Information Technology for Non-Profit Organisations

Extended Participatory Design of an Information System for Trade Union Shop Stewards

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Abstract

The conditions for the third, non-profit sector, such as grassroots organisations and trade unions, have changed dramatically in recent years, due to prevailing social trends. Non-profit organisations have been seen as early adopters of information technology, but the area is, at the same time, largely unattended by scientific research. Meanwhile, the field of information systems development is, to an increasing extent, recognising the importance of user involvement in the design process. Nevertheless, participatory development approaches, such as Participatory Design are not suited to the context of entire organisations, and new, networked organisational structures, such as those of non-profit organisations. This reasoning also applies to the theoretical framework of Activity Theory, whose potential benefits for systems development have been acclaimed but less often tried in practice.

This thesis aims, first, at extending Participatory Design to use in large, particularly non-profit organisations. This aim is partly achieved by integrating Participatory Design with an Argumentative Design approach and with the application of Activity Theory modified for an organisational context. The purpose is to obtain reasoning about and foreseeing the consequences of different design solutions. Second, the thesis aims at exploring information technology needs, solutions, and consequences in non-profit organisations, in trade unions in particular. The case under study is the Swedish Trade Union Confederation (LO) and the design of an information system for its 250 000 shop stewards.

The thesis is based on six related studies complemented with data from work in a local design group working according to the principles of Participatory Design. The first study was aimed at investigating and comparing trade union management’s view of the new technology and the actual needs of shop stewards. The second study investigated the situation, tasks and problems of shop stewards, as a pre-requisite for finding information technology needs. The third study merged the previous findings into an argumentative design of an information systems design proposal. The fourth study collected the voices from
secondary user groups in the organisation, and presented an Activity theoretical analysis of the union organisation and a modified design proposal in the form of a prototype. The fifth study presented an Activity theoretical framework, modified for organisational application, and used it for producing hypotheses on possible shop steward tasks and organisational consequences of the implementation of the information system. The sixth paper was aimed at the initial testing of the hypotheses, through the evaluation of information technology facilities in one of the individual union affiliations. The complementary data was used to propose further modifications of the integrated Participatory, Argumentative, and Activity Theory design approach.

The major contributions of the study are, first, a modified Participatory Design approach to be applied at three levels; in general as a way of overcoming experienced difficulties with the original approach, in the context of entire, large organisations, and in the specific non-profit organisation context. The second contribution is generated knowledge in the new research area of information technology in the non-profit, trade union context, where for instance the presented prototype can be seen as a source of inspiration. Future research directions include further development and formalisation of the integrated Participatory Design approach, as well as actual consequences of implementing information technology in non-profit organisations and trade unions.
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XI
The following papers are included in the thesis:


VI. Pilemalm S. & Timpka, T. (2002) Anticipated and Actual Consequences of Implementing Information Technology in a Large Third Sector Organisation: the Case of a Trade Union Confederation, Accepted to the 18th European Group for Organizational Studies Colloquium, Barcelona.
Information technology has, in recent years, reshaped lives, business and organisations (Dutton, 1999). As is the case with most technical innovations and advancements, the new technology was first taken in and used by private business and for-profit organisations (Shreve, 2002). Non-profit organisations associated with voluntary participation, such as trade unions, are often less resource-intensive than the private sector. The non-profit sector has, in the recent decade, undergone an economic crisis, due to cuts in governmental and municipal support (Anheier, Carlson & Kendall, 2001; Lundström & Wijkström, 1997). Non-profit organisations have thereby a disadvantage in the rapidly changing information society, which demands continuous investment in and adoption of new technology. Meanwhile, the position of trade unions, which belong to the non-profit sector (Anheier, Carlson & Kendall, 2001), has in recent years, on the other hand, become significantly weakened. General social trends, such as globalisation, individualism and the gradual diminishing of left versus right wing politic boundaries have had a negative impact on trade unionism (Giddens, 1998). Specifically, factors like new employer and wage-setting strategies, in some countries combined with anti-union legislation, have disfavoured the unions, resulting in substantial member loss (Addison & Siebert, 1998; Sandberg et al, 1992). Unions have responded with new strategies, adjusted to current societal trends (Utbult, 1997; Bacon & Storey, 1996). Since information technology is such a fundamental part of contemporary society, its extensive implementation and usage as a tool for trade unions, must be part of these strategies.

It has been questioned previously whether unions and the labour force can act upon the development of new technology. Research has shown that unions themselves, as well as workers, are little involved in the development of the new technology, which thereby falls outside their social control (Leyersdorff & van den Besselar, 1987). An exception has been the Scandinavian trade unions, which during the 1970s and 1980s were active in using the technology for deploying “the good work” and the multi-skilled worker (Sandberg et al, 1992). As regards the
implementation of information technology in trade unions, information technology maturity varies enormously world-wide, much according to general differentiation, e.g., with reference to the relative strength and resource intensity of union organisations in each country. It has been noted how labour organisations worldwide, from extensive international associations such as the International Labour Organisation (ILO) to local trade unions make use of and publish themselves on the Internet, and how discussion forums and chat rooms are integrated with national union homepages in order to promote union activism (Shostak, 1999). In contrast, major, deliberate investments in national federations, with the purpose of reaching out to all their members, still seem absent in most countries (Pilemalm et al, 1998), as do scientific studies on unions and information technology. As noted by Shostak (1999), information technology has only begun to affect, transform, and re-invent union organisations. This situation is also something they share with non-profit organisations in general, whose use of information technology is becoming common but has only begun to be recognised by research, a factor which means that there are few scientific studies on the subject (Burt & Taylor, 1999)

1.1 Non-profit organisations and trade unions

Non-profit organisations are often referred to as the ‘third sector’, voluntary or non-profit, non-governmental organisations (NP/NGOs) (Anheier & Kendall, 2001; Giddens, 1998). They are usually divided into those belonging to the social midfield and those which are private initiatives. Trade unions belong to the former category, being situated between the individual and the state (Dekker, 2001). Trade union organisations show a wide variety of characteristics seen from an international, comparative perspective, e.g., with regard to union density, collective versus voluntary affiliation, and the extent of the role they play in negotiations between employers and employees (Sisson, 1987; Kassalow, 1969). In Scandinavia, trade unions hold a comparatively strong position with the majority of the workforce being unionised. The Swedish blue-collar trade unions have long collaborated with the Social Democracy Party, which has contributed to labour relations stability and the formation of a series of laws, acts, and agreements, regulating the labour rights (Sandberg et al, 1992). Even today, Swedish unions are comparatively well off, and characterised by high union density (approximately 80%) with a focus on collective bargaining (Sandberg et al, 1992). They are thereby relatively well equipped for dealing with implementations of the new information technology. Swedish unions thus provide good breeding-ground for generating knowledge in the emerging area of information technology and information systems in a non-profit, trade union context.
1.2 Information technology as part of trade union strategies

The Scandinavian blue-collar trade unions have traditionally been progressive as regards the adoption of new technology at the work places (Bjerknes & Bratteteig, 1994; Ehn & Kyng, 1987). The unions have promoted technology that supports ‘the good work’, i.e., job enrichment by increasing responsibility and flexibility for the workers, e.g., by means of job rotation and multiskilling (Ehn, 1993). Much of the technology was developed in close collaboration of designers and those workers who were going to use it, e.g., in the 1970s and 1980s’ projects DEMOS and UTOPIA (Kraft & Bansler, 1992; Ehn & Kyng, 1987). When information technology, during the 1990s, became a fundamental part of society and organisations implemented information systems to an ever-increasing extent, the trade union organisations in Scandinavia soon followed suit. The national blue-collar confederations in Sweden, Norway, Denmark and Finland, respectively, presently (March, 2002) provide rather extensive on-line information and communication facilities to be used by union representatives and members, e.g., by direct access to laws and agreements and discussion forums through their homepages. In Norway, for instance, members are provided with smart cards by which they can access member services (http://www.lo.no, March, 2002). However, The Swedish Trade Union Confederation (LO) has gone one step further in a series of deliberate attempts to implement information technology and systems extensively throughout the entire organisation, for work re-design and for strengthening the union organisation (Utbult, 1997). One large-scale national project, the DLK project, focuses on information technology supported re-design of the day-to-day work of all trade union shop stewards (Jägare, 2001).

1.3 Systems development in non-profit organisations

Developing and introducing information systems in organisations is a complex task often involving multiple interests and user groups (Kuutti, 1996a). Active user participation in the design process is of great importance in order to make the introduced system useful and used (Mumford, 1993). Nevertheless, many approaches to systems development tend to not involve the users until at a late stage in the design process, in a form of passive consultation (Mumford, 1993; Bravo, 1993). One exception is Participatory Design (PD), which has as its focus active participation of users throughout the entire design process (Schuler & Namioka, 1993). Participatory Design has a strong connection to trade unionism and technology, since it was the approach used in DEMOS and UTOPIA (Ehn,
Further, it has strong connotations to non-profit organisations in general, since it shares with them ideological values of equality and work according to democratic principles. It has been argued that developing information systems in the third sector puts certain demands on the approach used. It has to be able to deal with identifying organisational strategy and often officially unclear goals. User participation thereby becomes of utmost importance (Morgan, 1995). Moreover, it is even more essential that the systems bring substantial benefit to the users than in for-profit organisations; the use of the information systems is as voluntary as the users’ participation in the non-profit organisation and is not imposed as part of regulated work tasks in relation to ordinary jobs (Misra & Golden, 1996). Participatory Design, therefore, seems to be a suitable approach for non-profit organisations. It has been applied successfully when working with volunteers for whom cooperation and consensus is important (McPhail et al, 1998). However, so far, Participatory Design has been targeted towards projects involving a limited group of users who are physically situated at the same work place, since otherwise active participation by all users becomes problematic (Törpel, 2000). Participatory Design has also, thus far, mostly been applied to small parts of organisations, in projects of low strategic importance and with a homogeneous user group (van den Besseler, 1998; Graham et al, 1998).

1.3.1 Information systems for change
Information technology and information systems are a means for change. Numerous studies have reported how the introduced systems have the potential to change and are indeed changing organisations (see, e.g., Alvarez, 1999; Walsham, 1993). The technology may affect everything from the overall organisational structure and culture (Zack 2000; Walsham, 1993), to more specific work routines and social interaction patterns (Murray & Wilmott, 1997). Often, changes are related to politics and power relations in the organisation (Bradley 2001; Coopersmith, 2001). Several studies, for instance, report how the introduced information system causes de-centralisation, the removal of certain, often middle managerial layers, and gives the organisation a networked structure (Bradley 2001; Mohamed & Appalanaidu, 1998). Still, many systems development approaches do not anticipate the future changes the implemented systems have the capability of causing (Kuutti, 1999; Kuutti, 1996a). It has repeatedly been pointed out how systems developers do not pay sufficient attention to the organisational context in which the systems are intended to function (Jayasuriya, 1999; Kuutti, 1996a).
1.3.2 Activity Theory for systems development and for analysing organisational change

Cultural-historical Activity Theory is a theoretical framework originally stemming from psychology (Engeström, 1987). It has, however, also been used in the analysis of new technology and change, and in Human-Computer-Interaction (Hasu & Engeström, 2000; Kuutti, 1996a). Activity Theory has been claimed to bring context and organisational knowledge into the process of developing and implementing information systems (Kuutti, 1996b). It has also been pointed out that Activity Theory explicitly embraces the anticipatory aspects relevant for systems development (Bødker, 1991). Still, Activity Theory has only been applied to a limited extent to practical information systems development projects (Kuutti, 1999). Activity Theory and Participatory Design have many points of contact, e.g., they both emphasise context and users when applied to the development of new technology. However, Activity Theory also shares with Participatory Design the limitation of being mostly applied to individual subjects in parts of an organisation (Ellison & McGrath, 2001).

1.4 Research needs

In the contexts of information technology, systems development and organisations, there is little research as regards the third sector. Since non-profit organisations are, in many aspects, different from commercial organisations and private enterprises, e.g., with regard to resources, structure, culture and differentiation of user groups, developing systems for them may have other implications and put other requirements on the systems development approach used. Also, since non-profit organisations, such as trade unions, is a recurrent phenomenon all over the world, and since they are making use of the new technology to an increasing extent, research is needed in order to pursue their information technology interests and needs.

To develop and introduce information systems in organisations is not trivial. It involves many tasks, interests and sometimes conflicting perspectives that need to be handled. Not paying enough attention to the users has repeatedly proven to result in complete or partial system failures (see, e.g., Mumford, 1995). Participatory Design is an approach that has been shown to bring substantial benefits to systems development in terms of system usability and acceptance of the system on the parts of users (Schuler & Namioka, 1993). However, the approach is suited for small groups of users in small organisations or parts of them, for the
design of small-scale systems. Research is needed to determine whether and how Participatory Design can be modified to be applied to entire large organisations, in particular those with a non-profit character where the user group tend to be spread out and differentiated.

The Swedish Trade Union Confederation is, in comparison, a large NP/NGO, hosting more than two million people, if all groups from management to union member level are included. Investigating the context of this organisation and how information systems may affect it is necessary, to avoid initiating unwanted or subversive changes. Meanwhile, many systems development approaches tend to neglect the importance of foreseeing the potential consequences of the implemented systems on the organisational context in which they are used (Jayasuriya, 1999). Activity Theory is a promising framework for analysing overall organisational consequences and change stemming from new technology. However, even the use of Activity Theory has mostly been limited to partial organisational contexts and groups of individuals. Research is needed to see whether and how the framework can be extended and applied for the analysis of entire organisations as part of the systems development process.

1.5 Research objectives

The aims of this thesis are, first, to study the context of NP/NGOs, unions and information technology needs, solutions and consequences in general, and second, to study the context of developing information systems for large organisations with heterogeneous user groups, especially NP/NGOs and trade unions. In relation to the latter, how aspects of potential organisational consequences and change as a result of the introduced system are incorporated into the development process, are also considered. The case under study is the Swedish Trade Union Confederation and its shop stewards, through the DLK project. In detail, the objectives are:

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1 In the thesis the abbreviation NP/NGOs, and the terms non-profit organisations and the third sector are used interchangeably.
Objective 1: To generate knowledge of non-profit, non-governmental organisations (NP/NGOs), in particular trade unions, and information technology, with regard to needs for and consequences of implementations of information technology. Specifically, the aims include:

- exploring and comparing information technology needs of shop stewards with trade union management strategies in terms of the new technology;

- establishing a picture of the situation, tasks and problems shop stewards experience in day-to-day union work;

- finding corresponding information technology needs and design solutions for shop stewards, and exploring consequences of implementations at the local union level.

Objective 2: To apply, extend, and modify the Participatory Design approach to be suited to the context of entire large organisations, in particular NP/NGOs organisations and trade unions. Specifically, the aims include:

- exploring the use of Argumentative Design (ArD) for aiding the early phases in Participatory Design of information systems through addressing organisational problem identification and argumentation of needs, design issues, design solutions and their potential organisational impact;

- extending Participatory Design to also be applicable to large organisations by capturing the voices of different user groups in the design process;

- determining if any and which additional modifications are needed in order to make Participatory Design more applicable, in general, to entire large organisations, and to the non-profit sector;

- exploring whether and how Activity Theory can be modified for an overall organisational context, and subsequently used to support an integrated Participatory and Argumentative Design approach by providing an organisational overview and foreseeing potential consequences of the system under design;

- performing initial evaluation of the relevance of the Activity theoretical framework in this context, by testing some of the consequences outlined, in relation to an implementation of a similar system at the local union level.
1.6 Delimitation

Different systems development approaches focus on different phases in the design process. In order to achieve operational information systems, all phases need to be completed. Participatory Design tends to concentrate on the early development phases including organisational analysis and the investigation of information and communication needs and solutions, even if technical aspects and implementation to some extent are included. Also this thesis has as its focus the early design phases and how they can be developed.

The work presented in this thesis suggests how a proposed information system solution will likely affect and change the Swedish Trade Union Confederation. The hypotheses are grounded on empirical data and initially tested through an investigation of an implementation of a to some extent similar but smaller-scale system in one of the Confederation’s 16 union affiliations. However, actual large-scale implementation and thereby wider evaluation of the information system for shop stewards and the organisational changes that may follow the implementation are beyond the scope of the thesis. The presented results refer to a prototype and requirements specification of a proposed system solution. Whether and how the system will actually be implemented is for the individual union affiliations to decide upon.
Chapter 2
Background

This chapter presents the research settings and various scientific and engineering areas that are of relevance for the thesis. First, the concepts of information systems and information technology are presented and explained in the context they will be used throughout the thesis. Second, information technology and information systems in an organisational context will be discussed with specific reference to organisational change. Following this, the area of software and requirements engineering, and different engineering approaches will be discussed. Finally, the research settings, including the specific project context and non-profit organisations and trade unions in a more general sense, will be described.

2.1 Information systems and information technology

The concept of information systems (IS) can be applied to all systems that process and transfer information (Avison & Fitzgerald, 1995). However, the concept is most often used to denote computer-based information systems. When information systems in the 1950s, 60s and 70s began to be implemented in organisations, the focus was on the technology itself, on data transfer and processes for administrative purposes (Dahlbom, 1999). The recent decades have, however, seen an extension of the concept to include human, organisational, and social aspects as well (Dahlbom, 1999; Lewis, 1994). Information systems have even been viewed as technical implementations of social systems (Hirschheim et al, 1995).

The concept information technology (IT) has been described as the use of computers for the processing, storage, transmission and presentation of information, with a focus on satisfying user needs (Jayaratna, 1994). In recent years, the term information and communication technology (ICT) has increasingly been used to denote the merging of computer, telecommunication and media technology (Bradley, 2001). In the 1990s, Scandinavian researchers likewise introduced the term informatics to denote a broader perspective relating to the
Scandinavian design tradition. They claimed that contemporary information technologies and systems are intertwined; impossible to separate from each other and from the lives of the humans with whom they continuously interact (Dahlbom, 1999). Even though this opinion is shared by the author of this thesis, the concepts information systems and information technology, respectively, will be used although with slightly different connotations, in order to facilitate distinguishing between the different research areas included in the thesis. The concept ‘information systems’ will mainly refer to the parts of the thesis dealing explicitly with systems development and consequences of implementations of design solutions. ‘Information systems’ will then be used to denote computer-based information systems embracing the broader perspective, including technology and information as well as communication, human, organisation and social aspects. ‘Information technology’ will most often be used when discussing non-profit organisation information technology needs, use and consequences in general, since these needs may be sustained either by entire information systems or stand-alone applications. ‘Information technology’ will then refer to information and communication facilities based on computer- and telecommunication technology.

2.1.1 Information systems and technology in an organisational context
The impact of information technology on organisations is pervasive. The deployment of the new technology for various purposes undoubtedly affects the organisational context in which it is used (Bloomfield et al 1997). The most common motivation behind introducing information technology in organisations is that it is supposed to bring increased productivity and efficiency in terms of organisational output (Iacono & Kling, 2001). However, information technology can be implemented for a variety of purposes. When it comes to power issues, technology can be used either to extend managerial control and technical domination, or to initiate empowerment and emancipation of the users (Bradley, 2001). Either way, it is clear that:

*Whether, for good or ill, IT is seen to be powerful, to have a transformative capacity, changing organizations and their members...As a complement to this, organizations (as social entities) bear the burden of plasticity. In other words, organizations must adjust to the imperatives of technology (Bloomfield et al 1997, p.2).*

The effects on organisations that the introduction of information technology and information systems bring, have been studied from various aspects, including, e.g., structure, work patterns, culture, learning, social interaction patterns and networks, and power and political issues (Bloomfield et al, 1997; Wal sham, 1993). Changes
have also been studied from different theoretical perspectives, including structuration theory, actor network theory and social network theory (Bloomfield et al, 1997; Walsham, 1993). It has furthermore been pointed out how important it is not to separate change related to technology from the broader context of environmental, historical, cultural and organisational circumstances (Bloomfield et al, 1997).

As regards the actual organisational impact of information technology, results are diverse. However, when it comes to political and power issues, it has repeatedly been shown that acquisition of new technology brings power. Early adopters of technology are those most likely to reinforce their position in the organisation (Burkhardt & Brass, 1990). Moreover, introducing information systems into organisations has often been shown to increase de-centralisation (Winter & Taylor, 2001). For instance, middle managerial layers are sometimes weakened or reduced, as the shop floor levels access direct contact to the highest managerial level without the mediation of the former (Huber, 1990). This development is also accentuated by the new possibilities for social interaction and networking that comes with the new communication technologies. (Murray & Willmott, 1997). Research has shown that access to these possibilities often leads to an increase in horizontal networks, and to re-structuring of networks and existing organisational boundaries (Murray & Willmott, 1997; Contractor & Eisenberg, 1990). Increased horizontal networking in turn is connected to the self-learning, empowered and self-organised employee (Bradley, 2001).

