, which focuses on the physical adjustment of the human-machine interaction, HCI focuses on the mental adjustment of this interaction.



The unit of analysis of HCI may thus be characterised as the 'informational' interaction between the human and the computer. Most often, the interaction is thought of as a process of dialogue in both directions. However, there is no agreement concerning how to understand and design this interaction of dialogue. Most HCI researchers argue that the interaction should be designed to simulate human-human communication processes as much as possible, making it a symmetrical relation. Others argue towards an asymmetrical relation, from the point of view that the computer does not act like a human being, and thus cannot be designed in that way (e.g. Nickerson 1992). Some even argue that in use situations the computer should become 'invisible' (e.g. Ehn 1988) – thereby eliminating the idea of interaction. This view is also called the 'tool perspective' in contrast to the 'dialogue perspective'.

I tend to agree with the asymmetrical relation, understanding the computer and the human as different 'agents'. I also suggest that the tool and the dialogue perspectives may be thought of as two aspects of the same computer-mediated activity – rather than being contradictory views. The computer is a tool mediating human activity, but at the same time it is a mental tool that processes 'sign systems'. Thus, in computer-mediated activity we may talk of tool-use as well as sign-use, referring to the distinction used by Vygotsky (1978). These two kinds of mediation principles seem to merge in computer-mediated activity.



Characteristic topics of discussion in HCI are the interface and the concept of usability. The user is not directly in contact with the system's functionality – only through its representation at the interface. By definition, the interface is where the user and the computer come in contact. Designing the interface is therefore an essential topic for designers, who are trying to develop user friendly representations of the system's functionality.

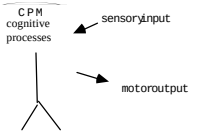
The interface provides an enormous range of possibilities for representing information and for structuring the user-computer 'communication'. One can choose between linguistic representations, using symbolic sign systems, or perceptual representations using pictures, diagrams, etc. One

can also use sound, picture and films. This is a great challenge for HCI designers as well as users. Problems of interaction emerge not from the incompetence of users, but are seen as a failure of designers to fully understand users and the use situation. It is assumed that computer systems can be improved if they are designed to accommodate characteristics of users. Hence, a central task for HCI designers is to describe and interpret users' preferences, skills, behaviour, goals and needs etc. into terms that can be used in the software engineering domain. This task is often seen as one of the most difficult ones throughout the design process (e.g. Aboulafia et. al. 1993). Thus, in order to support designers during this task, cognitive researchers have developed various so-called 'user models', attempting to provide knowledge of the users' mind and behaviour to software designers.

The focus here is not any specific user model, but the underlying basic assumptions concerning the human mind embedded in such models. Interest in these issues was mainly due to our observations of designers' reluctance to use such formal models (e.g. Aboulafia et al 1993).

The conceptual underpinnings of HCI

HCI draws extensively on the disciplines of cognitive psychology and cognitive science. Sharing the same object of study – that of mind, these two disciplines are highly connected and it is often difficult to differentiate between them. Yet, cognitive science seems to have a more philosophical approach, focusing on argumentation based on logical principles, whereas cognitive psychology is a scientific approach utilising a variety of empirical methods. Nevertheless, both approaches share what has been termed an »Information Processing Approach« (IPA) to the understanding of mind.



The IPA is a three-element model. It begins with an *input,* usually a sensory stimulus and ends with an *output*, such as e.g. physical behaviour, speech, or a decision. The middle term is named the information processing system. The basis of IPA can be traced to old philosophical ideas, especially to Descartes (Leiber 1991), who also talks of a three-element model: Input mechanisms, a Central Processing Mechanism (CPM), and a response output mechanism. Mental processes are here understood as a 'work up' of sense impressions by different rules that involve the formation and use of representations.

The focus of interest for cognitive researchers relying on the IPA is how the processing system between the input and the output actually operates, i.e. how the system changes sensory input into a 'cognitive form' according to certain rules, resulting in some type of mental representations[2]. Thus

2 Many different and very elaborated models of information-processing have been developed, e.g. the Interactive Cognitive Subsystems (ICS) model developed during the AMODEUS project (Barnard and May 1993).

the object of research is the flow of information through this 'cognitive system'. IPA or Cognitivism, as this trend has been called, involves this appeal to 'internal cognitive processes' to explain user (and system) behaviour (e.g. Pylyshyn 1984). As such Descartes' scheme is merely maintained in another version: IPA matches the Cartesian model both in relation to focusing on a world, which is 'cognized', rather than a world that 'is', as well as its deterministic mechanical causation.

