

Work and work roles: a context of tasks

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Final Draft
Published in the Journal of Documentation Vol 64
Issue 6, pp. 797-815.

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Purpose: Both task-based and work oriented research approaches have proved their value in information science research. A task is a workable analytical unit of human activity, which brings the level of explication close enough to cater for individual actions and their consequences. Similarly, work and work roles have been effective concepts at explicating the broad patterns of professional information activity. Major issues of the existing approaches are the difficulty of conceptualising the contexts of tasks and the relatively high level of abstraction of a work level scrutiny. The purpose of this paper is to discuss how the concepts of 'work', 'work role' and 'task' might be integrated into a common research agenda. We suggest that the explication of work and work roles might serve in providing additional understanding on the formation of the purposes, meanings and values, which guide the shaping of the activities conceptualised as tasks.

Methodology/Approach: The issue is discussed in general with a reference to an empirical study of information work of archaeology professionals informed by the notion of work role.

Findings: It is suggested that the broader notions of work and work roles are useful concepts for explicating the context of more specific tasks.

Research limitations/implications: The suggested approach brings together task and work – work role-based research and provides a basis for exploring human information activity from a broader perspective than before and thus improving the general understanding of why and how information is used as it is used.

Practical implications: The study provides an approach to conceptualise the ways how people work with information and lays the ground for improving information management and organisation practices.

Originality: There has been little prior discussion about integrating the task and work-based approaches. We suggest that the explication of work and work roles might serve in providing additional understanding on the formation of the purposes, meanings and values, which guide the shaping of the activities conceptualised as tasks.

Keywords (up to six): work, tasks, work roles, LIS research

Category: Conceptual paper

Introduction

Task-based research approaches have proved their value in information research (e.g. Wiberley and Jones, 1989; Ellis, 1993; Byström, 1997; Sonnenwald and Lievrouw, 1997; Widén-Wulff, 2000; Hansen and Järvelin, 2000; Talja, 2002; Heinström, 2002; Vakkari, 2003). A task is a workable analytical unit of human activity, which brings the level of explication close enough to cater for individual actions and their consequences. If a task is complex, it can be broken down into its smallest meaningful components by identifying “tasks in tasks” (Byström and Hansen, 2005).

An individual task does not reside, however, in isolation (Byström, 2000; Attfeld et al, 2003; Byström and Hansen, 2005). Individual tasks link together forming larger tasks, work flows, processes and, finally, the complete fabric of a human life-world (Byström and Hansen, 2005). The different levels of tasks may be conceptualised as entities, which resemble each other from a structural and functional point of view. The increasing and decreasing scale does, however, bring about matters, which pertain to the precise levels of perusal. As the basic ‘structure’ of a task stays relatively stable, it might be argued that scale dependent issues emerge especially in conjunction with the specific of ways how the tasks reside in their contexts. An especially transient point of the context is how the actors conceptualise tasks and their relations to each other.

The purpose of this article is to discuss how the concepts of ‘work’, ‘work role’ and ‘task’ might be integrated into a common research agenda. Work and professional information behaviour have formed almost a standard framework for information seeking and have used research for a long time until the relatively recent emphasis of everyday life information seeking (e.g. Savolainen, 1995; Kari, 1998; Spink et al, 1999). Therefore, the lack of conceptual clarity regarding work-related concepts might be considered to be somewhat surprising. In the present contribution we suggest that the explication of work and work roles might serve to provide additional understanding about the formation of the purposes, meanings and values, which guide the shaping of the activities conceptualised as tasks and vice versa. As an example of the potential benefits of work and work role level perusal, we refer to a study on archaeology professionals published by Huvila in 2006 (Huvila, 2006).

The concept of work

The sense of the term 'work' is profoundly a matter of description and definition. The present discussion attempts to take no sides and to assume as a premise that basically all human activity may be technically counted as 'work'. We propose that the concept of work denotes a distinct evolving set of inter-linked human activities with either explicitly or implicitly understood purpose, meaning and value (Huvila, 2006, 20-22). Work and 'works' are always, however, only a part of the entire life-world of an individual (ref. Savolainen, 1995; Dervin, 1997; Huotari and Chatman, 2001).

Work is a vague concept without a clear definition. The understanding of its objectives and implications differs between individuals. The work is construed through an individual and collective goal attainment, encodings and attitudes (ref. Brown 1958; Weber 1970; Fazio 1990) as well as through a direct activity of organising and steering. Generally speaking, the understanding of the concept of "work" is normally shared in a community, but the understanding of any distinct instance of work as 'work', does not need to be shared in its entirety (Star and Strauss, 1999, 10-12). An activity may be simultaneously considered by different individuals to be and not to be work.

The meaning of 'work' has been discussed frequently in the information sciences literature, especially with a reference to the Computer Supported Cooperative Work (CSCW) (e.g. Schmidt and Bannon 1992), human-computer interaction (HCI) (Bannon, 2000) and information systems science (e.g. Gasser 1986; Nurminen 1988; Karasti 1997; Torvinen 1999). In information science the notion of work was already present in the seminal works on information needs and uses (ref. Paisley, 1968; Allen, 1969; Dervin and Nilan, 1986; T. D. Wilson, 1994), but because work related information needs and uses were the *de facto* focus of information research, the notion itself remained relatively unproblematised. The complexities of work and working began to receive more attention after the rise of information seeking and information behaviour research (Paisley, 1980; T. Wilson, 1981; Belkin et al, 1982; Dervin and Nilan, 1986) when the emphasis shifted from systems to human beings. The emphasis on users, accidental and contextual information discovery (Erdelez, 1997; Solomon, 2002) and especially on the non-work settings of information use (e.g. Savolainen, 1995; Chatman, 1996; Solomon, 1999) have underlined the relevance of scrutinising the concept of work more thoroughly. Taylor emphasised the need to look at professional groups and different information use

environments (Taylor, 1991). In the cognitive work analysis based investigations of information interactions and information behaviour, the notion of work has been contextualised and structured even further (Pejtersen, 1989; Fidel and Pejtersen, 2004; Pejtersen and Rasmussen, 2004; Fidel and Pejtersen, 2005).

The present article acknowledges the relevance of several sub-conceptualisations of work, which spring from the different discussions within the information sciences. Besides the ones already mentioned, the most prominent notions from the point of view of the current discussion include the concepts of *cooperative work* (Schmidt and Bannon, 1992), *articulation work* (Strauss, 1988; Star, 1991; Schmidt and Bannon, 1992; Corbin and Strauss, 1993; Suchman, 1996; Nurminen and Torvinen, 1996; Fjuk et al, 1997) and *invisible work* (Star, 1991; Suchman, 1995). The focus of the perusal in the context of the present contribution is, however, on the general phenomenon of work, which grasps broadly the various modes of working, including the colloquial everyday work and work practices (Button and Harper, 1996; Karasti, 1997).

Work and work tasks

The concept of work is related closely to the notion of *work task* in the sense it is discussed in the information science and information systems science literature (e.g. Gasser 1986; Star 1999; Macredie and Wild 2000; Byström and Hansen 2005; Ingwersen and Järvelin 2005). The role of 'work task' is emphasised in the explicitly *task-based* studies of human activity and information interactions (ref. e.g. Star and Strauss 1999; Byström and Hansen 2005). Both the notions, task and work task, are based on the same theoretical understanding of human actions and interactions. Basically, a work task is a work related 'task' i.e. an 'atomic' (within each scope of perusal) meaningful activity, which is linked to a wider framework of 'work' (ref. Byström and Hansen, 2005). In the cognitive work analysis approach work is something to which the tasks belong. It forms a domain, which is part of the context where tasks can be analysed (Rasmussen et al, 1994; Fidel and Pejtersen, 2004, 2005).