Information technology and information systems are, thus, powerful tools for change. Since organisations must “adjust to the imperatives of technology” it is of great importance to foresee what those imperatives will or can be, even in the systems development process.

2.2 Information systems development

Up until the 1960s, methods, structures and standardisation for information systems development were in the main non-existent. Contact with the end-users was infrequent and documentation of the development process low (Avison & Fitzgerald, 1995). The lack of structure and co-ordination of activities resulted in frequent systems development project delays, exceeded budgets, and error-prone systems (Brooks, 1995). As a response, the area of information systems development saw an emergence and continual growth of formalised systems
development approaches. Today, there exists a wide variety of development philosophies, approaches and methods. These may be related to *software engineering* or *requirements engineering* which much focus on technology or handling of requirements, or be more oriented towards organisational analysis and human and social aspects (Avison & Fitzgerald, 1995).

2.2.1 Software engineering
When software engineering emerged as a research area in the late 1960s it was to a great extent focused on the end product and the code. Approaches such as structured programming, testing, and code inspection were applied to identify and remove system errors (Avison & Fitzgerald, 1995). Gradually, there emerged awareness that errors could not be eliminated in spite of careful testing, and the error correction process itself was a resource consuming process (Blum, 1991). Avoiding mistakes from the beginning of the development process seemed a better alternative and the focus hence came to embrace development process as well (Bischofberger & Pomberger, 1992). A number of software development methodologies came into existence, e.g., the *System Development Life Cycle*, embracing the steps of feasibility study, system investigation, system analysis, system design, implementation, review and maintenance (Avison & Fitzgerald, 1995). Gradually, the issue of usability was addressed and users were involved, e.g., through *Joint Application Development* and *Walkthrough methods* (Carmel, Whitaker & George, 1992; Bias, 1991). One might say that software engineering has switched focus, from detail to system, where it greatly relies on functional decomposition, i.e., the breaking down and re-construction of complex processes (Avison & Fitzgerald, 1995). However, software engineering still most often refers to the system specification, programming, implementation, and maintenance parts of systems development (Sommerville, 2001). There has been increasing awareness about the need for approaches and methods for capturing users’ context and requirements, i.e., a need for requirements engineering (Dorfman, 1997).

2.2.2 Requirements engineering and process and user orientation in systems development
Requirements engineering has been described as a systematic process of developing user requirements by means of an iterative co-operative process of analysing the problem, documenting subsequent observations and representation formats, and checking the accuracy of the understanding gained (Pohl, 1993). While software engineering often refers to the design, coding and implementation phases of systems development, requirements engineering refer to those stages preceding it, i.e., elicitation, specification, and documentation of user needs (Dorfman, 1997). One might say that requirements engineering sets out to specify
what the system should accomplish without saying how (Siddiqi & Shekaran, 1996). There are numerous approaches to requirements engineering, ranging from the early steps in the Waterfall model to combinations with Object-orientation and Rapid Development, to Prototyping and Evolutionary Development, to the Socio-technical approach (Kotonya & Sommerville, 1998; Graham, 1998; Dorfman, 1997; Mumford, 1995).

From the beginning, requirements engineering was still strongly focused on the technical requirements of the product to be delivered, i.e., the requirements specification as a sub-component of the implementable system. However, this focus has gradually expanded to embrace the requirements specification process, social and organisational aspects as well (Johansson, 1999). Today, there exist a wide variety of approaches to systems development in the borderland of requirements engineering and more process, organisation, and social aspects oriented alternatives (Avison & Fitzgerald, 1995).

The extent to which users are actively involved in the systems development process varies significantly, from a mere consultation to more active contributions and consensus participation, as is the case in the Socio-technical approach (Mumford, 1995). However, systems development in general has been criticised for not paying sufficient attention to the actual needs and active involvement of users in the entire design process (Schuler & Namioka, 1993). It has further been criticised by approaches like Design Rationale and Argumentative Design, for failing to document and reflect on the potential impact of different design solutions, i.e., failing to foresee the social and organisational consequences of the technology (Buckingham Shum, 1996; Sjöberg, 1994).

2.2.3 Participatory Design
Participatory Design (PD) is an approach to systems development that has as its major emphasis active user participation throughout the entire design process. It originated as a collaboration between the Scandinavian trade unions and academia in the 1970s and 80s, when it was used as a means to empower workers at the workplace by letting them take part in the design of the technology they were going to use (Ehn, 1993; Ehn & Kyng, 1987). The intention was to enhance workplace democracy and realise the ‘good work’ objective, i.e., increase worker autonomy, skill and task variety (Bjerknes & Bratteteig, 1994). According to the principles of Participatory Design, users are to be given direct influence on the design through their participation in design groups. In these groups, users are to contribute with organisational and work task knowledge, while designers contribute with systems development knowledge (Kensing & Munk-Madsen, 1995). Participatory Design
uses a range of techniques that are supposed to be easy-to-learn and put low demand on the users’ beforehand knowledge. Commonly used are mock-ups, Future Workshops and PICTIVE (a paper based toolbox for users to create their own interfaces), applied to the formulation, visualisation and realisation of design solutions (Ehn et al 1996; Muller, 1993). In the context of organisational change, it can be said that Participatory Design is applied to directing the imperatives of technology towards increasing the independence and emancipation of the users, often at the shop-floor organisational level.

Since the 1970s and 1980s, the Participatory Design approach has been extended and applied also outside its immediate ideological context (Reich et al, 1996; Anderson & Crocca, 1992). It has been argued that Participatory Design results in better systems than other approaches, since the systems are designed together with the users instead of merely using the users as information sources (Bravo, 1993). Thereby, the systems’ usability increases. Nevertheless, Participatory Design has also been criticised for lack of formalisation, resulting in increased overall complexity of implementation (Hirschheim, 1983) It has further been stated Participatory Design’s conceptual framework is in need of renewal if it is to be applied outside the academic context (Kensing, 2000). It has been claimed that while the approach extensively deals with the early design phases, the later, more technical stages are less well covered, and that few reports of the concrete use of Participatory Design are actually available (Tollmar, 2001). This results in that actual implementations in use are infrequent; and that those products delivered are almost exclusively small stand-alone information technology applications (van den Besselar, 1998). Criticism may thereby be directed towards Participatory Design’s pro-longed focus on consensus reaching and democratic processes, which sometimes tend to hamper efficiency and a coherent architecture. It has been questioned whether its worthy set of principles is actually agreeable with busy co-participants at a workplace (Trigg, 2000). Further, Participatory Design has mostly been applied to small-scale projects in parts of organisations (van den Besselar 1998; Graham et al, 1998). Due to its characteristics, the approach seems difficult to apply when designing for large organisations with a wide range of diverse user groups that are to have influence on the resulting system. In the last few years, several researchers have pointed out Participatory Designs’ need for modification and renewal, if it is to extend beyond individual, traditional workplaces and to large-scale strategic projects (van den Besselar, 1998; Greenbaum, 1996). It has been suggested that this modification involves interplay between local settings and organisation-wide exchange for the generalisation of local developments (Törpel, 2000).
2.2.4 Action Design

Action Design (AD) is a systems development methodology originally developed for use in healthcare settings (Timpka et al, 1992). It has Participatory Design as its major source of inspiration and shows substantial similarities with the former. Above all, Participatory and Action Design share the cornerstones of democracy and active user participation. However, while Participatory Design is an approach consisting of a wide range of rather loosely connected techniques, Action Design is more rigid and formalised. The methodology is based on a stepwise procedure. There are also clearly defined tools at hand to be used in each step, e.g., questionnaires, video recordings of work tasks, organisational maps, scenarios and technical prototypes (Johansson, 1999). Action Design also extends Participatory Design by explicitly including later design phases, aimed at delivering an end product. Further, Action Design aims to have all potential groups in some sense affected by the system represented in the design group, while Participatory Design has generally pre-supposed a rather homogeneous group dominated by the primary users. Action Design is based on the principles of (Timpka et al, 1993):

1) Active user participation throughout the design process.
2) Representation of all parties that will be affected by the resulting system.
3) A solid organisational analysis, including experienced problems and change needs.
4) An argumentative approach and consensus reaching.
5) Documentation of the design process and design decisions made.

The work procedure begins with establishing a design group in which both systems developers and representatives from the different areas of competence in the organisation are included. A project contract is set up and a project plan initiated. The design group then gathers in recurrent meetings throughout the design process. The group works through three design phases: organisational analysis, iterative prototyping, and writing the requirements specification. In the organisational analysis phase, present work routines, goals, problems and needs for change are analysed and documented. In the iterative prototyping phase, prototypes are constructed based on the previous analysis, evaluated and successively modified within the group. When the group has agreed upon a final prototype version that they all find acceptable, a requirements specification of the system can be established and documented. The specification should cover content, as well as organisational, interface and technical aspects of the system (Johansson, 1999).

While Action Design attempts to overcome some of the experienced limitations of Participatory Design, even the use of this methodology has thus far been restricted.
to small projects of little strategic importance to organisations. This is much due to the principle of letting representatives from all potential user groups actively participate in the design process, which becomes increasingly difficult with comprehensive information systems and the growing size of an organisation.

2.2.5 Design Rationale and Argumentative Design

Design Rationale is a technique used for systems development based on argumentation and documentation. It has its origin in the 1970s and Horst Rittels’ distinction of tame versus wicked problems in systems design (Rittel, 1972). Design Rationale is based on and motivated by the assumption that there exist several possible solutions to a design issue (Moran & Carroll, 1996a). Therefore, systems developers should have an argumentative approach in which different design options are reasoned and their positive and negative consequences are estimated before an option is decided upon (Moran & Carroll, 1996a). The benefits such a stance result in include consistency in decision-making, justification of design solutions with the user, a consideration of trade-offs in design, achieved design consistency and a smooth transition from prototypes to real system documentation (Souza et al, 1999; Lee, 1997; Han 1997; Buckingham Shum, 1996; Szekely, 1994). However, the most important advantage that comes with Design Rationale is perhaps its attempt to foresee consequences of implementations, thereby reducing the risk for unwanted consequences and system failures. Further, the argumentative process is concurrently documented which provides the implemented system with backward traceability, should it still function unsatisfactorily (Hughes & Martin, 1998; Conkling, 1989).

Design Rationale mostly applies to the software engineering process, i.e., the late, technically oriented design phases (see, e.g., Moran & Carroll, 1996b). Argumentation often relates to system performance, allocation of resources, speed, flexibility, interface issues, cost and so forth. Argumentative Design (ArD) was developed in the 1980s and 90s as a corresponding technique to be applied to the early design phases which focus on information system content and organisational problems, needs and consequences (Sjöberg, 1994). In other words, Argumentative Design sets out to design systems that from the very beginning are grounded in and well integrated with the organisational context in which they will exist. Argumentative Design draws on five core components: need, measure, consequence, goal, and decision (Figure 1).
The interest in Design Rationale and Argumentative Design seemed to reach its peak in the mid 1980s to the mid 90s but has since declined. One explanation could be that these techniques are time-consuming. Current Design Rationale research is faced with solving problems with indefinite rules as how to select from an infinite number of design issues thereby avoiding overdoing the rationale instead of doing the design, and with the formalisation of the structuration process of information, including the fact that information is gained from heterogeneous data sources (Wang & Guanleng, 2001). It has been argued that rationale representation schemes are needed in order to make argumentation serve design (Fischer et al, 1996). Nevertheless, the techniques are, even though they are perhaps in need of modification, useful when designing complex systems for large organisations in which the need for capturing rationale and structure is especially essential. It has also been argued that Design Rationale and Argumentative Design are clearly compatible with the Participatory Design approach since they all include argumentative processes and the reconciliation of conflicting interests (Buckingham Shum et al, 1997; Buckingham Shum & Hammond, 1994). Argumentative Design has also been integrated as part of the Action Design methodology (Johansson, 1999; Timpka et al, 1993). Argumentative Design is also in agreement with many principles of Activity Theory, when applied to work redesign and analysis of change.

2.2.6 Prototyping and scenarios

Prototyping has been defined as “building a physical model of the proposed system, and using it to identify weaknesses in our understanding of the real requirements” (Crinnion, 1991, p.17). Hence, prototyping focuses on constructing models of the information systems under development, which then can be evaluated throughout the design process. The purpose of prototyping is thus to pay attention to the voices...
of users and to identify and remove weaknesses in the emerging systems. The benefits of prototyping have in recent years been recognised in requirements engineering as a useful tool for requirements elicitation, aiding users in the process of visualising written requirements into executable software systems (Kotonya & Sommerville, 1998). In general, prototyping is divided into rapid and evolutionary prototyping. Rapid prototyping focuses on quick development of models, often by means of computer-aided design. These models are successively discarded after having been used for the elicitation of user requirements (Cooper, 2001; Crinnion, 1991). Evolutionary prototyping, in comparison, is an iterative process focussed on the gradual modification and improvement of one prototype, which may in the end be used as a basis for the operational system (Avison & Fitzgerald, 1995). Prototypes may, furthermore, provide a broad overview of the entire system or explore certain aspects of the system more in depth. In the first case, functionality is often low; in the second case functionality is usually higher (Avison & Fitzgerald, 1995).

When evaluating prototypes, user scenarios are often used (Kotonya & Sommerville, 1998). Scenarios are essentially stories; constructed user situations aimed to replicate those which take place in a real life context; a description of an activity defined as a sequence of actions (Carroll, 2000; Kuutti, 1995). The most often used form is the textual narrative, however even storyboards and video mock-ups may be used (Carroll, 1995). User scenarios have in recent years become extensively used in systems development as a way of capturing the social aspects of computer use, and the real life context in which systems will be used (Carroll 2000; Kuutti, 1995).

2.3 Study context

In this section, the various settings of relevance for the thesis will be described, ranging from the characteristics of NP/NGOs and trade unions in general to the Swedish Trade Union Confederation and the specific project context.

2.3.1 Non-profit non-governmental organisations

Non-profit, non-governmental organisations (NP/NGO’s), or voluntary organisations are often referred to as the third sector (Anheier & Kendall, 2001). This is a sector of large scale and continuous growth. In 1995, non-profit organisations accounted for the employment of 6.9 % and 7.8 % of the employees in Western Europe and the United States, respectively. Between 1990 and 1995, the
The sector grew by an average of 24% in the OECD countries (Anheier & Kendall, 2001). Non-profit organisations have been described as possessing the following characteristics (Butler & Wilson, 1990):

- They are formally constituted organisations.
- They are organisations that act separately from government (although they can receive governmental support).
- They are non-profit distributing to their owners and directors.
- They are self-governed and equipped to control their own activities.
- They have some meaningful voluntary content, such as voluntary income, volunteer labour or voluntary management.

The term ‘non-profit organisation’ is, however, an umbrella term that incorporates a variety of organisations. Generally, the term ‘third sector’ is used to denote both non-profit organisations emerging out of private initiative and those belonging to the ‘social midfield’, situated between the individual and the state (Dekker, 2001). The former category includes those cases in which people rally together in voluntary associations in order to pursue extra-individual interests. Typical examples can be neighbourhood mutual support associations, or charity as it is often practised in the United States (Dekker 2001; Anthony & Young, 1999). The latter category refers to a wide range of organisations including, e.g., those which provide services to the public and different interest groups. Typical examples are voluntary associations which fight for environmental or human rights issues, such as Greenpeace or Amnesty International, sports associations and trade unions.

That which many non-profit organisations have in common is that they are presently facing a crisis. Recent social, developmental, and labour market trends have resulted in a major re-appraisal of the third sector (Anheier & Kendall, 2001). In many countries, there has been a tendency on the part of municipalities to let the third sector take over some of the public services they previously provided themselves, for instance, parts of elderly and child care by means of co-operatives (Lundström & Wijkström, 1997). At the same time, non-profit organisations have to deal with governmental obstacles, as well as insufficient resources for handling their expansion. The experienced crisis in the western countries relates, e.g., to governmental financial retrenchment, the infiltration of market interests into a previously non-competitive sector, insufficient effectiveness, and a lack of legitimacy regarding prevailing misunderstanding of the sectors’ resource base (Anheier, Carlson & Kendall, 2001; Lundström and Wijkström, 1997).
Information technology is one way to face those aspects of the perceived crisis that relate to lack of effectiveness. Information systems, if well functioning, have been used to increase organisational output and efficiency (Iacono & Kling, 2001). Further, information systems can be targeted towards the specific context and characteristics of non-profit organisations, aiding them in organising themselves, pursuing their interests and counteracting potential threats. This fact is also beginning to be recognised. Today, an almost unlimited number of non-profit organisations, from international associations to local grassroots organisations have published themselves on the Internet, marketing themselves, providing services for their members, using the Net for quick retrieval and distribution of information, and often initiating contact between activists through discussion forums (Lee et al, 2001). It has further been noted how non-profit organisations have begun to make use of electronic technologies for the creation of networks (Burt & Taylor, 1999). It has also been argued that some of the best examples of using technologies for strengthening the democratic role played in society can be found in voluntary campaign organisations that often have high quality information and contact links on their Web sites (Taylor & Burt, 2001). What the new technology will have for implications for non-profit organisations remains yet to be seen. The research area is, thus far, mostly unattended and scientific studies have just emerged. It has been claimed that while many information systems theories and frameworks are for information systems in profit-organisations, they can be modified for application to the third sector, in order to increase its competitive advantage (Lee et al, 2001).

2.3.2 Trade union organisations
Trade union organisations are NP/NGOs that belong to the social midfield (Anheier & Kendall, 2001). In a classification of those organisations, trade unions can be said to be interest organisations, i.e., they are products of ideology and they advocate the interests of their members in producing services that the latter can benefit from (Lundström & Wijkström, 1997). Trade unions sometimes referred to as labour unions, organise the work force. They were already in the early 20th century described as “a continuous association of wage-earners for the purpose of maintaining or improving the conditions of their working lives” (Webb & Webb, 1921, p. 1). Trade unions are generally divided into blue-collar and white-collar unions, organising blue-collar workers and white-collar workers, respectively (van Eijnatten, 1993).

The structure, characteristics, and relative power of trade union organisations of course differ enormously throughout the world, between nations and between western society and third-world countries. Though trade unions are generally based on the same ideological principles of democracy, solidarity and equity, their
freedom and sphere of action in reality vary according to, e.g., political climate, the employment rate, union density, legislation and resource intensity (see, e.g., Deutsch, 1986; Wallerstein, 1983). In the western world, e.g., the British, French and American trade unions have traditionally had a weaker position in their respective countries, than that of trade unions in Canada, Germany and Scandinavia (Sandberg et al 1992; Deutsch, 1986). In Scandinavia, high union density, previous low unemployment rates and, in Sweden in particular, the blue collar unions’ close collaboration with the Social Democracy Party, have contributed to a relative welfare and a programme of action exceeding regular wage issues by incorporating issues of work environment and technology contributing to ‘the good work’ (Sandberg et al, 1992). Nevertheless, while non-profit organisations are generally experiencing an increase in popularity, the situation is actually the reverse for trade unions, specifically. Not even the Scandinavian trade unions have completely escaped a worldwide decline in union density and power as a result of current societal and labour market trends (Giddens, 1998). In Sweden, the fluctuation of density is pronounced, with young people and immigrants being less inclined to unionise (Kjellberg, 2000). Trade unions have partly responded to the new challenges by extending their concept of ‘the good work’ to include the overall life situation of people in order to attract new members (Pilemalm et al, 1998; Utbult, 1997).