There are huge problems with this internal view of mind, or as Descartes has expressed it, 'an ego sitting behind doing the thinking', and which later has been called 'the ghost in the machine'. Still & Costall have summarized several of the fundamental problems :

> »*There is the problem of* ***solipsism:*** *how can the knower ever reach beyond internal presentations to the reality they are supposed to represent? There is the problem of* ***development:*** *how can a system of formal rules ever be flexible enough to capture the mutuality between a growing organism and its richly structured and changing environment? And there is the problem of* ***relevance:*** *how does anyone following a rule know when to apply that rule? (the 'frame' problem). Most generally, there is the problem of* ***meaning****: how do symbolic representations attain their semantic status?*«
> (1991: 2).

Having mentioned the problems with the internal view of Descartes and Cognitivism, I would like to stress that Descartes' separation of the physical and the psyche, I find very encouraging – especially for psychology as a science. Descartes argued that mind (or soul) is an independent substance, totally different from the mechanical body, which therefore needs another explanation[3]. His separation of the physical and the psychological as two different phenomena is the basis of the psychophysical problem[4], which to this day has haunted philosophy and psychology. The psychophysical problem is not simply a problem of separating these two qualitative different phenomena. The problem emerges when researchers are trying to explain the relationship between the physical and the psychological. Relying on Galileo's mechanical theory, Descartes argued that the

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3 »Now the first and most important prerequisite for knowledge of the immortality of the soul is for us to form a concept of the soul which is as clear as possible and is also distinct from every concept of the body« (Descartes, translated by Cottingham, 1986: 9)

4 Philosophically, the psycho-physical gives two different views: either a total separation between the two (dualism) or as something inseparable (monism). Whereas the dualistic view results in the problem of explaining how subject and object are related after all, the monistic view results in the opposite problem, i.e. how to explain the differences between the two (Engelsted 1989).

activity of humans (including animals and other biological organisms) could be explained as mechanical interaction. Cognitivism remains within this natural-scientific approach, trying to explain mental processes as the operation of deterministic mechanisms whose principles can be captured in formal systems (e.g. mathematics and logic). Clearly, such an explanation of mind leaves no room for psychic phenomena such as e.g. consciousness, feelings and meaning, which e.g. Pylyshyn (1984) argues are 'mysteries' and also irrelevant to make scientific progress. Leaving out such essential psychic phenomena is characteristic of Cognitivism (and Behaviorism[5]), and is of course fatal for a psychological understanding of mind.

A major problem in HCI is therefore the split between the theoretical approach and the practice of computer-mediated work, where psychic processes such as meaning, motives, feelings, development, etc. are the explanatory factors. Although Cognitivism may be adequate in order to describe systems and data processes, it seems less useful to obtain an understanding of users' behaviour and cognitive processes. In order to get a common framework for the human and the computer, the choice has been to fit users into a systems model. It is therefore not surprising that much criticism has emerged from the cognitive approach in HCI, with arguments that 'user models' based on this approach have little impact on the design process (e.g. Warren 1992). In addition, a large amount of empirical work has been conducted without much theoretical foundation (Bannon 1990, 1991), which also seem to be of minimal relevance for practitioners (Whiteside & Wixon, 1987).

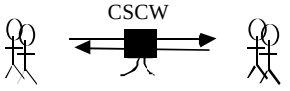
Basically the theory-practice problem in HCI reflects the split between the natural science approach reflected in Cognitivism, and the human and social sciences, in which the practice of the designers and much empirical work can be situated. To solve this problem, we need a 'theory of practice' – a position which is in contrast to e.g. Pylyshyn (1991) who argues that this is not possible.