The concepts of work and work task do share many functional characteristics to an extent that they do conceptually construct each other. As with work tasks, it is possible to discuss work construction, work performance, and (in a conditional sense) work completion as distinguishable phases of work (Byström and Hansen, 2005). Compared to this understanding of a work task, work may be seen essentially as a meta-concept, which is potentially inclusive of individually identifiable

work tasks. Work is basically an upper level activity, which ties individual work tasks together and makes them 'work tasks' instead of mere 'tasks'.

Unlike a rather typical understanding of a work task, work does not necessarily have to have neither a recognisable beginning nor an end (cf. Byström and Hansen 2005). Work functions on a long term cultural and societal level of activity. Besides being a meta-concept with respect to the work task, work is also a meta-process with respect to a distinct work flow. Work is situated not only in an instance of activity, but also in broader cultural contexts and situations. Work never consists of only one process. It is inherently an entity of overlapping, mutually non-exclusive processes (Star and Strauss, 1999). The purpose, meaning and value of a work task is in its relatively direct practical accomplishment (Byström and Hansen, 2005), while the notion of the work focuses on the purposes behind an immediate objective, meanings behind the first explicit understanding and values above the value of a (relatively) short-term practical accomplishment.

Control, coordination and cultural resonance

Besides the constituency of the breadth of its cultural and temporal scopes, the concept of work builds on the notion of *control*. In work literature, control expresses a capability to guide and steer (e.g. Suchman, 1995), rather than a state of an absolute possession, which is prevalent in the Marxist discourse of labour (Warner, 2005, 552). In CSCW and social informatics oriented literature, the phenomenon has been referred to as *coordination* (Kling, 1991), which does effectively emphasise the collaborative and in a sense, 'soft', approach to the functioning of the control. In general terms the control and coordination need not to be directional. Similarly, they are not necessarily organised in a hierarchical manner. Control is, however, perceived to be an important force for the work to emerge and exist (Suchman, 1995; Fjuk et al, 1997). The practical implication of this view is an emphasis on the need to manage and actively organise work in order to increase its efficacy, and eventually, to make it exist. In the CSCW literature (e.g. Strauss 1985; Gerson and Star 1986; Strauss 1988; Star 1991; Schmidt and Bannon 1992; Corbin and Strauss 1993; Suchman 1996; Nurminen and Torvinen 1996; Fjuk . 1997) this coordinative activity has been referred to as *articulation work*. The essential point behind the notion of articulation work is the cognisance of a need to articulate what is being done in a collaborative activity (Gerson and Star, 1986, 258 and 266). We propose that the notion needs to be pushed forward and argue that the work

occurs, because of the control and coordination, which are expressed through the articulation work, and that the work induces further control within its contextual and situated sphere of influence. The control frames work in a similar manner to the contextuality, albeit on a parallel level of modality to the context and situation. Due to the parallel and mutually embedded nature of contexts and situations, and of control, they cannot be represented in a single visualisation. Control is not wider or narrower, outside or inside, above or below contexts and situations.

The third important aspect of work (besides the notions of contextuality and control) is its cultural resonance and interwovenness with a distinct set of objectives. The hereby assumed inclusive understanding of the concept of work acknowledges the importance of the Vygotskian activity theory for work studies (e.g. in Fidel and Pejtersen 2004), although work is used here to emphasise the contextual and situational dimensions of human activity (i.e. purposes, meanings and values) rather than to explicate the activity itself. The viewpoint places emphasis on a notion that the perceived qualities of meaning and value are not merely qualities, but constituent constructors of work itself. In spite of the importance of the cognitive, social and cultural dimensions of work, we argue that work is not merely a cultural category. Work holds the keys to the understanding of why anything is being done at all. The mission of practical information management and information systems design is to find efficient solutions for distinct sets of identified tasks. The scope of the present discussion reaches, however, beyond task specific issues. It is proposed that work can be used as an instrument of scrutinising human activity on a more profound level in order to inform forthcoming work and task specific efforts.

In summary, the concept of work is perceived here as an articulation of four constituent factors:

1. Work is a collection of tightly inter-linked human activities with explicitly or implicitly understood purposes, meanings and values.
2. Work is a process, behaviour and transient procedure, not a static structure. As a consequence, the analysis of work focuses on the issue of how and why the work functions and evolves, instead of describing the present state of affairs.
3. Work is a subjective concept. Its becoming and being are dependent on its contexts and situations.
4. Work is conceived as being in a permanent state of establishing and reestablishing itself. Work becomes on the basis of its

individual, cultural and societal meanings, values and purposes through an active articulation of control.

'Work' in context

As a conclusion of the discussion so far, we suggest that work is a collection of tightly inter-linked human activities with explicitly or implicitly understood purposes, meanings and values. Work is a process, behaviour and a transient procedure, not a static structure. Work behaviour is often partially shared. Similarly the analysis of work focuses on the issue of how and why the work functions and evolves, instead of describing the present state of affairs. Work is a subjective concept. Its becoming and being are dependent on its contexts and situations. Work is conceived as being in a permanent state of establishing and reestablishing itself. Work *becomes* on the basis of its individual, cultural and societal meanings, values and purposes through an active articulation of control.

As in the earlier research, the work related information activity or *information work* is seen in the present article as belonging to the context of work and being an essential part of it (Paisley, 1980; Taylor, 1991). The significant characteristics of information work are that it is embedded in all work (in a broad understanding of the notion of work) and it is an infrastructural, largely invisible and indivisible part of the work itself (Huvila, 2006, 27-29). Apart from being contextual and situated in the framework of work, work roles and information, information work is embedded in participating individuals and their personal and contextual ways of acting and behaving with information. Dinka and Lundberg touch upon this double bind by referring to identity and role (Dinka and Lundberg, 2006). The present study discusses the phenomenon from the information point of view by referring to work roles and their related information interactions, and to information behaviour, which is seen essentially as a manifestation of a personal self identity in terms of information activity. The perspective of information behaviour adopted in the present study follows the lines of Solomon (based on Dervin) (1997) and Chatman (1991) (ref. also Chatman, 1996) in scrutinising information activity as a life-world wide phenomenon, which is not confined to any specific information seeking or use situations.

Emergence and evolution of human information behaviour is a complex contextual, situational and social phenomenon. Cognitive work analysis acknowledges this complexity in the cognitive work analysis framework by contextualising information behaviour with environment, work domain,

tasks and personal characteristics (Fidel et al, 2004). Information work analysis places a special emphasis on cultural, social and organisational sphere of complexity (Huvila, 2006, 51-52). Sonnenwald has addressed the complexity by introducing a theory for structuring information behaviour. According to Sonnenwald, there is an *information horizon* within the context and situation, where information activity takes place (Sonnenwald, 1999, 184-185) (ref. also Sonnenwald et al, 2001, 68). Basically an information horizon is a group of available information resources and information about their availability. Information horizons are determined socially and individually. The theory takes into account the interactions between different resources and their directionality by referring to the notion of availability (Sonnenwald, 1999). It is apparent that the notion of information horizon addresses only partially the complex contextual horizon where work and information work are situated. Therefore, it is considered necessary to conceptualise a similar horizon of work and introduce an analogous concept of *work horizon* to denote the space where the work activity takes place. Similar to the information horizon, the work horizon of an individual consists of the available sources and resources of *work*. In a still broader scope, the analogous instruments of human life might be described in terms of a *life horizon*.

