Design
as
Discourse

Representation, representational practice, and social practice

Jarmo Sarkkinen

ABSTRACT

Different viewpoints are helpful in the construction of new information systems. When based not only on one possibly biased viewpoint, but on different, even conflicting, viewpoints, new information systems are more likely to become successes in production use. Yet, different viewpoints, not to mention explicit requirements for a new system, cannot be just enumerated. They become visible as part of their construction and interpretation during interactive encounters of design. This interpretation and construction become more intelligible when tied to the underlying social context. Why something has been interpreted and constructed, or not interpreted and constructed, may become visible then. The traditional social view of design is insufficient, that is, seeing design as a social system is not enough. Seeing its social processes and practices is also insufficient. Design is also a discourse, that is, a matter of contextually bound human interaction. This research focuses on the constitution of design discourse. Representations, such as diagrams, are a key unit of this discourse. They are examined first as classifiers, bracketed from interaction, and then in this interaction during the context-bound construction of viewpoints. Themes such as power, constraints of action, frames of experience, representations and uses of representations are studied from a critical, interpretist and interactionist perspective. The empirical data that was used as a sounding board was collected during a one-and-a-halfyear-long information systems development project from an ethnographic standpoint. The design interaction in the project was found to take place in three dimensions: representation, representational practice and social practice. A framework for understanding the constitution of design discourse was constructed through these dimensions. With these dimensions, differently represented viewpoints can be seen as interpreted and constructed but also as socially constrained. The framework serves as a foundation for an emerging critical approach that may have relevance for both information systems researchers and practitioners.

Keywords: information systems development, encounters of design, discourse, viewpoint, verbal and visual representations, social construction, constraints of action

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FIGURES

CONTENTS

LIST OF ORIGINAL ARTICLES

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1 INTRODUCTION

*If you see in any given situation only what
everybody else can see, you can be said to be so much a representative
of your culture than you are a victim of it.*
S. I. Hayakawa

An information system (IS) is not only an arrangement of data, processes, presentation of data and information technology but also of people. This element of people calls for recognizing the participants' various interpretations of and different ways of looking at IS issues, that is, multiple viewpoints of an emerging IS. Information systems development (ISD) is the broader context in which these viewpoints will be concerned in this thesis. ISD here means "the process by which some collective work activity is facilitated by new information-technological means" (Korpela et al. 2002, 115). A change process view is needed. A change process is "taken with respect to *object systems* in a set of *environments* by a *development group* to achieve or maintain some objectives"

(Hirschheim et al. 1995, 15; Welke 1983, 203). Socially meaningful object systems are deliberately created and changed during this process. Avison and Fitzgerald (1988) present a 'waterfall' process model of ISD. In it, such stages as feasibility study, system investigation, systems analysis, systems design, implementation and review/maintenance have been included. Early design phase (Korpela et al. 2002) and evaluation are critical for successful ISD, and they are thus concerned in this thesis. They are critical because a new IS will then be determined from alternate point of views and because ensuing technical implementations of this IS will be grounded on this determination. Increased sensitivity to the diversity of the participants' viewpoints can engender system success based on criteria other than "on time and on budget". Perceived system satisfaction from the perspective of the client is, for example, one potential success criterion.

The determination of a new IS from various, even conflicting, viewpoints is based on talking in interaction that is supported by design artifacts. The main concern of this thesis is the construction of viewpoints within one design team during ISD meetings. The problem to be solved in this thesis is how features of both current and new IS are presented with design artifacts in talk in a particular context during the course of ISD, that is, how design discourse is constituted. What design artifacts tell as part of an underlying professional culture[1], how talk and design artifacts are used during interaction in design meetings and what the role of contextual matters is during this interaction are the questions asked. Even though context has been studied much in the IS field, the impact of context has been studied very little as an integral part of talk in interaction during ISD. Early design interaction is thereby examined as part of its situational, institutional and social contexts, as discourse. It is impossible to avoid power issues with this focus. Power does not mean a resource that people could own. People thus do not *use* power over others to do things in design encounters. Instead, it is a more comprehensive and situational matter that cannot be detached from what is being constructed, how it is being constructed and why it is (or is not) constructed.

Based on the findings of this thesis, a framework[2] is constructed for understanding IS design not only through its outcomes during the emergence of IS, but also and particularly through a contextually bound construction of these outcomes. The construction and interpretation around this construction

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[1]   An organization consists of a multitude of workers and many professional cultures. The ambiguous term "culture" is here understood as a collection of symbols (Geertz 1973). This view "holds symbols to be both the practices of social actors and the context that gives such practices meaning" (http://en.wikipedia.org/wiki/ Culture). Professional culture can be understood as "a patterned system of perceptions, meanings, and beliefs about the organization" facilitating sense-making in groups of workers (Bloor and Dawson 1994, 275). This view "holds symbols to be both the practices of social actors and the context that gives such practices meaning" (http://en.wikipedia.org/wiki/Culture).

[2]   The term "framework" denotes a "structure for supporting or enclosing something else, especially a skeletal support used as the basis for something being constructed" (http://www.thefreedictionary.com/framework). The object of construction of the framework to be outlined in this thesis is "design as discourse".

are capable of explaining the sources of both the success and failure of IS. Process outcomes cannot be detached from their construction and interpretation. These outcomes per se embed a synthesis of viewpoints, and some of the viewpoints are emphasized more than others. Yet, these outcomes enclose viewpoints and how and why they were embedded. The framework may be vital for understanding the construction of outcomes in talk supported by design artifacts in the particular context. It is concluded that the construction of a new IS is not only a matter of finding technical solutions to the given IS requirements, but also of dealing with requirements that are products of complex interactions, that is, interactions between representations, their producers and interpreters, and the underlying situational, institutional and societal contexts. It is also concluded that a critical discourse approach based on the framework could be useful explicitly for IS researchers and implicitly for IS practitioners.

The organization of this thesis is as follows. Chapter 2 provides a literature review, which serves as a foundation for the main contribution, the framework itself. Chapter 3 provides a description of the research setting and research methodology. Chapter 4 is the main contribution of this thesis. It presents the framework for understanding design as discourse. Finally, chapter 5 revisits the literature, speculates on some implications for both research and practice and draws conclusions.

2 LITERATURE REVIEW

This study is about understanding how design discourse is constituted. To introduce the main contribution of this thesis, the framework for understanding design as discourse, introduced in chapter 4, the readers are in this chapter introduced to the IS literature in which some central themes that are evident also in the framework have been discussed. ISD as a social phenomenon, as a general foundation for taking the focus of early design (section 2.1), sources of power and discourse (section 2.2), frames (section 2.3), representations (section 2.4), and representations as mediators in design interaction (section 2.5) are discussed.

2.1 ISD as social phenomenon

The construction of an IS is basically a matter of producing viewpoints of the participants with relation to requirements for this IS. These viewpoints are not merely inscribed on paper or on computer (Westrup 1999), but before that, constructed socially as part of the underlying social context. When constructed, these viewpoints are filtered out and negotiated, and they can be transformed for many purposes (e.g., Ovaska et al. 2005). Being capable of understanding this sort of contextualized construction process is important to the participants because it may lead to an improved IS. They thus need to consider the social element of ISD very carefully.

There has been debate over the dialectics between the technical and social agents of change in the IS field (Orlikowski 1992; Jones 1998). Putting emphasis on the technical element in ISD is, however, insufficient to ensure the quality of the outcome, the IS itself. That is because ISD is a social process of learning about the problem situation based on which *partial* goals for the future are planned (Suchman 1987), and because the technical element is merely a surface structure that implements partially planned human-machine (Suchman 1987) and human-human interactions. The emphasis must therefore be laid more on the mutual construction of these elements (e.g., Bloomfield & Vurdubakis 1994). The *functionalist* modelling is needed in the end to construct a successful IS comprised of the technical component. In this form of modelling, IS is approached as an ordered system of 'objectively existing' entities having properties and relations between them (Hirschheim et al. 1995). Yet, there is more to ISD than this sort of technical process (Hirschheim et al. 1991). Before proceeding to the *functionalist* modelling, the developer needs to 'tame' the heterogeneity of the ever changing perspectives (cf., Land 1982) in the requirements constructed intersubjectively but hardly ever completely agreed upon by every member of a multiparty group (cf., Matusov 1996). Taming this heterogeneity is an integral part of the social process of ISD (Hirschheim et al. 1991). This social process is the interplay of human beings (Hirschheim et al. 1991) who have differing, even conflicting, interpretations of the emerging IS (cf., Walsham 1993). The conflict models show that user influence is a source of both conflict and successful conflict resolution (Robey & Farrow 1982; Robey et al. 1989). The research has also shown that there is a strong positive relationship between conflict resolution and project success (Robey et al. 1993). In stark contrast, however, Barki and Hartwick (2001) found that the impact of interpersonal conflict may be negative regardless of how effectively it has been resolved. There is thus no definite answer to the successful management of conflicts. One strategy that the developers have used to resolve conflicts (Curtis et al. 1988) is to better understand user behaviour by presenting easily modifiable systems to the users. The developers also prioritized requirements and included as many of them as possible in the system specification. However, the developers frequently made incorrect assumptions about how another

group saw requirements, and this did not ease the pains to resolve conflicts as for requirements.

ISD as a social phenomenon has been approached from several social theoretical (Mingers & Willcocks 2004) and economic perspectives (Ciborra 1987). Gidden's (1984) structuration theory (Brooks 1997; Jones & Nandhakumar 1993; Rose & Lewis 2001) and Habermas' (1984; 1987) theory of communicative action (Lyytinen 1986; Lyytinen & Hirschheim 1988; Päivärinta 2001), for example, have been used as theoretical frameworks for understanding ISD. In contrast, social action/process models (Newman & Robey 1992) have been used to give a somewhat different view of ISD. These models define "different types of events that occur over time", and "specify antecedent conditions that exist prior to a sequence of events, describe the events in the process itself, and relate those events to outcomes" (Robey & Newman 1996, 32). Recurring sequences of events characterized by repeated failure, followed by success, can be an inherent pattern of many long-term ISD and IS implementation processes (Robey & Newman 1996). Gasson (1999) illustrates with her social action model that ISD is situated in and the development 'problem' is tied to the organizational context. She argues that the ISD process is not only a social one but both a rational and a political process. When seen as rational, the ISD process ensures timely delivery and the quality of the outcome system. ISD as a political process focuses on participants who have private interests and strategies for controlling the process itself (Franz & Robey 1984; Robey & Markus 1984). This political process takes place where human beings disagree on the goals and priorities of the ISD (Kling 1980). The ISD process then forms "the context against which the more rational elements can be seen" (Franz & Robey 1984, 1208). Both social theories and action/process models, however, remain on a relatively abstract macro-level. ISD can also be approached from the viewpoint of human (action) itself. The developer, for example, may perceive ISD as the interplay of knowledge, meaning, power, conflict, interests and consensus formation (Hirschheim et al. 1991). Bridging between the social action/process view and situated action (Suchman & Wynn 1984) in this way provides the link between social action theories and concrete phenomena of ISD (Hirschheim et al. 1991). This bridge brings human beings and human action to the foreground.

ISD practices have also been studied (e.g., Bloomfield 1992; Bloomfield & Danieli 1995). Howcroft and Wilson (2003) recognize the paradoxes of ISD practices. They emphasize that the developers, situated in between the interests of management and those of end users, may face that user empowerment, user involvement, exclusion of dissent, reconciliation of improved working conditions and increased productivity, and positive effects of participation may be difficult to reach in the boundary position. Levina (2005) studied multiparty collaborative practices and discusses how different modes of collective reflection-in-action such as adding to, ignoring and challenging the efforts made by the other participants, help to understand whose expertise will be reflected in the final design. ISD practices have also been studied with respect to rituals that are part of a rational process of ISD. The process of constructing

requirements for the new IS in a time of change can be seen as one type of ritual that is based on following a detailed methodology (Westrup 1996). Westrup seems to imply that the use of a methodology can bring with it the impression of rationality, but it may only be a ritual. It has also been emphasized that improvisation based on bricolage, that is, making do with the resources that are at hand, is characteristic of ISD practices (Bansler & Havn 2004). Information-seeking practices have also been studied, and trust has been shown to be of importance when the developers choose sources of information during ISD (Hertzum 2002).

Last but not least, the social interaction view has been taken in a few cases. This emphasizes that sense- or meaning-making is an inherent part of subjective thought processes and intersubjective interaction processes. This means taking an even more micro-level look at existing ISD practices. It has been found as early as in 1977 that poor communication is the central source of failure of ISD projects (Edstrom 1977). One of the few researchers in this field has been Urquhart (1997; 1999; 2001). She recognizes an array of system analysis strategies used by the developer during the user-developer interaction (Urquhart 1999). These strategies include key searching, process identification, scoping, imagining and reframing (Urquhart 1999). The client may lean on exemplification, for example (Urquhart 1999). Urquhart puts interaction in the organizational context in the process of requirements gathering. The context can be assumed to have an impact on this interaction even though it was not visible during the ISD process. It can be assumed because the context was visible when the participants were interviewed outside the actual interaction (Urquhart 2001).

2.2 Sources of power as enablers and constraints of action: towards power in and behind discourses of ISD

Franz and Robey (1984) claim that the analysis of rational activity is insufficient both in ISD and in IS implementation, of which only the latter includes bringing a new IS to the organizational processes of the client in practice. The rational analysis needs, they argue, to be supplemented by political analysis that is sensitive to private interests and their negotiation. This negotiation includes power. Power has many embodiments and many, possibly conflicting, definitions of power have been presented. For example, Jasperson et al. (2002) distinguish institutional power, interpretive power, processual power, socially shaped power and structurally constrained power. Yet, this sort of analytical division may be confusing. Instead, sources of power may be more informative in ISD.

First of all, power can be regarded as an enabler of action. That is, power is capable of producing positive effects on the environment from the standpoint of one stakeholder (group). Power in the form of control of organizational

resources has been seen as one enabler of action in IS research. Lee (1991) does not discuss ISD or IS implementation directly. However, showing that the control of an office IS increases the power of technical personnel can mean that technical personnel has power also in ISD. Keen (1981) emphasizes that the implementation of an IS may engender the redistribution of information resources within an organization. He argues that the implementation can thus break up institutionalized autonomies based on the ownership of data and information. Thus, more people become empowered. Cavaye and Christiansen (1996) explain the power of organizational sub-units in terms of the control of strategic contingencies, influenced by the effectiveness of coping with uncertainty, the centrality of workflows and the non-substitutability of activities and staff.

Individual influence is another form of power. In this, an individual has the power to do something. As mentioned earlier, user influence has a great role in both the emergence of conflict in the early phases of ISD and conflict resolution during the later stages of ISD (Robey & Farrow 1982; Robey et al. 1989; Robey et al. 1993). It is thus one manifestation of user power. The degree of this sort of power is central to the system outcome (Lynch and Gregor 2004). Champion[3] influence is another form of individual influence (Beath 1991). In general, champions use more influence tactics than non-champions (Howell & Higgins 1990) but their personality also has a great effect on how powerfully they can finally act during IS implementation (Howell & Higgins 1990). Managerial influence is yet another form of individual influence. However, this form of power may have an influence on other people only if these others (such as users) are associated with 'low' skills, needs, attitude and performance (Leonard-Barton & Deschamps 1988). Franz and Robey (1986), however, argue that 'lower' user positions imply one paradoxical benefit. That is, users being in these positions are likely to perceive system usefulness. Developer influence can manifest itself as power *over* users. This sort of power becomes possible by selecting system features that are not agreed upon with users, by introducing undesirable organizational structures making users inferiors, by selecting undesirable objectives outside the situation, and by transforming the desires and values of users (Markus & Bjørn-Andersen 1987). Individual resistance is also a form of power. This resistant form of power can originate either in people-related factors, poor system design, or in the political interaction between system design features and the organizational context of use (Markus 1983).