2. The research object of CSCW

The research area 'Computer Supported Cooperative Work' (CSCW) evolved in the late 80s, partly as a reaction to the cognitivistic approach in HCI, that was argued to be technology-oriented and individualistic; partly as a consequence of the development of IT, and the possibility of networking. Technology was assumed to effect the social and organisational structures of the workplace (e.g. Whitaker et al 1989), and it was argued that the

5 Cognitivism has its roots in behaviouristic theory (e.g. Chomsky), and thus has certain similarities with this approach. The cognitivists simply added mental representations to the stimulus-response paradigm as a way of explaining mind.

failure of many systems was due to lack of taking into account such issues (e.g. Kuutti 1990). This led a group of researchers to focus on the so-called 'social context' of the human-computer interaction field[6]. In its most general form, CSCW examines the possibilities and effects of technological support for humans involved in collaborative group communication and work processes (Bowers and Benford, 1990). Focus has been given to conceptualising a wide range of social issues, such as e.g. computer-mediated communication (e.g. Winograd and Flores 1986), collaboration (e.g. Hellman 1989), coordination (e.g. Malone and Crowston 1990), and the 'cooperative nature of work' (e.g. Schmidt 1990).



With the emergence of CSCW, we can talk of a shift in focus from human-computer interaction towards human-human interaction mediated by the computer. Some even talk of a new paradigm (Kraemer and King 1988). Nevertheless, we can at least say that CSCW brings together new sets of social and organisational issues, which had not been adequately addressed before in this area of research. CSCW also opens up a broader insight into design, such as observing people in their actual work setting, and the involvement of users in the design process more fully (Bannon 1993).

The conceptual underpinnings of CSCW

Shifting the focus of research, attempting to incorporate social activity in its conceptual and practical understanding, CSCW clearly demanded another (meta)theoretical departure and methodological orientation to that of Cognitivism. Traditionally, the choice has been Phenomenology and Hermeneutics. For instance, Moran and Anderson (1990) have proposed the 'Workaday World' paradigm, the perspective of the 'lifeworld' (lebenswelt) of people working, motivated by Husserl, Habermas and Heidegger. It is a description from the view of a particular 'actor', which captures the experience of that actor. Also Ehn's notion of 'work-oriented design' (1988) draws on a phenomenological account, arguing that a Heideggerian approach to design helps focusing on the importance of everydayness of use.

Applying a phenomenological methodology (and hermeneutics) to IT design was originally suggested by Winograd and Flores[7] (1986).Their approach, later named the language/action perspective, has had a signifi-

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6 There have been several attempts to clarify what is meant by 'context', e.g. a special issue on 'context in design' appeared in the journal 'Human-Computer Interaction' (1994).

7 Winograd and Flores' work is based on philosophical ideas in biology (Maturana and Varela's autopoietic systems), and linguistics (Austin and Searle's Speech act Theory) as well as being influenced by hermeneutics and phenomenology, especially Heidegger and Gadamer. I have discussed these approaches in my Ph.D.

cant influence on the development of CSCW ideas and approaches. It takes language as the primary dimension of human activity and is concerned with the analysis of communicative workflow. Winograd and Flores were especially opposed to the Cartesian position, arguing that models of rationalistic problem-solving do not reflect how actions are determined, and that programs based on such models are unlikely to prove successful. They argue that their work is an attempt to re-conceptualise the way we think about human action in the world and the role of artefacts: as a shift from an individual perspective to a social perspective, and from mental representations to social interaction.

Like the cognitive approach, CSCW has both problems and promising prospects. The prospects relate to the broader features of assessing and evaluating the design of application systems. The problems are related to its tendency towards 'social determinism': social relations are seen as the mediating link between the individual and the society. The 'internal representation' problem exemplified by Descartes' approach merely seems to be moved 'out of the head and into social relations', and it is unlikely that this 'social turn' provides a more adequate conceptual framework for the field.