In summary, the contexts of work are simultaneously both general and specific to work, its embedded information work and to the workers and their individual and shared contexts, situations and horizons. This contextual system in a permanent state of establishing and reestablishing itself *becomes* on the basis of its individual, cultural and societal meanings, values and purposes through an active articulation of control as concluded earlier.

Work roles and role theory

Role theory and the concept of work role' have been cited occasionally in the information systems and work related informatics literature. Here the concept of work role refers to a distinct set of activities within a work' similarly as the work' is a distinct set of activities in a broader scope of human life-world (Huvila, 2006, 22-27). The view of roles and role theory assumed in the present article acknowledges the critique of classical role theory, which carries a tendency to externalise roles of their actors (Davies and Harré, 1998, 52 ; Layder, 2006) and aligns itself with interactional role theory, which emphasises the dynamics and vagueness of roles (Turner, 2001). In accordance with Clifford, a role is a concept

with both abstract and tangible properties, but not a solid theory (Clifford, 1996). A work role is not a job description, profession or a professional group and it does not directly reflect any existing organisation of work in a manner, in which the organisation is perceived by workers or their superiors. Work role is an analytical organising concept (ref. Hilbert, 1981) like the concept of work. An individual may perform simultaneously in multiple work roles and share work roles with others. Work roles are not as exclusive as professions or professional groups tend to be. Traditional information science research has acknowledged that individuals have multiple memberships in different information behavioural classes or groups, but have generally focussed on a single membership (ref. e.g. Taylor, 1991; Case, 2007). Instead of studying engineers or nurses as monolithic groups, a work role-based approach makes it possible to explicate more variation inside a professional group.

Social psychologists have criticised the concept of role and role theory of highlighting static, formal and ritualistic aspects of human encounters. To emphasise dynamic aspects of the social world, Davies, Harré and Langenhove have proposed considering position' instead. Position theory builds on an observation that the position of individuals in their social environments is a highly dynamic process, which is based on the interplay of a large number of factors (Davies and Harré, 1998, 32). The critique does not, however, reject the observation that some of the factors are more structured than others. In this light, the position of an individual can be seen as a transient sum of different overlapping everyday lives, hobbies, interests, cognition, emotion and work related small' dynamic factors and potentially larger' roles (which in their part are sums of smaller' factors). The claimed transcendentalism of a role versus immanentism of position is a highly relative matter and depends on how a role is conceptualised in different contexts (cf. Davies and Harré, 1998).

Various role based approaches have attracted occasional interest among information science researchers (e.g. Leckie . 1996; Sonnenwald and Lievrouw 1997; Fidel . 2004; Fidel and Pejtersen 2004). Given has used social positioning theory to peruse the discourse in undergraduates' information environment and to highlight its implications on their information behaviour (Given, 2002).

The viewpoint of role theory assumed in the present article follows the steps taken within organisational theory, gender studies and cognitive psychology (with a special reference to the group roles) (Campbell,

1999)¹ . The roles are considered to be results of socialisation and contextual division of duties between abstract archetypal actors (instead of distinct human individuals). Therefore it is possible to discern individuals who are related to the different roles, but impossible to make any static assumptions that an individual is acting exclusively in a precise role. Individuals position themselves in roles, but as a role is an organising concept, not an objective position, the assumed and perceived roles are shared only partially and construct a person's actual position only partially.

Role theory has been acknowledged to be a viable instrument for understanding the actions professionals take while they work (Nurminen and Torvinen, 1996, 109; Leckie and Pettigrew, 1997, 109). A work role has been used both as an analytical (work role has some specific conceptual meaning, e.g. in Nurminen and Torvinen, 1996, 109 ; Leckie and Pettigrew, 1997, 109) and as a descriptive notion (role is used to denote positions assumed by the involved individuals, organisations or approaches, e.g. in Vicente, 1999; Fidel et al, 2004). Work roles gained an especially prominent position in the Business Process Re-engineering (BPR) approach introduced by Hammer and Champy in the early 1990's (Hammer and Champy, 1993). The focus of the BPR viewpoint of work roles is essentially on explicating the relations of business processes, individual work tasks and involved actors.

Besides Hammer, Champy and the subsequent contributions to work roles in the BPR context, the notion of work roles has been used by Nurminen and his students and colleagues (Nurminen, 1988; Nurminen and Torvinen, 1996) in several instances. Nurminen perceives work roles essentially as building blocks in the relation between the work and workers. An individual actor may have several work roles. Correspondingly, a work role may be performed simultaneously by several actors. The relationships between the concepts may be illustrated by using a many-to-many relation in Figure 1 (from Nurminen and Torvinen (1996, 4, Fig.2)). Similar to the many-to-many relation between actors and roles, one role may belong to several tasks and vice versa (Fig. 1, from Nurminen and Torvinen (1996, 4, Fig.2)). We suggest further that one work role may belong to several 'works' (Fig. **Error! Reference source not found.**). The proposed conceptualisation explicates the link (between the actors and work), which builds on the existence of roles. It

¹Earlier studies on group roles, see e.g. managerial roles of Mintzberg (see e.g. Mintzberg, 1973 and Leckie & Pettigrew, 1997) or sex roles in the social role theory introduced by Eagly (Eagly, 1987, 1997).

is important to emphasise, however, that this particular link is not an exclusive one. There is also a direct relationship between an actor and work. This link denotes the personal and communal relationships between the individuals and all the undertaken work related pursuits, which are unrelated to their work roles (Fig. **Error! Reference source not found.**).

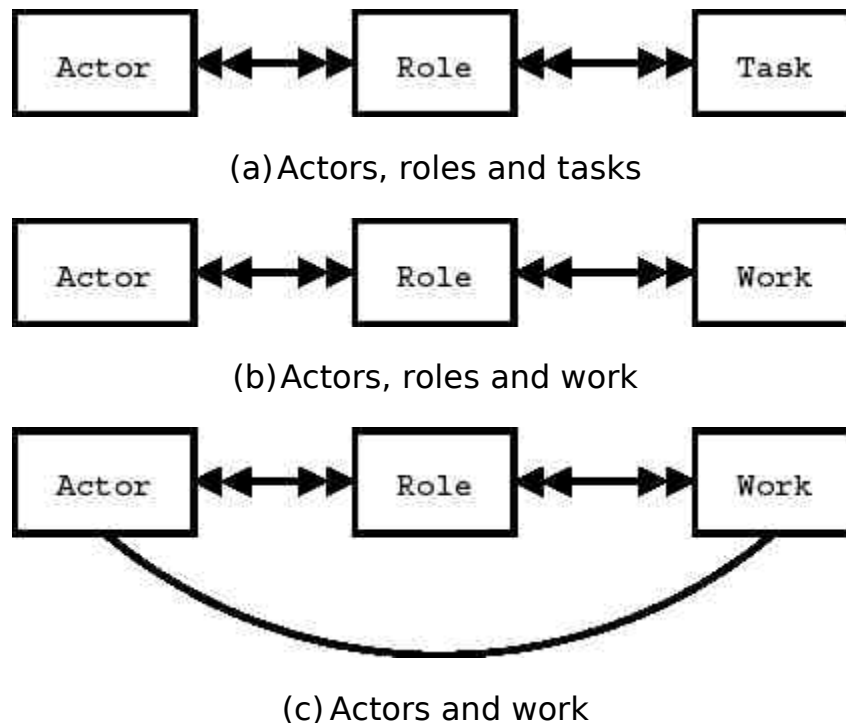


Figure 1: Roles seen in connection to the actors and tasks, and actors and work (Fig. 1 from Nurminen and Torvinen 1996, 4, Fig. 2)