Power can also be seen as a constraint of action. It is restrictive if people cannot do as much as they might want to. Institutional power can be one form of constraint of action. Governmental institutions can explain the process of information technology (IT) innovation, and this institutional power can be linked, for example, to the supply-push and demand-pull ideologies (King et al. 1994). This type of persuasive institutional control has also been studied by Nicolaou (1999). He discovers that institutional control may manifest itself in a

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[3]   The term "champion" here refers to an enthusiastic change advocate.

variety of ways, as coercive, mimetic and normative social forces. These can explain the decisions made during ISD. With these institutional forces, many ways of introducing and developing innovations are excluded. Forces are thus constraints, rather than enablers of action. In contrast to these institutional forces, environmental factors such as the size of the firm, competitive pressure, customer support, top management support (Premkumar et al. 1997), heterogeneity, uncertainty, concentration and inter-organizational dependence (Kwon & Zmud 1987) have been discussed in the context of the adoption of IT innovation. Bruque-Cámara et al. (2004) do not examine environmental, but organizational factors, such as communication habits, low levels of conflict and top management support in the IT adoption. However these finally turn out to be located in between environmental and structural forces. They thus are not real structural determinants. What is characteristic of these enumerated environmental and organizational factors is that they can be conceived of as enablers of action. In contrast, structural (and organizational) constraints of action can be considered as well. Yet, only a few of that type have been discussed in IS research. One of these is the hierarchical structure of Thai organizations. In one such organization, the structure made the decision-making process very bureaucratic and elongated during ISD (Thanasankit 2002). Organizational structures can influence in such ways that the new IS becomes unintended yet consistent with the organizational context (Noble & Newman 1993). It was also shown that structurally-derived authority had a role in constraining the possible ways of designing the system. Finally, the social status of women can be conceived of as one of the possible constraints in ISD. It has been discussed that male workers and their competencies are privileged in the skill assessment related to the ISD process (Woodfield 2002). Gender thus serves as one type of structural determinant. The act of choosing what to describe and how during ISD thus comes from somebody's understanding of the world, by the developer(s), and should be analyzed with gender in mind (Bratteteig 2002).

So far, both enablers and constraints of action have been discussed, but power can be a more multidimensional concept. It can also manifest itself as both an enabler and a constraint at the same time. Power can then be located, for example, in narratives (cf., Fairclough 2001, 51) in which it is employed to legitimize particular human interests and interpretations of events (Brown 1998). Based on this narrative approach, IT change process may appear a matter of producing narratives, of which a compelling one can shape a new technology radically because it can bring out intended and preferred future consequences (Dawson & Buchanan 2005). Moreover, the clients, for example, have been shown to produce narratives during requirements analysis interviews and, with them, to organize their experience, convey their interpretations of the objects of change to the developers and even to persuade the listeners (Alvarez & Urla 2002). Story-like, habitual and hypothetical narratives are used for these purposes (Alvarez & Urla 2002).

Power can also arise from inside the 'social body', from inside a disciplined mind, located, for example, within the new management and

economic discourse (Bloomfield & Coombs 1992; Doolin 2004). For them, the term "discourse" seems to refer to a reified entity influencing people from within their minds irrespective of the type of action. IT consultants are acting within the discourse "providing a means of cost savings, giving organisations a competitive edge or a means to increase corporate effectiveness" (Bloomfield & Best 1992, 544). IT consultants can thus be seen as objects, or even 'victims', of their own managerial consultancy discourse (Bloomfield & Danieli 1995). Power manifests behind discourse (Fairclough 2001, 51). That is, power is located not in action, but behind it, that is, in the background of this action. In the context of healthcare, the 'clinical leadership narrative' has been found to act as a discursive mechanism ordering and organizing action (Doolin 2003). This narrative produced within the background discourse was shown to give praise for such things as the economic notion of efficiency and enterprise, the development of new accountabilities and organizational relationships, and the use of IT as a surveillance tool (Doolin 2003). IT was not only seen to originate in the background discourse. IT did not only mediate the controlling influence but, as a new discursive space, it also brought about resistance for this control (Lowe & Doolin 1999).

Last but not least, power can reside in social relations that are located in the underlying context. In this contextually relational form, power is located both in and behind action at the same time (Alvarez 2001; 2002a; 2002b; 2005). Interactional talk in the social context is then considered. Alvarez studies ISD discourse in terms of the social context and in terms of constraints of action such as the face-saving ritual (2001) and organizers of experience called 'frames' (2002a; 2002b). She shows that saving face (i.e., the avoidance of insult) was conducted by the participants who emphasized the old system as a great system of the past, and talked about their competence in the context of uses of this old system (2001).

2.3 Frames as organizers of experience of design participants

Without a socio-cognitive frame of past IT-related events, the participants could not approach design of IS in a sensible manner. Experiences of past events help them approach future events as well. Goffman (1974, 21) emphasizes that frames as organizers of experience allow people to "locate, perceive, identify, and label" concrete occurrences around themselves. Frames in this sense form a ground for IS specific frames. Framing in design helps the participants to "represent, interpret and reproduce meanings" attached to a new IS (Gasson 2005, 2). Framing not only means being capable of experiencing things but also being incapable of perceiving everything. Frames serve as constraints of action in design, and, as such, they deserve further consideration.

Technological frames have been discussed in the IS field. The term implies the socio-cognitive assumptions, expectations and knowledge that people relate

to the development and use of IT (Orlikowski & Gash 1994). Technological frames are socio-cognitive filters directing attention with respect to IT (Davidson 2002). People perceive IT within their own frames. One reason for difficulties in the user-designer interaction is that users and designers as representatives of very different cultures bring "different frames of reference to the situation" (Bostrom 1989, 281). Integrating differently framed views is evident. Even in a situation where the participants use the same language, they might not share many of the assumptions with which they approach the goals of design and its outcomes (Gasson 2005). Breaking out of one's own frames that may be called 'psychic prisons', can however be very difficult (McLoughlin et al. 2000). This may be especially difficult if a responsible intrapreneur (i.e., the creative innovator) is not present and cannot bring about the legitimate status to alternative technological frames (McLoughlin et al. 2000).

In addition to studies of how people perceive the development and use of IT in organizations, the social and political construction of technological frames has been examined. Lin and Silva (2005), for instance, emphasize that a process view of framing and reframing of beliefs and values is an appropriate standpoint. Lin and Cornford (2000) found that the way the participants of an IS project evaluated IT influenced the future course of the project in a remarkable way. The IT personnel constantly tended to reframe the way the user group should approach the new IT (Lin & Cornford 2000; Lin & Silva 2005). In their case, the general project and solution-related assumptions were of the same kind among the IT personnel and the users, but the management group perceived the IS adoption through the business-oriented frame (Lin & Silva 2005). Understanding of the problem, requirements for the system (Lin & Silva 2005) and issues of use (Lin & Cornford 2000), however, differed drastically among the IT personnel and the users. Davidson (2002), in turn, found that changes in technological frames may in some cases contribute to the construction of requirements by rendering it turbulent. One of the best examples of examining framing as a dynamic process is that by Alvarez (2002b). She studied the user-developer interaction in the user interviews and exposed the technologist frame as the most dominant one during the interview. The users only occasionally had control of the interview within their personal frames. Alvarez (2002a) also emphasized that these personal storytelling frames were looked down upon by the developers who repeatedly returned back to their own technologist frames when storytelling frames were introduced.

Frames are typically seen as fixed. When brought to an encounter of design, they thus may act as constraints of action. In comparison with frames, viewpoints are changing situationally when constructed as part of design discourse. The main difference between the two is that frames can be replaced with another whereas viewpoints are ever changing. They are not replaced with another. Viewpoint thus is how one looks at objects of design at one moment of time. Different frames can be found in the background of one changing viewpoint.

2.4 Representations as cultural classifiers of objects of design

The abstract term "information systems development" has been used so far. It covers the whole process. The focus now, however, will be on design, that is, one stage of ISD. The term "design" here means "all the systems analysis and design activities involved in the development of individual application information systems" (Iivari 1991, 254). To wit, the focus here is on the "early design phase", which includes the requirements analysis as an early stage of ISD where end users and systems analysts make "an effort to recognize and specify the data and information needed to develop an information system" (Byrd et al. 1992, 117). The terms "requirements analysis" or "requirements elicitation" (Sommerville & Sawyer 1997) are rejected here since requirements are seen not to be elicited from or analyzed out of the users' answers to the developers' questions, but constructed instead. Requirements construction is used as a more illustrative term therefore. It refers to interacting participants constructing requirements by means of representations (i.e., descriptions of objects of object systems) as part of their talk.

Design is to a great extent, a matter of *re*-presenting ever changing objects. This sort of representing is possible by means of free form text, or semiformal, graphical and mathematical notations. Representation that is based on at least one of the notations can be defined as a human-made artifact that "captures a few intentionally selected qualities of that which is represented" (i.e., objects of design) (Kyng 1995, 46). Representations of these objects of design can be descriptive, predictive, prescriptive, interpretive or reconstructive in character (Lyytinen 1987). These representations are produced from a variety of perspectives (i.e., viewpoints) (Lyytinen 1987). In one way or another, representations, as models of the reality, are always grounded on some assumptions, and even philosophies (Hanseth & Monteiro 1994). Representation, with an objectified manifestation, is the product of a particular culture (Hall 1997; Kerne 1998) such as the management culture or that of the developers. In their studies of cultural practices of design, Tellioğlu and Wagner (1999), for example, loosely tie representations to the underlying cultures.

Adams and Avison (2003) do not concentrate on representations themselves but on techniques that are used to produce representations. They painstakingly study over 80 techniques and show how these techniques, and supposedly the resultant representations, frame the ways the problem situation needs to be seen. Another grouping of techniques is presented in Iivari et al. (2001). They include as much as 20 well-known techniques in their grouping. Representations, the focus of this thesis, are comprised of classifications, that is, of spatial, temporal or spatio-temporal segmentations of the world (Bowker & Star 1999; 2000). Classifications that are everywhere are capable of bringing structure to the represented objects (Hertzum 2004) and of guiding their users to approach the reality in some predefined, but not in completely irresistible

ways. Iivari (1989) provides a set of ways of how representations (or, in his case, abstractions) classify the objects at the organizational, conceptual/infological and data-logical/technical levels in terms of structure, function and behaviour. Benyon (2002) takes a look at many types of representations such as Entity Relationship Diagrams (ERDs), Data Flow Diagrams (DFDs), Unified Modelling Language (UML), rich pictures, activity checklists, storyboards and use case diagrams, and is able to show that they differ from each other in terms of their level of abstraction (from high to low) and their focus on the structure, functions and purposes of objects of design. Finally, Adams and Avison (2003) explicate some general-level classifications. They group representations into four structural categories that are the matrix/table structure, the hierarchical structure, the hierarchy-free structure including, for example, network representations, and the structure-free representations such as non-diagrammatical ones (e.g., verbal and written representations).

Only some of vast amount of possible representations are discussed in the following. One example of information modelling graphs as classifiers of objects was presented in the SAMPO experiment (Auramäki et al. 1992). In it, the speech act theory (Austin 1962) was used to discern structure both in the graphs themselves, objects of design, and the outcomes of the process in terms of speech acts (i.e., the utterances that do something). Four types of speech acts are called *assertives*, *directives*, *commissives*, *declaratives* and *expressives* (Austin 1962). One technical implementation of this theoretical model of communication is a conversational system, *The Coordinator*, presented by Winograd (1987-88). This proves at its simplest that a classificatory system embedded in one sort of representation of design can at least to some extent be transferred to the final product.

Another means used for structuring requirements is user viewpoint models (Darke & Shanks 1997). Each viewpoint representation "instantiated for each user viewpoint identified" (ibid., 217) is structured in terms of six elementary information sets. These are viewpoint agent, viewpoint domain, viewpoint owner, viewpoint knowledge, viewpoint link (allowing to draw relations between different user viewpoints), and viewpoint trace that tells the development history and the current state of the included viewpoint. Multiple ways of organizing and storing the viewpoint knowledge are allowed in a viewpoint representation, and for that reason each viewpoint representation is free of structure in this regard. In addition to user viewpoint models, many other representations have been touted as being capable of making assumptions about the perspective of users. Use case is one of these (Fowler 1997). Contrary to DFDs and ERDs, which as detached from the user-designer interaction classify requirements in terms of 'system shalls' grouped by functionality and subsystems (Kulak & Guiney 2000), use cases are built on the assumption that users view a computer system as a black box, that is, "the application is concerned only with what goes in and what comes out" (ibid., 22). Use cases "show the interactions between the system and the entities external *to* the system" (ibid., 35). The principal unit of classification of use cases is 'actor' (i.e., the generalizable role) (Fowler 1997). Information about use cases is presented

in terms of basic course of events, alternative paths, extension points, triggers, assumptions, pre- and post-conditions and related business rules (Kulak & Guiney 2000).

Many other 'user- or work-friendly' representations have been introduced. Ethnographic accounts of work practices, for example, have been filtered for the developers from three complementary perspectives: "distributed coordination", "plans and procedures" and "awareness of work" (Hughes et al. 1997, 148). With these dimensions in mind, the work can be presented "as part of patterns of activity, as operations within the context of a division of labour, as 'steps' in protracted operations, [and] as contributions of continuing 'processes' of activity" (ibid., 148). How the orderliness of work has been produced as part of activities and how people make "the nature of those activities 'visible' or 'intelligible' to others" is another focus (ibid., 148). The notation of UML (Viller & Sommerville 1999) and patterns of cooperative interaction (Erickson 2000; Martin & Sommerville 2004) can also be used to filter rich ethnographic accounts of work. For example, objects classes and related properties have been suggested as potential ways of classifying, for example, awareness of work (Viller & Sommerville 1999). With these abstractions, the assumptions of the development culture are highly regarded over authentic work place assumptions.

Rich pictures, in turn, describe the problem situation and put aside development assumptions. Even though they have been said to be informal representations using the language of the people described (Checkland 1981), rich pictures are also comprised of classifications. Their higher-level classifications include structure, process, concerns, and climate or culture, (Checkland 1981; Lewis 1992; Monk & Howard 1998). Many other types of representations could also be mentioned here, but the ones discussed are well capable of describing the embeddedness of cultural classifications.