3. The cognitive and the social aspects of computer-mediated work

The HCI and the CSCW research fields share the same overall goal, that of the design of usable and effective computer systems. However, they differ in focus and have contradictory perspectives on several issues. HCI is concerned with the individual's cognitive processes in direct interaction with the computer system, and the design of the interface according to such principles (the 'tool perspective'). CSCW is concerned with the social interaction mediated by computer systems, especially communication processes (the 'language perspective'). HCI and CSCW also differ in relation to the method of research (task analysis vs. Ethnography/Ethnomethodology). Also we may talk of opposite positions such as Rationalism vs. Empiricism, and cognitivism vs. social behaviourism (i.e. viewing psyche either from the inside or from the outside). The table below summarizes these contradictions:

HCI	**CSCW**
Natural science	Social (Human) science
Cognitive activity (perception, memory, etc.)	Social activity (social relations, group work, etc)
Cognitivism (inner view of psyche)	Behaviourism (outer view of 'psyche')
Rationalism	Empiricism
Task analysis	Ethnography/Ethnomethodology

Presenting the two trends as oppositions, merely jumping from one extreme to the other, I have made a caricature of the two approaches. Some researchers and practitioners appear to draw on both, more or less eclectically or pragmatically (but not without problems of connecting the two). However, this 'caricature' shows some features which are characteristic of the two approaches and, more importantly, shows some of the basic problems in this area of research which need to be solved if we are to achieve a more adequate conceptual understanding of computer-mediated work. The reason for some of the shortcomings of HCI research is not a lack of awareness of the 'social context', but rather the lack of a (meta)theoretical framework to handle issues of that kind. Relying on the conceptual understanding of humans embedded in Cognitivism, the researchers and practitioners do not have much choice but to focus on the individual's 'internal' perceptual or cognitive processes. However, turning towards a social, external or behavioural perspective does not solve the problem either. Conclusions about systems design that are based solely on the social aspect will be as far off the mark as those based solely on the cognitive aspect of activity. Keeping these two perspectives separated, having to choose one over the other thus makes little sense.

Interdisciplinarity cannot in itself resolve the methodological problems embedded in such attempts. It can merely increase the tendency toward either a cybernetic reductionism or a sociological reductionism. In both cases human beings are in danger of losing their psyche. The problem is that neither of the two 'paradigms' is able to incorporate the other into its framework, i.e. to handle the individual, cognitive and social aspect of human activity simultaneously. Social issues cannot simply be added to the psychological or cognitive/technical issues or *vice versa*. This is also the reason that none of them are able to bring forward an appropriate 'paradigm' for the relationship between people and technology.

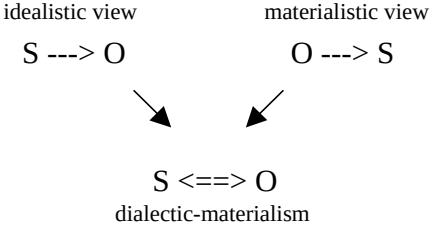
Kuhn's idea of 'incommensurability' of different paradigms points toward the need to have an overall conceptualisation of the subject in order to synthesise the two approaches, or to use the expressing of Engelsted (1993), the recognition of diversity presupposes some unifying order. Such an unifying order or conceptual framework must be based on a consistent meta-theoretical orientation, where psychology is not reduced under the guise of the necessity of developing interdisciplinary research, such as reducing human cognitive processes to machine mechanisms, or to biological, social or sociological processes. Striving at interdisciplinary research, we need a (meta)theoretical approach that is able to incorporate both the cognitive and the social aspect of human activity, as well as other significant characteristics, such as the societal (work) activity and its meaning.

4. Meta-theoretical problems solved by Activity Theory

The presence of these two 'paradigms' and their contradictory views of the human mind reflects the split in today's psychology between Cognitivism and Behaviourism – especially characteristic of US psychology (Bruner 1990). This 'crisis', however, bears remarkable similarities to the crisis in the 1920es, which Vygotsky attempted to overcome. It may therefore be worthwhile to look at Vygotsky's solution to such problems.

The key problem which Vygotsky tried to solve was the contradiction between a natural-scientific psychology (and experimental methods of research) based on the principles of materialism, and an empirical psychology (the subjectivist theory of psychology) relying on idealist philosophy (Petrovsky 1990) – a contradiction which could be traced to Descartes and John Locke. The *natural-scientific psychology*, which had close ties with behaviourism, protested against subjectivism and idealism, and demanded an objective method of investigation. Regarding psychology as an exclusively natural science, however, it ignored the social and societal determination of personality whereby problems such as motivation, emotion and many other issues could not be resolved. It failed to perceive the individual as a dialectical unity of e.g. the biological and the social/societal.