2.3.3 Trade unions and information technology
What unites trade unions all over the world is a belief in solidarity and democratic values. This belief is something that information technology can support. The power of the Internet has been recognised by trade unions and other labour organisations that to an increasing extent make use of it in creating networks and announcing their existence and struggles (Shostak, 1999; http://www.mcspotlight.org/campaigns/tactics/unionlinks.html, March 2002). When it comes to more extensive efforts from within entire trade union federations, affecting all their members, Scandinavia, and in particular Sweden, again seem progressive, e.g., by providing members with smart cards, generating comprehensive information technology projects, and by attaching extranets, information and communication facilities to their homepages. Information technology and information systems can be a powerful tool for trade unions in their strive for survival, renewal, and organisational strengthen. Thus, research is needed in an area that is beginning to emerge. Research efforts and scientific publications on information technology, information systems and trade unions are, thus far, mostly absent.
2.3.4 The Swedish Trade Union Confederation
The Swedish Trade Union Confederation (LO) is a national union umbrella organisation presently consisting of 16 individual union affiliations (at the time of the DLK project there were 18). The Confederation organises the Swedish blue-collar workforce and presently engages about two million wage earners, equivalent to a union density of approximately 80% (Nelander & Lindgren, 1996). The organisational structure, in general terms, embraces central trade union management, the corresponding affiliation offices in each of the 16 union affiliations, and their respective region departments, sections, and local clubs (Nelander, 2001). However, the structure and size vary among the affiliations, as do the number of departments, sections, and clubs in each affiliation. Most of the day-to-day operative union work targeted towards members is performed by about 225 000 shop stewards, belonging to the different affiliations (Nelander, 2001). Shop stewards are in most cases regular employees with a union assignment and represent their colleges at the workplace. They thereby perform the main bulk of their union tasks on a voluntary, unpaid basis. This is to be compared with the full-time union ombudsmen, mostly found at the union departments, affiliation offices and central trade union level, who are employed by the unions.

2.3.5 The Distance supported learning for Local Knowledge needs project
The Distance supported learning for Local Knowledge needs project (DLK) was a large collaborative project between the Swedish Trade Union Confederation through 17 of its then 18 individual union affiliations and Linköping University through the Department of Computer and Information Science (IDA) and the Centre for Adult Education (Vuxenutbildarcentrum). The project was financed by The Swedish Board for Development of Competence in the information technology domain (KK-stiftelsen). It was a four-year project, running from 1997 to 2001. The project is one in a series of projects aimed at renewing union strategies and work, partly by means of information technology (Utbult, 1997). The overall purpose of the DLK project was to extend and renew traditional forms of union learning, and the target group was all trade union shop stewards. When the project started, the Confederation had for many years faced a difficult situation in which these shop stewards received a limited amount of or no union training, and the organisation did not have the resources to sustain their knowledge needs by traditional means. The project attempted to partially replace face-to-face, top-down directed, all-cast-in-the-same-mould oriented union training, taking place through study circles or courses at the union folk high schools. This was to be substituted with training that

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2 A union folk high school is a school which runs different courses for union members as well as for those with a union assignment. There are presently three LO folk high schools in Sweden.
to its character is continuous, integrated with the everyday work and life of the shop stewards, and information technology supported. Moreover, the needs for training, information and knowledge were to be formulated locally and individually, by the shop stewards themselves and be connected to their everyday reality (Jägare, 2001). The project had several different approaches:

- First, it was based on approximately 150 local projects, the content of which was decided upon by the participating shop stewards themselves, and related to their local workplaces. The local projects were to their character strongly focussed on the exchange of experience in networks supported by technology, e.g., by the FirstClass conference system (http://www.runo.net/runo/it-distans/index_it.html, May 2002). The experience generated from the local projects is to be further passed on to the entire organisation.

- Second, a group consisting of project management and representatives from IDA worked with surveying and evaluating current technologies applicable to shop steward’s work, e.g., videoconference systems and audio systems (see, e.g., Hallberg, 2001).

- Third, a local design group consisting of user representatives from the union organisation, through the individual affiliations and their different levels, and representatives from IDA and the Centre for Adult Education, worked with the design of an information system to support shop stewards in their day-to-day work. The design work took as its point of departure Action Design, user participation and the everyday practices, problems and needs of shop stewards, and was thus extensively bottom-up oriented.

- Fourth, a pedagogue group consisting of project management representatives, representatives from Centre of Adult Education and one representative from IDA worked with pedagogical and learning issues in relation to new technology and distance education in the trade union context.

In the context of trade unions and information technology the DLK project was unique in its kind, initiating work with change for all shop stewards and extensive information technology support far out in the own organisation. In this thesis the third approach to the project, the work in the design group and the design of an information system for the shop stewards, in which the researcher has also actively
participated, is the object of study. The other approaches are beyond the scope of the thesis.

2.4 Summary of background

While NP/NGOs and trade unions, to an increasing extent, are exploring the potential of the Internet and other information technology facilities, scientific studies in the area have only begun to emerge. Needs for and the consequences of information technology implementations in the third sector appear as strong candidates for study. As regards information systems development in particular, the trend has been towards increased attention to system requirements, social and organisational aspects, and to the needs of end-users (Kotonya & Sommerville, 1998; Egger, 1998). Participatory Design is a systems development approach and Action Design a design methodology that consider active user participation to be a fundamental basis for designing well-functioning systems. However, both are restrictive in the sense that they are formalised for application to small-scale systems development projects involving a limited, reasonably homogeneous user group. Meanwhile, large organisations world-wide introduce extensive systems that co-ordinate the activities of many user groups. (Katsikides, 1998). If such organisations are to benefit from Participatory Design as well, modifications are needed. Non-profit organisations and, in particular trade unions, are organisations in which the user group is often of a marked heterogeneous character (Zielstra, 1999) and perhaps also geographically distributed. This situation may have further implications for the development of information systems, implications that need to be looked into if development approaches should be further targeted towards use in the third sector and trade unions.
Chapter 3

Theoretical framework and empirical research approaches

In this chapter, the theoretical framework for the thesis work is presented, followed by the choice of the empirical research approach informing the overall design and thesis work. First, some trends in organisational theory are described briefly. Second, Activity Theory, which is at the core of the final analysis in the thesis work and the development of which constitutes part of the results, is described more in depth. As for empirical research methods, Participatory Action Research and case studies are described.

3.1 Organisational theory

Within the research area of organisational theory, a wide range of approaches and classification schemes can be found. Starting out with Max Weber’s late 19th and early 20th century concept of organisations as bureaucracies (Weber, 1971), they are viewed from a variety of perspectives and with many different metaphors. Organisations have been described as machines, as brains, as cultures, as political systems, as instruments of domination, and even as physical prisons (Morgan, 1997). This thesis draws on the classification undertaken by Phersey (1993), in her overview of contemporary research of organisational behaviour with a focus on organisations as cultures. To view organisations as cultures seems proper in this case, since the Swedish Trade Union Confederation is an organisation where culture has a strong hold, and since the organisation is presently moving between cultures by initiating major change work and re-invention of the organisation, partly through the DLK project. According to Phersey’s view, there are four types of cultures governing organisational behaviour; role cultures which are characterised by hierarchy and clearly defined tasks, achievement cultures characterised by people working out of their own interest and everybody knowing something about what is going on in the organisation, power cultures in which some people are dominant and others are subordinates and in which social order is significant, and support cultures that are characterised by solidarity, a sense of
membership, and a joint belief in what one is doing. Cultures may also be \textit{mixed}. Seen through Phersey’s classification, the Swedish Trade Union Confederation is presently a mixed culture, drawing on the notion of role culture and support culture simultaneously.

As regards current views of organisational development and change, a distinction is generally made between planned and unplanned changes. Planned changes originate with a decision from within the system to deliberately improve its function and typically involves the engagement of external resources as support in the process (Johnson, 1996; Porras & Robertson, 1992). In large, complex institutional systems, this process includes the steps of diagnosing the present situation and its need for change, setting goals and defining the new state of conditions, defining the transition state, the developing strategies and action plan, and evaluating the change effort and stabilising the new conditions (Beckhard & Harris, 1977). According to Phersey (1993), role and power cultures tend to favour \textit{regulation} for carrying out changes, i.e., the purpose is set, and means and plans for reaching the purpose exist. Support and achievement cultures, on the other hand, tend to favour \textit{appreciation}, i.e., more people are involved in carrying out changes, and the lower organisational levels have more say in the process. The introduction of information technology in the Swedish Trade Union Confederation as a way of strengthening the organisation and attracting more members is a planned change. The DLK project relates to all but the last step in the sequence for carrying out changes. With the DLK project and increased responsibility for shop stewards at the local union level for formulating their knowledge needs, the Confederation can be said to have moved from regulation to an increase in emphasis on appreciation, in its view of how change is to be achieved.

3.2 Activity Theory

Cultural-historical Activity Theory (AT) is a theoretical framework that may be applied within organisational theory and research. However, it originated in psychology, late 19\textsuperscript{th} century Russia and the ideas of Vygotsky on how learning is socially situated, interactive, and mediated by tools (Engeström, 2000; Axel, 1997). It has since been extended to a variety of different areas, e.g., organisational learning, and development, work re-design, and Human-Computer-Interaction (HCI) (Virkkunen et al 1996; Virkkunen & Kuutti, 2000; Uden & Willis, 2001; Nardi, 1996). In the organisational context, the version most often applied may be described as macro-level Activity Theory, that has collective object-oriented activity as its prime unit of analysis (Figure 2) (Engeström, 1987). Activity systems
are contexts in which subjects, i.e., individuals or sub-groups participate. An activity system is driven by a collective motive and directed towards a common object in continuous transition (Engeström, 2001a). The object, e.g., the activity system’s ‘raw material’ is transformed into an outcome of the activity (Engeström, 2001a). This outcome is reached by means of tools that can be both external, e.g., artefacts, and internal, e.g., symbols (Hasu & Engeström, 2000). The subjects work towards their object in an immediate community characterised by a certain division of labour and explicit and implicit rules (Engeström, 1999a). At the individual level, goal-oriented actions are used to accomplish the overall activity (Kuutti, 1996b). Sometimes, these actions become internalised and transformed into unconscious operations performed by the individual (Hasu & Engeström, 2000).

Actions are more short-time oriented and therefore less stable than the activity systems to which they belong. But also activities as well as their objects are subject to continual change (Virkkunen & Kuutti, 2000). Changes result from inner contradictions that are inherent in all activity systems and cause recurrent tensions, disturbances and breakdowns (Engeström, 1987). The contradictions can exist anywhere, e.g., between the object and tools or labour division, and when different subjects have a different comprehension of what the object actually is. Changes in activities may lead to an expansion of the object as it manifests itself for the subjects involved (Engeström, 1999b). Such processes are referred to as expansive learning processes, and the points of time at which the expansion takes place in the minds of the subject are called zones of proximal developments (Engeström, 1987).

**Figure 2.** Model of an activity system. The subject directs its actions towards the object by means of tools, and in a community with a certain labour division and rules.
3.2.1 Activity Theory in need of renewal

Activity Theory has in recent years been criticised from several aspects. It has been noted that there are unsolved problems with the theory, its concepts and notations. For instance, even though new organisational and “post-fordist” forms of work organisation put increasing emphasis on flexibility, coordination and networking of individual actions to overall processes, and employees aware of collective organisational objects (Kuutti, 1994), it has been claimed that the present version of the theory neither pays sufficient attention to the structure, components and classification of different activities, nor to the distinction between individual and collective subjects Davydov, (1999). The latter relates to the fact that the application of Activity Theory has thus far, in spite of the theory’s explicit collective and often organisational focus, in reality mostly been limited to parts of organisations and single activity systems involving individual subjects (Ellison & McGrath, 2001). Even when entire organisations are studied, a perspective from a specific group of subjects being involved in, e.g., task-related change is most often taken, even if some studies have begun to recognise the networking, overall organisational perspective (see, e.g., Kuutti & Molin-Juustila, 1998). It has been noted that the third generation of Activity Theory needs to consider new organisational structures, multiple perspectives, networking and interactions of different activity systems (Engeström, 2001a; Konkola, 2001).

Likewise, even though it has repeatedly been pointed out how Activity Theory with its pronounced contextual focus has great potential for information systems development (Spasser, 2002; Ditsa & Davies, 2000; Bødker, 1991), actual experience from concrete systems development projects are only occasional (Kuutti, 1999; Kuutti, 1996a) or in the planning stages (see, e.g., Wang, 2000). It has been argued that the new post-industrial form of work organisations that the information technology revolution has paved the way for includes ever increasing needs for collaboration and co-ordination of previously isolated activities with the broader work context and for networking the organisational collective, and that Activity Theory can support the process for developing information systems to sustain such co-ordinated activities (Kuutti & Molin-Juustila, 1998; Kuutti, 1994). Meanwhile, while there are numerous Activity theoretical studies on information systems use, a prescriptive theory or methodology guiding concrete design is still missing (Hasan, 2001a) Activity Theory has several points of contact with Participatory Design, e.g., they share a common emphasis on context, tensions, and the subject or end-user. There have also been attempts to apply the theory as a framework for Participatory Design projects (Bai & Hermanson 2001; Hyysalo, 2000; Kuutti, 1999; Sjöberg, 1996). But more comprehensive endeavours to integrate the approaches are missing.
3.2.2 Voices
One theoretical strain at times integrated with Activity Theory is Bahktin’s notion of voice, utterance and language (Carpay & Van Oers, 1999). Bahktin originally applied the notion of voice to analysis of dialogicality in novels in which different voices or speakers use different social languages (Wertsch, 1991). Within the community of researchers applying Activity Theory, voices have mainly been used in, e.g., discourse analysis, analysis of group communication, and of classroom writing (Engeström, 1995; Sjöberg, 1996; Moro, 1999). It has also been explicitly applied in relation to Participatory Design, in analysis of the discourse that takes place at design meetings (Timpka & Sjöberg, 1996). But there is also a more practical sense in which voices can be used in the design of information systems for large organisations. Voices then become integrated as a part of Argumentative Design in a process aimed at collecting the different voices, i.e., the opinions of the different groups of users that in some way will be affected by the introduced system, as a solid background for an Activity Theory analysis and reasoning about the system and different design solutions and consequences.

3.3 Empirical research approaches
Qualitative research originates from the social sciences and aims at exploring individual, social, organisational and cultural phenomena in their real life context (Strauss & Corbin, 1998). In contrast to quantitative approaches, which much rely on measurements, variables, statistical procedures, testing of hypotheses and validity, their qualitative counterparts provide no rigid set of rules but put an emphasis on subjectivity, sense-making and interpretation (Denzin & Lincoln, 2000). The researcher studies representations of the real world in naturalistic settings and analyses, re-constructs and transforms these representations (Denzin & Lincoln, 2000; Gubrium & Holstein, 2000). In the past decade, qualitative research methods have gained acceptance in the area of information systems, as it has been acknowledged that even computer systems need to be studied in their real-life environment (Trauth, 2001; Wynn, 2001). In this thesis work, a qualitative research approach has been used consistently, except for some quantitative distribution of qualitative data, according to demographic categories, in Paper II. The thesis focuses on areas, such as information technology and systems development in non-profit organisations, that are thus far relatively unexplored, and aims at generating knowledge empirically grounded in a gradually emerging picture of the union organisation and its relation to technology. Therefore, a qualitative, explorative approach is suitable.
3.3.1 Case studies
Case studies have become one of the most common ways of performing qualitative inquiries (Stake, 2000). The approach, is basically what the name implies; a case is studied, a real phenomenon, be it, e.g., an individual, a setting, an incident, an organisation, or even an information system (Stake 2000; Hamel et al, 1993; Yin, 1993). Case studies are a choice of what to be studied, not of methodology (Stake, 2000). According to Yin (1994, p. 1), they are suitable “when ‘how’ and ‘when’ questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real life context”. Case study research often focuses on a single case, but cases can also be replicated, i.e., in a multiple case design (Yin, 1993). Case studies have been criticised from several aspects, for lacking scientific rigour and being biased by the pre-assumptions and aims of the researcher, for providing insufficient basis for scientific generalisation and theoretical validation, and for being time-consuming and producing enormous masses of inaccessible documentation (Stake 2000; Yin, 1994). But this criticism is something that research in general, especially qualitative research, is exposed to and has been met with the argument that case studies are indeed generalisable, but to propositions, not populations or universes (Yin, 1994). The propositions can be tested by future research. As for lack of rigor and bias, these are problems that all research must deal with and can be overcome by thorough work and conscious attempts to present fair evidence. A thorough design of the case study also reduces time-consumption, and, according to Yin (1994), case studies should include the stepwise procedures of designing the study, conducting it through preparing for data collection and collecting the evidence, analysing the evidence and composing the case study report.

Case studies can be of an explorative, descriptive or explanatory character (Yin, 1993). This thesis mainly belongs to the first category, both in its focus on how non-profit organisations and trade unions can make use of information technology and on how systems development can be applied to the context of large, non-profit organisations. The nature of the DLK project providing the basis for the thesis work is, in itself, of an exploratory character. However, also descriptive and explanative elements are included in the thesis work, e.g., in describing the situation, tasks and problem patterns of shop stewards (Paper II). The case study steps described above have been followed by planning the collection of data from different user groups and some of the design work according to Participatory and Action Design principles, and performing data collection and analysis. The thesis itself constitutes the case study report.
3.3.1 Participatory Action Research

Participatory Action Research (PAR) is a qualitative research approach based on an alternative philosophy of social research (Kemmis & McTaggart, 2000). It has as its focus the collaboration of the researchers and the subjects under study throughout the research process, from planning the project to analysing the data and presenting the results (Lundberg & Starrin, 2001). The motivation underlying the approach is that ordinary people with a realised need for knowledge should be allowed to undertake a research project themselves, thereby enhancing their knowledge and transforming their environment by their own praxis (Lundberg & Starrin, 2001; Fals-Borda & Anisur Rahman, 1991). Participatory Action Research has clear socio-political connotations and is often associated with the empowerment of oppressed groups, above all social transformation in the Third World (Kemmis & McTaggart, 2000; Fals-Borda & Anisur Rahman, 1991). Critics of Participatory Action Research claim that it lacks the scientific rigour necessary for creating valid knowledge (Lundberg & Starrin, 2001). On the contrary, it has been argued that the participation of practicians and their continuous feedback reduces the risk of hasty conclusions and simplified interpretations (Greenwood & Gonzales Santos, 1995; Whyte, 1989).

Within computer science, Participatory Action Research has been given attention as way of studying a discipline that has previously partly escaped scientific attention (Kyng, 1994). Within systems development, Participatory Design and the system developer-worker collaborative trade union projects of DEMOS and UTOPIA (Sandberg et al 1992; Ehn & Kyng, 1987) can be said to greatly replicate the Participatory Action Research Approach. In this thesis context, the application of Participatory Action Research has informed the design work in the local design group. Participatory Design principles and the method of Action Design is, with its focus on active user-participation throughout the design process, clearly in line with Participatory Action Research.
Information Technology for Non-Profit Organisations
Extended Participatory Design of an Information System for Trade Union Shop Stewards
Chapter 4

Methods

In this thesis, a distinction is made between the methods applied for data collection and the design methods applied in the design work. In this chapter, the different methods that have been applied for data collection are presented, followed by a description of the design methods applied in the work in the local design group. As a consequence of the empirical research approach and the theoretical orientation of the thesis, the aim has been to use a combination of data collection methods, in order to establish accumulative knowledge of the union organisation, shop stewards, their need for information technology, information systems, and possible consequences of implementation. The different methods for data collection and analysis used, and how they relate to different aspects and phases of the thesis work are summarised in Figure 3.

4.1 Methods for data collection and analysis

In the following, the methods applied for data collection and analysis are presented. The findings from the data collection are in the main to be found in the appended research papers. However, the findings have also been integrated with and some of the methods applied more informally in the design groups’ work. When this is the case, their application there is presented in the same section as their application for external data collection.

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3 The methods for data collection have been applied by the researcher (the author of the thesis) alone or in collaboration with other researchers. The work in the design group, the application and analysis of design methods has been a collaboration of three system developers/researchers, including the author of the thesis.
**Figure 3.** The different methods used for data collection and analyses and how they relate to the gradual establishment of knowledge on shop stewards’ situation, the union organisation, information technology and information systems, and consequences of implementing information technology facilities and information systems.

### 4.2 Literature review

Literature reviews have been defined as the “selection of available documents (both published and unpublished) on the topic, which contain information, ideas, data and evidence written from a particular standpoint to fulfil certain aims or express certain views on the nature of the topic” (Hart, 1998, p.13). It is typically applied in the first exploratory phase of investigating a certain phenomenon, in order to receive an initial picture of it. Literature reviews and analysis of documentation and other written material are also often used in case studies, as one of many
interdependent data sources (Travers, 2001; Yin, 1994). Literature studies put certain demands on interpretation, since different texts must be understood in the context of their production and reading (Hodder, 2000). For instance, some texts may be written for propaganda purposes or for explicitly displaying a certain view of something. But taking these interpretative precautions seriously, written material is a rich data source, considering that much of the interaction that takes place in our modern society is textually mediated (Travers, 2001).