The present notion of work role builds on the proposition of Gasser that it is often possible to discern a primary activity or work within the comprehensive spectrum of the work related roles and activities of an individual. This *primary work* directly addresses the purposes, meanings and values (agendas in Gasser, 1986), which are conceived to be the most essential ones. As an assumed position (at least to a degree), the primary work related role may be expected to have a deeper impact on the activities of individuals and to induce changes in their cognitive structures (ref. Collier and Callero, 2005). The primary work is also

typically, yet not necessarily, reflected in the formal job descriptions and in the personal work related identities.

In spite of its partial formality, a work role is not a static entity (cf. Davies and Harré, 1998, 32). The dynamics of the work roles may be compared and illustrated by the concepts of genre and genre ecology of Spinuzzi. Similar to genre ecology, the notion of work role refers to inter-coordinated routine and official practices, which build on each other over time in order to develop working solutions for recurring problems. Compared with a genre, a work role is perceived, however, as a broader concept. The work roles embrace the cultural dimensions of the activity in a more inclusive manner than the genres. They incorporate the notions of motivation, meaning and value of the body of the recurring and recognisable activities in addition to the activities themselves (cf. Spinuzzi 2003, 119-120, 222).

The primary implication of referring to work roles as conceptual relations is the possibility of linking work and workers together. In the present article work roles are seen as a conceptual instrument for explicating and identifying different locations', where work, and more precisely information work, reside within the work processes. Even though Leckie and Pettigrew have argued, that roles and role theory have the potential to function as a workable conceptual framework for explicating the precise issues of information seeking and use (Leckie and Pettigrew, 1997, 110), the fundamental problem of incorporating information activities and work roles, is that a role is a general concept in respect to the precise issues of information use. General objectives, which are associated with a work role, may be accomplished in various diverging ways. This diversity does subsequently imply a range of possible diverging information behaviours.

Considering the remarks of Leckie and Pettigrew (Leckie and Pettigrew, 1997), it is important to note that not only a work role, but also a task is a problematic concept in its precision. If a role is too broad, a task is at risk of being too narrow a concept. A task level approach permits a precise explication of the issues of the information interactions, but takes simultaneously the scale of the perusal to a level, where the purposes, meanings and values of the complete effort become indiscernible. Individual tasks are at risk of becoming isolated from each other and especially from the reasons, which originally triggered the more far-reaching process. Alternative information behaviours incorporated in

work roles represent a repertoire of viable activities and tasks for an information user even if their number is a complication for information scientists and information systems developers.

Example: Work roles and information interactions

The case of field archaeology

To illustrate the point of using the notions of work and work roles as a complementary instrument for elaborating a task-based approach, we present an example concerning the work of field archaeologists. The example is from an empirical qualitative interview based investigation on the information work of archaeology professionals (n=25) (Vatanen, 2005; Huvila, 2006). Here the discussion is focussed on the details, which are essential from the work and task point of view. A more thorough account of the example may be found in Huvila, 2006.

One of the major parts of archaeological work is an archaeological excavation. The purpose of an archaeological excavation is to investigate archaeological deposits on a site of archaeological interest. Typically, the process consists of literally excavating the underground or underwater archaeological deposits, which have accumulated due to the stratification of earth masses over time (Joukowsky, 1980, 1-9). In Finland and Sweden almost all archaeological excavations and surveys are triggered by communal and private land use i.e. exploits (Huvila, 2006, 109). This branch of archaeology is referred to as *rescue archaeology* in Britain and *salvage archaeology* in North America (Darvill 2002, Joukowsky 1980, 5). Research excavations launched on a purely scholarly interest are in a clear minority, mostly because of the lack of funding (Huvila, 2006, 109).

Rescue archaeology is based on the legislation, which protects all monuments and sites of archaeological significance. Basically all exploits (i.e. land use or construction projects) are preceded by an archaeological consultation and evaluation. An evaluation may consist of the use of pre-existing information resources and a field survey. In the case of a limited exploit and a relatively minor probability of eventual archaeological concerns, an adequate measure might be to employ an archaeologist to supervise the work, ready to intervene if something important turns up (Huvila, 2006, 109). If a location is evaluated to be of archaeological importance, the possibilities to alter the land use plans are considered usually as the first measure to minimise the eventual disturbance (Huvila,

2006, 109). Sometimes the site may be saved altogether, but almost invariably, the extents of the necessary research and salvage efforts may be reduced. Everything which cannot be saved, but is still considered to be of importance, is typically investigated in an excavation prior to the exploit (Huvila, 2006, 109).

Research excavations and surveys differ from the rescue archaeology mainly within the scope of their objectives. The primary purpose of a research motivated field work is to gather material to address specific scholarly and scientific questions. Projects may be initiated by the archaeologist conducting the field work. The viewpoints of archetypal a) research archaeologist and b) rescue archaeologist are summarised in two CATWOE-analyses (Checkland, 1981) (Table 1). Technically speaking the two types of excavations resemble each other, but due to their differences, it is clear that the outcomes of the efforts will be dissimilar. The personal and professional interests of the excavating archaeologists are reflected in the research reports as well as the priorities and the perspectives of the projects. Because of the documentation-as-an-outcome' oriented nature of the rescue excavations, the reports produced tend to be more technical, contextually more shallow and more "bureaucratic" than the reports originating from research excavations where the essential outcome is an answer to an explicit research question.

Research archaeologist

Customers	Archaeological research (individual researcher)
Actors	Me
Transformation	Excavation / survey
Weltanschauung	It is important to excavate / survey

	<p>the designated area in order to answer specific research questions and to document subsequent findings to secure as much information about the site as possible.</p>
Owners	<p>Me; contractor (if applicable); (general public)</p>
Environment	<p>Archaeological site / research area and its past context</p>
<p>I am excavating this site because I am interested in finding answers to my research questions. It is important to proceed on schedule, but the most important thing is to find applicable material and achieve significant results.</p>	

Rescue archaeologist

Customers	Archaeological heritage administration (general public)
Actors	Me
Transformation	Excavation / survey
Weltanschauung	It is important to carefully excavate / survey the designated area to retrieve as much information about the site and to sufficiently document the findings.
Owners	Archaeological heritage administration (general public)
Environment	Archaeological site / research area

A field project is started to document an archaeological site before exploitation. My duty is to perform the documentation as well as it is possible within the confines of the established schedule and budget. I am expected to deliver a report of the field work describing the process and the findings.

Table 1: CATWOE-analysis of a generic research archaeology project (adapted from Huvila, 2006, Table 6.4 (Archaeologist use case) pp. 132) and a generic rescue archaeology project (adapted from Huvila, 2006, Table 6.3 (Field director use case) pp. 131).