Empirical psychology occupied a middle position between the natural-scientific and the philosophical approaches. At the same time as applying experimental methods in studying the psyche, borrowed from natural science, this tradition had a preference for idealist constructs (in particular neo-Kantianism and positivism). It refused to recognise general laws governing the psyche and consciousness. Rather it sought to turn psychology into a scientific discipline, by using 'applied science'. However, this effort resulted in devastating criticism especially from philosophical idealism and the natural-scientific trend (ibid.).



These two previous psychological schools may be illustrated in the following way. The idealistic view sees the subject as determining the objective element (Subject → Object). Psyche is here viewed from the inside, as something subjective. The materialistic view sees the subject as being determined by the object (Object → Subject). Psyche is here viewed from the outside, as something objective. For both of these ways of explaining the human being, the dialectical processes between a person and his environment are not captured.

The Cultural-Historical School outlined by Vygotsky, and further developed by Leontjev, Luria and many others under the name of Activity

Theory (AT), is an attempt to unite the subject and the object through the concept of activity. Vygotsky believed that the subjective as well as the objective were crucial for the psychological understanding. He was especially opposed to behaviourism and found psychology without psyche rather senseless. He also believed that no progress could be expected from a psychology based on a framework in which humans are viewed as passively receiving inputs from the physical and social environment. Vygotsky argued that humans are embedded in a cultural-historical context and their behaviour and thinking processes cannot be understood independent of it. Human activities are not just surrounded by a context within which they interact. Especially Leontjev argued that Activity is not understood as a reaction (a stimulus-response), but as an active system that has its own structure and development. Humans are continually changing their 'context' by creating and using artefacts. This dialectical process between the human (the subject) and their environment (the object), i.e. the activity, is regarded as the smallest unit of analysis in psychological research.

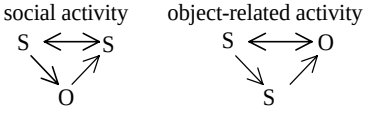
Although the 'crisis' in HCI (based on natural science) and CSCW (based on social science) may be expressed in a less open form than in the 1920es, their contradictory views resemble the battle between an internal and external understanding of mind, where the dialectical processes between humans and their environment are not captured. Leontjev (1978) argues that either information processing is seen as an intervening variable, or the stimulus is interpreted as a 'cultural stimulus', in both cases we come up against the binomial formula and the postulate of directness (Stimulus $\rightarrow$ Response). The notion of Activity (the subject-object relation) is an attempt to overcome the S-R paradigm. Thus the choice of Activity Theory seems quite appropriate as a way to solve at least some of these difficulties.

Object-related activity vs. social activity

From an activity theoretical point of view, cognitive and social activities are inseparable. Vygotsky talks of two interconnected features that must be considered basic to psychological science: the tool structure of activity and social relationships. Tool mediated activity is connecting humans not only with the world of things but also with other people. In the process of material production, people also produce language, and this serves not only as a means of information but also as a carrier of the societally developed meanings fixed in it (Leontjev 1978). Hereby, the distinction, on the one hand, of the external world (including physical activity), and on the other hand, the world of internal phenomena are replaced by another distinction: objective reality and activity of the subject, including both external and internal processes.

In the context of the combination of tools and signs, as a mediating function orienting human activity, Vygotsky uses the term 'higher psychologi-

cal functions'[8]. Tool-use and sign-use are two different kinds of activity that orient human behaviour in different ways. Whereas tool-use is a means of mastering nature (i.e. externally oriented activity leading to changes in objects), sign or language is internally-oriented and acts as an instrument of mastering one's own psychological processes. These two kinds of mediation principles seem to merge in computer-mediated activity.

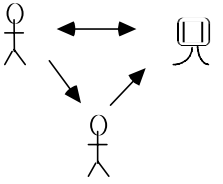


So, although at the phenomenological (or behavioural) level of analysis we find that cognitive and social behaviour is disconnected or separable, analysing their inner structures we find that mediation remains the central link in both types of relations (Petrovsky 1990). What seems to be an individual's cognitive or object-related activity, is mediated by one or more individuals through which the person can better perceive, comprehend and sense the object of activity (the activity content). Expressed in a schematic way: subject-object relations exist as mediated subject-subject-object relations. In turn, subject-subject relations exist as mediated by objects (the activity content). Thus, subject-subject relations exist as mediated subject-object-subject relations, or we could say social relations do not exist without having something to be social about.