2.5 Representations as mediators in the encounters of design

Representations are used as mediators of action (Bødker 1998). Her notion of mediation is derived from activity theoretical (AT) literature (Engeström 1987). Its key idea is that a representation can mediate "the relation between designers and their products, between designers in a team, between the design team and other design teams, and between the design team and the future users" (Bødker 1998, 109-110). One benefit of mediators is their dual role in the interactions of design. Like boundary objects, they "maintain a common identity across sides" (i.e., professional groups), yet they "adapt to local needs" of these sides (Star & Griesemer 1989, 393). Representations are, for example, an essential part of architectural design. They cannot be detached from the architectural practices; they are embedded in these practices (Schmidt & Wagner 2004). The knitwear design is by no means a case apart (Eckert 2001; Stacey & Eckert 2003), but in a

way more troublesome in that "the relationship between visual appearance and structure and technical properties of knitted fabric is [more] subtle and complex" (Eckert 2001, 29). A similar link between the surface structure and technical properties is evident in the design of IS. Representations are a critical part of successful communication between participants in design of IS. Different participants come together around representations in the encounters of design and co-construct realities; they produce 'symbolical externalizations' in the negotiation for system requirements (Clases & Wehner 2002).

Materially objectified representations can be used widely in encounters of design. They can serve different communication functions (Hendry 2004). They can, for example, enlist participation, express progress, establish or reaffirm a *common ground* (Clark 1996), convince a stakeholder and record the solution state (Hendry 2004). Before entering the realm of uses of materially objectified representations more deeply, the concept "small-scale classification scheme" (Hertzum 2004) is considered. A classification of requirements is one such scheme (Hertzum 2004). This scheme was found in one case study to be objectified "as the structure" of a requirements specification document, and as such it became the source of "control over the scope of the project" in the encounters of design (ibid., 57). Many other schemes are possible in design, and they can have impact on the course of design.

Engineering interaction mediated by representations has been studied, for example, by Boujut and Blanco (2003), Bucciarelli (1996), Henderson (1991) and Subrahmanian et al. (2003). In this type of interaction, participants with similar backgrounds carry out activities together. Interaction then can be more fluid than in mediated interaction in more heterogeneous design groups. In these groups that are next discussed, differences between participants are more obvious, perspectives differ from each other, and the consequences of addressing them more or less successfully are more far-reaching than in homogeneous groups.

Language implies differences. In one study where an IS project was studied (Andersen & Holmqvist 1991; Holmqvist 1989), the language of professionals such as instructors and coordinators was found to be general and normative whereas that of workers was found to be more specific and descriptive with respect to their work. A new IS then appeared as a medium, which finally brought the different languages together. In Timpka and Sjöberg (1996), the voice of practice and of engineering were recognized, but the latter was not only used by the developers but one of the workers also grounded talk in it. All in all, voices with different languages and produced perspectives may differ significantly from one another in encounters of design. A common project language needs to evolve for participation of multiple stakeholders (Dittrich 1998). Representations can at best provide the focus for the user-developer communication, and of different types of representations, the whiteboard may appear even as an 'external memory' during design meetings (Potts & Catledge 1996).

Prototypes, scenarios and video clips from work practice will be considered in more detail since they are used to bridge different cultures.

Prototyping has been recognized as a useful communication basis (e.g., Budde et al. 1992). Prototypes facilitate the emergence of a common ground for the user-developer interaction and importantly, delimit the physical interaction space for cooperative activity (O'Neill et al. 1999). Focus shifts and breakdowns encountered during prototyping are potential openings for mutual learning, leading to the emergence of new insights and ideas (Bødker & Grønbæk 1996). Mutual learning has been found to be possible even if the user is not willing to control the prototype use (Trigg et al. 1991). This is because the user is, nonetheless, triggered by the prototype to tell stories about work practices and to reflect on them (Trigg et al 1991). New understandings of the current practices can be triggered as a consequence (Mogensen & Trigg 1992). Bowers and Pycock (1994) emphasize that the prototype can render the user-developer interaction indirect which is by no means a negative thing. Instead, they show that the interaction becomes more fluid in that requirements are anticipated and implied by queries, and in that refusals, disagreements and resistance are made visible in an indirect manner.

Scenarios provide a way of grounding a user interface in the users' work (Carroll 1995). They may be used as a communication prop in the usability testing of prototypes, as a starting point for action in design workshops and for stimulating new thoughts and ideas (Bødker 2000). The developers, however, do not necessarily use scenarios for communication with users, but possibly as an input to the design of prototypes (Hertzum 2003). Video clips shown in one project to a heterogeneous group of participants, provoked unanticipated topics for common contemplation (Blomberg & Trigg 2000). Video collages also help the participants to co-construct both 'shared' understandings of work practice and work practice-based design issues for a new IT (e.g., Karasti 2001).

In the previous discussion, representations have been regarded as the enablers of the successful crossing of the boundaries between different types of participants. Yet, representations of a new IT may configure the users, for example, during usability trials (Woolgar 1991). In these, the *natural* users are being constructed by showing through a new IT how it should be used, thus denoting that the users will have a configured, non-bizarre, relationship to that IT (Woolgar 1991). Representations of IT can also be used, unconsciously, to configure users as 'everybody', resulting, first, in the ignorance of the diversity of users and, then, in the implementation of IT for one gender (Oudshoorn et al. 2004). Not to be overly pessimistic, the experiment with Rapid Application Development implies that whereas the developers configure the users, the developers can also be configured by the users, and indeed the boundary between these two types of participants is configured (MacKay et al. 2000). Therefore, not only the co-construction of understandings but also the configuration of participants is possible during encounters of design.

3   RESEARCH SETTING AND METHODOLOGY

This chapter first describes the overall objective, research problem and research questions of this thesis. After this the philosophical underpinnings of the thesis are discussed. This includes the description of the research paradigm of the thesis and the bridging between the micro and macro levels of the study. Next, each original paper is introduced in terms of the aim, studied representation, its main findings, relationship to the whole thesis and data analysis methods. Both data collection and analysis periods are thereafter discussed from a practical perspective. Personal reflections on the field work are revealed in the final section.

3.1 Objectives of the thesis

The objective of this thesis is to understand representations as classifiers of design both in isolation from action and in the course of the social construction of objects of design. The objective is also to understand the construction of objects of design in the context of constraints of action. On the basis of the understanding derived, the objective then is to construct a multidimensional and critical-interpretive framework for understanding design as discourse. The overall research problem of this thesis, based on these objectives, is *how design discourse is constituted*. Resolving this problem necessitates answering three separate, but closely related research questions (RQ1-RQ3) that can be set forth as follows:

RQ1: What do visual representations tell when bracketed[4] from action?
RQ2: How are viewpoints constructed and interpreted with verbal and visual representations?
RQ3: How is the construction and interpretation of viewpoints socially constrained?

Visual representations are an integral part of design. Firstly, it is important to understand what they reveal as meaningful classifiers of human cultures that are related to design, that is, when bracketed from action. This is important because they are not only able to enable but also constrain design and, thus, a resultant IS. Secondly, by understanding how verbal and visual representations are used to construct viewpoints, representations become meaningful also as part of action. Thirdly, representations cannot however become meaningful if not also studied as part of their context. Constraints of action (including visual representations as classifiers) help to examine the ways that viewpoints, included in the resultant system, may be biased. Each of these three focus areas brings one central element to the examination of design from a discourse perspective that is based on the study of interaction in its context. Without understanding each of these areas together, design might not be seen as it appears naturally in practices of ISD.

3.2 Philosophical underpinnings of the thesis

This thesis is anchored in the conceptual-intellectual boundary between the two discrete research paradigms, *interpretism* and *critical inquiry* (Crotty 2003). What

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[4] From the social scientist perspective, the term "bracketed" is widely used to mean the same as the word "separated" or "detached" that may be more common in IS research. The first one, "bracketed", means that something has not been analyzed, but it is still there.

interpretism denotes in this thesis will be discussed first. Then, the critical paradigm as an extension of the chosen interpretive 'paradigm' is discussed. Finally, the ontological and epistemological assumptions of this mixture are summed up.

The interpretist inquiry of this thesis is based on a relativist ontology because I assume that the researched reality (design interaction) was constructed by the human beings involved (Guba & Lincoln 1994). Epistemologically speaking, I believe that the "investigator and the object of investigation are assumed to be interactively linked so that the 'findings' are *literally created* as the investigation proceeds" (ibid., 111, italics in the original). I committed to the interpretist inquiry because my aim was to understand the design interaction as 'social action' (Weber 1964). This research orientation sensitized me to how humans assign meanings to their conduct and how they are related to actions of other humans by these meanings (Hughes 1990). I thus concentrated on the point of view of the researched participants in the design. I agreed with the interpretist research orientation because it gave me a possibility to gain "a deeper understanding of the underlying process of organizational change" (King 1996, 174). The language that was used in the analysis is sensitive to "the meanings agents give to their actions and environment" (Hughes 1990, 93). Hence, I needed to bring languages used by the researched participants to the analysis, and my interpretations had to be anchored in those languages and their uses.

The interpretist inquiry remains on the surface of the researched reality. It lays the foundation for a critical inquiry. The critical inquiry, taking the form of 'demythologization', adds to the interpretive one "the will to better comprehend the text" (Ricoeur 1974, 389) such as talk during the design or the content of representations that are used. In its radical form, the critical inquiry sensitizes the researcher to "*critique and transformation* of the social, political, cultural, economic, ethnic, and gender structures that constrain and exploit humankind" (Crotty 2003, 113, italics in the original), and to "restitution and emancipation" (ibid., 112) of an organizational unit or individuals in it. This radical variation of critical inquiry has originally been based on the following philosophical assumptions (Kincheloe & McLaren 1994 in Crotty 2003, 157-8) implying that

- all thought is fundamentally mediated by power relations that are social in nature and historically constituted;
- facts can never be isolated from the domain of values or removed from ideological inscription;
- the language is central to the formation of subjectivity;
- certain groups in any society are privileged over others, constituting an oppression that is most forceful when subordinates accept their social status as natural, necessary or inevitable;

- mainstream research practices are generally implicated, albeit often unwittingly, in the reproduction of systems of class, race and gender oppression.

Howcroft and Trauth (2004, 205) claim that the critical researcher becomes skilled at exposing "power constraints, repression, ideology, social asymmetries, and technological determinism giving priority to certain ways of viewing the world" in the processes of ISD. The critical researcher thus situates social action in the context of historically constructed, distorted or false assumptions, beliefs and ideologies that have taken over in the prevailing discourse.

My critical inquiry does not explicitly dig into human experience invaded by false and distorted values and ideologies. As for what is in the background of human action, my analysis is restricted to an array of situational, institutional and some societal constraints of action, but values and ideologies are not explicitly included in the analysis. I became sensitive to the "new ways of understanding" but did not strive to "take effective action for change" (Crotty 2003, 157). I myself did not commit to the emancipatory knowledge-constitutive interest (Habermas 1972) but saw the researched subjects themselves as indirectly challenging the constraints in their talk with objects. I thus strive to make subjective accounts of the subjects visible for the research audience and nothing more. I reflected the represented critique. Crotty (2003, 113) distinguishes "a research that accepts the *status quo*" from "a research that seeks to bring about change". In principle, this change is possible through the reconstruction of meaning structures produced by the subjects. For me, however, it would be unintentional. If it happened for some reason, it would be merely a concomitant of my neutral research effort.

The current research orientation is called "critical interpretism". Ontologically speaking, structures of power and constraints of action are locally constructed according to it. My assumption is that these might have 'crystallized over time' but they can be assumed to have been constructed by the researched subjects also in the analysis. The word "historical realism" could thus be replaced by critical relativism in the same way that in the positivist orientation, naïve realism can be distinguished from critical realism (Guba & Lincoln 1994). Epistemologically speaking, structures of design are not merely made visible by me as an outsider, but they have been constructed in the critical interpretist inquiry.

3.3 Micro instances of action in the context of macro theories

The macro dimension of research means "the study of society, of social institutions and of socio-cultural change on an aggregate level" (Knorr-Cetina 1981, 1-2). What is, according to Knorr-Cetina, characteristic of this dimension is

its uses of theoretical concepts on a system level. My micro-level research efforts delved into situational matters, including inquiries into details of human meaning-making processes. The focus then was laid on the

> …ultra-detailed observation of what people do and say *in situ* [which] is not only considered a prerequisite for any sociologically relevant understanding of social life, but concrete social interactions may also be considered the building blocks for *macro-sociological* conceptions (ibid., 7).

What has been included in the thesis in the integration of micro- and macro-levels was so called 'theoretically informed empiricism' (Knorr-Cetina 1981). I agree that it is through "*micro*-social approaches that we will learn most about the macro-order" (ibid., 41). The research must proceed from micro to macro. Macro structures cannot be detached from the practices of everyday life (Cicourel 1981). Cicourel warns about too much 'decontextualization' brought about through analyzing very small fragments of interactional units of conversations. Yet, only through understanding interaction can wider situational, institutional and even societal structures be unveiled. This implies that there are many types of social structures in the social world, but in the end people produce them locally. That is, structures are "perceived and attributed by participants to each other" (ibid., 52). Cicourel emphasizes that starting with *the micro* events makes the analysis necessarily ahistorical to some extent but this should not be problematic, for example, in this thesis. That is because the purpose is not to discuss societal changes or to recognize patterns in the locally produced data, but to illuminate general features through the description of particular events (Hammersley 1990) in terms of constraints of action.

Many attempts to integrate the micro and macro dimension have been proposed. For example, some of the most recognized are Bourdieu's (1977) and Giddens' (1984) attempts to do so. These, however, differ from the integration of structure and action (agency) in this thesis in two remarkable respects. Bourdieu and Giddens do not sufficiently emphasize humans as a necessary starting point of analysis. Giddens, for example, lays emphasis on the reproduction of systems such as repeated forms of action and patterns of relations, together with the reproduction of structures such as procedural rules, moral rules, material resources and resources of authority. Giddens seems to assume that people "are always "imprisoned" in a given horizon of meaning" and that when people try to understand things, "they carry with [them] this framework of meaning" (Kaspersen 2000, 11). The significance of these frameworks has been emphasized in the context of knowledge production as follows:

> As knowledge is created in a process of interpretation having its point of departure in a given horizon of meaning, new knowledge will always be affected by this confrontation between tradition and history on the one hand and the concrete social reality on the other (ibid., 11).

Reading Giddens thus gives an impression that structural changes are possible through the organized activity, not by one human. This same is evident in the critique of Bourdieu. His theory of cultural reproduction and social reproduction "is deterministic" and "fails to allow or account for social change at the level of the system and does not allow for meaningful agency or process at the individual level" (Jenkins 2002, 118). This, however, does not mean that individuals could not challenge how things are. Jenkins emphasizes that Bourdieu's integrative theory is ahistorical. In this thesis, however, humans come first, but they are enabled or constrained by underlying structures.

More generally, Bourdieu (1977) and Giddens (1984) ground their view of society on the holistic scheme (Eskola 1982). In it, individuals are constituents of communities such as teams (Figure 1a). Actions are then based on institutions in these communities that are seen in a particular order. That is, each individual in a group knows their place and challenges how things are and what they can do in terms of their historical frameworks of meaning. Bourdieu's dismissal of the underlying problems of human agency was already mentioned. Giddens also falls short of handling these problems, as sociologists in general. This is because sociologists typically "stay[s] in the shadow of Parsons" [a key advocate of structural functionalism] despite their many criticisms of him (Meštrović 1998, 3). Sociologists tend to be "obsessed with the problem of social order; view the self as excessively cognitive; assume rather than investigate the nature of human agency" (ibid., 3). Human agency is assumed but not really seen as equal to structure.
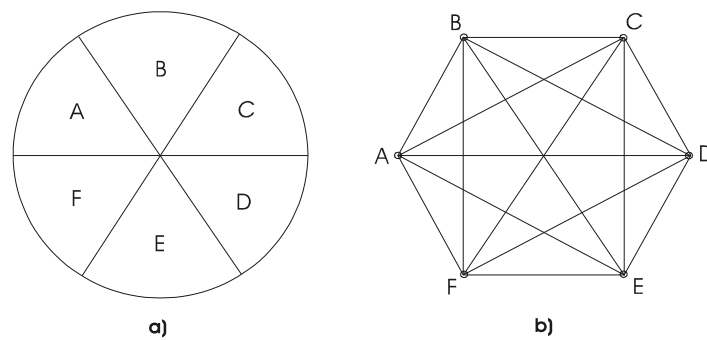
FIGURE 1   The holistic (a) and individualist (b) scheme (Eskola 1982, 120). Letters refer to humans.