4.2.1 Application of Literature review in the thesis
In this thesis, a policy review was undertaken by the researcher in the initial project stage (Paper I). The aim of the review was to get an initial idea of how the Swedish Trade Union Confederation looked at training and technology in general and their strategies and aims with introducing information technology extensively throughout the organisation. About 50 publications were studied, including books with an historical perspective as well as recent published material focusing on contemporary technology, such as reports, accounts, union working material, and news magazines and newsletters. The material was analysed with a focus on the trade union management’s general view on union training, on unions and technology, and how information technology related to these views, i.e., the pre-requisites for information technology in the union organisation. The collected data was re-used in Paper III, to provide one source of input for the Argumentative Design analysis.

4.3 The Critical Incident Technique
The Critical Incident Technique (CIT) is a method originating in 1940s and 1950s psychology for the observation of human behaviour in recurrent critical situations (Flanagan, 1954). It was soon applied to work psychology, e.g., in studies of factors leading to a high level of satisfaction or dissatisfaction, respectively, among middle management personnel (Gardell & Westlander, 1968). It has later been extended to other disciplines, e.g., to management science, caring sciences, marketing and to analysing the use of information technology (Dean, 1998; Cheek et al, 1997; Tay & Ang, 1995; Norman et al, 1992). The Critical Incident Technique relies on the self-report of incidents, and most often the respondents are encouraged to report both incidents that lead to satisfaction and the demonstration of efficiency in the situation, and incidents that lead to perceived dissatisfaction and inefficiency (see, e.g., Dean, 1998; Tay & Ang, 1995). Interviews and surveys are common approaches (Dean, 1998). The information gained can then be used to take pre-
cautions to improve the current situation, through the change of work routines. The Critical Incident Technique has a relatively detailed procedure for analysing respondent data, including the steps of establishing a frame of reference of relevance for the sought knowledge, the initial clustering of some incidents and forming tentative categories, testing additional categories against the categories and their potential change and modification, until saturation is reached (Flanagan, 1954; Bradley, 1992). The Critical Incident Technique is extremely effective in isolating variables for analysis, and also in collecting real-life examples from those specific persons the research is aimed to benefit (Dean, 1998). On the one hand, the technique has also been criticised, e.g., for whether the observed factors really are representative of the whole attitudinal variation of the respondents, and for paying insufficient attention to frequency and reconstruction of incidents (Hultåker, 1977). On the other hand, it has been argued that the results from Critical Incident studies have been in line with studies using other approaches for studying the same phenomena, e.g., questionnaire-based attitude studies (Hultåker, 1977).

4.3.1 Application of the Critical Incident Technique in the thesis
The Critical Incident Technique has, because of its focus, great potential for application to studies of information technology supported re-design of work and for systems development with a contextual focus. In this thesis, it has been used for investigating shop stewards’ assessment of their work situation and for investigating needs for information technology (Papers I–V). A survey was sent to a sample of 386 shop stewards. The respondents were asked to:

1) give a description of the most recent problem they had experienced in their union assignment;
2) describe what consequences the problem had had for them;
3) describe how they had handled the situation;
4) tell if they could think of something that could prevent or solve the problem in the future;
5) estimate how often the problem occurred.

In the first analysis phase, approximately 50 incidents were initially clustered and basic categories formed. In the subsequent analysis, all the remaining incidents were categorised and some modifications made to the initial categories. Two researchers undertook the categorisation process independently and then compared their categories. Further, another researcher, external to the project, scrutinised the categories before they were finally settled, in order to enhance validity. In Paper I, the initial categories and their incidents were used as input to a Future Workshop with shop stewards on their needs for information technology. Paper II is entirely
based on the complete categorisation and analysis of 201 reported incidents, and also on likewise categorisation and analysis of the consequences of incidents in describing shop stewards’ experienced work situation. In addition, distribution of the categories with regard to age, experience, gender and affiliation was investigated. In Paper III, the solutions to and potential remedies of incidents were classified according to the same procedure as the incidents, with the exception of external scrutinisation. The solutions and remedies were used for investigating shop stewards’ needs for information technology and potential corresponding information system solutions, to be used as input in Argumentative Design. Papers IV and V refer to the previous studies for the purpose of visualising the organisation and contrasting the perspectives of shop stewards with those of other organisational layers. The survey approach helps to overcome some of the objections to the Critical Incident Technique in that it reaches a relatively large sample of respondents, making it easier to control uniformity of results. This Critical Incident survey differs from many others in that it focuses only on problematic situations, not on situations leading to perceived satisfaction. The focus was deliberate to find those cases in which shop stewards may benefit from information technology support, and to avoid focusing on the technology itself from the beginning. The approach is in line with approaches taken in many Activity Theory oriented studies, in recording breakdowns in work activities as a starting point for the re-design of the work activities (see, e.g., Engeström, 1999b).

### 4.4 Future Workshop

The Future Workshop (FW) originates in urban planning an attempt to let otherwise powerless and vulnerable groups in society influence their environment (Jungk & Muller, 1987). It has later been integrated with and commonly used in Participatory Design (Bjerkenes & Bratteteig, 1994). Future Workshops are aimed at letting users reflect upon their own work situation, its potential problems and needs for change, and how information technology can aid in introducing these changes (Kensing & Munk Madsen, 1995). They are generally divided into three phases: the Critique phase, the Fantasy phase and the Implementation phase (Kensing & Halskov Madsen, 1991). The Critique phase is aimed at reflecting on the own work situation, its disturbances and needs for improvement. The Fantasy phase is aimed at generating futuristic solutions to the needs for improvement. Suggested solutions are in this phase not restricted by technical or organisational constraints; neither need they relate to information technology. In the Implementation phase, those solutions identified in the previous step are
transformed into realistic, organisationally and technically feasible implementations (Kensing & Halskov Madsen, 1991). The motivations for the use of Future Workshops in systems development are several; to enhance active user participation in the design work, and to avoid focusing on technical solutions except to computerise those aspects of work that are in need of it. Meanwhile, the last phase ensures that solutions are still technically feasible. Future Workshops have been claimed to be easy to learn by putting low demand on users’ beforehand knowledge, and also to result in more innovative problem solving than many traditional systems development approaches (Hallberg et al., 2000). At least one full day is normally devoted to the workshop. Still, the work seldom includes the Implementation phase in concrete systems development projects; but the result is saved for later implementation (Ehn et al., 1996; Kensing & Halskov Madsen, 1991).

4.4.1 Application of Future Workshop in the thesis
In this thesis work, two Future Workshops have been held. The first was held with 37 shop stewards in the initial project phase (Papers I and III). The workshop was partly modified in that it was not the workshop participants who defined the problems (the Critique phase), although these people were exemplified based on the Critical Incident survey described above (see Section 4.3.1). It was felt that an acceptable picture of union work had already been established and thus time could be devoted to the subsequent step of formulating solutions (the Fantasy phase). During the session, the participants confirmed that they recognised themselves in the problem descriptions. The participants were divided into two groups, each having one and a half hours at its disposal. For about half an hour, the participants individually scrutinised problem descriptions from the established categories and wrote down needs and suggestions for what could be done to solve them in the future. During the remaining time, each individual was allowed to present his or her solutions to the others in each respective group, using a whiteboard for attachment and classification of solutions. After the workshop sessions, the researchers involved completed the classification of the solutions since some shop stewards did not categorise their notes. The generated categories were further worked on in the local design group, to reach implementable solutions (as part of the Implementation phase).

A separate Future Workshop was also held in the design group, stretching over two design meetings and including about six hours of design work. In this Future Workshop, eight (fourth design meeting) respectively seven (fifth meeting) user representatives participated, representing four respectively three shop stewards and other organisational levels. The procedures in this workshop greatly replicated
those described above. The Critique phase was not performed from scratch here either, but included scrutinisation and potential modification of the pre-established problem categories. The major difference was that this Future Workshop partly included the Implementation phase in the sense that reasonably comprehensive and technically feasible solutions that became parts of the prototype were arrived at. In the workshop, the participants performed the categorisation of solutions themselves. The Future Workshop was videotaped.

4.5 Participant observation

Participant observation is the observation of subjects in their natural settings, by the researcher spending time with and participating in their day-to-day lives (Taylor & Bodgan, 1998). It is a method commonly applied in anthropology and ethnography (Angorsino & Mays de Péres, 2000). In general, participative fieldwork can be divided into three major categories, the complete participant where the researcher is officially a member of the community that is under study, the participant observer where the researcher’s identity is undisguised but she or he actively participates in the activities of the community, and the complete observer where the researcher observes and records the current activities without interaction with the subjects (Bernard, 2000). From the beginning participant observation was used as an approach in studying non-western cultures and populations (Bernard, 2000). Today, it is applied to a wide variety of fields outside immediate anthropology and ethnography, where there is a need to study subjects acting in their real context (Kristiansen & Krogstrup, 1999). It has proven beneficial in work re-design and the design and implementation of new technology, in gaining contextual first-hand information on the work activities the technology is aimed at supporting (see, e.g., Hasu & Engeström, 2000; Engeström, 1999b; Rouncefield et al, 1995; Hughes et al, 1993). Participant observation is a direct research method that provides information on how the studied situation actually is; not how it is re-told and maybe distorted by the study subjects. It also supports adaptation, flexibility and the successive accumulation of knowledge (Bernard, 2000). Nevertheless, participant observation is an obtrusion into the lives of the study subjects, which may modify their behaviour (Rose, 1990). It is usually a particularly time-consuming approach involving, e.g., lengthy stays in the field, detailed note-taking and prolonged methods for working with data. It has been suggested that participant observation can be beneficially used in data triangulation for the mutual check of different data sources (Taylor & Bodgan, 1998).
4.5.1 Application of Participant observation in the thesis

In this thesis, participant observation was combined with interviewing and a focus group interview in one study, for the purpose of investigating the structure and activities of the union organisation, and the role of information technology, from the perspective of union leaders (full-time ombudsmen) at the union affiliation offices (Paper IV). Two offices participated in the study and were studied for a period of approximately one week and a half week respectively. The researcher assumed the role of the participant observer. Field notes were taken, and audio taped following each session of observation. The tapings were transcribed. The data from the tapes were categorised, and categories gradually emerged and were modified during the categorisation process. The total time of observation in the study was comparatively short (about 55 hours). However, this is justified in that it was only one way of collecting comprehensive data on the entire organisation, i.e., a form of data triangulation. Also, the eventual goal of the observations was to gain information for systems design, which demanded a somewhat more pragmatic approach.

The data collected at the two affiliation offices provided a picture of the organisation the relevance and generalisability of which were confirmed by the user representatives at the local design meetings. Participant observation was also, in a sense, undertaken at these meetings, since each meeting was videotaped and then analysed with a focus on systems design issues and the evaluation of the Participatory design method itself. In the design group, the researchers assumed the double roles of systems developers and participant observers. Participant observation finally informed the re-construction of the overall DLK project narrative in contrast to a conventional design project that took place in an individual affiliation (Paper VI). This study was undertaken after the DLK project and built, in the case of participant observation, on re-construction of the researcher’s participation in and notes from seminars held in relation to the two projects. A project diary from the DLK project was also available to the researcher.

4.6 Scenarios, evaluations and prototyping – application in the thesis

Scenarios and prototyping were described in Section 2.2.6. In relation to the design process that the thesis is based upon, prototyping with a broad focus has been done. The application of prototyping has drawn both from rapid and evolutionary development. First, three different models were constructed by the researchers/system developers in the design group by means of different drawing and prototyping tools. These were concurrently evaluated. The last version was
modified and refined in a stepwise process. The final prototype version should be seen as a basis for implementations of an information system aimed at supporting shop stewards’ day-to-day tasks.

As regards data collection and analysis, a scenario-based prototype evaluation based on the first prototype, with 22 full-time ombudsmen at the union departments was performed (Paper IV). The departments will be responsible for most of the information system administration. In a half-day workshop, the ombudsmen were presented with four written scenarios in relation to a paper-based version of the prototype. The scenarios were connected to a case database, a discussion forum, an address book, and facilities for navigating between union courses. The ombudsmen were divided into groups of three or four, and asked to reflect upon the scenarios in their role as ombudsmen. In particular, they were asked what they thought was the system’s advantages, and what was considered problematic. All opinions were taken down on post-it sticker notes. Following this, each group was allowed to present its results to the other groups, by sticking the notes on a whiteboard and explaining their contents. The notes were saved and used by the researchers when designing the subsequent prototype version.

Prototype evaluations of a more informal character, sometimes scenario-inspired, have also been a recurrent task at the local design meetings and have also been done with temporarily invited shop stewards from other affiliations. All prototype versions have been evaluated with a focus ranging from, e.g., information content, to interface, to administration, to target group issues. The prototype evaluations were videotaped, analysed and re-used when describing a design rationale for the system.

4.7 Interviewing

Interviewing is a commonly used method to gain information on and understanding of peoples’ experiences and what meaning they make out of them (Seidman, 1998). Interviewing is done both in quantitative and qualitative research, and the concept covers a lot of ground, from completely unstructured to highly formal, controlled interactions with the respondents (Bernard, 2000). In general, the field can be divided into informal interviewing in which the researcher attempts to remember overheard conversations, e.g., in participatory observation, unstructured interviewing which is based on a clear plan but little control over the respondents’ responses, semi-structured interviewing which greatly replicates the former but
includes the usage of an interview guide containing a predefined set of questions, and *structured interviewing* in which people are asked to respond to as nearly identical a set of stimuli as is possible (Bernard, 2000). Interviewing is suitable in cases in which the researcher is interested in the perspectives of the subjects under study and their perceptions of their reality (Seidman, 1998). It is also a method that provides great flexibility in that the researcher can modify and extend his or her questions, based on the respondents’ association, during the course of the interview. This is to be compared, e.g., to surveys in which the set of questions are completely set beforehand (Wengraf, 2001). Nevertheless, by interviewing the questions only reach a limited number of respondents, which makes it more difficult to draw general conclusions. It can also be argued that interviewing only provides information on how people construct their reality; not how they actually behave, which puts great demand on the researcher to make inferences (Wengraf, 2001).

### 4.7.1 Application of semi-structured interviews in the thesis

In this thesis, two studies relied on interviews in combination with participant observation and focus groups (Paper IV and VI). A semi-structured approach was used. This approach is useful in cases in which the researcher only has the opportunity to interview the respondents once (Bernard, 2000). The topic under study in Paper VI was task-related and organisational consequences of initiated information technology supported work on change, through DLK and through the introduction of an extranet at the local union level in one of the individual union affiliations, respectively. For the latter, six section chairpersons were interviewed with a focus on information technology access, use, usefulness, and perceived and actual changes in work tasks, organisation, and information and communications patterns, as a result of implementing the new facilities. These themes had been pre-defined in an interview guide. The interviews lasted for between 40-55 minutes and were audio taped, transcribed, and analysed. During the course of the interviews, quality criteria defined by Kvale (1996) was pursued, e.g., by follow-up and clarification questions, and by continually trying to verify individual interpretations. In the analysis process, the interview material was first exposed to stepwise clarification, i.e., diminishing superfluous material (Kvale, 1996). In the subsequent analysis, the material was divided into sections and sub-sections in agreement with the different categories that had been established in relation to the interview guide. In Paper IV, semi-structured interviews complemented participant observation; in that one leader in each affiliation office under observation was interviewed for about 40 minutes to an hour. Also in this case, the recommendations by Kvale (1996) were followed, but the topics in the interview
4.8 Focus groups

Focus groups are interviews in which several respondents participate simultaneously. The ingredients of focus groups have been described as including (1) people who (2) possess certain characteristics and (3) provide qualitative data (4) in a focussed discussion (5) to help understand the topic of interest (Krueger & Casey, 2000). They thus have a collective, multivocal focus as compared to the individual interview, and can be used to display inner dynamics of groups and different perspectives (Stewart & Shamdasani, 1990). Focus groups have gained popularity in recent decades and are often used in triangulation of data, e.g., in complementing or helping to interpret survey material (Bernard, 2000). They are also used in pilot studies, for providing knowledge on a subject to be used in the subsequent design of larger studies (Bloor et al, 2001).

4.8.1 Application of focus groups in the thesis

In this thesis, focus group studies served the purpose of data triangulation and pilot studies, by complementing other data collected on the same topics. In Paper IV, a focus group was held to complement the data collected by means of participant observation and interviews at two affiliation offices (see Sections 4.5.1 and 4.7.1). Interview topics related to how three union leaders at an additional affiliation office experienced the union organisation, its activities, labour division, information and communication patterns and technology, and how they anticipated organisational changes as a result of the introduced information systems for shop stewards. The focus group lasted for about one hour and was audio taped and transcribed. In Paper VI, a focus group interview was held partly as preparation for the subsequent design of the extranet evaluation interview study, as described above in Section 4.7.1, partly for generating knowledge on the experience of the DLK project and the use of the extranet (since the respondents in the focus group but not the respondents in the interview study had participated in DLK). Four section chairpersons were interviewed on the same topics as in the following interviews. The focus group lasted for one hour and was audio taped and transcribed. The data analysis provided knowledge for complementing and modifying the questions in the guide used in the subsequent interviews, but also on the topics themselves, related to DLK and the extranet respectively. Categorisation of data in both papers in the main followed the procedure described in Section 4.7.1. In Paper IV, the
categories that had been established as a result of the participant observation were applied. In Paper VI, the initial interview guide provided for categorisation.

4.9 Design, work procedures and data collection in the design group

In addition to the methods described above, data was collected from the design work that took place in the DLK design group. The group worked according to the principles of Participatory Design, substantiated by the Action Design methodology. The group was formed locally and was originally comprised of two system developers who had the twofold role as researchers (including the author of this thesis), one pedagogue, and 10 user representatives from the union organisation. The user representatives included four local shop stewards, two local full-time ombudsmen, two representatives from the DLK project management, and two local management representatives from the Swedish Trade Union Confederation. Six affiliations were originally represented in the group. The group held 20 half-day meetings for a period of approximately two years, resulting in a design rationale and a prototype of an information system to be accessed by all union shop stewards. The design work at the meetings focussed, first, on organisational analysis including the establishment of shop stewards’ tasks, problems and needs. The emergent organisational knowledge is partly re-used in Paper V. Second, the groups’ work focussed on iterative prototyping including performing different design practices and subsequent evaluations of prototypes and prototype versions of the system. All design meetings were video recorded and subsequently analysed and documented with a focus on:

- the construction of a design rationale as a basis for the requirements specification,
- method evaluation, i.e., implications of applying the Participatory Design approach, especially in the context of a large organisation with a pronounced heterogeneous and non-profit character.

The system developers/researchers looked at the video recordings after each meeting session. Notes on those aspects of the meetings that related to the design rationale were taken, and categorised in a process that included continuous update.

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4 In this context, it should be noted that some of the data collection methods, as described in the sections on data collection, were also applied more informally in the work of the design group (e.g., the Future Workshop and prototype evaluations), as integrated parts of the design methods and providing knowledge for the design rationale.
and re-modification of categories (see Section 5.2.1 for further details). Those aspects that related to the application of Participatory Design were partly noted in a project diary by the author of the thesis. An example of the emerging design rationale is provided in Appendix 1.

4.10 Summative data analyses

In the preliminary data analyses, double perspectives were often used because both information technology applications in general and systems development in the third sector context were studied. The Critical Incident survey was analysed first by the researchers with a focus on finding general information technology needs among shop stewards, but also was integrated with part of the design groups work with the organisational analysis phase, for confirmation or modification of results. The Future Workshops served similar purposes as one was held in the design group and the other was held with shop stewards external to the group. The participant observation, interview and focus group data (Paper IV) was first analysed by the researcher performing the study (the author of the thesis), then evaluated by the entire design group by integrating the findings with the prototype in the prototyping phase. The prototype evaluations were mainly undertaken with a focus on information technology and system solutions, the data being analysed by the system developers/researchers. However, the emerging results were integrated with the prototype under construction in the design group, and were seen as an important part in modifying Participatory Design for organisational use by capturing different voices in the design process. The data analysis in the final study had as its focus the consequences of implementations of different information technology applications at the local trade union level. However, the analysis should also be seen as a partial evaluation of the modified Participatory Design approach, in that the hypotheses produced by an Activity Theory analysis in the study preceding it, were initially tested. The data collected from the design group meetings related both to information technology and information systems applications in the trade union, non-profit context and to developing Participatory Design by means of the researchers analysing the experiences of applying the Participatory Design approach.
Chapter 5

Results

This chapter describes the scientific and practical results achieved in the thesis work. The chapter is divided into three parts. The first part presents the results of each thesis paper. The main findings and contributions of the papers related to the thesis are summarised in Figure 4. Following this, the extended Participatory Design approach, that is partly to be found in the papers, is described in more detail. The final part presents additional modifications to Participatory Design that emerged from the design work, and integrates all results into a final modified Participatory Design approach. In general, the first part of the chapter relates equally to the subject of information technology in trade unions and non-profit organisations as to systems development aspects. The second and third part mostly pertains to systems development, even if knowledge of the first subject has naturally even been generated.