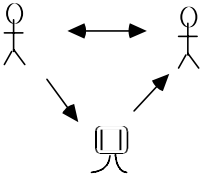
From this follows that we cannot understand HCI (object-related activity) without incorporating other people, and we cannot understand CSCW (social activity) without incorporating the computer. Both HCI and CSCW are concentrated around interactions between the human, the computer and other people. The smallest unit of analysis of these two approaches thus involves a mediating link – either other people or the artifact. However, we can talk of two different activities – having different motives and goals. The individual's activity is directed either towards the 'thing' ('gegenstand'), or towards other people. The object-related activity is characteristic of learning activities, where the motive is cognitive development, i.e.to express oneself through tool-use or tool making (problem solving and skill acquisition). Here we should ask questions such as how the computer (mediated by other people) affects the development of cognition, goal formation processes, problem-solving, etc. Velishkovsky's (1991) hierarchical six-level model of human cognition may be useful. It answers questions relating to very general problems, such as the laws of human development,

8 Leontjev (1978) in particular has made important contributions to our understanding of the relationship between cognition and action. He stresses that there is not a direct mechanical transition of external behaviour processes to internal processes. Through the process of internalisation, thought processes are transformed and undergo a specific transformation: they are generalised, verbalised, condensed, and most important, they become capable of further development, which exceeds the boundaries of the possibilities of external activity.

causation of activity, the functional architecture of underlying mechanisms, knowledge representation, etc. At the social aspect of activity, the motive and goal of the activity is other people. Here we can talk about the development of the 'social self' through socialisation, communication, co-operations, etc. Here Engelsted's (1984) distinction between different types of social activity that correspond to Leontjev's cognitive, developmental types of activity can be useful[9].



Human-computer interaction mediated by other people



Social interaction mediated (or by computer systems)

Learning to operate the computer (tool-use), or designing computer systems (tool-making) the motive and goal of the activity is directed at the computer itself. HCI research has achieved many valuable results in attempting to understand this 'direct interaction' with the computer. In situations, where the individual has accomplished the learning task and the skill has become automatised or an operation (to use the expression of Leontjev), the computer becomes a mediating tool in order to achieve other goals (the content of the work activity). In these situations CSCW research and results may be useful in order to identify the social and organisational conditions for computer-mediated work.

5. Basic motives in the activity of work

The cognitive and the social activity of work need to be embedded in a framework that captures work activity in total. The proposed conceptual framework is an attempt in that direction[10]. Before presenting it, some background for the proposal may be useful.

The activity of work has often been characterised as a process of tool-use and tool-making. In addition, Engelsted (1989) argues that as humans are embedded in society, the activity of work is ultimately targeted at con-

9 To the simple activity corresponds simple reciprocity; to the operational activity corresponds associative social activity; and to the intellectual activity corresponds cooperative activity (Engelsted 1984).

10 This framework was initially presented in my master thesis in 1992: Quality of Working Life: Key issues & Conceptual Framework (integreret speciale & almen psykologi), Københavns Universitet, Feb.1992 (not published).

tributing to the reproduction and development of society. The significance of work activity is here viewed as the societal contribution (which equals Marx's concepts of 'separation through surrender'). This specific human need or motive is essential for human society and the characteristic feature of working. Here it is important to distinguish between social relations and societal relations, which belong to different research objects and different levels of analysis (Engelsted 1984). Social activity refers to the means by which the individual adapts to a social context, i.e. the process of socialisation, whereas societal activity refers to the individual being engaged in societal activity, appropriating societal meanings, i.e. the process of, what could be called, 'societalisation'.[11]

Engelsted (1989) distinguishes between three dimensions of activity: the need, the object and the meaning dimension by which human activity can be directed. The need dimension is directed towards restoring a homeostatic balance (e.g. food, providing the basic condition for human life). The object dimension is directed towards the object itself, which can be either 'things' (object-related activity) or other humans (social activity), e.g. sports and other hobby activities, providing social and intellectual satisfaction). The goal of human activity can also be directed by the 'meaning dimension', where the purpose of the activity is to contribute above oneself. This 'self-exceeding' activity is the essential characteristic feature of work activity.