The three-dimensional conception of discourse (Fairclough 1992; 1995; 2001), or my extension of this conception, serves as an alternative integrative 'theory' that is used to dispose of the micro-macro dilemma. In this thesis, the term duality of action, not of structure (cf., Giddens 1984), can be used to emphasize the human point of view as a starting point in the integration of structure and action. Fairclough's attempt to resolve the problem of duality is preferred here. His conception of discourse is well operationalized for a critical inquiry. The focus is on the conduct, the interaction itself, limited by constraints of action (or social determinants). The individualist scheme (Eskola 1982) is thus embraced. In it, individuals act as 'discrete entities' in relation to each other. There are

different forms of relations between these 'entities' (Figure 1b) and the underlying structures are manifested through enabled or constrained action, of which the latter is the focus here. Individuals hardly change structures other than situational ones.

3.4 Introduction to original articles

As a whole, five reported studies that have been included in this thesis, contribute to the construction of a framework for describing how design discourse is constituted. By examining design interactions through this framework, elements beyond the surface level of interaction may be uncovered.

Each study has been reported in a separate article. Each article is next discussed briefly in terms of its purpose, analysis details (Appendix I), general results and relation to the whole. Articles I-V provide an answer to RQ1. They thus give structure to the "representation" dimension of the suggested framework. Article I answers this question directly but the other articles do this indirectly only. Articles II-V provide an answer to RQ2, and they explicate the elements of the "representational practice" dimension of the framework. Of these four, articles IV and V provide an answer to RQ3. They explain what the "social practice" dimension of the suggested framework means in terms of constraints of action.

Article I takes a look at the structure of one visual representation, concentrating on how it classifies objects of design when detached from action. One sequence of a test scenario, introduced by the members of the developer community, was deconstructed to understand how classifications of this scenario give structure to the tested technical element of a new IS and how it could be tested by users through user-centred classifications uncovered through the deconstructive research effort. Deconstruction is a method of literary criticism used to challenge conflicting assumptions embedded in texts (Derrida 1982). Deconstructing text (terms and objects) means to tear this text apart, in other words to challenge binary classifications embedded in it, and to emphasize the hierarchical order of its built-in assumptions. In other words, one 'pole' of each binary appears 'dominant' in some regard. It is superior to its counterpoint. (Encyclopædia Britannica, 2003). The original scenario is regarded as a technology of classification. An emancipatory version of one scenario step was outlined. It is suggested that it be used by users during the early phases of design. This article provides a foundation for the framework. Yet, representations as instruments whose uses are seen as part of social contexts are examined in other articles.

Article II investigates verbal and visual representations when they are used, either interpreted or constructed. The aim is to understand how the boundary between the old work process and a planned one is interpreted and constructed with representations around the wall chart (process diagram). This

article differs from the others in that interpretations of the studied subjects were 'theoretically interpreted'. No known, named method is used. The capsule model as a foundation of analysis is presented for the purpose of locating different modes of action (monologue, cooperation and dialogue) in relation to each other. Moreover, the different modes of action are seen to have two dimensions: conception and construction. Different modes together with dimensions of action are knitted together with mediating artifacts (i.e., representations). The main finding is that the construction of new objects is more monological than the conceptualization of problem areas. The article extends the framework in that the focus moves outside classifications of the wall chart.

Article III examines uses of a prototype. Interaction is studied around it. Yet, it did not only serve as a communication support for collaboration between the participants, but was harnessed for its persuasive purposes, as well. Uses of this prototype become understandable in relation to rhetoric (i.e., persuading). The study of rhetoric is coupled with Interaction Analysis (IA). IA is used to carry out "the empirical investigation of the interaction of human beings with each other and with objects in their environment" (Jordan & Henderson 1995, 39). The article shows how a transition from responsive collaboration to rhetoric persuasion takes place in one sequence of design interaction. This transition is examined with respect to modes of action, frames of action and control. It is found that the manager used the prototype to clearly establish one way of using a new system. He persuaded other participants to see one legitimate task performance. The prototype supported the manager in this. This article adds the dimension of 'power' to the uses of representations. Yet, it does not present uses of representations in the context of constraints of action. A question of power has been touched upon but the concept is still under-developed.

Article IV emphasizes that some constraints of action impose determination on the interaction around the wall chart. Frames of experience (Goffman 1974) were studied as part of this social context. Frames can be understood as structural determinants since they have been 'internalized' by members of an organization as part of the organizational practices. Although conceiving of frames as structural determinants may sound unorthodox, frames, like any other structural determinant, if 'internalized' first, can contribute to the sustaining of legitimate handling of issues inside organizations. Frame analysis (FA) (Goffman 1974) is used. FA is, in fact, more like a theory than a method. It is, however, as such, capable of sensitizing the researcher to different ways that people experience the surrounding reality. FA was 'operationalized' for this study. A set of strategies were produced for examining talk in interaction within different frames. IA is used in the same way as in Article III. Critical Discourse Analysis (CDA) (Fairclough 1992; 1995; 2001) is also used. It approaches uses of verbal representations not only as instruments of carrying out actions in social struggles, but also as manifestations of relations of subordination and as reflections of constraints of action. The aim of this article is to study how unequal social realities are maintained and challenged in the design interaction. When IA and CDA are

used together, they enable the examination of talk as intertwined with uses of objectified representations as part of a social context. The aim thus is to produce a discursive but visually extended account of interactions of design. In this article, the manager represented issues within a planning frame. The others, however, became marginalized from this planning. It appears that acting within his 'master' frame augmented the manager not only to master the future, but also to configure the other participants in the session. The wall chart, used by the manager, can be conceived of as a constraint of action. It is shown to be used as a classifier within the master frame. This article widens the scope of analysis with respect to the discourse view although structural issues have been discussed only in terms of frames. Many other types of constraints of action are examined in article V.

Article V provides the most comprehensive view. It brings the structural determination behind the interpretation and construction of verbal and visual representations to the analysis more comprehensively. IA and CDA are used. The theoretical contribution of this article is an extension of Fairclough's (1992; 1995; 2001) three-dimensional conception of discourse by examining how the wall chart is interpreted with verbal representations produced in talk. The main finding is the way that the planned changes in tasks and authority relationships, represented on the manager's wall chart, can instigate a social struggle around this visual representation without the manager being present in the session. This struggle is uncovered behind acts of re-representing the wall chart in talk. An extended model of discourse not only helps to move the focus from outcomes of action to the construction of outcomes as part of the social context, but it also helps to recognize some situational and institutional constraints of action. The study suggests the neutral, reflective and sensitive role of the developers in the redistribution of authority inside client organizations.

In this thesis, generalization has been possible only locally. This means that each studied case is "significant in the context of a theory" (Seale 1999, 109). If the theory used in one case is also powerful in another case, the findings may be generalized to the latter under some reserve. However, "readers must always make their own judgements about the relevance of findings for their own situations" (ibid., 108). Contrary to rationalistic research designs, the reliability or "the stability of methods and findings" is not "an indicator of" validity in this research (Altheide & Johnson 1994, 487). The present research deals with a variety of interpretations. To provide the reader with a feeling of reliability with respect to the analyzed case, I attempted to make visible the context that "provides for interpretative meaning" (ibid., 496). Another strategy for this was to analyze the data in a group (see section 3.6). The findings of my critical-interpretive studies cannot be generalized to a universally valid theory since the analyzed episodes were chosen merely for their power to explain (Mitchell 1983) the design interaction in this case. The strength of reasoning in terms of the concepts of the theory may be generalized to other cases, but only if the used theory is powerful in them as well. All in all, the findings are not generalizable outside the theory.

3.5 Data collection process

My supervisor during the period of data collection enabled access to the studied IS development project. He had contacts with the software house and made the effort to acquire a formal permission for me and my colleague to conduct research on one of their projects. Together with the supervisor, I, myself and my colleague, who started her PhD studies, visited the software house ('*Incognito*') by invitation. We were given two commencing projects to choose between. We chose the project to develop a new financial-administrative system for the Finnish Slot Machine Association (RAY).

We were told that the requirements determination period of the project starts in the beginning of 2000. Well before that, however, we began to familiarize ourselves with daily life in the software house. January 10 was our first day at work. We were not only identified as researchers by the others. We also acted as half-time, indeed unpaid, developers for the project. We were therefore introduced to the other workers as any other person who is coming to the house.

We went into the encounters with people inside the software house and, a little later, also during the client meetings. Ethnography was our method of encountering these two new worlds. All the time, we kept the intent of an ethnographic data collection in mind. Agar (1980, 77) tells that the purpose of an ethnographer is to learn, that is, "to acquire some knowledge that he previously did not have". This was what we hoped we could do. For Agar, paraphrasing (i.e., interpreting) is a key activity of an ethnographer but what was more significant for us was to collect data as authentic as possible. This data took the form of tape- and video-recordings, documents and emails (cf., Hammersley & Atkinson 1983). Even during the first day in *Incognito*, we dug into some feelings of the one and, at that time, the sole developer who had been involved on the project. I interpreted his feelings of an upcoming client meeting as follows:

> We arranged some issues for our first visit to Helsinki. Our purpose was to carry out a detective investigation for understanding changed needs of the client. Based on this, he argued, the requirements documentation could be worked up. He mentioned that this investigation can be no easy matter. He told us that particularly for us as neophytes some concepts might be troublesome. He instructed us to ask as much as possible to get an access. (Entry in my notebook, January 10).

The formal goal of this project, said in an entry in the project plan, was to replace old operative information systems functioning on the HP 3000 platform with solutions based on new technology and equipment. Some more informal aims were also enumerated in the project memo, dated January 19, 2000:

- Papers will no longer be carried from one room to another.
- Approval decisions need to be made on the terminal.

- Pay-offs daily?
- The system supports remote logins.
- Moving over to a web browser-based system needs to be taken into account.

The developer promoted us to gain access to the authentic data of client meetings by asking whether we could use our video and Minidisc (MD) recorders. We were given permission, and we then used MD- and video-recorders extensively. Recorders enabled us to store exactly what was discussed, what the situation looked like and how people behaved. Throughout the data collection, our aim was to carry out participant observation where significant events were taking place. We also conducted informal interviews (Agar 1980). When doing so, the ethnographer sometimes only chatted with informants about what they "both saw occur in the flow of life" (ibid., 91), but in other occasions it "might [have been] sensible to lead, and lead strongly" (ibid., 93). When leading, the ethnographer has been said to be able to "*falsify* emergent conclusions in informal interviews" (ibid., 93). I did not use this latter strategy. Instead, I asked informal questions in many types of places such as in corridors, at coffee tables, at breakfast, in lifts, in a pizza restaurant, in taxis and in an airport beer bar and in many similar sorts of places where people tend to be relaxed.

We attended 13 one-day and two 2-day client meetings during the requirements determination phase (see Appendix II). I also attended a few interdisciplinary encounters during the design, construction and system testing. The design documentation was 'tested' in one of these encounters. The actual system testing phase was meant by the developers to help in the removal of errors in the software code and to ensure the flawless functioning of the system when taken into production. Participant observation was not enough for us. *In situ* interviews, field notes, MD- and video-recordings and materials (e.g., documents, many drawings, emails and the like) helped us to collect rich data in the encounters. Video-recordings proved to be especially useful. We, however, decided not to video-record the system testing phase. With this decision, we tried to secure a more relaxed atmosphere since the participants seemed a bit tense during that time. We were included in a project mailing list. Thus, many emails sent between the meetings could easily be archived. Nevertheless more informal communication by email remained to a great extent inaccessible.

Theories were not used during our ethnographic data collection period. Micro-instances of action were thus examined as 'natural'. Even though I aimed to go into the field with an open mind, however, many personal 'implicit assumptions' influenced my selection of interesting 'seconds' (Agar 1980, 8). Ethnography was not only an analytical means to collect rich data but also a way of constructing descriptions that are, however, not theories, although certainly "theoretical in the sense that they employ concepts and theories" (Hammersley 1990, 598). Concepts can sometimes be found to arise

'spontaneously' from the data (Hammersley & Atkinson 1983). This happened at every turn when I was in the field.

3.6 Data analysis process

Data analysis was not a pure form of ethnography for me. My purpose was not to tell *stories* from the field (cf., Van Maanen 1988), but due to my growing interest in methods such as CDA, I ended up providing critical 'tales' with a reduced narrative form. For me, producing a tale was less important than critically shedding light on "social, political, symbolic, or economic issues" (Van Maanen 1988, 127).

I started by creating a content log of the MD- and video-recorded requirements determination meetings. In it, I described time-stamped events in terms of who spoke and did what. In fact, this was already a matter of interpreting the data since I did not merely cite original conversations. When I had constructed the content log and familiarized myself with the content, I approached the data set (consisting of approximately 60-70 hours of videotapes) by classifying it with colour codes, each of which represented a particular theme. These preliminary themes were technological issues, economic rationales, managerial rationality, tactics and strategies, conflicting views, and personal interests and ideals. However, I found these analytical themes counterproductive since they too early forced the data into a set of artificially created categories. Therefore, I rejected this prescriptive classification system. Instead, I began to walk through the content log again and again. I also began to read about themes such as representations, common objects, participation frameworks, discourses and power.

When reading my content log, I began to make preliminary interpretations. One episode suddenly arouse not out of the data but from the 'dialectics' between the data and the literature. In this particular episode, I recognized a transition from a responsive interaction mode to a rhetoric one. Article I grew from this reading of the data and literature. Articles II-V emerged from the same kind of dialectics between the empirical data and the literature, from a process where I acted as an interpreter. Every time I found a new illustrative sequence of interaction for a new article, I transcribed this sequence and began to analyze the video. The transcripts helped me to follow the dialogue. In some occasions, the data was also analyzed in a group of both junior and senior analysts. Transcripts, focus sensitizing devices, such as guidelines for applying analysis methods, and the video itself were used in the group analysis meetings such as one in Figure 2. The analysis itself was a matter of watching and interpreting the data repeatedly. Group sessions enabled the joint juxtaposing, acceptance and rejection of interpretations, but there were many occasions that the different analysts' interpretations were conflicting. The uses of transcripts were an essential part of many analysis efforts. One example

of how I personally ended up using a transcript is illustrated in Appendix III. Rhetoric uses of words in strengthening some intentions and, for example, alliances were counted as important, for example, by highlighting them in the transcript.

FIGURE 2   A scene from one group analysis session.