Work and tasks of field archaeologists

An excavation is a task or, depending on the level of perusal, a combination of multiple tasks. Rescue excavation and a research excavation represent two instances of the basic task of conducting an archaeological investigation. From a task-based point of view, they may be treated as instances of an abstract excavation' super task or as two separate (albeit closely resembling) tasks.

The perspective of the work and work roles offers an alternative view to the conceptualisation of the two kinds of excavations. Two alternative viewpoints may be considered. Depending on the focus of the analysis, the two types of excavations may be taken either as two distinct work roles (research archaeology and rescue archaeology) or as two different works' within a single field archaeology' work role. The second approach was chosen in the example (Huvila, 2006) due to the breadth of the analysis of the archaeological information work, but in a case of a more limited undertaking concerning merely field archaeology, the first one would appear to be an entirely plausible perspective.

The explicit relevance of integrating the notions of work and work roles concerns the clearer agency of the questions, which relate to the

worldview and purposes of the undertakings. The priorities of the excavating archaeologists are not specifically related to the task of excavating an archaeological site *per se*, but to the specific role they have assumed for the length of the project. Precisely the same technical excavation tasks relate to the both kinds of efforts. Only their implementation and outcomes are bound to be affected by the position (i.e. the role) of the excavating archaeologist.

A further benefit of a work and work role-based approach relates to the contextual dynamics of excavating. The same priorities, meanings and values, which relate to the excavating, are reflected throughout the spectrum of assumed activities relating to the rescue or research archaeology work and work roles.

Towards an integrative viewpoint

The motivation for complementing a task-based approach with the considerations of work and work roles is a question of broadening the temporal and contextual scale of the analytical exploration. The entire sphere of human activity does not comprise merely tasks in context'. The contexts are equally meaningful and comprise entities, which may be analysed and explicated further.

The framework of work and information work, which emerged during the current study, is illustrated as a meta-contextual framework in Figure 2. The graphic presentation places emphasis on the active nature of the relations and on the situatedness of the actors at the moment the information work instantiates. In essence, there is never an exact stable moment like the one presented in Figure 2. All of the components, which are present in the components of the framework, are in an infinite state of alteration. The actors are acting both as individual themselves, and within the framework of an assumed work role (or several overlapping work roles). An actor' and an actor in work role' are practically inseparable, yet conceptually there is a difference between acting and reacting to the surroundings as a personal individual or as a participant of one or several work roles. A work role is a channel, which brings personal and work related behaviour and personal and work related contextual horizons together, and funnels their combined impact on the work and subsequently on the work related tasks and their outcome. The essential difference of the work role-based framework in comparison to the approaches, which look at the work activity from the point of view of an individual or a group situated in a context (e.g. cognitive work analysis Fidel et al, 2004), is that all the dimensions of work reside within the

context and situation parallel to each other. Instead of focussing on what an actor does, on collaboration between individuals or on organisational memberships, the framework emphasises the meta-contextuality of work. For an individual, work and information work may belong to simultaneous domains or contexts, which are parallel to each other. Similarly, personal preferences are not merely personal. They have a subject and motivations and they relate to multiple contextual and situational memberships and horizons of work and information resources. Therefore it is necessary to look at the contexts of tasks and work, but also at other tasks and work being conducted in their *contextual proximity*.

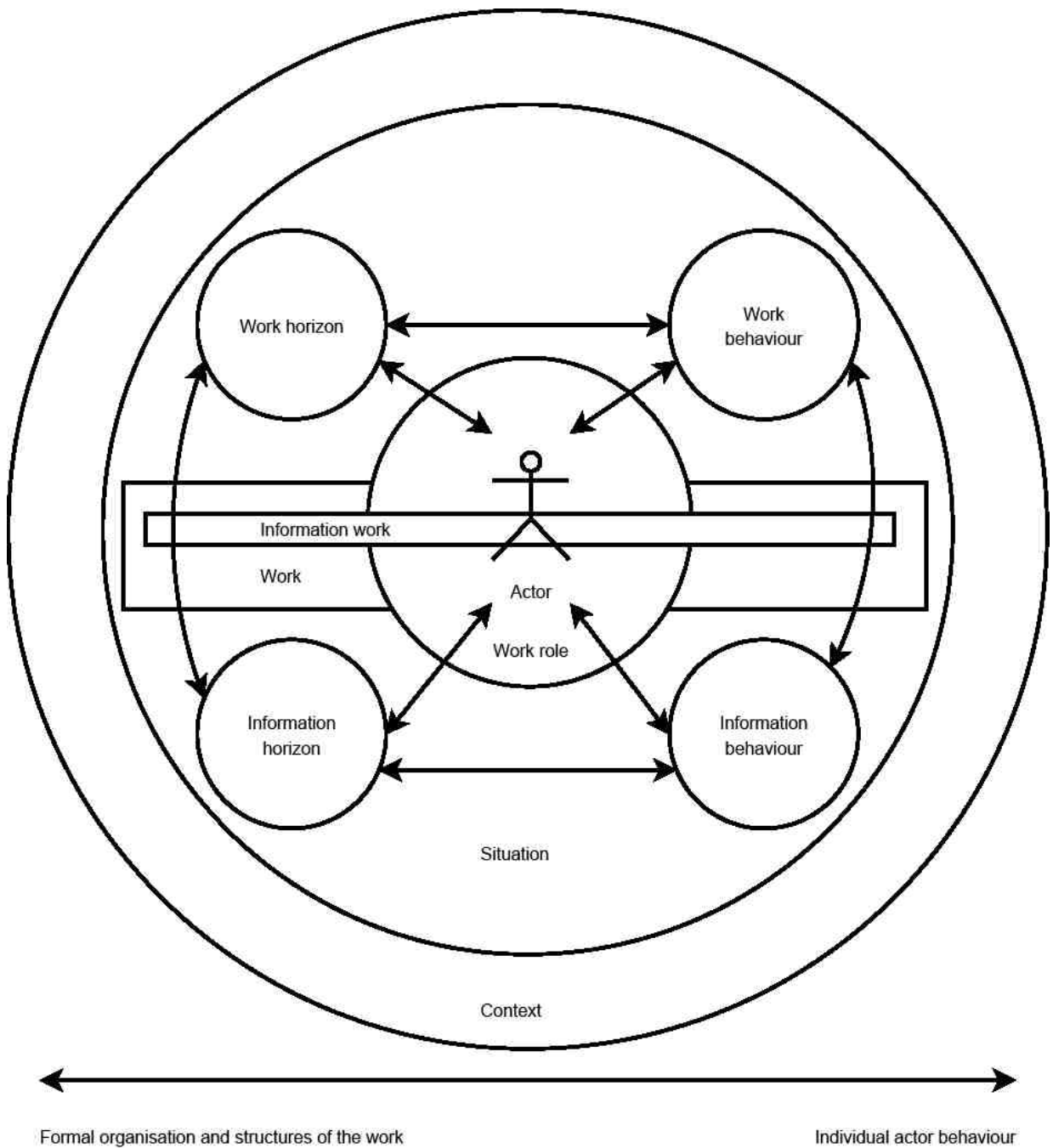


Figure 2: Work in context.