5.1 Summary of appended papers

The papers are described chronologically, in the way they have gradually added to the knowledge base on shop stewards and the union organisation from the perspective of information technology and systems development. Papers I, III and IV treat both the subject of shop stewards, trade unions and information technology, and the subject of extending Participatory Design to use in large organisations, especially those with a non-profit, heterogeneous character. Paper II adds to the knowledge on shop stewards’ work situation as a pre-requisite for developing information technology support. Paper V discusses the use of Activity Theory from an overall organisational perspective and for systems development, as part of the theory’s integration with Participatory Design for foreseeing consequences of design solutions, but also as to how the introduced system will influence the specific trade union context. Paper VI is an initial and partial evaluation of the hypotheses proposed in Paper V, through the investigation of how
the introduction of information technology has influenced the local union level in one of the Swedish Trade Union Confederation affiliations.

5.1.1 Trade union management and shop steward perspectives on information technology (Paper I)

The study was undertaken in the initial stage of the DLK project, with the aim of exploring and comparing information technology needs of shop stewards with trade union management strategies as regards the new technology. The results of the policy review and the Future Workshop, above all, pointed at a substantial discrepancy between management’s vague and sometimes conflicting aims with the new technology and the shop stewards’ very concrete and down-to-earth needs. While trade union management in 1998 used the concept of information technology in a rhetorical manner as being used to enhance democracy and knowledge retrieval for union members and shop stewards, the actual comprehension of what knowledge retrieval should be sustained was, to a large extent, undefined. (This may of course have changed since then, due to continually growing information technology maturity). Moreover, the management level proved to have conflicting ideas about whether information technology should be used to reinforce communication and the union collective, or to emphasise individual knowledge retrieval and to increase the independence of shop stewards. Meanwhile, the needs of shop stewards emerging in the Future Workshop were concrete and explicitly defined. They included training in forms of courses for factual union orientation and development of personal competence, creation of support networks among shop stewards, and the effective management of union information through an information "repository" containing laws, agreements and case-based information. The study highlighted the need for Participatory Design for capturing the needs of users, as well as the necessity of complementing the approach with an overall organisational focus in which other organisational layers and groups of users in some way related to the system, in this case trade union management, are also heard in the development process in order to arrive at a system solution that will actually be implemented, administered, used and usable.

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5 In the study, the term union representative was used to denote persons with a part-time union assignment in addition to their ordinary job. This term was later substituted with shop steward, which is used in the subsequent studies. Likewise, the term union federation is used instead of union affiliate/affiliation in Papers I, III and IV. Finally, the DLK project changed its name during the project process, substituting the term “distance education” with “distance supported learning”, as reflected in the papers.
5.1.2 The situation and tasks of union shop stewards (Paper II)
The study focused on the work situation and tasks of Swedish shop stewards, in the light of recent years’ changing circumstances for unions, and in comparison with similar international studies. The aim of the study within the framework of design in the project was to establish a picture of the situation, tasks and problems the shop stewards experience in their day-to-day union work, as a pre-requisite for finding corresponding information technology needs and solutions. 201 reported Critical Incidents were analysed. It was found that the major problem categories related to disputes with and relations to the employer (44% of problems), to relations with members (30%), to personal problems (13%) and to union organisational problems (9%). The most common consequences of problems related to experienced dissatisfaction (15% of problems), impaired relations (14%), time pressure (13%), mental anxiety (11%), and experienced mistrust (6%). As for categories, differences with regard to, above all, gender and age were found, in which women and young people related less to traditional workplace disputes and more to members and personal problems than did their male and older counterparts. The study concluded that the basic components of union work have remained relatively stable over time and among nations and pertain to shop stewards working as negotiators, informants, conflict handlers, knowledge acquistiors and continuous debaters. Meanwhile, new perspectives are taken by new generations and groups of shop stewards; and need to be supported. Some supportive measures to aid carrying out local union work were suggested, including information technology facilities such as on-line distance learning, support networks through E-mail lists, and discussion forums and electronic bulletin boards.

5.1.3 Organisational policy and shop-floor requests in design (Paper III)
The study explored the use of Argumentative Design for aiding the early phases in designing information systems, in particular Participatory Design, through addressing organisational problem identification and the needs to be supported by the system. The data analysis showed that the solutions that were reported in connection to the 201 Critical Incident descriptions mainly related to formal information retrieval/communication (31% of problems), intuitive decision-making (34%) or informal discussions (21%). As for proposed remedies to the problems, they related to formal information retrieval/communication (25% of the reported problems), informal discussions (10%), structural changes (34%), and training (20%). The needs and solutions reported in the Future Workshop greatly replicated the categories related to information, communication and training, but were much more information technology oriented. A modified ArD notation was used in the Argumentative Design analysis. The data results and the study baseline from the policy review in Paper I were used as input to the argumentative analysis. The
analysis revealed that while the central union level displays some contradictory objectives for its activities and a narrow concept of what information technology should supply, in the main related to presently existing, traditional union information, shop stewards’ needs and proposals are extensive and concrete. They include both traditional and non-traditional union information and communication, e.g., case-based information, societal knowledge and horizontal support through shop steward networks. Critical issues, which need to be considered in the design process, related to the retaining or empowerment of the present shop steward status, centralisation versus decentralisation, the strengthening or weakening of union boundaries and, the extent to which members and employers should be seen as parts of the information system. Based on the Argumentative Design analysis, a design proposal of an information system for shop stewards, built on their needs but also paying attention to the trade union management perspective, was presented. The design proposal included, e.g., a laws and agreements database, a case database, discussion forums and electronic bulletin boards to be accessed by shop stewards, as well as members, an address book and access to on-line electronic courses. The main conclusions from the study were that Argumentative Design can bring major benefits to the early phases of the systems development process by eliciting fundamental organisational issues and by illustrating the impact selected information technology solutions may have on these issues. As regards Participatory Design, the argumentative approach supports a partial extension of perspective outside the immediate user group, paving the way for system solutions that have a greater chance to be compatible with an entire organisation.

5.1.4 Capturing the voices in design (Paper IV)
The study aimed at extending the Participatory Design approach to be applicable also in large organisations by capturing and modelling the voices of different direct and indirect user groups in the design process. The theoretical framework of Activity Theory was used to merge the different voices collected from participant observation, interviews and a focus group interview, and a scenario-based prototype evaluation, with the voice of shop stewards that had emerged from previous studies. In particular, these voices were used as input to modelling the union community with respect to work activities, subject, object, tool, rules, inner contradictions and labour division. It was found that the Swedish Trade Union Confederation is characterised by a hierarchic structure and pronounced labour division in which level is directly related to function. Meanwhile, the organisation is presently undergoing a change in which the previous focus on work relations is extended to comprise the entire life situation of union members. The issues emerging from the scenario-based prototype evaluation mostly relate to how the system is to be administered. When comparing these findings to previous studies, it
was found that shop stewards often use a task-oriented, operative voice, and middle-level union ombudsmen use an organisational voice, and union federation management use an ideological voice when relating to information technology. The Activity Theory analysis showed that the union organisation displays fundamental inner contradictions in and between activity systems, e.g., related to long-term goal-oriented activities versus day-to-day operative tasks, workplace disputes versus total the life-world of members, and formal workplace disputes versus soft issues. The union organisation presently stands at a crossroads, and the choice of information technology will directly influence the direction to be taken by the organisation in the future. Based on the findings, a modified prototype of an information system for shop stewards was proposed. One conclusion from the study is that Participatory Design, if it is to be applied to large-scale projects in entire organisations, must be extended to all parties in the design process. All parties must be heard, in order to arrive at system solutions that can actually be implemented, used and administrated. In other words, the design group’s work must be complemented with data collected externally. Activity Theory can help in this process, by summarising the disparate voices and providing an organisational overview.

5.1.5 Activity Theory as a framework for systems development in entire organisations (Paper V)
The study set out to explore how the theoretical framework of Activity Theory can be applied to the analysis of entire organisations and in systems development. For the thesis, the aim of the study was to gain knowledge about how Activity Theory can be used to support the integrated Participatory and Argumentative Design approach by providing an organisational overview in foreseeing consequences of different design solutions. Data from previous papers were merged with knowledge gained from practical design work in the local design group. Based on this combination of results, an Activity Theory analysis was undertaken and visualised through an extended Activity Theory representation. First, the overall activity system of shop stewards was modelled with specific reference to collective subjects, followed by modelling of the corresponding counterparts at other organisational levels. Subsequently, the different activity systems were networked and the inner contradictions between them were visualised. Finally, envisioned changes in the different activity systems and in the object of shop stewards’ work, as a result of the possible implementation of a information system proposal in the form of the latest prototype version, were proposed and modelled. The major findings of the study relate, first, to the union organisation and its potential transformation due to the introduction of an information system for local shop stewards, and second, to the use of Activity Theory in general, in an organisational,
systems development context. In the first case, the union organisation was found to be characterised by a substantial hierarchic character with clearly defined spheres of action and power structures that were reproduced in the access to information technology tools. Inherent inner contradictions between different activity systems relate to, e.g., people living in different sub-communities governed by different rules. This leads to recurrent breakdowns of various kinds, the most important being that shop stewards experience an inability to fulfil their assignment and members become dissatisfied with their own organisation. Likely changes as a result of the introduced system include an expansion of the object of shop stewards’ work, the creation of shop steward networks and the emergence of a new collective subject, a changed division of labour with shop stewards taking over certain duties from the full-time ombudsmen who receive more supervisory and administrative functions, and power re-distribution in favour of the local level. In the second case, Activity Theory was found useful in an organisational systems development context, for providing an organisational overview, structuring voices and foreseeing the consequences of different design solutions. But the organisational approach also accentuated known difficulties with Activity Theory, e.g., those related to the conception of the object, people living simultaneously in different communities, the networking of activities, and to generalisation, that need to be considered. In the context of Participatory Design, Activity Theory aided the argumentation parts, and helped in shifting the focus partly beyond the local design group, on order to capture an overall organisational perspective.

5.1.6 Anticipated and actual organisational consequences (Paper VI)
This study was performed after that the DLK project was completed. It set out to test the hypotheses on change proposed in Paper V by investigating anticipated and actual changes which took place following the completion of DLK, as compared to the introduction of an extranet at the local union level in the Construction Workers Union. While DLK had been built on participatory principles, the extranet was designed in a conventional manner and implemented without user involvement. The study also set out to further explore the use of Activity Theory in an organisational context, with a focus on how the notion of collective subjects should be treated. It was found that the DLK project’s concept of information, knowledge, and learning had changed greatly over time. When the project started, project management comprehended the project to be about learning to use computers for retrieval of traditional union information and about union courses in an on-line format. When the project was finished four years later, the concept of information technology and learning had received a different connotation, concentrated on communication, horizontal networks, and the collaboration and exchange of knowledge and experience among shop stewards. In contrast, when the
Construction Workers’ Union made their investment in new information technology for the local union level, very limited communication facilities were included. The extranet was exclusively based on information and templates defined by the affiliation office. A focus group and interviews with section chairmen representing the local level showed that the use of the section computers and the extranet was low. Explanations included that the extranet was not based on their needs, information, training and follow-ups were insufficient, and that the computers had often been handed over to the wrong person and place. In comparison, communication facilities external to the extranet, such as E-mail, were more used and were often a private initiative. Horizontal networks had just started to emerge. In one section, a true enthusiast had carried out far-reaching change work supported by communication technology, resulting in cross-section collaboration and a more vital section which took over some tasks from the region department. In retrospect, the actual use of technology did not differ substantially between the two design projects, despite their discrepancies as to user involvement and information technology facilities provided, one conclusion is that users target existing technologies towards their social situation and specific needs. Within the framework of the thesis, the proposed hypotheses emerging from the Activity Theory analysis of task-related change and organisational effects following the implementation of the proposed information system for shop stewards in Paper V were partly confirmed. The creation of horizontal networks and the emergence of new collective subjects the analysis had predicted, have just started to occur, even though access to communication technology is much lower in the extranet than it is supposed to be in the information system for shop stewards. In contrast, the hypotheses on empowerment and change related to increased access to information at the local union level were not initially confirmed, perhaps owing to the deficiencies in the extranet investment as perceived by the respondents. Even though the proposed information system for shop stewards contains partly another type of and more information than the extranet, based on the needs of users, it seems that extensive information, training and follow-ups must accompany its implementation. The Activity Theory analysis showed that the section chairpersons in each section directly influenced the extent and character of organisational change. It is argued that classification of collective subjects is necessary when applying Activity Theory in an overall, organisational context, to avoid simplified interpretations.
The main contributions of each study to the thesis are summarised. The methods applied in each study are shown to the right.
5.2 Participatory Design, Argumentative Design and Activity Theory – an integrated design approach

The papers all relate in part to the endeavour to extend Participatory Design to suit the context of large organisations. From the beginning, the researchers in the design group recognised that Participatory Design as it has most often been applied would not suffice when designing an information system for an entire trade union confederation. Therefore, the approach was extended to include elements of Argumentative Design and Activity Theory. The integrated design approach and the contributions of its different parts is summarised in Figure 5.

Figure 5. The integrated design approach with the perceived contributions of the different parts in the middle.

5.2.1 Participatory Design, Action Design and Argumentative Design

Action Design expands Participatory Design in that not only the direct users of the system, but also other groups that will be affected by the system one way or the other are represented in the design group. But since these groups in this case were so numerous, belonging to different union levels and affiliations, they could not be guaranteed representation in the group. Instead, they had to be reached by data collected externally to the design group. This in turn meant that Argumentative Design, which is also a part of the Action Design methodology, received increased emphasis in the design process, in that the voices, not only of the design group participants, but also of other groups affected had to be analysed, reasoned and merged as input to the design proposal. Thus, work and documentation of the design group’s work had an argumentative character. Beginning with the second
meeting, a design rationale behind the intended system was successively constructed. The design rationale considered the aspects of the system that had been debated in the design group, relating both to the internal design work and to the collection of external data and different perspectives on the system, including content, administration, security, ethical, interface and technical issues. From the beginning, the design rationale from the beginning consisted of only fragments of texts taken from the video recordings of meetings, but these fragments were subsequently categorised by the researchers, and the design rationale modified until it provided a sound overview and basis for final discussions and decisions in the group about the information system proposal and the requirements specification (see Appendix 1 for some examples of the emerging design rationale). Some of the issues that were felt to be of major importance to the system, i.e., its basic characteristics, were graphically documented by one researcher (the author of the thesis) using the modified Argumentative Design notation, prior to the start of the design group work, and these characteristics were used as a basis for the initial design proposal (Paper III). The graphical documentation is exemplified in Figure 6.

**Figure 6.** Example of high level design argumentation on databases, based on the modified ArD notation.
5.2.2 Argumentative Design in the theoretical framework of Activity Theory

Further, the researchers felt that when designing an information system that, if it is implemented, will most likely have consequences for an entire, large organisation, these consequences must somehow be anticipated. Neglecting potential consequences and choosing a design entirely based on the needs of shop stewards would possibly result in that the system being rejected by those organisational levels which have the power to decide on its implementation, or that those levels that are intended to take responsibility for its administration will not be willing to do so. Therefore, the design work had an anticipatory character, greatly substantiated by the Argumentative Design process. This process was sustained by three Activity Theory analyses grounded on the empirical material collected, on the organisation and how the information system may influence the situation of shop stewards and, thus, have organisational effects. The Activity theoretical framework was intended to provide an organisational overview by merging the different voices collected in the design process, and constructing an overview picture of the organisation by connecting different activity systems and displaying their inner contradictions. Activity Theory analyses were undertaken by the author of the thesis during the second half of the design group’s work, following the graphically documented Argumentative Design analysis described in Section 5.2.1 above. After the first Activity Theory analysis, the design proposal, by this time substantiated into a prototype, was partly modified to suit the perspectives of different organisational levels (Paper IV). The second Activity Theory analysis was based on the last prototype version (Paper V), in the strive to include comprehension of and hypotheses on future potential consequences of the information system before writing the requirements specification. An example of this analysis is provided in Figure 7. The third Activity Theory analysis took place after the DLK project was completed, with the partial aim of testing the hypotheses proposed in Paper V and thereby the relevance of the Activity theoretical framework for the development of comprehensive information systems (Paper VI).
Figure 7. Envisioned changes in the overall activity system of shop stewards as a result of implementing the information system, with the perceived changes in italics.

5.3 The work in the design group: additional modifications to the integrated approach

In addition to the integration of Participatory Design with Argumentative Design and Activity Theory, the approach was further subsequently modified in the design process, as a result of emerging experiences, in general, and in order to suit the context of large organisations, non-profit organisations, and trade unions. In the following, these modifications are described. The results are mainly built on the notes and video recordings from the design meetings, which were analysed as described in Section 4.9.6.

5.3.1 The double function of the design group - performing design locally while not excluding an organisational perspective

In the DLK project, the bulk of the concrete design work took place in the local design group. However, the papers mainly relate to data collected external to the group. From the beginning, it was felt that the design work had to have a double focus. The practical design work was to take place in a local design group consisting of user representatives and system developers, and working according to

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6 The quotations are taken directly from the notes from the design meetings but have been translated. Dotted lines indicate that something has been left out, brackets indicate that text has been added.
the principles of Participatory Design substantiated by the Action Design methodology. At the same time, it was evident that all potential user groups could not be represented in the group. Work was, thus, divided between work in and data collection outside the local design group, which deviates from how the approaches are usually applied. Some data was collected and analysed by the system developers/researchers even before the work in the design group had been initiated, but later fed back to the group. At that time, in the first phase of the design group’s work, the procedures for the subsequent way of working were settled as a result of negotiations between the researchers and the user representatives. The user representatives, as was stated in the project contract, wanted the researchers to “take the main responsibility for collecting and analysing material”. The user representatives were to help in this process and to “contribute with knowledge that is relevant for the group’s work”. In practice, this came to mean that the researchers collected the data from external user groups. The user representatives gave their support in analysing this data, above all by reacting to, confirming, extending or rejecting the interpretations of the researchers, in light of their own, much more comprehensive union organisational knowledge. The design group participants thus had the double function of designers and evaluators. These double functions were evident throughout the entire design process, and sometimes the externally collected data was evaluated and used as input to practical design work simultaneously. One example is the Critical Incident survey. The problem picture that had emerged from the researchers’ analysis was discussed and in the main confirmed at the third design group meeting. As the user representatives were presented with shop stewards’ situation and perceived problems they also came to think about solutions to these problems. This aspect was further elaborated upon at the following meeting, at which sampled problems were used as input to a Future Workshop. Also the result of the participant observation at two union affiliation offices was discussed at a design meeting and used as a basis for a commonly agreed upon update and evaluation of the prototype, including a broader focus on the entire life situation of union members.

On several occasions, the design group’s work also functioned the other way round, in that design meetings were used as a basis for planning and testing practices for collecting data externally. One example was a practice of mapping out the structure of the then 18 union affiliations, as part of the organisational analysis phase. This practice was performed on a small-scale during the third design meeting in which the present user representatives mapped out the four affiliations they belonged to. The practice was subsequently modified after discussion in the group and then applied by the researchers in a large seminar for the entire DLK project, in which the seminar union participants helped to map out all 18 affiliations. Moreover, the
5.3.2 Increasing flexibility

It soon appeared that the design group experienced problems with regard to the composition and permanence of the group. First, it was hard to recruit shop stewards as user representatives, because they do the major bulk of their union work on their free time. It was simply not easy for them to take leave from work in order to participate in the group’s meetings, and even harder to receive economic compensation for this leave. Therefore, the original composition of the design group included fewer shop stewards than was the initial intention. Of the original ten user representatives, only three were shop stewards in the sense that they carried out their union work at a local workplace. One was formally a shop steward but worked at a union section and was at her ordinary job only one day a week. The somewhat low representation of shop stewards as stipulated in the principles of Participatory Design further decreased after a while, since several shop stewards successively left the group at the same time as they left their assignments as shop stewards. In the union affiliations, the shop steward assignment is often held on a yearly basis, and is not always renewed. The first shop steward that left the group was replaced by another, but the other two (the one working at the union section, and one working at the workplace as described above) were not, as this happened late in the design process. Also the two representatives from DLK project management left the entire DLK project for other assignments in the union organisation after about half the project/design process period. In the design group, they were replaced by their predecessors. In addition, a full-time union ombudsman left the group after only two meetings, and a local trade union management representative left for other duties in the organisation after about two thirds of the design meetings.