3.7   Reflections on the fieldwork

This section gives a self-reflective, retrospective and an intimate account of my assumptions, feelings and influences in the field. Ethnography guided me to approach things as natural as possible. However, I did not write ethnography of an orthodox type but, instead, the one that is informed, to a great extent, by external concepts and even theories like that of Fairclough (1992). I did not produce an 'experiential cinema' for the readers to view (Denzin 1997) even though this was my original goal. I also confess I have not been able to help the reader to become a 'viewer-reader' who is "an active, participating voyeur—a detective who hears and sees the sounds and consequences of the other's voice and actions" (ibid., 41). I mainly used techniques, common in ethnography, for data collection. My research effort does not extend to a vivid story-like tale (cf., Agar 1980). At the outset of my trip to meanings of the studied interdisciplinary world, my aim was to write an 'artistic' ethnography. After the actual fieldwork period, I read lots of sociological theories and experienced that I do not necessarily have to write orthodox ethnography. I realized that ethnography had served my purposes best already when striving to become an inside observer. When I had succeeded in that at least to some extent, I no longer needed ethnography.

I agree with Agar (1980, 41-2) in that ethnography is a 'personal discipline' whose problem is not "whether the ethnographer is biased", but "what kinds of biases exist". I agree that it is the ethnographer's responsibility to "deal with them as part of methodology" (ibid., 42). I certainly inherited from my past an

initial frame that was guiding my "interest toward different topics at the expense of others" (ibid., 46). I had become a 'product' of one development culture through my education. Yet, I had already struggled to leave aside some of its classifications. What made my struggle particularly difficult was that I first acted as a developer inside *Incognito*. I was "surrounded by a multitude of noises and activities" (Agar 1980, 48) when I, for the first time, entered the interdisciplinary encounters between *Incognito* and RAY. Then happened what Agar (1980, 48) describes nicely as follows: "As you choose what to attend to and how to interpret it, mental doors slam shut on the alternatives". I experienced this phenomenon when I found myself on the users' side. This may still be read between the lines of my thesis. An explanation for taking the users' side is that I had read lots of literature where sympathy had been shown towards the users. Luckily, I recorded the meetings. I was thus not forced to rely merely on my biased field notes. However, my attitude changed. By the end of the project I had also learned to have sympathy for the developers (several developers were involved then). They were experiencing difficulties with some of the representatives of the client at that time.

I was not a 'complete participant' or 'complete observer' (Junker 1960) in any of the phases of the project. There are some transitional forms between these two extremes such as 'participant as observer' and 'observer as participant' (Junker 1960). Hammersley and Atkinson (1983) are not convinced of the relevance of this distinction, but at least in my case, I found this difference very striking.

For less than two months, I acted as a participant inside the software house. I was treated by the developers as a developer in addition to my research role. However, my role was more detached in the interdisciplinary encounters. My role then changed and I became an 'observer as participant'. I interviewed people *in situ* at some opportune moments, especially during the breaks in the client meetings. At the same time, I tried to detach myself from the meeting interaction, but I partly failed to do so. The detachment, however, does not mean that I would have remained outside the interdisciplinary sphere. I felt myself to be an insider more and more after each client meeting, and especially, after each informal chat with the insiders I met during the breaks. I finally became a 'therapist' especially for one developer after the emergence of an appropriate level of 'rapport' (Agar 1980, 87). Like a real therapist, I was told, especially by that one developer, some intimate feelings about troublesome issues. My role changes are described in the figure of a clock in Figure 3. In it, 8 a.m. is the beginning of the project and 4 p.m. is its end. It shows that transitions from one role to another were not straightforward at all, but I switched the degree of detachment according to the phases of the project, and also when events changed during these phases.

I confess that I was a novice ethnographer in the very beginning of the project, but some progress happened with my observational and note writing skills. As a 'participant as observer' at first, I was too shy to take notes in the presence of people. One reason for this is that I wanted to avoid any artificiality of *in-situ* interviews and untruthful opinions during these interviews. On the

other hand, I simply did not have the nerve to obtrude on people and snoop around too much with a little notebook in my hand. Therefore, I was sometimes, after being involved with people, forced to retrospectively reconstruct stories I was told. I, however, learned to be more natural in my unnatural observer role during the project or, alternatively, the others simply learned to trust me more. In the end, it felt even pleasant to be an 'observer as therapist' who is told deep feelings.
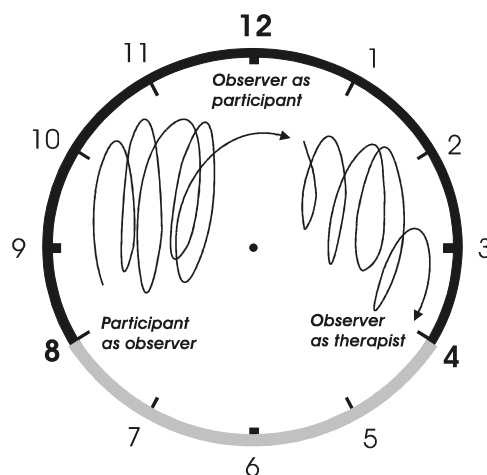
FIGURE 3   My role changes.

Agar (1980, 61) reminds novice ethnographers that "[w]hatever you do, though, you are probably going to be regarded with some caution initially". That was true in my case, too. Yet, the participants were not overly suspicious of me, perhaps due to the fact that I acted as a developer, as well. Agar (1980, 61) emphasizes the importance of "begin[ning] your work honestly by presenting yourself and your task in some way that will make sense to group members". In my case, the developer introduced me and my colleague to the 'natives' in the first encounter. I cannot recall every aspect of how he introduced us. My notes, however, indicate that during the first time when some research interests were discussed, at least one of the 'natives' woke up markedly. This may imply suspicion that was not normally shown overtly.

Video-recording as an intrusive method contributed to the contents of discussions at least for a start. During the very first sessions, the video camera standing in the corner was many times mentioned by some participants. For example, there was one dispute once, and one of the participants suddenly mentioned that they could reconstruct what had been said on the tape. Most of the participants seemed to get accustomed to the camera. One participant from the client, however, was quite unwilling to be video-recorded, but even he finally seemed to get accustomed to the camera standing in the room. There was one critical session in which we were not allowed by him to use the video camera. It is, however, difficult to say how the camera influenced his behaviour. What I know is that he normally was quite silent during the sessions, but this may just be a characteristic trait. Moreover, he did not have any great role in the

requirements determination. He attended since he was to take part more actively in the project later.

My role was not later asked about by the clients. The participants seemed to get used to the fact that I was sitting quite silently in the meetings and asking questions during breaks. One of the developers was more close-mouthed in the beginning of the project than in the end when I finally became his 'therapist'. He became keen to open up to me and my colleague about many awkward incidents with the clients he had spoken with. This was especially during the system testing. By contrast, another developer remained more distant. In the latter phases of the project, some representatives of the client became more open to me. In addition to this, I myself was no longer too shy about talking with the clients during breaks. One of the representatives of the client even asked my colleague to give a lecture to the future users about how to test a system. She, however, decided to reject this invitation. She did not want to intervene in the events that much. Moreover, the 'open-minded' developer once told us that I and my colleague made him more conscious of what he was saying and doing than on any past project. We thus had a great influence on how things unfolded on the project. However, how we influenced cannot be known.

Finally, every ethnographer needs to ponder the degree of his or her own involvement. This question here turns out to be whether I felt I was too involved. I did not feel too much involvement maybe because I did not spend any prolonged periods in the strange culture but was also living my own life in my own world. With too much involvement, I could have no longer seen how things unfold naturally. In a successful ethnographer position "one is, at the same time, part of and distant from the community" (Agar 1980, 50). I managed to have this sort of position.

4   A FRAMEWORK FOR UNDERSTANDING THE CONSTITUTION OF DESIGN DISCOURSE

He that climbs the tall tree has won
right to the fruit.
Sir Walter Scott (1771-1832)

This chapter presents the primary contribution of the thesis. It outlines a framework that has been constructed based on the findings of the five separate studies on different aspects of encounters of design. The resultant framework can be used to understand design as discourse, and how design discourse is constituted.

4.1 Design as discourse

Without the increased sensitivity of an external observer, encounters of design may appear as ensembles of participants talking about objects of design. Yet, these talks may appear as detached from the interpretation and construction of these objects as part of the underlying context. The aim of these ensembles has typically been assumed to be to elicit requirements from users for the technical construction of a new IS. Based on my five articles, republished in this thesis, a deeper look at this same phenomenon is taken. Design encounters then open up as discourses. The framework, presented in Figure 4, illustrates how design discourse may be constituted in terms of three dimensions (representation, representational practice and social practice). This multi-layered complex is discussed next in the abstract and then in more detail in sections 4.2-4.4. The dimensions are naturally nested and they cannot really be separated, as presented in article V. However, one analytical dimension can be emphasized if one wants to provide a *detailed* look at design from one particular perspective.

The "representation" dimension helps one to consider visual representations as detached from their uses, as products of professional cultures. In general, any human-made artefact such as a diagram, a prototype or a form, intended to support action in design, can be regarded as a visual representation. Visual representations have emerged as part of professional cultures, and within them, they have become, in particular ways, useful in the handling of objects of design and of change. Within their cultures, representations have been intended to provide either system or social descriptions. Of these two, built-in system descriptions provide either socially or technically systemic views of how objects are related to each other in the world whereas social descriptions are geared towards showing in which ways these objects are meaningful. There are many types of manifestations of both of these (see section 4.2). Deconstructed descriptions can be seen as hidden in every representation. However, they can be made visible through a particular type of sensitivity. Deconstructed description is a counterpoint of the intended description.

The "representational practice" dimension supplements this view (see section 4.3). It presents the production of viewpoints with respect to a set of different conceptual-interpretive and constructive-productive uses of both verbal and visual representations. Verbal representation here refers to the description produced in talk. Thus, both types of representations are examined as part of action, not as bracketed out of it. Both types can be both interpreted and constructed. Hence, four types of uses of representations can be recognized: the construction of verbal and visual representations and the interpretation of both these types.

The examination of both verbal and visual representations as part of interaction is insufficient. Participants in encounters of design are many times constrained by the context in which interaction takes place. It has been found in

this thesis that situational, institutional and societal constraints of action need to be taken into account to form a complete picture of design as discourse (see section 4.4). Frames are found to serve as one of the key constraints of action. It is the 'mind map' behind other constraints. In sum, requirements for a new IS cannot simply be elicited, but they are constructed and interpreted through viewpoints as part of socially constrained human interaction. Taking this view allows the observer to make sense of how design discourse is constituted.
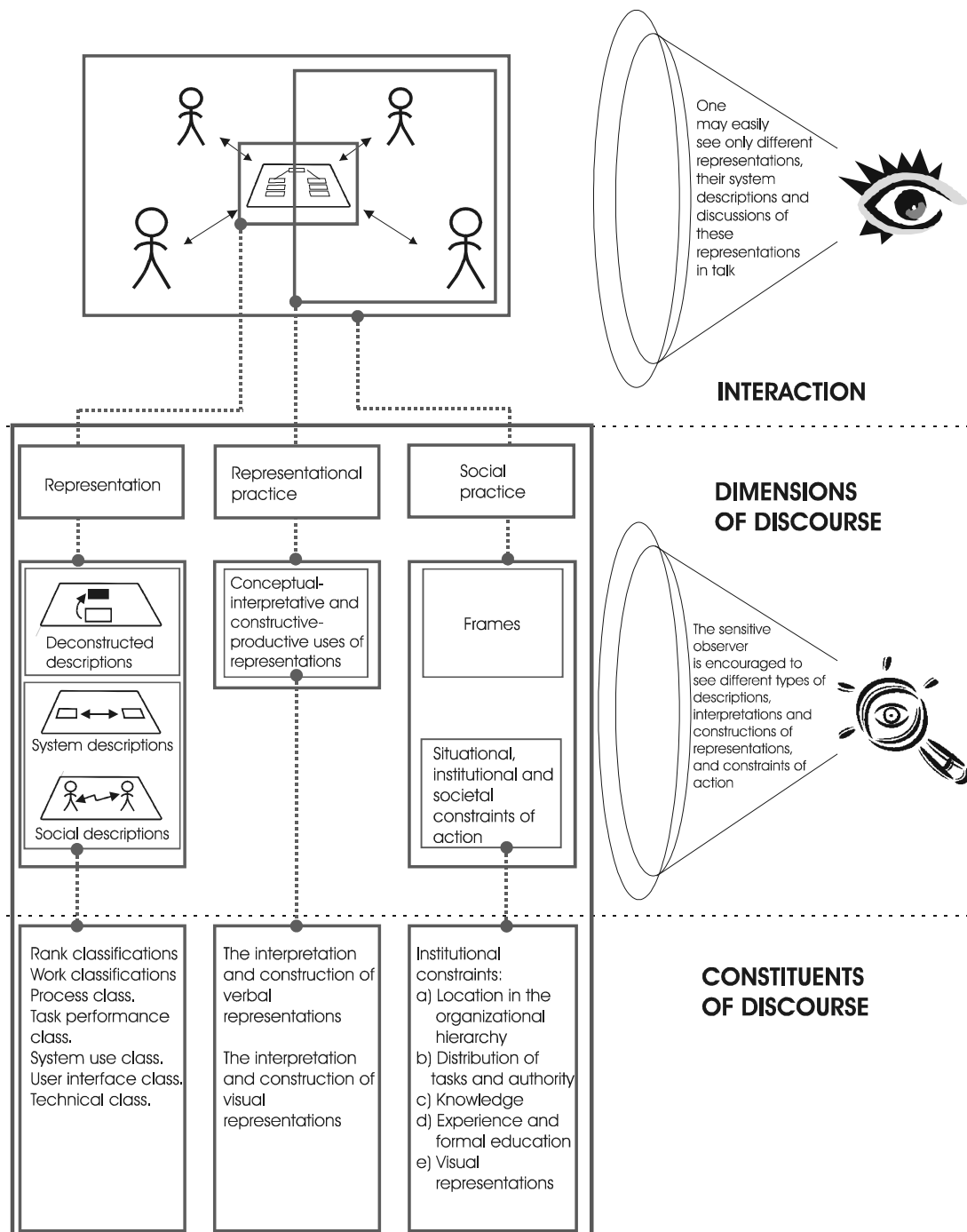
FIGURE 4   A framework for understanding design as discourse.

4.2 Visual representations as classifiers of design

What do visual representations of design tell when bracketed from action was asked as RQ1. Answering this question uncovers the ways that the underlying professional cultures give structure to objects of design through visual representations in ways that are controlled by these cultures.