Based on these dimensions of human activity, the proposed conceptual framework identifies four interrelated basic motives that humans have to realise through their engagement in the activity of work. Apart from being derived from a generic understanding of human activity, each of the motives can be associated with the kind of assumptions about human nature and motivation that have evolved during the history of work psychology: Rational-economic assumptions emphasising the idea that material reward acts as a motivator (e.g. Taylor's Scientific Management); Social assumptions emphasising the importance of social relations within an organisation (e.g. the Hawthorne studies in the late 20s); and Self-actualisation assumptions in the 50s, emphasising the motive for self-actualisation (originally derived from Maslow, 1943). The 'meaning of work' motive as an aspect of work has not been given much attention by researchers. This 'hidden' motive, however, surfaced in the unemployment studies in the 80s, showing that unemployed people experience feelings of meaninglessness, alienation, isolation, and not belonging to the society.

These different conceptions of human nature are traditionally seen as competing and disconnected. However, we need to acknowledge all four motives and understand their mutual relationship.

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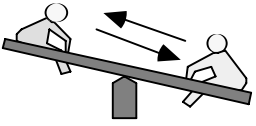
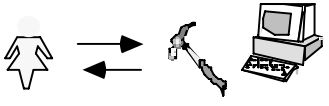
11 A term for these processes seems to be lacking in the English language. The Danish term is 'samfundsmæssiggørelse' and the German term is 'gesellschaftlichkeit'.

The proposed four motives are viewed as different dimensions or aspects of the activity of work: On the economic dimension, the subject is relating to himself as the object of the activity; on the social dimension, the object of the activity is other people; on the cognitive dimension, the object is tools or artefacts; and on the meaning of work dimension, the object of the activity is society in general. Understanding the significance of work as an activity that aims at contributing to society in general, both social relations and tool use/-making exists merely as mediated actions, i.e. work activities are mediated through tool-use/making and other people. Futhermore, whereas the cognitive and social aspect of the human activity is targeted at development of oneself (needs, motives, goals, etc), the 'meaning of work motive' is targeted at exceeding the individual's own needs – towards satisfying the needs of society (children, older people, handicapped, sick people, etc.). Summarizing these different aspects below:

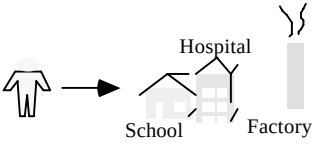
The economic aspect of Work
Wages are means to secure 'material needs' of the worker and his family. Maintaining one's life is the condition for human development, and thus a political question rather than a psychological one. At this aspect of work we are concerned with issues such as pay, physical working conditions, occupational health and safety, ergonomics, etc.



The Social Aspect of Work
Cooperation and socialisation (integration of workers into a specific organisational structure), contribute to the development of the social self. This aspect of work (social activity) involves motives such as occupational socialisation, working groups, management, etc.



The Cognitive Aspect of Work
Humans develop their intellect and skills through toolmaking and -use. This aspect of work (object-related activity) involves motives such as problem solving, thinking, qualifications, skill acquisition, etc.



The Meaning of work
Working life serves to maintain the society. This altruistic motive concerns the workers' ultimate goal or purpose of his activity. The motive at this level may involve issues such as the personal meaning of working, the development of responsibility and the development of 'the societal self'.

As well as being a conceptual framework for basic motives in working life, these motives may be conceived as stages of development, organised hierarchically. So, although each level of the hierarchy may be studied in its specifics (as a 'unit of analysis'), we need to grasp the relevant characteristics of work activity. If the meaning or altruistic motive, that transcends one's own 'self-activity', is the defining characteristic of work activity, the cognitive and the social aspect should be embedded in such an understanding. The 'meaning aspect' of human life, however, is still only at the surface in psychology, although works such as Bruner's 'Acts of meaning' (1990), as well asVictor Frankl's earlier 'Man's search for meaning' (1959) should be mentioned.

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