In order to attain a comprehensive understanding of intertwined contexts of work and tasks, a spectrum of analytical scales is needed. The present discussion touches two practicable scales, which do not, however, represent a pre-emptive view of all human activity. Work and work roles emphasise a sustained human activity, which lasts for a considerable length of time and is not centred on the completion of an individual instance of action or a series of actions performed by individuals. A role-based approach makes it possible to study what is shared by the different individuals, who work in different organisations over a time-span of several years. The task-based analysis, on the other hand, provides necessary means to bring structure to the activities and to achieve a level of description, which is needed, for instance, in the design and development of formal information systems and in numerous practical contexts of information use and management.

Even though the concepts of work and work role seem to be somewhat larger than a task, as Sonnenwald has proposed respectively of contexts and situations (Sonnenwald, 1999, 180), their relationship does not need to be seen as hierarchical as the general model of Leckie et al. might be considered to suggest (Leckie et al, 1996). Figure 3 illustrates the point of 'joint inclusiveness' of the concepts. Tasks are embedded in work and work encompasses one or more tasks. Work roles, on the other hand, are seen as viewpoints situated within work, which contribute to the formation and perception of tasks, rather than as components of work and determinants of task related behaviour. Work roles explain and compose the fabric of human behaviour and information activity in the contexts and situations of work. They are not definite structural blocks, but rather analytic lenses' used by a researcher to explicate the context of work. The individuals assume one (e.g. individual A in Figure 3) or several work roles (e.g. individual B in Figure 3) and within that particular work role they see the tasks in a different light (the work roles acts as lenses').

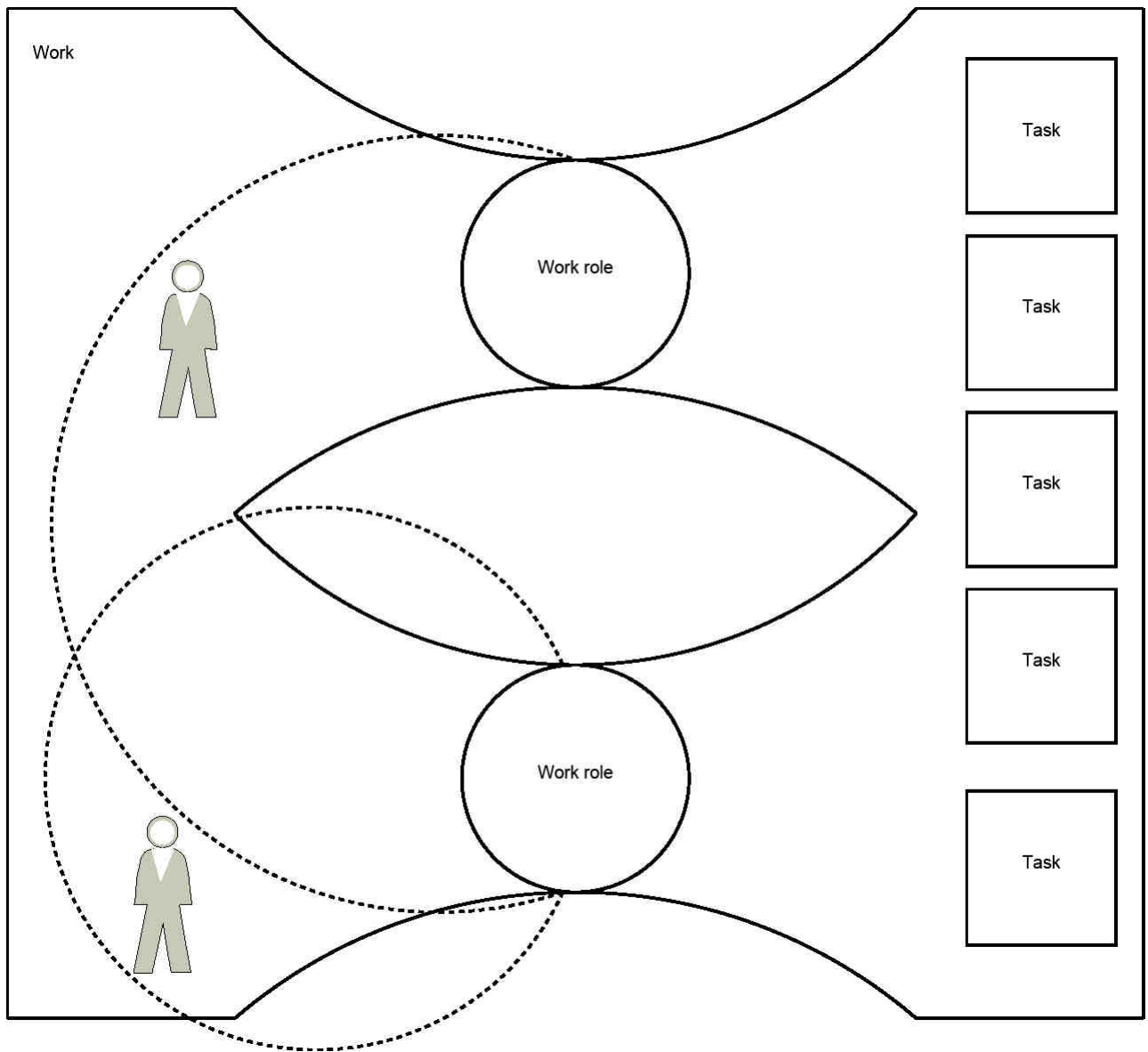


Figure 3: Human actor within the context of work, work roles and tasks

Conclusions

In this paper we have discussed the relation of task, work and work roles as components of a common framework. In order to attain a profound understanding of the matters relating to the human life-world, a spectrum of analytical scales is needed. The present discussion touches two

practicable scales, namely of work' and 'tasks' and their relation. It is clear that in the future the discussion needs to be broadened to incorporate other kinds of activities and subtleties of human life, which do not fit into the framework of work and tasks.

The definition of a work task as a separable part of an individual's professional duties implies a need to describe the entity formed by the duties. We propose that the concepts of work and work role can be used to explicate this underlying context of tasks in the form of common purposes, meanings and values. The tasks, on the other hand, provide a practicable instrument for scrutinising *activities*, their premises, progress and practical outcomes. The relation of work and tasks is inclusive (tasks are embedded in work, work incorporates tasks), but not necessarily definite (i.e. work would be a composition of tasks). Tasks are embedded in work and work encompasses one or more tasks. Work roles, on the other hand, are seen as viewpoints situated within work, which contribute to the formation and perception of tasks, rather than as components of work and determinants of task related behaviour. Work roles explain and compose the fabric of human behaviour and information activity in the contexts and situations of work. They are not definite structural blocks, but rather analytic lenses' used by a researcher to explicate the context of work.

References

- Allen, T. (1969), Information Needs and Uses. *ARIST*, Vol. 4, pp. 3–29.
- Attfield, S., Blandford, A., and Dowell, J. (2003), Information seeking in the context of writing A design psychology interpretation of the problematic situation, *Journal of Documentation*, Vol. 59 No. 4, pp. 430–453.
- Bannon, L. J. (2000), Situating workplace studies within the human-computer interaction field, in P. Luff, J. Hindmarsh, and C. Heath (Eds), *Workplace studies: Recovering work practice and informing system design*, Cambridge University Press, Cambridge.
- Belkin, N. J., Oddy, R. N., and Brooks, H. M. (1982), Ask for information retrieval: part I.: background and theory, *Journal of Documentation*, 38 (2), 61-71.
- Brown, R. (1958), How shall a thing be called? *Psychological Review*, 65, pp. 14–21.
- Button, G., and Harper, R. (1996), The relevance of work-practice for design, *Computer Supported Cooperative Work*, Vol. 4 No. 4, pp. 263–280.