Figure 5 explicates how a visual representation, introduced within one professional culture, can be approached from different perspectives depending on the professional and cultural background of a person. Visual representations such as a wall chart (W), prototype (P) and test scenario sequence (T) have been studied in this thesis. How a representation is assumed to classify objects of change can be different in different minds. A visual representation can thereby be examined either from the perspective of 'cultural insiders' or 'cultural outsiders' within an insider or outsider interpretation space. Unlike the insider interpretation space within which a representation has been introduced, the outsider one implies that a member of another professional culture may have his or her own way of classifying the world. The outsider thus has a natural analytical distance from those classifications with which a representation has originally been developed by the insiders. Cultural lenses of different professionals thus matter very much.
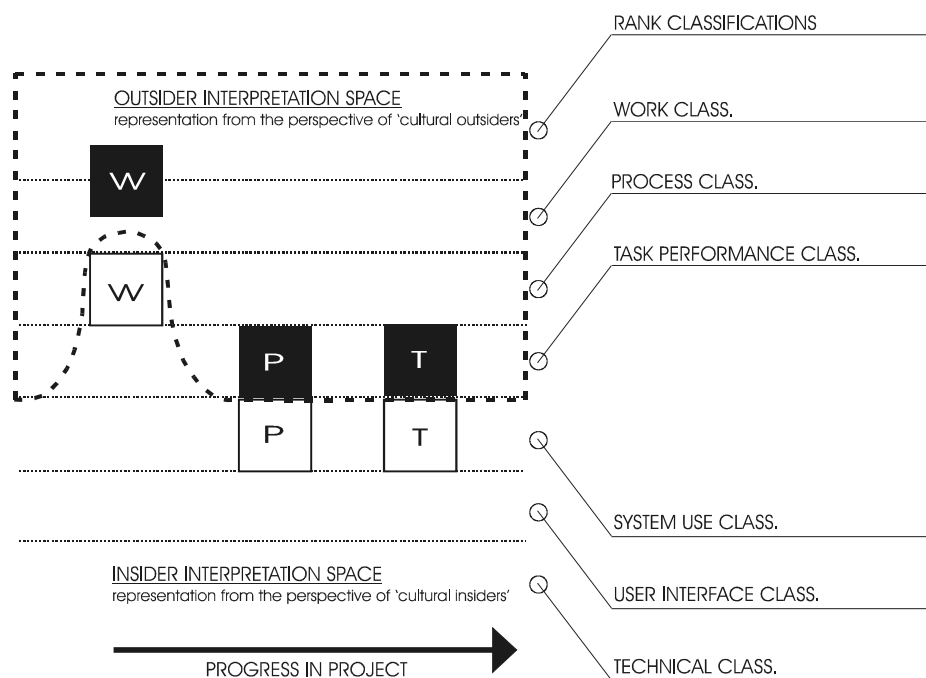
FIGURE 5 The classification levels of visual representations and some comparisons between representations seen by insiders and outsiders. W = wall chart, P = prototype, and T = test scenario (sequence).

Based on the findings of the included articles, seven types of classifications can have a great role in visual (and verbal) representations, and how they are used

by the insiders and interpreted by the outsiders. Findings of the reported studies are classified, put into categories, in this section. They have not been presented in the articles or in research literature. Based on the articles, the following seven classification levels can be named. These abstract categories merely exemplify some possible constituents of the recognized dimensions of design discourse, presented in Figure 4. Rank classifications (describing a relative position or value in a group), work classifications, process classifications, task performance classifications, system use classifications, user interface classifications and technical classifications can be used by both insiders and outsiders to represent objects of change. The order of these classification levels is from higher to lower, from more social and abstract ones to more system-centred and concrete ones.

In article I, one test scenario sequence was examined. This representation is the exception in this thesis since the assumption may be that new requirements should no longer come up at the testing stage. Even though this is not necessarily true from the perspective of the users, this sort of assumption seems to have some effect on how the test scenario sequence has been built to classify the system. In article I, it is easy to recognize built-in classifications of the analyzed test scenario sequence since it is examined in isolation from action. This enables us to deconstruct the test scenario sequence. The test scenario sequence, as a product of the local (or more global) development culture, appears to be a system description. In more detail, it is comprised of five classifications.

First, the most central classification of the test scenario sequence is "using the system". The test scenario sequence tells how to use functions of the system. Second, the test scenario sequence presents uses of the system as a "linear input-output process", which is related to the central assumption of "producing the outcome", the third classification. Fourth, "textual presentation" is assumed to decipher the tested object in a sufficiently detailed way. Fifth, errors that may be faced during the system usage are assumed to be detected from system outputs. However, these five classifications are not the only possible ones to be used in test scenarios. Alternative classifications, the antipodes of the original ones, were recognized through deconstructing the test scenario sequence. In doing so, some key assumptions of the general development culture were challenged, and alternative classifications suggested.

The first antipode is "performing the tasks". The second antipode is "non-linear process". In it, task performance is assumed to be a process with no predictable course of action. Third, the outcomes of this unpredictable process are not significant in themselves. Instead, "understanding the outcomes" is more fundamental for successful task performance. The fourth antipode is "visual presentation". With it, the assumption is that text is insufficient to comprehensively understand the suggested course of action. The last one, "breakdowns-as-experienced", assumes that errors are not tied to outcomes of the process and their correctness only. For example, an illogical order of performing tasks, proposed by a system, is one potential reason for users to *experience* an error. There is one level climb in the hierarchy of levels of

classifications (from system use classifications to task performance classifications) when I, as a researcher, deconstructed the scenario (see Figure 5). The developers' system use classifications, built in the test scenario, were challenged, and this made it possible for me, as a researcher, to be critical.

In articles II-V, representations are continuously subjected to reinterpretation and reconstruction as part of interaction. Representations can be interpreted within different participation frames, they become meaningful when tied to human intentions and interests, and they can be followed blindly or even ignored for many reasons (as actually happened in my studies). New descriptions are constructed and interpreted, and reconstructed and reinterpreted. However, these will not be discussed until the following section. Visual representations, discussed in articles II-V, are now examined from the perspective of the insiders who introduced them to the outsiders. In this way, when bracketed from interaction, representations can be examined in the context of underlying culture to understand how they classify objects of design. This detached look makes it possible to see visual representations as constraints of action.

In articles II, IV and V, the participants used a wall chart as the main representational support. The idea of using the wall chart was introduced in a process planning meeting by some management representatives of the client. This wall chart seems to be strongly founded on the assumptions of the management culture. In the three articles, the wall chart was analyzed as part of the interaction between different participants who came from diverse professional cultures. Yet, the classifications of this chart are now explicated as bracketed from interaction. The wall chart provides its readers with a social description. As a process diagram, its descriptions are comprised of process classifications. The process classifications that are used in it are discussed next. *Tasks* are used to divide a whole process into smaller fractions, and tasks are attached to responsible *roles*. With them, the process becomes manageable. Objects of change are also classified in terms of *transitions of states* in the chart. *Flows of data* and *documents* are also used to some extent to make the process more manageable from the perspective of the managers. These five process classifications are most outstanding in the chart. The developer, as an outsider, however, found the process view difficult to work with at least in the beginning of the process planning meeting. Differences of this sort are likely to produce a gap between the insiders' and outsiders' ways of perceiving the world. Compared to the original test scenario (presented in article I), the wall chart provides a different level view of objects of change (see Figure 5). Moreover, compared to the suggested scenario step (presented in article I) that is founded on task performance classifications, the wall chart still remains at a different classification level (see Figure 5).

In article III, the interactions between the participants were mediated by a prototype, a product of the development culture. It provides a system description of objects of design. It is of the same type as the original test scenario (presented in article I) as for its level of classification. Both of them represent uses of the system. However, their surface structures differ. The

original test scenario is textual whereas the prototype is visual. These visual representations differ from one another also in that they are used at very different stages of development. The prototype is used in the early phases of development but the scenario is utilized in later testing periods. In article III, the developer was in control of the prototype. He produced different types of system descriptions in his demonstration and brought about many sorts of classifications to the discussions. These uses of the prototype are discussed in the following section. A couple of classifications, built in the prototype, are enumerated now. First of all, the prototype is founded on technical and user interface classifications, but they only form the foundation on which a couple of system use classifications, that are relevant here, are 'operating'. Some of the classifications of this system use level include, for example, choosing an object, clicking on a document and hitting the button. These are some of the most elementary ways of using a technical system. Each is based on a set of assumptions that are controlled by the general development culture. Moreover, each of them implies one natural and normalized way of managing information in the system.

In summary, each visual representation is a collection of cultural classifications of objects of design and of change. These classifications may influence the way that humans interact around them. However, they merely make visible the 'inside world' of a representation from the perspective of those who have constructed and introduced the representation. The outsider perspective has been excluded so far. In article I, I as an outsider, deconstructed the test scenario sequence. In article III, the managers appeared to be outsiders with respect to the developers' prototype. In articles II, IV and V, both the users and the developer acted as outsiders with respect to the managers' wall chart. The users were chosen as the research focus since the developer finally learned to act with the wall chart to some extent better than the users.

4.3 Verbal and visual representations in the construction and interpretation of viewpoints

How viewpoints are constructed and interpreted with verbal and visual representations was asked as RQ2. The answer moves the focus further from the control imposed by culture. With this focus, the ways that visual and verbal representations are used to give structure to objects of design are considered. The formation of objects of design is a matter of both the *construction* and *interpretation* of representations and, implicitly, also classifications included. Article II deepens the understanding of these two elementary forms of action that were referred to as *construction* and *conceptualization* in the article. These forms of action were examined in the article with respect to how collaborative actions are. The construction of objects appeared more monological than the interpretation efforts. The latter turned out to be dialogical to some extent.

Interpreting and constructing objects of design with verbal and visual representations are considered next. No special attention is paid to how collaborative these actions are but the individualist perspective on action is taken. In articles II-IV, the construction of verbal representations was shown to be a cornerstone of design despite the fact that the design literature has mainly concentrated on visual props as key elements of design. The construction of verbal representations in talk during design is many times supported by other forms of action. These are the interpretation of verbal representations, the construction of visual representations and the interpretation of visual representations. One joint form of action was recognized. In it, the construction of verbal representations was supported by the interpretation of visual representations. It was frequently relied upon in the studied moments of interaction.

The construction of verbal representations took place continuously, as shown in articles II-V. Speaking very generally, verbal representations were constructed to produce viewpoints on design. In the same way that producing viewpoints in talk is a basis of everyday life of human beings, participants need to communicate verbally, with verbal representations, in encounters of design. As the articles indicate, viewpoints were responded to by participants in one of the following ways. First, viewpoints were elaborated by means of verbal representations in the course of design. Second, participants presented alternative viewpoints with verbal representations, and compared and 'tested' them for feasibility. Third, participants tended to summarize, repeat and paraphrase viewpoints with verbal representations (see e.g., Tan 1994). Fourth, participants defined new terms for objects with those representations. This is a prerequisite for successful construction of objects. Fifth, participants argued for their own views, and users, for example, championed institutionalized ways of carrying out their jobs and performing tasks with those representations. Sixth, users challenged the development of new objects and practices with rhetoric (e.g., article IV). Seventh, it was possible for the participants to favour or go against another one's view with verbal representations. Eighth, participants became capable of establishing allies with verbal representations for the purpose of defending views that they preferred.

The interpretation of verbal representations is needed for constructing socially meaningful viewpoints on objects of design. This was demonstrated in articles II-V. It was found that what another person says is quite often a starting point for constructing arguments and counter-arguments. No doubt it is possible to commit to monologue inside ostensibly dialogical talk (e.g., the manager's monologue in articles II and IV). Yet, verbal representations that are produced in a monological manner cannot necessarily become conceived of as socially meaningful. The interpretation of verbal representations is thus needed to guarantee the meaningful construction of realities in encounters of design. One needs to listen to and make sense of what others say. It was demonstrated that interpreting represented viewpoints of others was of great benefit since emerging understandings helped participants to formulate their own viewpoints through the construction of verbal representations.

The insiders' perspective was taken in section 4.2. That is, the cultural perspective of the insiders was embraced. By contrast, the outsiders' perspective becomes visible through representations during action. An insider who is talking about objects of design around a visual representation of his or her own culture can be assumed to organize talk with terms provided not only by this culture, but also by the representation itself, that is, a key product of his or her culture. What one knows and what has been inscribed in material artefacts have an influence (cf., Hall 1997) in the background of action. An outsider may either adjust him- or herself to the classifications provided by the representation or interpret the representation more freely with the classifications of his or her own culture in the course of action. In article III, the managers from the client organization interpreted the developers' prototype not at the level of system use classifications, but in terms of task performance classifications. The prototype was 'flexible' enough for the managers to make sense of demonstrated uses of the system in the context of task performance. It is clear that the means of interpretation by the outsiders (the managers) differed to some extent from those of the insiders (the developers). This was illustrated in Figure 5.

The collision between the insider and outsider interpretation space becomes clear also in articles II, IV and V. In the articles, the manager classified objects of change in terms of process classifications. However, as shown in Figure 5, the outsiders (the users) took a more abstract view of the represented process. The outsiders did not only focus on the process, but began to re-interpret the process diagram as a portrayal of their future work (practices) where authority relationships would be distorted. Seeing processes was not their natural way of perceiving the world, but instead these outsiders saw how their work would become less valued. They thus used work and rank classifications to make sense of the chart. In the case of both the prototype and the wall chart, the representation itself, as part of the interaction, turned out in the eyes of the outsiders to be something other than what had originally been intended by the insiders. System descriptions, provided by these representations, tended to become social ones in the eyes of the outsiders. Social descriptions, in turn, began to include even more social classifications of objects of change. What is typical of these re-interpretations is that they relate to the defending of viewpoints.

The construction of visual representations is an integral part of design. Yet, the construction of visual representations did not really take place in the studied encounters of design. The term "construction" in this particular context refers to the process of making things and thoughts concrete as the form of objects, and this process took place, for the most part, inside the software house. In articles II and IV, however, the wall chart was shown to be constructed in an intercultural planning encounter. The construction of this wall chart was, however, one of the rare instances of this sort during the whole project. In fact, the skeleton of this chart was constructed even before the intercultural encounter took place, this time inside the client organization. The representation was merely modified during the encounter. Visual

representations were not only used as mediators in the joint construction of objects. In articles II and IV, the construction of visual representations was, on the one hand, a matter of legitimating objects. On the other hand, it was a means of managing an emerging process. The basic idea behind this type of construction in the analyzed project was abstracting entities of the world and then presenting these abstractions as more concrete than would be possible in talk (e.g., with text labels). Entities were many times made more durable and 'sacred' (i.e., untouchable) in this way. The basic mechanism behind making things 'sacred' with the wall chart was 'nominalization', which means turning a verb into a noun (Fairclough 2001), or in this particular case, for example, turning the means of performing a task into a term referring to the process of performing the task. In practice, this meant, for example, in article IV that the manager legitimated a task name by putting a concrete text label on the wall chart.

The construction of verbal representations, carried out in talk, appeared to be one of the most central forms of making thoughts meaningful in encounters of design. It was occurring continuously. Nevertheless, the other three forms of action (the construction of visual representations, the interpretation of verbal representations, and the interpretation of visual representations) ought not to be under-emphasized in favour of the construction of verbal representations. The three are essential elements that are, however, finally subjected to the construction of verbal representations. There is the mutual interdependence between verbal and visual representations in encounters of design. Verbal arguments become, on the one hand, stronger and more anchored in concrete objects of change with visual representations. On the other hand, however, visual representations cannot help much in the construction of legitimate viewpoints if not explained in talk (cf., Robinson 1991). Especially the interpretation of visual representations many times served as a foundation of the construction of verbal representations. Influencing the formation of others' viewpoints was one of the purposes of referring to visual representations in talk. Visual representations were many times interpreted in some favourable ways and used as visual evidence in the production of legitimate viewpoints. They were also used in support of making another one's viewpoint weaker and less favourable. In article III, for example, the manager interpreted a task performance, implied by the prototype demonstration, and, based on his interpretation, made this particular way of performing a task legitimate in his talk. In articles II and IV, the manager used his interpretations, presented also on the wall chart, when he configured the others' interpretations of the future process, and the future process itself. Finally, in article V, both the users and the developer interpreted the viewpoint of the manager presented on the wall chart. In this case, the users tried to defend their viewpoints and went against the manager, but the developer supported the manager's represented viewpoint.