Thus, while in Participatory and Action Design the same people are most often the one that participate in design work throughout the design process, this group was characterised by some turbulence in turnover of user representatives. This meant that the group at an early stage had to consider forms for meetings and work procedures. The final project plan that was commonly agreed upon states; “the group’s work should be of the character that does not come to a stop when someone does not attend a meeting”. It was further decided that potential newcomers should be introduced to the group’s work in beforehand, through the
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auspices of the researchers and by reading material from previous meetings accessed on the Web, via E-mail or conventional mail. In this way, they could be prepared before entering a meeting, and thus not interrupt design work too much. Finally, it was decided that the group’s work should be concentrated on working with modules. Each new practice was be quick to learn and was to stretch over no more than two meetings. In this sense, design work could proceed reasonably smoothly. In practice, this meant that some procedures that are usually part of Participatory and Action Design approaches subsequently had to be abandoned. For instance, the project contract was never signed by everyone in the design group, since re-circulating it and re-negotiating with new participants would take too much time.

5.3.3 Reduction of work procedures
Participatory Design has been criticised for being a time-consuming approach not suited to the context of commercial systems development (Bannon, 1995). The Action Design methodology was designed to improve the rigidity of the Participatory Design approach, in order to secure the delivery of an end product. But even Action Design is rather time-consuming. Above all, similarly to Participatory Design, it devotes a large amount of attention to the phases that precede practical design, e.g., the establishment of commonly agreed upon meeting rules, for instance, substantiated in a project contract, reaching consensus and working out potential conflicts between user groups (Bødker, 1994). In the design group, this way of working, however, did not meet with the approval of the user representatives, as they thought it took too much time. In addition, the group had to deal with the fact that new approaches (Argumentative Design and Activity Theory) were actually added to the original Participatory Design approach, even though the researchers performed much of this work between meetings. One solution was to reduce some early Participatory Design procedures in favour of moving on more quickly to the design practices, and integrating consensus into the ongoing Argumentative Design process. In practice, this meant that some work procedures that were initially stated in the project plan were reduced or removed (see also 5.3.2). The project plan itself was not written together with the user representatives but was prepared beforehand and modified according to their suggestions. Further, initial plans for a separate organisational/information system goal analysis were abandoned and the analysis was continually performed as part of Argumentative Design and design practices. The partial switch of focus immediately met with approval on the part of the user representatives. From the fourth meeting, at which the concrete design work truly got underway through a Future Workshop the user representatives expressed much more enthusiasm, and acknowledged that they had been rather impatient during the initial procedures.
5.3.4 A focus on practical design practices
This impatience was further accentuated by the fact that many of the user representatives stated that they were not used to this way of working. In the ideal version of Participatory Design, the user representatives take part in as much as possible of the design process. This did not function at all in the design group. The user representatives clearly stated that they thought such an approach would take too much time from practical design work, and that they wanted the researchers to take responsibility for project and meeting planning (see also 5.3.3), information flow between meetings, documenting and constructing the design rationale. For instance, according to the Action Design methodology, the design group participants take turns being the meeting chairperson and jointly formulate the meeting agendas. But the user representatives wanted the researchers to take sole responsibility for the chairmanship, and exclusively propose items for the agendas themselves. In the notes from the second meeting it is stated that:

At the meeting, it was decided that the...[system developers/researchers] are to be chairpersons at the meetings. At the end of each meeting, the meeting participants shall propose items for the next meeting agenda. In due time before the next meeting the...[researchers] shall propose an agenda that the others in the group can comment upon before the final agenda is settled, at least two weeks before the next meeting.

As the meetings proceeded, however, no items or modifications were proposed. The user representatives were content with having the researchers put together the meeting agendas and only occasionally complemented it with a new item, not beforehand, but at the beginning of the next meeting. Further, they expressed a lot of impatience with work procedures such as establishing meeting rules, drawing up a project contract, project planning, and administrative routines. They saw these procedures as abstract and not contributing to practical design or to advancement of the design process. Practices for organisational analysis and analysis of the situation of shop stewards were accepted but did not meet with the same enthusiasm as those explicitly design-oriented. The design practices included, e.g., a Future Workshop, PICTIVE (a paper-based tool for users to design their own interfaces originating in Participatory Design), the construction of user scenarios and subsequent evaluations of the prototype, and the investigation of other Web sites as reference.

5.3.5 Parallel focus on needs and technical solutions
Participatory Design and Action Design are largely bottom-up oriented approaches. Participatory Design, in particular, has been criticised for focussing on the early
design phases to the extent that later design is neglected and end products are not always delivered (van den Besselar, 1998; Bannon, 1995). In the design group, potential technological solutions were introduced at a rather early stage and worked with in parallel to organisational analysis and the establishment of user needs, i.e., a kind of simultaneous bottom-up/top-down approach. In particular, existing technologies that might be of use in shop stewards’ work were tried out and evaluated by the design group. This was partly due to the overall DLK project structure, in which a technical group worked with the testing and assessment of new technologies of potential use for the trade union organisation. This meant that some of the technologies were also available to the design group. At a rather early stage, the group decided that it should make use of this availability, since it was deemed important to “design for the future, not only the present” (third design meeting). One intention of introducing technologies in the design group was to provide hands-on experience as a complement to the otherwise somewhat abstract, documentation character of some of the work. More specifically, the group tested MIMIO (http://www.mimio.com) (the ninth meeting), which is a tool for transferring whiteboard text to digital form on the computer, and GROOVE (http://www.groove.net), which is a system for the communicating and sharing documents between users who use voice input. Also, one researcher and three of the user representatives tested FreeSpeech (http://www.freespeech.com), a tool for generating text on the computer by voice input. This was because some of them also had other functions in the DLK project, and their experience was fed back to the entire design group. The user representatives appreciated the group’s work with demonstrating and testing existing technologies. MIMIO, in particular, was regarded as having great potential for shop stewards, who are often on the run informing at workplaces, and in need of a tool to quickly transfer their information from a whiteboard for storage on a laptop computer. FreeSpeech was deemed as possessing great potential for those shop stewards who experience difficulties in writing. However, this technology was found less mature, and something for the future rather than the present.

5.4 Summary of results

In the following section, the major results achieved in the thesis work are summarised. First, the results of relevance to the context of a large trade union federation and information technology in general, as well as the more practical results in form of the specific information system solution, are summarised. Following this, a summary is provided of the results relating to the context of Participatory Design in a large, non-profit organisation.
5.5 The Swedish Trade Union Confederation and information technology

The Swedish Trade Union Confederation is comparatively progressive as regards extensive implementation of information technology throughout the organisation, all the way down to the local level. Nevertheless, introducing information technology tools to shop stewards is a complicated process involving fundamental organisational issues. The shop stewards’ situation was found to be characterised by having to balance several, sometimes conflicting roles, and a multitude of tasks. They act as negotiators, conflict solvers, informants, debaters and knowledge seekers. Being a shop steward often implies working alone, since there is only one at a workplace. Commonly experienced problems include formal and informal conflicts with the employer, difficulties and insufficient support when dealing with members’ problems, experienced insecurity in and insufficient knowledge of the union assignment, time pressure and indifferent members. Information technology has, throughout the entire project process, been viewed as a potentially useful tool for shop stewards’ day-to-day tasks, both by themselves and by the entire organisation. Needs for information technology include above all an emphasis on communicative facilities, to strengthen, in particular, horizontal communication at the local union level. But also making existing union and societal information sources for shop stewards electronically available and easily accessed, as well as including new types of, e.g., case, real life related information will be useful. This also goes for forms and templates shop stewards can use in their day-to-day work, if these forms and templates are based on their perceived needs.

However, introducing extensive information technology applications for use by shop stewards is not an uncontroversial issue. The organisation is presently characterised by a rather hierarchic structure, with a clear division of function and tasks between different organisational levels, and with power re-produced in the use of information technology tools. Shop stewards presently have only limited access to existing union information technology applications and changing this situation involves a certain risk of re-distributing organisational power relations. Meanwhile, it is commonly acknowledged that the organisation has experienced problems in retaining union density and power, and in attracting new groups and generations of members. Many, union leaders as well as shop stewards, claim that unions are in need of renewal if these problems are to be solved. Working in new ways with new computer tools, and giving more attention to local union needs is one method for such renewal, which was substantiated by the DLK project. Information technology has great potential to influence the future direction of the
Swedish Trade Union Confederation. An information system used by all its shop stewards is one such influence.

5.5.1 An information system for union shop stewards
The results of the design group’s work, through the 20 design meetings and the design rationale that emerged from them, in combination and interplay with externally collected data, were substantiated in a requirements specification and a Web-based prototype of an information system for shop stewards, to possibly be implemented in all the blue-collar union affiliations. The prototype is thereby based on the needs and requests of shop stewards, but also considers the voices of other organisational levels. It is thereby aimed to be both useful for local union work and to have the potential to be accepted, implemented and maintained by the organisational levels which are perceived to have this power and responsibility.

The prototype was implemented in DreamWeaver (http://www.macromedia.com/software/dreamweaver/). Its successive development is described in Papers III-V and the last prototype version is summarised below. The prototype has been designed with consideration to content, interface, technology, administration, security and organisational consequences issues. The result is further documented in a requirements specification based on the design rationale and covering the same issues as the prototype. The requirements specification and the prototype are intended to serve as guidelines for entire or partial implementation of an information system for shop stewards on the part of the Swedish Trade Union Confederation union affiliations. A general overview of the prototype, with its basic facilities exemplified, is provided in Appendix 2. For a more detailed presentation, see Irestig et al, 2002 and Ericson et al, 2002.

The prototype is a Web-based, platform, hardware and software independent solution. It is intended to be compatible with the structure of the union organisation, in which people are geographically widely distributed and use many different platforms, and in which access to PCs computers varies significantly. It is also intended to be entirely or partially implementable, since existing information technology applications vary substantially between different affiliations. The prototype has three interfaces, one for shop stewards, one for union members and one for the public. The main facilities provided in the shop steward interface relate to information, communication, training, and tools for writing. The information part includes the computerisation of existing union information sources (e.g., laws and agreements), as well as sources that are entirely new (e.g., a case data base) and links to external sources of relevance for union work available on the Web. It also includes service offers to members, information that today seldom reaches the shop
The proposed information system solution for shop stewards has a self-supportive character and further introduces new horizontal communication possibilities between the stewards. If it is implemented in the union affiliations and used by a substantial part by the 225 000 shop stewards, the system will, most likely have consequences for their work situation and for the entire union organisation. Potential outcomes include an expanded object of shop stewards’ work and their increased independence, the formation of shop steward networks and a new collective subject. This, in turn, will likely lead to a change in labour division in the organisation, in which shop stewards take over certain tasks currently performed on other levels, for instance, giving the full-time ombudsmen more supervisory and administrative rather than active support functions. A change in labour division will, in turn, probably lead to organisational power re-distribution and an empowerment of the local level. An initial evaluation of the consequences of the implementation of an extranet for the local union level in one of the affiliations, showed that extended communication facilities, above all, have the potential to provide for this development. Even though such facilities were not included in the extranet, they were used, in many cases on a private initiative for horizontal communication. The creation of networks had only emerged, and only in one section had any real change in terms of cross-sectional collaboration, labour and power re-distribution already taken place. But considering that the trend experienced an increase in horizontal communication in almost all cases, an information system that actively promotes such communication will, it is believed, have more far-reaching consequences.
5.6 Systems development in a large NP/NGO

In the DLK project, design work took place in the context of a large NP/NGO. The design process was guided by Participatory Design, substantiated in and more formalised by the Action Design methodology. Even before concrete design work started, it was decided that the Participatory Design approach had to be partly modified and re-conceptualised in order to suit this organisational context. It was impossible to represent all potential direct and indirect users in the local design group, since the organisation consists of different levels and different affiliations, has a geographically dispersed character and a marked heterogeneous user group with unions organising numerous types of workers. Therefore, additional data had to be collected external to the group. Some of the data was collected by the system developers/researchers even before the design group started up. Work in the design group came to have a double focus; on practical local design, and on evaluating and merging of externally collected voices into local design work. Design thus became an interplay between the local design group and the overall organisation, in which the design group also prepared for design practices held outside it. In addition, Participatory Design was complemented by an Argumentative Design focus, which is part of the Action Design methodology, but which here received increased emphasis. It was felt that this would support the process of merging all the different voices in the design. The argumentative focus, in the theoretical framework of Activity Theory, intended to support providing an organisational overview and foreseeing organisational consequences of different design solutions. The frameworks’ usefulness in predicting consequences was also initially tested.

However, as design work proceeded, it became clear that the extended Participatory Design approach had to undergo further modifications in order to suit the large, NP/NGO, trade union context. First, the approach required increased flexibility as the trade union organisation in itself entails some rotation of people on assignments, which means that some people come and go in the group. One solution to this problem was to make the design group work with modules rather than longer exercises and design practices, so that work would not be interrupted if a new person entered the group. Working participatory with the project contract and project planning became problematic and these procedures where shortened and partly substituted by concrete design, and hands-on practices. Another reason for making these substitutions was that the user representatives became impatient with the early, and as they saw it, prolonged design phases, including the establishment of work routines and organisational analysis. This way of working did not comply with union traditions and usual procedures. The modifications were also made in order to move forward more quickly and secure delivery of the final
prototype and requirements specification. Finally, the design group started to look at existing technologies at an earlier stage than is usually the case in Participatory and Action Design, thereby complementing the bottom-up with a top-down approach. Also this was done for two reasons; to avoid losing aspects of the future and technologies that can actually be used to comply with user needs, and because the technology testing was much appreciated by the user representatives in the group. The final, modified, extended and integrated design approach is summarised in Figure 8.

**Figure 8.** To the left, the modifications that were decided upon before actual design work started, are displayed. In the middle, the double focus on design and evaluation in the group, which was agreed upon in initial design work, is displayed. To the right, additional modifications, emerging gradually as experience from design work, are displayed. The double arrow indicates the interplay between Argumentative Design and Activity Theory.
Chapter 6
Discussion

The contributions of this thesis relate to two areas, information technology in the third sector and, more specifically, trade unions; and to Participatory Design and its need for renewal if applied in the design of information systems for large organisations, especially those with a NP/NGO, heterogeneous character:

Contribution 1: This thesis contributes to development of knowledge and experience in the emerging research area of NP/NGOs, in particular trade unions, with a focus on experienced problems, information technology needs, design solutions and their consequences.

Contribution 2a: This thesis contributes to existing Participatory Design methods by adapting them for use in comprehensive systems development projects involving large organisations and user groups, in general, and in NP/NGOs and trade unions, in particular.

Contribution 2b: This thesis contributes to the extension of existing Participatory Design methods to explicitly embrace also a focus on organisational aspects of implementing design solutions, e.g., through the integration of Participatory Design with Argumentative Design and Activity Theory.

In the following, the findings of the thesis as related to Participatory Design are discussed at three levels, generally, in the context of large organisations, and in the context of the third sector and trade unions. This is followed by a discussion of NP/NGOs, trade unions and information technology.

6.1 Participatory Design – in need of renewal?

The benefits of Participatory Design have been pointed out repeatedly (see, e.g., Cherry & Macredi, 1999; Reich et al, 1996; Bjerknes & Brattetieg, 1994; Schuler...
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& Namioka, 1993). It has been claimed that traditional systems development methods fail to capture the chaotic, dynamic nature of human and organisational behaviour, and the social factors that are of utmost importance for successful implementations of information systems; and also that Participatory Design can be a support in overcoming these failings (Cherry & Macredi, 1999). But the approach has also been exposed to criticism. As early as the 1980s, Hirschheim (1983) investigated participative design approaches and found that they were much more complicated than literature contended, and, even though universally praised by the participants, were never applied a second time in organisations. Since then, several particular problems experienced with Participatory Design have been highlighted. These include obstacles in gaining access to and motivating potential users to participate in the design process (Grudin, 1993), and in the collaborative design process itself (Doll & Deng, 1999). In the latter case, studies have shown that full-user participation when it comes to, e.g., project initiation, information flow analysis and format design, is neither effective nor appreciated by the users. They tend to want to leave these issues to the expertise and focus on information needs (Doll & Deng, 1999). Also, several authors have pointed out that Participatory Design is actually seldom used in concrete, product-oriented projects; that its principles are not in agreement with the real life industrial context outside academia; and that, once it is applied, it only results in small-scale, stand alone IT-applications (Tollmar, 2001; Trigg, 2000; Kensing, 2000; van den Besselar 1998; Beynon-Davies & Holmes, 1998).

The experience generated from design work in the DLK project confirms many of these findings. Even if the focus of this thesis work is on the large organisational and NP/NGO context, it appears that some experience also relates to applying Participatory Design in a more general sense. For instance, even though the initial intention was to provide user representatives with full user participation throughout the process, it gradually became clear that these intentions were not compatible with efficiency or user satisfaction. Once changed work routines were decided upon, design work proceeded much more smoothly, quickly and productively. The trade-off was a somewhat increased workload for the researchers. Perhaps full user participation is an utopia that needs to be compromised in order to achieve functioning design work. In the design group, the user representatives did not feel that they lost anything with the new work procedures; but rather that they could contribute more to the concrete design of the information system. Likewise, the evaluations of existing technologies were greatly appreciated as a complement to paper exercise and more abstract, paper-oriented design practices. The decision to map identified needs against technology at a reasonably early stage emerged gradually in the design process, and was only initially tested with a few
technologies. One conclusion is, however, that organisational analysis important as it is, can be beneficially combined with such practices. In The Future Workshop you look at technology to a limited extent and there are other such techniques as well, but perhaps such aspects should be more emphasised throughout the entire design work. Thinking of technology earlier in the design do not only contribute to delivering a technically feasible end-product, but may also enhance user representatives’ pleasure with design work, an aspect which is often forgotten but crucial for successful Participatory Design. Of course, the perceived risk of users being restricted to think in terms of existing technologies, which Participatory Design attempts to avoid, must be considered, but parallel organisational analysis should reduce this risk.

In relation to the above, it has been argued that Participatory Design should be merged with other design approaches, such as Rapid Application Development and Computer Supported Cooperative Work in order to complement social with practical acceptability of the systems, and to evaluate the technologies developed using the Participatory Design approach (Beynon-Davies & Holmes, 1998; Kensing & Blomberg, 1998). An important step in the process of renewing Participatory Design is to survey present systems development approaches, finding out where mergers can beneficially be made. Also, Participatory Design was, from the beginning, a rather loose approach, comprising a wide variety of available techniques (Kuhn & Muller, 1993), even if some groups have systematically organised their practices into a coherent approach (Kensing & Blomberg, 1998). Action Design is one such attempt, aimed at providing more rigidity and a stepwise procedure with a delivered product as the eventual focus. Also the extended and modified Participatory Design approach needs documentation and formalisation, providing the design group with a reasonably clear design agenda from the very beginning of the process.

6.2 Participatory Design for large organisations

Participatory Design has also been criticised for only being used in isolated project contexts, targeted towards small organisations or parts of organisations, presuming a limited, rather homogeneous user group (van den Besselar, 1998; Graham et al, 1998; Clement & van den Besselar, 1993). This is probably part of Participatory Design’s ideological inheritance, in which workers at a single workplace were the target group, and the one presumed conflict was between workers’ and managers’ perspectives (Törpel, 2000; Greenbaum, 1996). It has been noted how contemporary organisations move away from traditional co-determination,
displaying heterogeneity, multiple hierarchic levels as well as horizontal interest
groups (Törpel 2000; Bødker, 1996). It has been suggested that local and
organisational activities must interact, in order to extend the applications of
Participatory Design beyond the workplace to entire organisations (Törpel, 2000). 
Only in this way, can more comprehensive information systems be designed. The
interaction might be achieved through local development and testing in the wider
organisation, in order to explore potential for generalisation (Törpel, 2000).