- Byström, K. (1997), Municipal administrators at work – information needs and seeking [IN&S] in relation to task complexity: a case-study amongst municipal officials. In ISIC '96: Proceedings of an international conference on information seeking in context, Taylor Graham Publishing, London.
- Byström, K. (2000), The effects of task complexity on the relationship between information types acquired and information sources used, *The New Review of Information Behaviour Research*, 1, pp. 85–101.
- Byström, K., and Hansen, P. (2005), Conceptual framework for tasks in information studies, *Journal of the American Society for Information Science and Technology*, Vol. 56 No. 10, pp. 1050-1061.
- Campbell, S. J. (1999), Role theory, foreign policy advisors, and U.S. foreign policymaking. available at: www.ciaonet.org/isa/cas01/
- Case, D. O. (2007), Looking for information: A survey of research on information seeking, needs, and behavior (2nd ed.), Academic Press, Burlington, MA.
- Chatman, E. A. (1991), Life in a small world: Applicability of gratification theory to informationseeking behaviour, *Journal of the American Society for Information Science*, Vol. 42 No. 6, pp. 438-449.
- Chatman, E. A. (1996), The impoverished life-world of outsiders. *Journal of the American Society for Information Science*, Vol. 47 No. 3, pp. 193-206.
- Checkland, P. (1981), Systems thinking, systems practise, Wiley, Chichester.
- Clifford, C. (1996), Role: a concept explored in nursing education, *Journal of Advanced Nursing*, Vol. 23 No. 6, pp. 1135-1141.
- Collier, P., and Callero, P. (2005), Role theory and social cognition: Learning to think like a recycler, *Self and Identity*, Vol. 4 No. 1, pp. 45–58.
- Corbin, J. M., and Strauss, A. L. (1993), The articulation of work through interaction. *The Sociological Quarterly*, Vol. 34 No. 1, pp. 71-83.
- Darvill, T. (2002), Rescue Archaeology, in *The Concise Oxford Dictionary of Archaeology - Oxford Reference Online*, available at: <http://www.oxfordreference.com/>

- Davies, B., and Harré, R. (1998), Positioning and Personhood, in R. Harré and L. van Lagenhove (Eds), *Positioning theory: moral contexts of intentional action*, pp. 32–52, Blackwell, Oxford.
- Dervin, B. (1997), Given a context by any other name: methodological tools for taming the unruly beast, in *ISIC '96: Proceedings of an international conference on information seeking in context*, Taylor Graham Publishing, London.
- Dervin, B., and Nilan, M. (1986), Information needs and uses, in M. Williams (Ed), *ARIST*, Vol. 21, pp. 3-27, Knowledge Industry Publications.
- Dinka, D., and Lundberg, J. (2006), Identity and role—a qualitative case study of cooperative scenario building. *International Journal of Human-Computer Studies*, Vol. 64 No. 10, pp. 1049–1060.
- Eagly, A. H. (1987), Sex differences in social behavior: A social-role interpretation, Erlbaum, Hillsdale, NJ.
- Eagly, A. H. (1997), Sex differences in social behavior: comparing social role theory and evolutionary psychology, *American Psychologist*, Vol. 52 No. 12, pp. 1380-1383.
- Ellis, D. (1993), Modeling the information-seeking patterns of academic researchers, *Library Quarterly*, Vol. 63 No. 4, pp. 469-486.
- Erdelez, S. (1997), Information encountering: a conceptual framework for accidental information discovery, in *ISIC '96: Proceedings of an international conference on information seeking in context*, Taylor Graham Publishing, London.
- Fazio, R. H. (1990), Multiple processes by which attitudes guide behavior: The MODE model as an integrative framework, in Zanna, M. P. (Ed) *Advances in experimental social psychology*, Academic Press, New York.
- Fidel, R., and Pejtersen, A. (2005), Cognitive Work Analysis, in K. E. Fisher, S. Erdelez, and L. McKechnie (Eds), *Theories of information behavior: A researcher's guide*, Information Today, Medford, NJ.
- Fidel, R., and Pejtersen, A. M. (2004), From information behaviour research to the design of information systems: the Cognitive Work Analysis framework., *Information Research*, Vol. 10 No. 1.
- Fidel, R., Pejtersen, A. M., Cleal, B., and Bruce, H. (2004), A multidimensional approach to the study of human-information interaction: a case study of collaborative information retrieval,

- Journal of the American Society for Information Science and Technology*, Vol. 55 No. 11, pp. 939–953.
- Fjuk, A., Smørdal, O., and Nurminen, M. I. (1997), *Taking articulation work seriously: an activity theoretical approach* (TUCS Technical Report No. 120), Turku Centre for Computer Science, Turku.
- Gasser, L. (1986), Integration of computing and routine work, *ACM Transactions on Office Information Systems*, Vol. 4 No. 3, pp. 205–225.
- Gerson, E. M., and Star, S. L. (1986), Analyzing due process in the workplace, *ACM Transactions on Office Information Systems*, Vol. 4 No. 3, pp. 257–270.
- Given, L. (2002), Discursive constructions in the university context: social positioning theory and mature undergraduates' information behaviour, *The New Review of Information Behaviour Research*, No. 3, pp. 127–142.
- Hammer, M., and Champy, J. A. (1993), *Reengineering the corporation: A manifesto for business revolution*. HarperCollins, New York.
- Hansen, P., and Järvelin, K. (2000), The information seeking and retrieval process at the Swedish patent- and registration office. moving from lab-based to real life work-task environment. In *Proceedings of the ACM-SIGIR 2000 Workshop on Patent Retrieval, Athens, Greece, July 28, 2000*, ACM, New York, pp. 43-53.
- Heinström, J. (2002), *Fast surfers, broad scanners and deep divers - personality and informationseeking behaviour*, Diss. Åbo Akademi University, Åbo Akademi University Press, Åbo.
- Hilbert, R. A. (1981), Toward an improved understanding of role, *Theory and Society*, Vol. 10 No. 2, pp. 207–226.
- Huotari, M.-L., and Chatman, E. (2001), Using everyday life information seeking to explain organizational behaviour, *Library and Information Science Research*, Vol. 23 No. 4, pp. 351–366.
- Huvila, I. (2006), *The ecology of information work – a case study of bridging archaeological work and virtual reality based knowledge organisation*. Diss. Åbo Akademi University, Åbo Akademi University Press, Åbo.
- Ingwersen, P., and Järvelin, K. (2005), *The turn: Integration of information seeking and retrieval in context* (Vol. 18), Springer, Brelin.