4.4 Social constraints behind constructing and interpreting viewpoints

RQ3 was how the construction and interpretation of viewpoints is socially constrained. It has sometimes been taken for granted that a new IS enables people to do tasks. Yet, the answer to RQ3 reveals that the construction and interpretation of both verbal and visual representations of these systems are many times constrained in myriads of ways. The participants from different institutional settings perceive objects of design within their own frames of experience. They have different degrees of inclusion in the others' frames. In article IV, the participants' frames appear to constrain their own experiences. The manager's planning frame, for example, served as the master frame, the strongest organizer of experience in the planning encounter. It provided the manager with a natural way of handling issues related to the construction of future processes and tasks. The planning frame helped the manager in his construction effort, but it also constrained him. This was indicated by the fact that he was not able to approach processes from any other viewpoint. Guided by his frame, the manager was capable of making sense of an emerging process, and was thus able to add tasks to responsible roles. However, he could not take into account, for example, the viewpoint of users. Both the users and the developer, for this reason, had difficulties in accessing the planning frame. No direct evidence can, however, be found on their frames since they remained mostly quiet. However, the fact that they could not finally comment on the process when asked to do so indicates differences in frames. It is possible to speculate that they had their own natural ways of approaching objects of change. If this is true, they can also be assumed to have been constrained by their own frames in the same way that the manager was when acting within his planning frame. Other constraints of action were mainly recognized in article V. These can be divided into situational, institutional and societal constraints (Fairclough 2001).

Situational constraints of action were discussed implicitly in the articles. They cannot be easily detached from the flow of analyzed interaction. The participants continuously evoke situational constraints in the course of constructing viewpoints in talk supported by visual representations. For example, the production of one's own position with respect to other participants and objects of change can be conceived of as one type of situational constraint for other participants. Enablers of action were not emphasized in the articles, but one situational enabler of action, the absence of the manager, was mentioned in article V.

Institutional constraints of action can be mentioned. How participants are located in the organizational hierarchy was one of these. In article V, the developer did not accept the viewpoint of the users, but stuck to that of the manager. The explanation can be that the users are at a 'lower' level in the organizational hierarchy. This hierarchy can also explain why the users were

more active in the absence of the manager, but became more reticent when the manager was in the room. The distribution of tasks and authority in the organization can explain action as well. For example, some higher-level users were against major changes in authority relationships. They were constrained by their organizational rank. They were not able to yield their powerful positions to others due to their acquired rank. Knowledge that people have can serve as an institutional constraint as well. The users, for example, seemed to feel they know far too much to accept major changes that would obviate their acquired knowledge. Their experience constrained them in accepting change. Formal education and skills acquired in the practice can also constrain interaction. The background education and practical experience may explain why the developer was geared towards seeing system descriptions of representations, and why he once misinterpreted the wall chart. The users instead recognized its social descriptions (i.e., changes to their work practices). Neither the developer nor the users recognized alternative ways of reading the chart.

Societal constraints were not emphasized in the articles. However, one societal constraint, face-saving, was mentioned in article V. People do not normally infringe upon this societal norm capable of constraining the way they can act. Other societal constraints were not recognized in the articles. Recognizing, for example, the effects of ideological changes in our contemporary society could have been very difficult by way of analyzing detailed interactions.

Visual representations can also be conceived of as constraints of action. They may close their 'owners' inside their classificatory realms. A visual representation that one is using guides this person to see the world in one way, but it also prevents this person from seeing the world in another. It may also be difficult for this person to see the world through a visual representation that another one is using. In both of these cases, one's own culture provides boundaries for action. In articles II and IV, the manager was closed by his own wall chart and, in article V, both the users and the developer were unable to understand the wall chart in terms of the classifications of the management culture, provided by the wall chart, and they thus re-interpreted it.

5 REVISITING LITERATURE, SPECULATING ON IMPLICATIONS AND DRAWING CONCLUSIONS

To be conscious that you are ignorant is
a great step to knowledge.
Benjamin Disraeli (1804-1881)

This fifth chapter discusses the research findings in terms of the research literature, that is, possible contributions to the research are suggested. Possible contributions to the practice of design are also suggested. After discussing the limitations of the thesis and outlining future research directions, some conclusions are drawn.

5.1 Contributions to IS researchers

Ways of becoming sensitive to different aspects of design discourse through the three main dimensions of the framework are discussed in the following subsections in terms of the research literature that was reviewed in the introductory section.

5.1.1 Taking a discourse view of design

Much of the literature in this area of research was shown in the beginning of this thesis to be based on the social system or social process view of ISD. Thus, the ensembles rather than parts have been emphasized widely. Historically, this sort of view can be rooted in a typical engineering mindset. Structures and functions of a technical IS are central in that view. Meaning-making has not typically been the main substance for a technical IS. The social systemic view of ISD (e.g., Jones & Nandhakumar 1993) that is detached from human (inter)action, does not resolve problems of understanding objects of design as products of human meaning-making processes. The discourse view, presented in this thesis, is consistent with the systemic one in that the technical element has been seen as only one part of an IS. The social element is needed to understand the inherent nature of design efforts. That is, IS design is basically a human endeavour.

The discourse view that is outlined as a framework (Figure 4, p.47) has, however, more in common with the social process view (e.g., Newman & Robey 1992). This view, in which social events are preceded and succeeded by other social events, comes closer to the discourse view of this thesis. Events, or encounters of social kind, are a starting point of analysis in both of them. Yet, social events have not been examined as tied to human interaction in the processual view. Related to this, the political process view (Franz & Robey 1984) cannot be detached from my discourse view. This is because disagreements that are evident in the political process view were also studied through the suggested framework in my studies. My discourse view extends the other views, in that the emergence and handling of disagreements becomes visible in human interactions in encounters of design. The conflict view was mentioned as yet another way of approaching ISD in the introduction. My framework includes the examination of conflict. With the framework, however, conflict itself is not the focus. Instead, conflicting viewpoints, produced by means of verbal and visual representations, can be analyzed through the framework. My framework, as used in my studies, helped to recognize that conflicts, or, conflicts that are manifested through different viewpoints cannot necessarily be resolved (cf., Barki & Hartwick 2001). This was shown implicitly since chains of events were not extensively studied. However, my framework helped to notice that, for example, prioritizing requirements (Curtis et al. 1988) cannot guarantee the quality of the IS itself. This is because requirements are

constructed all the time, and as stated by Curtis et al. (1988), the way that one understands a requirement can be troublesome for others to understand.

The organizational context has an effect not only on ISD process (Gasson 1999) but also on design interaction. Becoming conscious of this may be possible through my framework which enables a deepening of the macro view. This is because the examination thus enabled takes into account not only human action, but also the micro-level interaction as part of the underlying context. Moreover, rather than bridging between social action and situated action (Suchman & Wynn 1984), the focus of the framework is on situated action. I agree in this thesis that although humans come first, they are part of the interaction taking place in a broader situational, institutional and societal context in encounters of design. It is possible to see through my framework that, for example, user empowerment and user involvement can be practically impossible in some encounters of design (cf., Howcroft & Wilson 2003). Defending ideals behind them in those encounters may be difficult because every human being has some private interests they naturally aim to preserve (e.g., Franz & Robey 1984). For example, managers who strive to maximize productivity of a firm are not necessarily able to accept every user interest they are given.

My discourse view helps to investigate those ways that design participants influence the final product. Levina (2005) exposed how humans contribute to a product by adding to others' efforts and by ignoring and challenging these efforts in the emergence of the product during ISD. The constructed framework gives a more comprehensive understanding of ways of contributing to representations of an emerging IS. It, however, does not guide one to approach design interaction as improvisation (Bansler & Havn 2004), but instead helps to recognize how humans preserve their interests by influencing the others' interpretations of objects of design in the underlying context that is imposing constraints on action. Yet, improvisation has some sort of role here. Situational rhetoric can be improvised to prop up one's position with respect to other humans.

Poor communication is a central source of trouble in encounters of design (Edstrom 1977). For this reason, strategies for making communication successful have been introduced (Urquhart 1999). My framework may help researchers to recognize those ways that humans influence one another. With this understanding, successful communication may become possible. It has been shown that, for example, reframing can be used as a strategy to understand another one's viewpoint (Urquhart 1999) and make one's own viewpoint more intelligible. Yet, design participants normally do not reveal their own deepest intents. My framework may sensitize researchers to how humans reframe their viewpoints in order to detach them from their interests.

Urquhart (2001) argues that design participants are not necessarily aware of the underlying context when they are acting in encounters of design. However, they were told by her to become retrospectively aware of this context when interviewed outside the actual action. The framework may be capable of showing that the social context manifests itself in the form of constraints of

action also during interaction, but in ways not necessarily known by participants.

This thesis emphasizes that understanding the construction of viewpoints with both verbal and visual representations as part of the situational, institutional and societal contexts necessitates the discursive view of design. My framework does not conceive of discourse as something that orders the interaction as detached form human interaction (e.g., Bloomfield & Danieli 1995; Doolin 2003), or as something that tells what is acceptable and what is not. My framework is closer to the one used in Alvarez (2001; 2002a; 2002b). Yet, it differs from that, in that the interaction is not only a matter of uses of verbal, but also visual representations intertwined with the process of sustaining and challenging design discourse (i.e., the whole design situation) as something.

5.1.2 Becoming sensitive to representations as classifiers of objects

What seems to be obvious in the existing research literature is that there are only a few analytical reflections on intended classificatory capacity of visual representations. There are some recent reviews (e.g., Adams & Avison 2003; Benyon 2002), but they only make sense of visual representations on their surface. One does not dig into representations *per se,* but discusses those techniques that are utilized in the production of representations of objects of design (Adams & Avison 2003). The focus has many times been laid on the introduction of new techniques (and representations), and the general portrayal of these. Their ideological intents are sometimes present in the introduction of techniques, as with rich pictures, for example (e.g., Checkland 1981). In the introductory section, many 'user or work-friendly' representations were discussed. This literature is relevant since many similar representations have been studied in this thesis. They were intended to support gaining of understanding of users and their work practices. My framework, and the whole thesis, is an attempt to move beyond the surface structure of visual representations of design, and to understand how these representations classify objects of design when detached from real action, and when examined inside their cultural boundaries. How representations are intended to classify what is represented has been the focus of this thesis. Yet, only one of the articles directly answers this. In the rest, the answer was only provided implicitly.

The wall chart, the prototype and the one test scenario sequence were studied in this thesis. To the best of my knowledge, these three types of visual representations have not been deeply analyzed in the literature in terms of their built-in classifications. Each of them was intended to be a 'user' or 'work-friendly' representation. Indeed, the wall chart was more of the latter category, taking even a business process perspective within this 'work-friendly' category. When examined a bit closer and deeper, the prototype and the one test scenario sequence did not simply emphasize user viewpoints (Darke & Shanks 1997). How this user point of view is classified in these representations was uncovered in this thesis.

The taken-for-granted assumption has generally been that prototypes, as mediators of the user-developer interaction, bring the user point of view to the foreground. Yet, how they classify this viewpoint when detached from interaction has not been studied in detail. This thesis adds our knowledge by showing that one prototype appeared as a system use classifier inside the development culture. Adams and Avison (2003) do not mention prototyping in their classification of ISD techniques, and thus this thesis makes a contribution to this vacuum.

Scenarios have been studied more often. Yet, how they classify objects of design has been discussed in general terms only. Adams and Avison (2003) emphasized that scenarios for future are structure-free, open and non-prescriptive, but no deeper analysis of their built-in classifications was offered. Benyon (2002) is also keen to discuss scenarios, and scenarios are emphasized as being geared towards understanding system functions. Different levels of abstraction, ranging from high to low, are said to be possible. This thesis contributes to the existing literature by emphasizing that one test scenario was based on system use classifications making the user viewpoint visible. System classifications as a means of doing this may sound a bit strange since using a new system is unlikely to be an end in itself to the users. Many more detailed classifications were also recognized. Therefore, the knowledge about the 'inside' structure of test scenarios has been proliferated.

Wall charts have not been investigated in terms of their built-in classifications to the best of my knowledge. In one of the studies of this thesis, however, one wall chart was deeply scrutinized and found to be based on process classifications, and more detailed dimensions were also recognized. This knowledge increases our understanding of the classificatory power of wall charts.

All in all, not only some general classification levels, related to visual representations, have been recognized and named. Some more detailed classifications of these levels have also been recognized, and in this regard, this thesis makes a contribution to the vacuum in the existing research literature.

5.1.3 Becoming sensitive to viewpoints interpreted with verbal and constructed with verbal and visual representations

Much of the literature in this research arena has been geared towards the role of representations as mediators enabling collaboration in the boundaries between different types of participants (e.g., Bødker 1998). Many empirical studies have been carried out based on this emphasis, as was shown in the introduction section (e.g., Clases & Wehner 2002; Potts & Catledge 1996). This thesis is not confined to this narrow view of simply representing objects of design, but also, and especially, shows how representations are used as instruments of influencing others. A different view to the earlier factor-based investigations of influence (e.g., Beath 1991) has thus been taken into consideration in this thesis. With this view, the aim has been to show how influencing takes place as part of design interaction itself. This thesis, therefore, does not argue that maintaining

a common identity (Star & Griesemer 1989) during design interaction would always be attainable. Representations do not always adapt to the needs of single participants (cf., Star & Griesemer 1989). In fact, common identity and local adaptation may remain out of reach during encounters of design if the interactants try to influence one another with representations, as found in this thesis. In many encounters of design, representations do not merely serve to establish and reaffirm a common ground and enlist participation on this ground, but they are also likely to be used to convince other participants (Hendry 2004).

This thesis has separated out those ways that both verbal and visual representations are used in interpreting and constructing viewpoints. These ways of acting have not been studied very much in the ISD literature. As was earlier mentioned, visual representations are many times only introduced as innovative ways of supporting ISD. Yet, the interpretation of visual representations *in situ* has not been widely studied in the earlier ISD research. Even less have they been studied as situationally constructed means of influencing others during design interaction. This thesis has touched upon the issue of interpreting verbal representations. It has also concentrated on the construction of verbal representations as part of preserving positions and convincing others in encounters of design (cf., Alvarez 2001; 2002a; 2002b). Alvarez, however, does not approach the act of influencing by recognizing how "representations" have been interpreted and produced during design interaction. By doing so, this thesis contributes to the design discourse studies. Influencing others by means of verbal representations was not the focus in Urquhart's study (1997; 1999). Instead, she was keener to understand the process of gaining an understanding of a user's viewpoints. Interpretations of verbal representations, produced by the user, were emphasized in her research, whereas in my research influencing through the construction of verbal representations has also been emphasized.