In this thesis, such local and organisational interaction was reached in two ways.
First, data was collected external to the design group from various interest groups
in the union organisation, but integrated with the groups’ work. And the other way
round, local developments were, as suggested by Törpel (2000) above, tested in
different parts of the entire organisation. In particular, the prototype was mainly
developed locally but also evaluated by other user groups in an iterative process,
and modified according to their suggestions. Needless to say, the extension of
external voices to local design work created an extra workload for the researchers,
since they had overall responsibility for data collection and analysis and external
evaluation of prototypes. Still, it was felt that this was a trade-off that could be
reached within the project time limits, if the additional tasks partly replaced some
of the other Participatory Design and Action Design usual early administrative and
somewhat pro-longed consensus reaching procedures. It seems that an overall
organisational approach and design of comprehensive information systems demand
this trade-off, where some tasks are added and some are reduced, as compared to
Participatory Design, as it was originally applied.

6.2.1 Argumentative Design for merging of voices
The extended Participatory Design approach was supported by using
Argumentative Design and Activity Theory, for analysing data and merging the
different voices in design. Bahktin’s notion of voice, which has been adopted by
some Activity theorists (see, e.g., Carpay & Van Oers, 1999; Moro 1999;
Engeström, 1995), inspired an approach in which potential different direct and
indirect user groups were mapped, e.g., with regard to different organisational
levels and affiliations, and using different data collection methods. The different
user groups were spelled out as voices bringing their specific perspectives and
knowledge to design. Argumentative Design has been proposed to be integrated
with Participatory Design due to that both emphasise argumentation and a certain
degree of consensus in reaching design decisions (Buckingham Shum, 1996). In
this study, Argumentative Design was found useful in capturing different
organisational perspectives of design, for locating important design issues and
tracing different design options and criteria. The emerging design rationale
documentation, including a categorisation of different aspects of the design, provided a valuable basis for the requirements specification.

However, even Design Rationale and Argumentative Design, which were actually added to the Participatory Design framework, are approaches that can be criticised for being time-consuming. This was partly solved by having the researchers document the argumentative process between meetings. Design Rationale has also been criticised for lacking focus, not providing for powerful notations and clear guidelines as for choosing from easily infinite design issues, and for lacking a rationale representation scheme that organises information according to its relevance to the task at hand (see, e.g., Fischer et al, 1996). It has further been argued that there are no clear guidelines as to how to transform short-term group argumentation and memory to long-term organisational memory and documentation (Buckingham Shum et al, 1997). Also the argumentative process at the meetings, in retrospect, was found to be somewhat prolonged, focusing more on proposals and argumentation itself, than on motivations behind arguments and actually reaching a decision, which also rendered the documentation process more difficult. After about two thirds of the meetings it was evident that criteria for when the argumentation process must stop had to be defined, and which compromises with the ideal of full consensus had to be made. It seems as if even Argumentative Design must define more specified criteria as to what design issues are most relevant, when is argumentation to be disclaimed in favour of reaching a design decision and how are group decisions to relate to the long-term organisation memory and perspective. Probably the original Participatory Design ideal to reach full consensus must be compromised even here. As for sources of inspiration for future applications of Argumentative Design, recent work by Conkling et al (2001), in which they work with a hypertext system aimed to support the transformation of short-term argumentation to a wider perspective and also to support work across communities of practice, may be used. A further possible source of inspiration for calculating and ranking the importance of design issues is Quality Function Deployment (QFD), which has been used in combination with Participatory Design (Hallberg et al, 1998).

6.2.2 Activity Theory for providing an organisational overview
Activity Theory has been claimed to bring benefits to systems development in terms of bringing context and notions of dynamics, expansion and change in activities to the design process (Ditsa & Davies, 2000, Kuutti, 1999; Bardram, 1998; Kuutti, 1991). In particular, it has been claimed that the theory provides certain instruments to deliberately deal with the change process information systems are often aimed to support, i.e., to foresee task and organisational changes
(Bødker, 1991). Nevertheless, concrete applications in information systems developments projects are largely absent (Hasan, 2001a; Kuutti, 1999). And if they exist in this context, they mostly relate to deriving requirements from a certain work situation, designing single applications and being focussed on the task level (see, e.g., Turner et al. 1999; Bardram, 2000; Tuikka, 2001; McGrath & Uden, 2000). There is no full integration of the theory as a prescriptive part of entire systems developments approaches (Hasan, 2001a). As regards Participatory Design, there have been endeavours and proposals to make Activity Theory, as it is used for developmental work research, serve the design (see, e.g., Bødker, 1994). But these studies have often had a different focus, for instance, applying Activity Theory in analysing the Participatory Design process itself (see, e.g., Hyysalo, 2000; Sjöberg, 1996). There have been no attempts to fully integrate Activity Theory as part of the Participatory Design approach. This is in spite of claims that the theory has to be combined with other approaches and methods in order to support information systems development and research (Truane, 1991).

Moreover, Activity Theory, in general, is mostly used for analysing activities involving individual subjects and local work communities in parts of organisations, not an organisation in its entirety (Ellison & MacGrath, 2001, see, e.g., Engeström, 2001b; Hasan, 2001b). It has been claimed that the framework must take in and deal with new organisational structures and networking, as well as new configurations of more flexible work situations (Engeström 2001a; Konkola, 2001; Kuutti, 1994). Applications of Activity Theory in the organisational context have also began to emerge, for instance, studies on network organisations and the visualisation of collective objects, and on power, politics and different interest groups in processes for systems development and implementation (Kuutti & Molin-Juustila, 1998; Vrazalic, 2001). Finally, Activity Theory has been criticised for not paying attention to distinguishing between and classifying activities, and for not making a difference between and classifying individual and collective subjects (Davydov, 1999).

In the context of Activity Theory and information systems in general, analyses have pointed towards the importance of that all members in a community are represented when designing and implementing the systems for that community, so that the systems are not rejected due to cultural unfitness (Hill et al, 2001; Gobbin, 1998). It is mainly in this sense this thesis contributes to the application of Activity Theory in systems development and overall organisational contexts; through integrating the framework as part of the systems development approach, in early design phases, for structuring the community members’ interests and anticipating organisational effects of the system under design. In the study, the use of voices in a dialogue
employed by some Activity Theorists was applied to the analysis of different design voices. More specifically, Activity Theory was used for aiding the argumentative parts in the design work by merging the voices and constructing an overview of the organisation, its activities and inner contradictions and how the organisation may be effected as a result of the emerging system solution. The approach was found beneficial in that it provided a structural framework for making sense of the different layers of multiple voices, and gradually establishing a common basic picture of the union organisation. Above all, in combination with Argumentative Design, it helped to foresee potential organisational consequences of the proposed system solution. Participatory Design has, traditionally, been customised towards a small group of direct end-users, for whom changes due to the technology may be palpable but hardly reaching to the entire organisation. But when designing for diverse user groups at a multitude of organisational levels and units, Participatory Design needs to pay more attention to the change aspect itself, avoiding local developments that have unpredictable organisational consequences.

The initial testing of the hypotheses (Paper VI) that has been generated from the Activity Theory analysis also shows that these are reasonably relevant, in particular regarding increased horizontal communication and the emergence of new collective subjects. Changes related to increased information retrieval and a more knowledgeable local union level, were less confirmed even though all sections in the evaluation study acknowledged that they had access to more information unfiltered by the union departments, following the implementation of information technology. But it should be noted that the extranet for the sections and the information system proposal for shop stewards are rather different, the content of the former being pre-defined by a central union affiliation office, the latter being based on the needs of, and developed together with the users. In this respect, the hypotheses proposed seem relevant, and the Activity theoretical framework usable in the context of considering organisational consequences when developing comprehensive information systems for entire organisations.

Of course, even the Activity Theory analyses are an additional effort to be undertaken in the design process. In this case, this effort was undertaken by one of the researchers (the author of the thesis), greatly owing to the users’ preference to work with concrete design practices rather than with organisational analysis. Future research might concentrate on more fully integrating Activity Theory with the Participatory Design approach, through formalisation as to when and how it can be applied, and perhaps through partial simplification so that it can also be used by design group participants with little beforehand knowledge. There are also some difficulties identified with applying the Activity theoretical framework on an entire organisation, e.g., with regard to double structures, networking, the treatment of
collective subjects and generality, and to distinguish between activities, practices and actions, as described in Papers V and VI, and summarised in Sections 5.1.5 and 5.1.6, respectively. These difficulties need to be further considered. The framework and potential extensions and modifications of its notations and models, e.g., with regard to classifying subjects, networking different activities in an organisation, the phenomenon of double structures when subjects simultaneously belong to several activity systems, and linking different levels of overall activities, are candidates for future research. Nevertheless, the perceived benefits of using Activity Theory in connection to design were judged to outweigh the difficulties. Hyysalo & Lehenkari (2000) have applied Activity Theory in a Participatory Design project for finding crucial user voices missing in the design process. Once having located these voices, bringing structure to them is equally important.

6.3 Participatory Design in NP/NGOs and trade unions – pre-requisites

It has been argued that present systems development methods are not suited to the emerging context of the third sector, and that user participation is especially important in non-profit organisations (Morgan, 1995). The third sector possesses certain characteristics that differentiate it from profit-oriented organisations. First, much of the work is performed by unpaid volunteers who make up the membership of the organisation in question (Lundström & Wijkström, 1997). It has been noted that this situation may enforce certain difficulties in carrying out Participatory Design projects and systems development in general; non-profit groups typically operate with little money outside their ordinary job and find it hard to allocate time for design work (Trigg, 2000; Morgan, 1995). Moreover, the user group in non-profit organisations is often markedly heterogeneous, with different levels of computer literacy and sometimes with different information technology needs (Zielstra, 1999; Hallam & Murray, 1998), and in many cases is geographically distributed over large areas. NP/NGOs occupy a position between the family, employer, and state, where rather loosely connected people are supposed to cooperate with each other (Sjöstrand, 1995; Qvarsell, 1995). This is to be compared to many other organisations and workplaces where most personnel are situated under one roof, experience a joint work situation, have a similar vocation background and, to a certain extent, share company culture and ideology (even though, of course, different perspectives exist here, as well). Even members of non-profit organisations share a common ideology which is the foundation of their organisational belonging (Lundström & Wijkström, 1997). But, apart from that,
they are often found at a multitude of work places differentiating in size, structure and culture, and have much various demographic backgrounds with regard to, e.g., age, gender, education, family situation and computer maturity.

As for the specific case of trade unions, shop stewards can receive some compensation for absence from work when carrying out parts of their union assignment. Still, they perform most of their tasks on an unpaid basis, outside their ordinary jobs. Moreover, the aspect of user group heterogeneity is further complicated in the particular case of trade union federations. At the time of the DLK project, The Swedish Trade Union Confederation consisted of 18 union affiliations, almost giving the organisation an inter-organisational structure. Some of the affiliations have similar, some very different internal structures, characteristics and cultures. As an example, in the Construction Workers’ Union, the sections replace local clubs; the latter is absent in the affiliation, since construction workers work at temporary workplaces, on buildings under construction. In addition, it has been noted how occupational and union boundaries do not always coincide (Trice & Beyer, 1993). A further aspect of trade unions is that they are often coloured by culture-based action and oral forms, and a tradition of getting things done and circumventing formal contracts (Trice & Beyer, 1993).

6.3.1 Implications for design
The NP/NGO, trade union context was perceived to have significant impact on certain aspects of the design work. Above all, the characteristics of the shop steward assignment posed problems for the design group. It has previously been noted how Participatory Design imposes a rather substantive investment of time for the user representatives who are not always willing to devote this time (Trigg 2000; Grudin, 1993). In the case of grass-root shop stewards, they were often, in addition, not even allowed to devote this time, because design meetings were held at ordinary working hours and had no relation to their normal jobs. The group’s final composition included a larger proportion of representatives from higher union levels than shop stewards, which had not been the intention when recruiting user participants. In addition, only four-six (this varied with the turnover and replacement of user representatives) of the 18 union affiliations were represented in the group; a representation of all affiliations was not possible. These circumstances were taken advantage of to inform the extensions that were made to the Participatory Design approach, e.g., in terms of external data collection. In retrospect, it appears that even though the affiliations in some cases differ substantially from one another with regard to structure and union terminology, the basic needs for an information system among their shop stewards remain the same, as do overall organisational issues and constraints.
The circumstances of the non-profit, union context also necessitated an increased flexibility in the design group’s work with a focus on working with modules. Of course, it is common in Participatory Design that the tools are reasonably easy-to-learn and fast to use, given that the user representatives have little previous design experience (Ehn et al., 1996; Bødker et al., 1993). But the original approach still presumes continuity and a stable design group based at a common workplace. In NP/NGOs and trade unions, this is seldom the case, making some aspects of Participatory Design, such as full user participation in all aspects of design work, extremely difficult to carry out. In the design group, some of the most time-consuming aspects of early design work preparation, such as the commonly negotiated project contract, had to be abandoned after some time with several newcomers. Also the extensive use of hands-on-practices is part of the original Participatory Design approach (see, e.g., Bødker et al., 1993). Increasing this aspect seems even more important in the trade union context, which is essentially based on an oral culture and an attitude of getting things done. In the design group, the formulation of project contract and planning aspects were actually dismissed as academic nonsense, and completely rejected in favour of more hands-on oriented tasks, including the evaluation of existing technologies. An experience in retrospect is also that routines for handling difficulties of group stability must be incorporated into the modified Participatory Design approach.

In retrospect, the modifications made to Participatory Design seem in line with its use in large, NP/NGOs. Some of the modifications emerged with proceeding design work, as part of the experienced situation. The modifications should be formalised in order to establish a more effective approach. Moreover, the problem of recruiting shop steward representatives to the group enforces a partial rethink for design work in the non-profit context. There have been attempts to have part of the Participatory Design work performed on-line in a non-profit organisation, by having the user representatives gain access to a continually up-dated database design proposal through their workstations (Trigg, 2000). Even the design group had access to an on-line version of the successively emerging prototype solution through their work or home computers. Also, all design documentation was published and continually up-dated in a document archive on the World Wide Web. Probably even more aspects of design work can be performed on-line in a more formalised manner, assuming continuous but not simultaneous interaction among the participants, in order to enhance the flexibility of Participatory Design in a context in which users have pronounced difficulties in letting daytime off for design work.
6.4 Information technology and NP/NGOs

The third sector comprises organisations ranging from charity to human rights’ and environment associations, to churches, to sports associations, to trade unions (Anheier & Kendall, 2001). In recent decades, the third sector has undergone rapid changes. There has been an increased interest in many non-profit areas greatly due to prevailing social trends. For instance, the third sector is often seen as having the potential to complement to the services, care and support usually provided by the state, and in Sweden, the form of financial state support has tended to become more directed towards specific engagements at the local level (Lundström & Wijkström, 1997). These changes may result in that the service aspect of voluntary work becomes more emphasised, and that local members receive increased responsibility and a greater need for information and support. NP/NGOs, in particular charities and grassroots organisations, were noted as early adopters of the Internet; marketing themselves and creating grassroots networks (Shreve, 2002) and today (March 2000) their presence on the Internet seems innumerable. It has also been noted that those citizens most negative to contemporary, traditional democratic institutions are the most frequent Internet users (Taylor & Burt, 2001). The Internet offers great potential for NP/NGOs to spread their messages, expand their sphere of activities, linking groups of grassroots in networks and providing for collaboration and transnational, cultural exchange. The potential that advanced information technology has for the third sector in terms of change processes and member services has only recently been noted (Burt & Taylor, 2002). For instance, it has been claimed that electronic networks and www databases are suitable information and communication resources that are beginning to be explored by the third sector (Burt & Taylor, 1999; Hallam & Murray, 1998). Nevertheless, it has also been claimed that when NP/NGOs make more formal investments in information technology, they still favour applications used for administrative and operational routines; not applications that can be used for reconfiguring external networks, rescoping organisational missions or achieving strategic learning (Burt & Taylor, 2001). Non-profit organisations still lag behind as regards, e.g., access to computers, hardware as well as software. Having less financial resources than the private sector, many of them have been dependent on donations of and reuse of technology (Shreve, 2002). However, this is about to change. In recent years, several computer companies have been seen to produce software especially targeted towards the third sector, and non-profit organisations are recommended to develop technology plans and assess their needs on a regular basis (Shreve, 2002). As part of this, research efforts, which up to this time are only emerging, are necessary.
Since the information system proposal for shop stewards is targeted towards a geographically widely distributed group of users that perform their assignment on a voluntary basis outside work hours, many solutions seem to apply to the third sector, in general, for exploring aspects of renewal beyond administrative and operational routines. Examples of this are case databases for the dissemination of real experience among non-profit organisations and their participants, and communication facilities like discussion forums and E-mail lists for the creation of networks, within and between organisations. Above all, communication facilities appear relevant for non-profit organisations in getting their members together. They can use the communication tools presented in the thesis (see, e.g., Papers III-V, Section 5.5.1 and Appendix 2.) as a source of inspiration and a base to build on. Nevertheless, the third sector comprises a wide span of organisations, ranging from, e.g., small private charity initiatives to international associations like the Red Cross. It has been noted how local information technology needs may differ among non-profit organisations (Hallam & Murray, 1998). Information technology solutions should, of course, be specifically oriented towards the non-profit organisation in question.

6.4.1 Information technology and organisational change in NP/NGOs

It is only possible to speculate as to how information technology may affect NP/NGOs. But it is today established that decentralisation and empowerment are strong motives for initiating change. The introduction of information systems has repeatedly been shown to cause organisational decentralisation, the creation of horizontal networks and restructuring of organisational boundaries (Winter & Taylor, 2001; Contractor & Eisenberg, 1990). In this thesis, the Activity Theory analysis has shown that introducing an extensive information system for shop stewards will probably have consequences in terms of an expansion of their object of work and power re-distribution in favour of the local union level. As regards non-profit organisations in general, and grassroots organisations, in particular, such organisations have been seen to use the Internet precisely for horizontal networking. Grassroots associations occupy a special position in the third sector in that they work locally, being rather small in territorial base or scope (Horton Smith, 2000). Decentralisation and empowerment then refer partly to internal organisational re-distributions, but even more to empowerment and expansion of the organisations as such. Non-profit organisations often build their work on the grassroots level; in the specific case of trade unions hierarchy seems more of an issue. It has been noted how the ever increasing communication and transport networks provide new possibilities for global “villages”, based on voluntary choices and achieved interests, rather than ascriptive roles, such as nationality, ethnicity and social class (Horton Smith, 2000). The future may seen an increase in
people rallying together and organising in grassroots information technology supported networks, and an expansion of local boundaries in grassroots organisations, hopefully initialising and realising ideals of equity, justice, democracy and the good life.

6.5 Information technology and trade unions

As for the specific context of trade unions and information technology, Shostak (1999) has noted how different lines of computer usage can be seen in the labour movement. First, it is the more regular use of centralised mainframe or midsize computers that unions have used for their own work, e.g., membership rolls, payrolls and voting records, for more then 30 years (Shostak, 1999). Second, it is the networking, on-line activities that in recent years have happened in union related movements all over the world. For instance, the LaborNet Website of the AFL-CIO (the American Federation of Trade Unions) provides official information and informal chat rooms as well as E-Activist Networks to be used by union activists (http://www.aflcio.org/home.htm, March 2002). And both international, national, and local union homepages exist all over the world, sometimes providing specialised list-servers to enable unionists to engage in free-wheeling discussions on-line (Shostak, 1999). Nevertheless, the union networking trend has but yet started, and is under continuous construction. Experienced problems so far include, for instance, limited access to computers on the part of union members. Shostak (1999) has noted how only a small minority of unionists can be found on-line, and that even fewer click on other Web pages than that of their local union. He claims that too many union related Web pages are dull and static; and too many union leaders and members are content with having it this way (Shostak, 1999). Similarly, Dator (1999) argues that a major reinvention of the unions themselves; not holding on to traditional structures and ways of working, must accompany networking activities and computer usage, if future union prospects are to be bright.

Experience from the DLK project and the thesis confirm the above observations; and in addition suggest that basic union needs do not differ substantially between nations or over longer periods of time. Shop stewards, in general, have similar duties and experience similar problems, related e.g., to negotiating, conflict handling, and member recruitment. As for information technology, it is above all the communicative, networking aspects of technology that has shown to be perceived as most useful on the local union level. Trade unions and information technology is a new and continually emerging area which thus far has been mostly
unattended by research. Results suggest that the DLK experience and the prototype can serve as a learning tool and source of inspiration for other trade unions, nationally and internationally, which wish to implement technology in a fuller scale as part of their change efforts. However, it is also important to take into account the unique history, culture, and vision of every trade union federation or local union in our world; and target potential information technology applications towards this uniqueness (Shostak, 1999). Active user participation in design is one way of capturing the needs of specific trade unions, thereby making information technology solutions thoroughly grounded and supportive of the future prosperity of the labour movement. When developing information systems for the local union level, active user participation should, in the future, also embrace explicit representation of union members in design, as they are important parts in shop-floor union work.