- Joukowsky, M. (1980), *A complete manual of field archaeology*. London: Prentice-Hall.
- Karasti, H. (1997), Bridging the analysis of work practice and system redesign in cooperative workshops, in *DIS '97: Proceedings of the conference on designing interactive systems*, ACM Press, New York, pp. 185–195.
- Kari, J. (1998), Paranormal information seeking in everyday life: the paranormal in information action, *Information Research*, Vol. 4 No. 2.
- Kling, R. (1991), Cooperation, coordination and control in computer-supported work. *Communications of the ACM*, Vol. 34 No. 12, pp. 83–88.
- Layder, D. (2006), *Understanding social theory* (2nd ed.), Sage, Thousand Oaks.
- Leckie, G. J., and Pettigrew, K. E. (1997), A general model of the information seeking of professionals: role theory through the back door? in *ISIC '96: Proceedings of an international conference on information seeking in context*, Taylor Graham Publishing, London.
- Leckie, G. J., Pettigrew, K. E., and Sylvain, C. (1996), Modeling the information seeking of professional: a general model derived from research on engineers, health care professionals, and lawyers, *Library Quarterly*, Vol. 66 No. 2, pp. 161-193.
- Macredie, R. D., and Wild, P. J. (2000, February), An evaluation of the potential of task analysis in the evolution of interactive work systems, *Cognition, Technology and Work*, 2 (1), 7–15.
- Mintzberg, H. (1973), *The nature of managerial work*. New York: Harper and Row.
- Nurminen, M. I. (1988), *People or computers : three ways of looking at information systems*. Studentlitteratur and Chartwell-Bratt , Lund / Bromley.
- Nurminen, M. I., and Torvinen, V. (1996), *Role-based interpretation of ISs*, TUCS Technical Report No. TUCS-TR-9, Turku Centre for Computer Science, Turku.
- Paisley, W. (1968), Information needs and uses. *ARIST*, Vol. 3, pp. 1–30.
- Paisley, W. (1980), Information and work, *Progress in communication sciences*, Vol. 2, pp. 113–166.

- Pejtersen, A. M. (1989), A library system for information retrieval based on a cognitive task analysis and supported by an icon-based interface, in *SIGIR '89: Proceedings of the 12th annual international ACM SIGIR conference on research and development in information retrieval*, ACM Press, New York, pp. 40–47.
- Pejtersen, A. M., and Rasmussen, J. (2004), Cognitive work analysis of new collaborative work. in *SMC* Vol. 1, pp. 904-910.
- Rasmussen, J., Pejtersen, A. M., and Goodstein, L. P. (1994), *Cognitive systems engineering*. Wiley, New York.
- Savolainen, R. (1995), Everyday life information seeking: Approaching information seeking in the context of "way of life", *Library and Information Science Research*, Vol. 17 No. 3, pp. 259-94.
- Schmidt, K., and Bannon, L. (1992), Taking CSCW seriously: Supporting articulation work, *Computer Supported Cooperative Work*, Vol. 1 No. 1, pp. 7-40.
- Solomon, P. (1997), Discovering information behavior in sense making. II. The social. *JASIS*, Vol. 48 No. 12, pp. 1109 - 1126.
- Solomon, P. (1999), Information Mosaics: Patterns of Action that Structure, in T. Wilson and D. K. Allen (Eds), *Exploring the contexts of information behaviour*, Taylor Graham , London, pp. 150-175.
- Solomon, P. (2002), Discovering information in context. *ARIST*, Vol. 36, pp. 229-264.
- Sonnenwald, D. H. (1999), Evolving perspectives of human information behavior: Contexts, situations, social networks and information horizons, in T. Wilson and D. Allen (Eds), *Exploring the contexts of information behaviour*, Taylor and Graham , Cambridge, pp. 176-190.
- Sonnenwald, D. H., and Lievrouw, L. A. (1997), Collaboration during the design process: a case study of communication, information behavior, and project performance, in *ISIC '96: Proceedings of an international conference on information seeking in context*, Taylor Graham Publishing, London, pp. 179–204.
- Sonnenwald, D. H., Wildemuth, B. M., and Harmon, G. L. (2001), A research method using the concept of information horizons: An example from a study of lower socio-economic students' information seeking behaviour, *The New Review of Information Behaviour*, Vol. 2, pp. 65-86.

- Spink, A., Bray, K. E., Jaeckel, M., and Sidberry, G. (1999), Everyday life information seeking by low income African American households: Wynnewood Healthy Neighbourhood Project, in T. Wilson and D. Allen (Eds), *Exploring the contexts of information behaviour*, Taylor Graham Publishing , London, pp. 371–383.
- Spinuzzi, C. (2003), *Tracing genres through organizations: A sociocultural approach to information design*. MIT Press, Cambridge, MA.
- Star, S. L. (1991), Invisible work and silenced dialogues in knowledge representation, In I. Eriksson, B. Kitchenham, and K. Tijdens (Eds), *Women, work and computerization*, New Holland , Amsterdam, pp. 81-92.
- Star, S. L. (1999), The Ethnography of Infrastructure, *American Behavioral Scientist*, Vol. 43 No. 3, pp. 377-391.
- Star, S. L., and Strauss, A. (1999), Layers of silence, arenas of voice: The ecology of visible and invisible work. *Computer Supported Cooperative Work*, Vol. 8 No. 1-2, pp. 9–30.
- Strauss, A. (1985), Work and the division of labor. *The Sociological Quarterly*, Vol. 26 No. 1, pp. 1-19.
- Strauss, A. (1988), The articulation of project work: An organizational process. *The Sociological Quarterly*, Vol. 29 No. 2, pp. 163-178.
- Suchman, L. (1995), Making work visible. *Communications of the ACM*, Vol. 38 No. 9, pp. 56–64.
- Suchman, L. (1996), Supporting Articulation Work, in R. Kling (Ed), *Computerization and controversy: Value conflicts and social choices*, 2nd ed., Academic Press, New York, pp. 407-423.
- Talja, S. (2002), Information sharing in academic communities: Types and levels of collaboration in information seeking and use. *New Review of Information Behaviour*, Vol. 3, pp. 132-159.
- Taylor, R. (1991), Information use environments, in B. Dervin and M. Voigt (Eds), *Progress in communication sciences*, Vol. 10, Ablex , Norwood, NJ, pp. 217-255.
- Torvinen, V. (1999), The Labor Game Method, in *DEXA '99: Proceedings of the 10th International Workshop on Database & Expert Systems Applications*, IEEE Computer Society, Washington, DC, pp. 382-386.
- Turner, R. H. (2001), Role Theory, in J. Turner (Ed), *Handbook of sociological theory*, Springer , Berlin, pp. 233–254.

- Vakkari, P. (2003), Task-based information searching. *ARIST*, Vol. 37, pp. 413–464.
- Vatanen, I. (2005), Affordances and constraints in knowledge organization, in S. Hawamdeh (Ed), *Knowledge management: Nurturing culture, innovation and technology, Proceedings of the 2005 international conference on knowledge management*. World Scientific, Singapore, pp. 315-321.
- Vicente, K. J. (1999), *Cognitive work analysis: Towards safe, productive, and healthy computer-based work*, Lawrence Erlbaum, Mahwah, NJ.
- Warner, J. (2005), Labor in Information Systems, *ARIST*, Vol. 39, pp. 551-573.
- Weber, M. (1970), Subjective meaning in the social situation, in L. A. Coser and B. Rosenberg (Eds), *Sociological theory: a book of readings*, Macmillan , London, pp. 209-221.
- Wiberley, J., S. E., and Jones, W. G. (1989), Patterns of information seeking in the humanities, *College and Research Libraries*, Vol. 50, pp. 638-645.
- Widén-Wulff, G. (2000), Business information culture: a qualitative study of the information culture in the Finnish insurance industry. *Information Research*, Vol. 5 No. 3.
- Wilson, T. (1981), On user studies and information needs. *Journal of Documentation*, Vol. 37 No. 1, pp. 3–15.
- Wilson, T. D. (1994), Tools for the analysis of business information needs. *Aslib Proceedings*, Vol. 46 No. 1, pp. 19-23.