6.5.1 Information technology and organisational change in trade unions
Trade union movements all over the worlds have thus, in recent years, struggled with problems of a weakened position and a fading membership (Giddens, 1998). The intentions behind introductions of information technology and the use of the Internet, therefore, to a great extent reflect this struggle, in an attempt to regain power and to seek the Net for members (Shostak, 1999). This, above all, applies to the local union level, which has completely new possibilities to go on-line for the exchange of support and material in horizontal networks, and which is provided with direct communication channels to authorities and the highest union organisational levels (Laskonis, 1999). The DLK project was aimed directly at planned union organisational changes by means of appreciation, which implies that even the lower organisational levels were to have a say in the change process. Shop stewards at the local level were largely responsible for carrying out intended changes, by acquiring greater responsibility for their continuous knowledge acquisition of locally formed needs. In reference to organisational theory, as described in Section 3.1, the project reflects a strife on behalf of the Swedish Trade Union Confederation to reduce organisational role culture elements in favour of a culture drawing on achievement and support, by increasing knowledge on and belief in the union organisation at the local union level simultaneously. However, this also means that central management, despite having been the actor initiating the change process, partly loses control over the turns taken and the organisational consequences that will eventually result.

The Activity Theory analysis undertaken in the thesis work has suggested that the planned information system solution for shop stewards, if it is implemented and extensively used the way it is intended, will result in far reaching organisational
changes. The evaluation study undertaken in the Construction Worker’s Union has shown that the current implementation of information technology at the local union level had thus far only partially had task-related and organisational effects. The change process was slow and hindered by the technology, in this case, not being based by user needs, insufficient training and information on and follow-up of the new technology. In one section, however, a real enthusiast had used the technology for implementing far-reaching changes in his section. It is believed that the consequences outlined in the thesis have great potential to take place. First, some changes in the Construction Worker’s Union had occurred, in spite of the obstacles described, and second, communication facilities were used and viewed as the real facilitators of change even though they were not part of the information technology facilities provided by the affiliation office. The proposed information system for shop stewards, in contrast, has an explicit focus on horizontal communication facilities.

The proposed changes are largely in line with that which is happening on the Internet with reference to virtual communities gathering around issues of common interest (Bradley, 2001), and in the case of trade unions with the creation of grassroots horizontal networks, the transcendence of national union boundaries, collaboration for pursuing questions of common interest and the mutual exchange of experience and support. If unions manage to successfully use information technology as part of their efforts too meet present challenges, the efforts must be accompanied by new processes and forms, not merely the re-arrangement of old, familiar ones. The evaluation study undertaken in the thesis confirms this, as well as the importance of follow-ups, information and training in the new technology. The eventual result will, in this case, be comprehensive trade union organisational changes, most likely with an increase in emphasis and power on the local union level. Future research may concentrate on the actual usage of implemented information technology applications and why certain uses and changes have or have not occurred. This applies to DLK, as well as future information technology implementations in trade unions and the third sector in general.

Moreover, an extensive introduction of information technology in trade unions may possibly lead to a power re-distribution among different groups of unionists, not un-likely in favour of new, previously less salient groups. It has been acknowledged that even though new groups of unionists, such as women and young people, have received increased space in trade unionism during the 1990s, power is still mainly a prerogative of “the Old Boys Club” (Shostak, 1999). Technology is often more easily adopted by young people and may also make it easier for new groups, e.g., women and parents with small children, to become active unionists.
and influence power distribution in union organisations. Research has further suggested that organisational structures of the kind information technology would promote, e.g., less hierarchy (Lunneborg, 1990) and, in the case of trade unions, an increase in emphasis on democracy and participation (Cobble, 1993), are preferred by women. Experience from this thesis indicates that men and women, young and old people perceive their union assignment differently. Young people and women were more focussed on membership relations, member services and democratic aspects of union work (Paper II). If information technology is used in the above respects, it will also enhance the possibilities for these groups to exert influence on trade unions.

### 6.6 Limitations of the studies

The design work studied in this thesis took place in the special context of the DLK project, which must be taken into regard when interpreting the results. The project ran for four years, which meant that much time (about two years) could be devoted to work in the design group. It also meant that some technical resources were available within the scope of the overall project, facilitating, e.g., the evaluation of existing technologies. The fairly generous amount of time that could be devoted to early design work made it possible for the system developers to take on the extra analysis tasks required by the extended Participatory Design approach. Applying this design approach in another, less time- and resource intensive context would require that the experience generated from design work be more formalised in steps, providing the approach with more rigidity and guidelines for how carrying out each step. On the one hand, the use of Activity Theory in systems development, in particular, requires extensive data collection using different techniques, and a research time frame long enough to understand the activity systems under study (Ditsa & Davies, 2000). On the other hand, reductions to the original Participatory Design approach were made, which largely compensated for the additional tasks. Also, some procedures that were taken on solely by the researchers, such as overall project planning and documentation, will likely not be different in another systems development project context. In general, it is often hard to delegate to busy user representatives in design, tasks that are additional to their ordinary jobs (Grudin, 1993). It should also be noted that the delivered product in this case was a prototype that has been complemented by a requirements specification, and which has been handed over to the Swedish Trade Union Confederation and the union affiliations as a basis for possible implementations. If the delivered product on the other hand is to be a ready-to-use system, as is usually the case in the commercial context, additional modifications of the methods may be needed to integrate steps
of coding and implementation within given time limits. Nevertheless, the approach presented in the thesis may be used as a basis for such modifications.

Participatory Design was originally developed for application in Scandinavian unions, in a culture strongly based on democratic work principles and open to user representation. Kraft & Bansler (1992) have argued that the approach has limited acceptance outside the Scandinavian context, due to cultural divergence. This may apply to the modified Participatory Design approach as well. On the other hand, some of the most pronounced, prolonged work procedures based on democratic, ideological, full consensus-reaching principles have been reduced in this version. Also, it has been found that participatory approaches to systems development are especially appropriate in the non-profit context, when working with volunteers who expect control over their work in exchange for their efforts (McPhail et al, 1998). In this case, common ideological beliefs may override national cultural divergences.

The findings concerning organisational changes in the Swedish Trade Union Confederation as a result of the introduced information system solution are thus far mainly hypothetical. Paper VI provides some indications concerning which organisational consequences actual implementations have or have not had. But these findings are indicative as to the evaluation of the changes proposed in the thesis, being based on the implementation of a system with some similarities to the information system proposal in terms of the target group (local union level) and content, but also substantial differences. Nevertheless, the consequences outlined seemed reasonably relevant, and foreseeing potential and plausible organisational consequences of an information system solution is a first step in achieving an organisationally compatible implementation.

6.7 Methodological reflections

This thesis has mainly been of a qualitative and explorative nature. Much of the motivation for this approach lies in the character of the subject under study; namely scientific studies of non-profit organisations, trade unions, information technology and information systems development are still rare. Data triangulation, with different methods giving complementary perspectives, was used to enhance data validity and the accumulative building of a knowledge base. In particular, the prototype evaluations served partially as evaluations, confirmations or modifications of the picture of the union organisation, which had emerged from
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previous data collections. Also, the interplay between externally collected data and the evaluation of that data as part of the design group’s work served the purpose of enhancing the validity of the analyses.

According to the principles of Participatory Action Research, practitioners are supposed to be involved in the research process both as subjects and co-researchers (Kemmis & McTaggart, 2000). Thereby, the application of the approach is one way to enhance the accuracy of data, since the participants have a say in the analysis, interpretation and presentation of research results. In this case, this means that user representatives in the design group, which work was inspired by Participatory Action Research principles, should be able to influence the formulation of situations, problems and perceived needs of shop stewards, as well as the data analysis and presentation of the results. This has been achieved; namely by the user representatives in the design group acting both as informants in their own right, co-evaluators of the externally collected data, and co-determiners of the form of presentation of the final results (a prototype linked to a requirements specification and their look-alikes).

The thesis has been carried out as a longitudinal case study in which the separate studies were performed in sequence, each study providing a knowledge base for and influencing the subsequent study. This approach entails the risk that previous results will result in certain presumptions which bias the next study. This risk was, however, reduced by the continual interplay between the researchers and user representatives in the design group. Moreover, the Activity theoretical framework entailed certain presumptions of how reality is constructed in activity systems, thus guiding analysis of the data. This is, however, an issue that all research, especially when theory is involved, has to deal with, putting demands of carefulness, requiring caution, the capability for self-scrutiny and reflection on the part of the researcher.

Some of the methods that have been applied in the thesis have been modified from their original form. Above all, this applies to the Critical Incident Technique, the Future Workshops and participant observation at the union affiliation offices (see Sections 4.3.1 - 4.5.1). The modifications concerned a problem-oriented focus in the Critical Incident Survey to enable it to serve the purpose of finding potential needs for information technology in shop stewards’ work, and some compression of the Future Workshops and the participant observation. As concerns the compression, which entailed that somewhat less time than usual was spent in applying the methods, it was felt that this trade-off was necessary to make the methods serve design. Future Workshops seldom reach through the entire phase of feasible solutions, and therefore, it seemed unnecessary to devote a lot of time to
the Critique phase, because the survey had explored exactly the same phenomenon. Participant observation, which originates from ethnography and anthropology, has extended for application in the design of information systems (Anderson, 1994). This gives it somewhat different connotations, as a step in the design process, rather than it applying for exclusively explorative, descriptive or explanatory purposes. Shorter stays in the field are, thereby, often necessary.

The thesis’ contributions are based on findings emerging in parallel, from the data collection and analyses, and from the particular experience from applying the design methods in the local design group. It is important to make a distinction between those different sources of information. It has, in retrospect, sometimes been hard to separate the sources from each other, as data was often re-used when applying the design methods. In general, the external data collection and analyses have been performed with some more formality and rigidity, than have the analyses relating to the design methods. However, the sources should be seen as complementary, and their continuous interplay as adding to the validity of the accumulatively built knowledge base on large organisations, NP/NGOs, trade unions, information technology and information systems development.

6.8 Generalisation

The aspects of generalisation of the findings have already been discussed (see Sections 6.1 - 6.5.1). Generalisation can be made at different levels. As regards systems development, generalisation in the widest sense applies to the partial renewal of Participatory Design focusing on increasing efficiency and product orientation, e.g., by reducing some of the prolonged democratic procedures in the earliest design phases. Other studies (see, e.g., Doll & Deng, 1999) support these findings. Some aspects of the extended Participatory Design approach are most suitable for large design projects for entire organisations, i.e., local and organisational interaction in data collection and evaluation, aided by Argumentative Design and Activity Theory for merging voices (even though these aspects can be beneficially used also when designing smaller applications). And some aspects, such as increasing flexibility and hands-on practices seem, specifically relevant for the non-profit, trade union context.

As regards information technology applications in the third sector, the findings are most relevant for trade union organisations. Basic union duties and problems show striking similarities from one country to another and have not changed significantly in spite of new social and labour market trends. Scandinavian trade unions, that
have similar constitutions and live under similar regulations, can particularly benefit from the Swedish experience. But also NP/NGOs, in general, may use the information technology applications suggested in the studies as sources of inspiration when developing their own applications. Especially the communicative facilities seem relevant for the networked structure of many non-profit organisations.

Having made these claims for potential for generalisation; it nevertheless remains that this thesis is a case study that should be re-produced in similar contexts in order to qualify for far-reaching generalisations. The thesis is based on studies targeted towards the specific organisational context of the Swedish Trade Union Confederation, against a background of Swedish social circumstances, laws, and regulations, which would make a more in depth, detailed, automatic transformation to other non-profit, trade union contexts risky. The specific organisational context always needs to be studied before arriving at information technology solutions in order to target them towards the particular user groups and needs in question.
Chapter 7

Conclusions

The main contributions of this thesis relate to two areas that have been in continuous interaction with each other throughout the work; systems development in large, NP/NGOs and information technology needs and impact in the third sector, more specifically, in the trade union context.

7.1 An extended approach to Participatory Design

New organisational structures, increased inter-organisational collaboration and networking impose demands for renewal of Participatory Design. The thesis contributes with an extended and modified Participatory Design approach suited to the context of large organisations and the design of comprehensive information systems, the third sector and trade unions. In the design process, local Participatory Design work was complemented with external data collection. For analysis of the data, Argumentative Design and Activity Theory modified for an overall organisational context, were integrated with Participatory Design, for merging the externally collected voices, providing an organisational overview, reasoning about different design options and foreseeing potential task-related and organisational consequences of design solutions. This approach was found useful in that it helped to achieve interaction between locally formulated needs and organisational compatibility, and to reach a thoroughly grounded solution with an anticipating view of the information system. Initial evaluation of the hypotheses on change proposed in relation to the Activity Theory analysis showed that these were reasonably relevant, especially those parts relating to the communicative aspects of the information system.

Additional modifications to the Participatory Design approach included the increase in flexibility by working with modules, reduction of work procedures, thus replacing some early, prolonged, consensus focusing work procedures and full user participation in all aspects of design work with more down-to-earth, hands-on
design practices, for instance the parallel evaluation of existing technologies to organisational analysis. In this sense, a trade off is also made, in that the partial reductions to the original Participatory Design approach compensate for the additional work procedures the organisational perspective demands.

In retrospect, the modified Participatory Design approach has proved useful in the sense that user representative satisfaction in the design group was high at the time for terminating the design process. Moreover, the prototype was delivered within the DLK project time limits and has been acknowledged as well grounded in the organisation and in user needs’, both by the union affiliations, the overall DLK project and central management in the Swedish Trade Union Confederation. Some modifications made to Participatory Design seemed especially relevant for the NP/NGO context. However, also in general, with an increase in product focus, the participative aspect is not lost but incorporated into the argumentation process and design solution itself, in a trade-off between reality and ideology the present information society and new organisational structures seem to impose on Participatory Design.

7.2 NP/NGOs, trade unions and information technology

As for NP/NGOs and trade unions, they today occupy an important but exposed position in our society, regardless if they deal with an increase or decline in popularity and density. The third sector, in general, has fewer financial as well as technical resources than business organisations. This means that substantial efforts must be taken to make information technology applications usable for and targeted towards the perceived needs of users. In this thesis, it was found that it existed discrepancy between central union management’s information technology strategies and vague concept of “information technology for increasing knowledge” and shop stewards’ concrete, down-to-earth needs. Shop stewards’ work situation is characterised by a conflict situation from several aspects, and they act as negotiators, conflict handlers, debaters, informants and knowledge seekers. The experience obtained from this thesis is that it is often the less technically sophisticated and resource demanding communication facilities for the exchange of knowledge and support, such as E-mail lists, discussion forums and bulletin boards, that satisfy user needs and are met with approval. As for the specific case of trade unions, extending traditional union information with a broader societal scope and case based experience, and tools for self-support in terms of writing, complement the communicative aspects in sustaining shop stewards’ needs and empowerment.

As for consequences of information technology implementations, it is believed that
if extensively used from the above respects, information technology will result in an increase in shop steward independence and empowerment, probably leading to fundamental organisational changes in terms of labour and power re-distributions. Initial evaluation confirms these findings.

At this stage, the prototype has been presented for and handed over to the central union management and to representatives from the union affiliations. Several affiliations have expressed an interest to implement the prototype or parts of it, and acknowledged that, at the least, they will use the information system proposal as one basis when developing information technology applications. From a broader perspective, the information proposal presented can also be used by other NP/NGOs as a source of inspiration, as they continue to expand their present use of the new technology, providing for a society in which democracy, equity and justice receive enlarged space.
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Appendix 1.
Examples from the emerging design rationale

In the following, some extracts taken directly from the emerging design rationale are provided. The rationale version is from February 2001, at a point of time in which about two thirds of the design work had taken place. One example from each major category in the rationale is provided for illustrative purposes. These categories were then further divided into sub-categories.

Overall requirements on the system
The employer should not access the system. It might be good with different levels of access, and all might benefit from that the employer is more up-to-date as regards agreements and duties. On the other hand, such material is often of a local character and should fit better at the workplace’s potential intranet. Agreements and information of a more general character is today available at many affiliation homepages, accessible for all. Further, the union should not provide too much information to the employer, it is the responsibility of the employer’s own organisation. The decision reached was thereby that the employer should be kept out of the system. Neither should communication facilities include the employer, present contact channels are much sufficient [However, this changed somewhat, since the final design rationale and last prototype version include a public interface with some information available for all].

Communication
There should be discussion forums or mail lists for the exchange of experience. There, one should be able to contact and tip others, and also discuss current union issues. Responses must be guaranteed within a certain limit of time. Also members can be contacted. In this way, it will be possible to reach a “meeting between meetings”, that, in turn, can increase member interest for the usual meetings [discussion forum].

Information
In the section on agreements, it need not stand “Show agreement for group” since the agreements are common (collective agreements) for all if they are not local. There are a variety of local agreements, depending on what organisation one works for and where one works. It is not practically feasible to show all local agreements. Instead, it is possible to have information on the Web page saying that “If you do not know which agreement is relevant for you, contact your section.”
The same applies if one wants to know where local agreements can be found [Laws and agreements database].

**Training**

*It should not be possible to make own reservations of courses but only to send a notification of interest. One cannot neglect the full-time study ombudsmen. An alternative can be that one receives a description of the course, then is encouraged to contact one’s own local study ombudsman, who contacts the department, which contacts the affiliation office [Union courses for shop stewards].*

**Navigation and system structure**

*The main page: It must be easy to navigate to one’s own affiliation and local club, to the affiliations of others and to central LO. There should be a general page that everybody can reach. It should then be possible to link to a page that has been specially designed for the respective affiliation the user belongs to [Linking between system pages]*

**Design**

*Roll-over functions in the main menu are good. If one scrolls the mouse over a link, a short summary, explanation or help text to the link should be provided. The function should also be provided at other pages, it should for instance be possible to read summaries of link collections. A description of a discussion forum may also be shown, without one having to navigate to the description page in order to see what messages can be found in the forum [Layout].*
Appendix 2.
General overview of the prototype

<table>
<thead>
<tr>
<th>General information</th>
<th>Decision-making/tools</th>
<th>Communication</th>
<th>Training</th>
</tr>
</thead>
<tbody>
<tr>
<td>LO’s organisation and history</td>
<td>Laws and agreements database</td>
<td>Discussion forum</td>
<td>Information about traditional union courses</td>
</tr>
<tr>
<td>LO member services</td>
<td>Case database</td>
<td>Bulletin board</td>
<td>Information about courses for development of</td>
</tr>
<tr>
<td>Affiliation’s organisation and history</td>
<td>Verdicts from the labour court</td>
<td>E-mail</td>
<td>personal competence</td>
</tr>
<tr>
<td>Affiliation member services</td>
<td>FAQ on different union areas</td>
<td>E-mail lists</td>
<td>Information on IT-based courses</td>
</tr>
<tr>
<td>Information about the workplace</td>
<td>General and union dictionaries</td>
<td>Address book for support networks</td>
<td>Addresses to union folk highschools</td>
</tr>
<tr>
<td>Union project database</td>
<td>Forms and templates</td>
<td>Ask your union department</td>
<td>Links to union folk highschools</td>
</tr>
<tr>
<td>Insurances</td>
<td>Surveys</td>
<td>Chat</td>
<td>Course database</td>
</tr>
<tr>
<td>Guide to Swedish society</td>
<td>Computer programs</td>
<td>My groups</td>
<td>On-line notification of interest</td>
</tr>
<tr>
<td>EU directives</td>
<td>Links to authorities</td>
<td>Netmeeting/ICQ</td>
<td>IT-school</td>
</tr>
<tr>
<td>Union home pages</td>
<td>Search motors</td>
<td>Audio/videoconference system</td>
<td>Internet - ABC</td>
</tr>
</tbody>
</table>

Figure 9. Overview of the final information system proposal/prototype with the basic facilities exemplified in the interface for shop stewards. Many of the facilities are also provided for members, and some for the general public, through two alternative interfaces.
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Figure 10. The main page in the prototype. The interface is targeted towards union affiliation belonging. In this case, the shop steward belongs to the Swedish Building Maintenance Worker’s Union.
Figure 11. The case database with a case description exemplified.