By emphasizing the pervasive role of the construction of verbal representations in talk, this thesis makes one of its key contributions, that is, materially objectified representations (i.e., visual representations) are not the primary, indeed central, element of design, but only tools supporting the construction of a new system through various viewpoints. In general, the great deal of discussion in the IS research, indeed quite naturally, revolves around technical artifacts, not around talk *per se* (with exceptions such as Urquhart and Alvarez). Interaction taking place around technical artefacts, or visual representations, has been studied, for example, by Bowers and Pycock (1994), Trigg et al. (1991) and Karasti (2001). In these studies, not only the construction but also the interpretation of talk is studied. By contrast, my research has uncovered an array of purposes for which verbal representations can be constructed in talk. Many of the recognized purposes can be related to the acts of influencing interpretations of objects of design. In this sense, this thesis expands our understanding about talking around visual representations. In some earlier research (e.g., Trigg et al. 1991; Karasti 2001), the collaboration view has been an impediment to seeing how the influence takes place around

representations. This thesis emphasizes that those participants who are attending design continuously attempt to interpret what the others have said about objects of design. The construction of meaningful objects is possible in this way.

My research may make it possible to understand how visual representations of one culture can be re-interpreted *in situ* in unique ways within another culture. In more detail, the classification levels (see Figure 5) that are present in the acts of re-interpretation have been discussed. This thesis thus deepens knowledge about how participants in encounters of design interpret objects around visual representations in relation to other participants. It does this by revealing that those who 'own' a visual representation or are part of the same culture where this representation has been introduced, have a more detailed view of the represented objects than outsiders (see Figure 5). One reason for this may be that insiders also have more knowledge of the represented domain whereas outsiders have trouble understanding its details and appropriate ways of handling these details.

One contribution is that the construction of visual representations *in situ* is a means of making uninstitutionalized objects more legitimate. Visual representations are not only capable of serving the communication functions by Hendry (2004). The legitimizing function is also possible. This thesis, however, shows that visual representations *per se* cannot make objects of change more durable. In studying how objects were rendered legitimate, it was shown that verbal representations were used as well. Based on this finding, the construction of verbal representations thus appears as a central means of change. These issues have been studied earlier under the label of "configuring the user" (e.g., Oudshoorn et al. 2004; Woolgar 1991). How 'natural' relationships between users and a future system have been constructed has been studied from slightly different perspectives in these studies. Yet, none of these studies examines the configuration of participants taking place in early design interaction.

To sum up, this thesis brings about four ways for studying how things are done with and around representations. With them, a more comprehensive and deeper look at design interaction at the level of representational practice has become possible.

5.1.4 Becoming sensitive to social constraints of design interaction

The conventional view in IS research has been that the social context that is underlying action is 'given', that is, it is seen as an institutionalized one and rather static ensemble of factors explaining why actions are constrained or enabled (cf., Noble & Newman 1993; Thanasankit 2002; Woodfield 2002). If the context is seen as 'given', it does not, on the one hand, have to be sustained by human beings. Nor can it be challenged and altered by them on the other hand. This thesis takes a different view by studying constraints of design interaction as an essential part of action. This standpoint moves the focus away from the view that the social context is detached from action and, thus, remains

ineffective and intact during action. My framework helps to see the whole situation within its context in a state of flux (cf., Alvarez 2001; 2002a; 2002b). This does not, however, mean that researchers need to approach design interaction as an arena where nothing remains as it is. To say that the situation is in a state of flux means that people typically do something to 'activate' or 'deactivate' constraints of action at least in their own minds, many times even unconsciously. My framework sensitizes one, for example, to see that one participant might do something which may make another act in a constrained way.

Alvarez (2001; 2002a; 2002b) has approached in her studies interaction in the requirements determination as the main context of analysis, but she at the same time sees it in its wider context. She has made an effort to show how design is discourse even though she has not paid any special attention to visual representations and their role as instruments of struggle. This thesis takes one step ahead by separating out constraints of action at different levels of society and by showing how these become 'alive' in interaction through different types of verbal and visual representations. I have become sensitive to separate situational, institutional and societal constraints of action (Fairclough 2001). In fact, the focus of this thesis has mainly been on the recognition of institutional constraints and how they were reproduced, more consciously sustained, and even challenged. Compared to Alvarez's studies, this thesis has attempted to be more analytical in terms of different levels of constraints. Even though situational constraints were not examined to a great extent in my studies, it becomes quite obvious in the articles that every turn in talk may create a situational constraint of action of some kind. It becomes clear when taking a closer look at the ways that participants talk that the analyzed interactions abound in situationally constructed positionings and other types of constraints of action. However, these were not explicitly discussed in the articles.

This thesis shows how frames (Goffman 1974) enable and constrain participants who act within them in encounters of design. Frames thus help researchers to anchor design more in the institutional sense making practices. In most of the recent studies of frames of design, frames have typically been understood as comparatively static determinants capable of explaining action (e.g., Gasson 2005). Even though more dynamic portrayals of acts of framing and reframing during the processes of change have also been provided (Lin & Cornford 2000; Lin & Silva 2005), the analysis does not descend to the level of interaction in encounters of design as in this thesis. Yet, this thesis does not help in seeing the construction of frames, but the ways that participants of design act within their frames and how their frames are sustained implicitly when they are interacting with other participants. Alvarez (2002b) is even capable of showing how shifts in frames happen in talk, and in this sense the analysis of frames is more developed in her research. Yet, the analysis of other institutional constraints of action is underdeveloped to some extent in my thesis. By contrast, I have recognized a set of constraints in this thesis, and thus my thesis is capable of showing that constraints cannot be detached from the flow of events, but are handled in various ways during this flow. The constraining capacity of

structural determinants was privileged over their 'enabling capacity' based on the studies. The central contribution here is that, for example, education is not only the enabler of action, but it can also constrain participants, in that they cannot take alternative perspectives on design. One contribution is that visual representations can also be seen to serve as constraints of action. With them, one may be 'locked' inside one's cultural realm, and will become unable to open up to conflicting viewpoints that are characteristically constructed in the course of design.

5.2 Contributions to practicing IS developers

Formalized, mechanistic and functionalist ISD methods do not provide a key for understanding social and organizational intricacies during design interaction, as was mentioned at the beginning of this thesis. The developer, equipped with and guided by these sorts of methods, can be said to have no appropriate change management expertise (e.g., Brooke & Maguire 1998). The characteristic of change management, they argue, would be to understand individual stakeholder needs, requirements and intended goals, together with predictable and unpredictable change effects. Users are typically ignorant of these change effects just like developers. Developers were also shown in their three cases to concentrate on technical issues that they were more familiar with. There is evidence of insufficient people skills of developers. For example, Jiang et al. (1999, 26) have shown that "political orientation is negatively associated with technical skills". The developers thus may have troubles with 'change management space' evident in ISD, and they have even been shown to consciously avoid discussions about issues of change (Brooke & Maguire 1998).

   This thesis, however, does not seek to provide the practicing IS developers with an operational manifesto for advising how to 'seize' the elusive 'change management space'. Instead, the aim is to bring about some, indeed non-specific, guidelines helping the developers to act as agents of change in the intersubjective construction of viewpoints in addition to acting in more technical roles. The following discussion is based on the findings of this thesis, and outlines some general guidelines for being critical about design. Increasing sensitivity in this respect is possible, as is shown, for example, in the self-reflexive account of the mental growth of a researcher (Walsham 2005). What is needed from researchers can in principle also be required from the IS developers who need to become critical about discussions of objects of change. However, the path to being critical may be long, and no magic tricks can be suggested.

   The aim is not to suggest the developers adopt a new world view, but instead to discuss what they could practically do to become more interpretive and critical in the client encounters. What I am after is that the developers could become conscious of those things that may get in the way of the uncurbed

construction of viewpoints as for a new IS. Generally speaking, the practicing developers need to open up to a variety of stakeholders' ways of approaching objects of change. The modelling of objects and events and their mutual relationships is needed, but it is insufficient in the early phases of design to guarantee the successful end product, an IS itself. For this reason, not only is some sort of cross-fertilization between traditional IS methods and interpretism needed (e.g., Alter 2004), but also between the technical thought process and the critical interpretation of social viewpoints for a new IS from conflicting perspectives. In Alter's words, a "path to deep, situated knowledge" (ibid., 181) is needed. What is needed in practice is the sensitivity to many types of viewpoints that are socially constructed, but oft times also socially constrained. No in-depth discourse analysis of interactions can be conducted by the developers. Nor is the watching of videotapes of client meetings appropriate since there are time pressures in any project. In fact, this type of viewing was once tried in the studied project, but we noticed that there were time constraints.

The developers are encouraged to sensitize themselves to biased courses of event. If participants of encounters of design work jointly, trying to end up with an intersubjective understanding of issues, there ought not be issues of trouble. Instead, the developers could seek to recognize those moments in design interaction during which one viewpoint appears to be stronger than others. The developers especially need to be aware of different, even conflicting, viewpoints that are constructed verbally by participating stakeholders. This is especially needed if one participant promotes one's own viewpoint or renders this viewpoint superior to others, and if this same person goes against other viewpoints produced in talk that is sometimes supported by visual representations. The developers are especially encouraged to be aware of the construction of allies with both verbal and visual representations. The situation in which some participants are for one biased viewpoint, may make it very difficult for others in that situation to actively propose their viewpoints. How participants (including developers themselves) construct viewpoints with verbal and visual representations are some of the best ways to access problems of design. Yet, the developers could become conscious of troubles in the process of constructing and interpreting both verbal and visual representations. In fact, this can be speculated to be very difficult since those who do not understand things may simply be quiet. They do not necessarily let the others know they do not understand a thing. Yet, being aware of silent moments can imply troubles in the joint action. Constraints of action are not normally mentioned aloud. The developers could, however, take a critical view and begin to anticipate what constraints of action there are in the situation concerned. If nothing else, they could cautiously act as mediators promoting the *weaker* viewpoints. They could seek to make sense of the client interactions from a variety of perspectives and "serve[s] interests of all clients, not just funders and direct participants" (Markus & Benjamin 1996, 388). The main thing then is that the developers become reflective, in that they conceive of differences of any sort as an important source of insight and development (Bjerknes 1991; Mathiassen 1998).

Through dialectical reflection, the developers could recognize and collect biased and conflicting viewpoints and could, for example, cautiously bring them later back to the discussion.

Mathiassen (1998) emphasizes that ISD methods should be regarded as frameworks for learning and should not blindly be adapted to any ISD practice. By contrast, visual representations are used widely in ISD practices. Yet, the importance of being reflective about many types of ways of using representations has not been emphasized in the literature. Based on the findings of this thesis, it seems to be justifiable to say that the developers need to learn how and why representations are used both by themselves and other stakeholders. The developers then need to learn to recognize those ways that their own talk and visual representations always bring biased views to the joint contemplation of design issues, and thus either prohibit others from using their own terms or, at least, make it difficult to take part in design actively. In fact, the developers could try to remain outside political struggles within the client organization (see article V) and instead could become more sensitive to the ways that different client representations classify objects of change. By becoming aware of different ways of classifying with and around visual representations, the developers can delve into unique variations of stakeholder viewpoints. It is, however, quite unlikely that the developers could remain totally outside political struggles. Someone always needs to make a final decision and if the developer accepts this decision, he or she becomes a pawn in the power game. Again, however, it is better than nothing if the developers seek to bring underrepresented viewpoints back into the discussion even if some of them will be finally rejected.

Representations have been emphasized in this thesis as an essential element of design discourse. Many discursive efforts in encounters of design revolve around visual representations, and these representations need to be understood by the developers as being interpreted and constructed by the participants in the underlying social and organizational context. What is thereby of critical importance to the success of an ISD project and the emergence of a successful IS is how the participants of the project come together around visual representations.

In the case studied in this thesis (Figure 6a), the interaction typically took place in a meeting room in a group of participants acting around some stakeholder's representation (typically that of the developers). Of course, different types of representations can be concentrated on at different development stages. This particular social arrangement may be quite common on many other projects as well. The problem, however, in grounding technical solutions on the arrangement *(a)* and on merely one or a couple of representations of current practices is that there will be no common ground (Clark 1996), and that some participants should deal with a strange set of classifications. The alternative arrangement can be suggestive of the following one (Figure 6b). In it, the participants do not immediately start around a representation of one culture, on which solutions will soon be constructed, but they together go over to different types of representations one by one both

physically by going to different places, and mentally by trying to abandon one's own classifications and opening up to those of other cultures. The participants are likely to need mediating representations capable of bridging different realms and enabling a common ground to evolve. The whole group of people can then move, physically and mentally, from around one type of representation to another, and many times back and forth. For example, the whole project group first takes a look at the work being done by several stakeholders and then can, for instance, talk about issues around the management representation. Then still another type of representation could be chosen and so on. Finally, the development team should become mature enough to go to one common table and start discussing new designs based on their common understanding, on a common ground. Yet, the cycle, presented in Figure 6b, may be needed several times also when new designs are being constructed. Different representations may be needed also then.
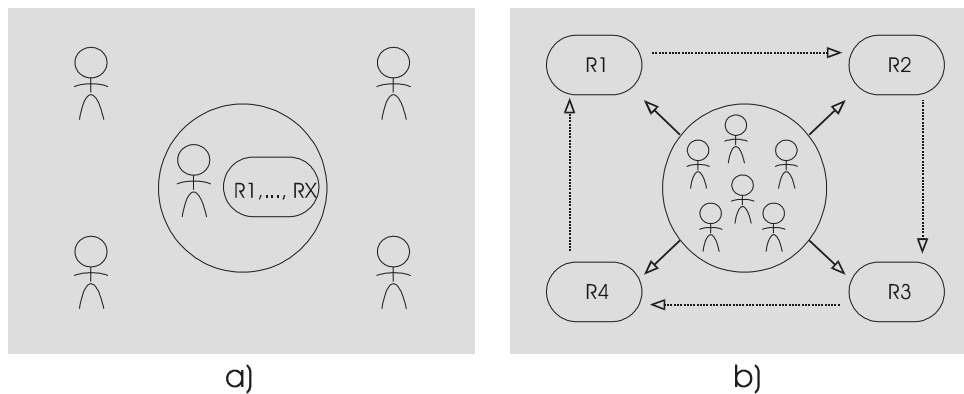
FIGURE 6   Two ways of coming together around visual representations.

5.3 Limitations

As any research effort, this one has its limitations that are partly due to the chosen focus area. Some of the main limitations of this thesis have been recognized during the process of writing. They are discussed briefly in the following. Examining a couple of episodes from a few sessions cannot give a comprehensive portrayal of the project and its turns of events. Illustrations of particular events prohibit us from seeing the longitudinal progress with objects of design and the evolution of objects to the final product, the technical system itself. It now is not possible to see that participants first talked about things from their own perspectives, then different persons tried to improve the situation, but failed one after another, and that not until closer to the end of the project was one participant capable of acting as a mediator who brought all the viewpoints together.

The discursive view of design, taken in this thesis, does not exclude the joint consensus type of action from the studied project. In fact, participants

many times did things 'jointly'. Due to the initial focus setting of this thesis, however, the emergence of an intersubjective understanding was not studied. The discursive view of design is restricted to what happened during the interdisciplinary encounters of design, during interaction. What happened between the meetings, especially inside the client organization, was not accessed. It is quite obvious that various discussions took place between the interdisciplinary meetings, and might change the course of event although it was not discussed in public in the meetings.

The in-depth examination is incomplete as for the study of structural determinants of action. Of these, enablers of action were considered less than constraints of action. Yet, this does not mean that enablers were not present in the project. In actual fact, any constraint of action, discussed in this thesis, can also be seen as an enabler from one of the stakeholder's perspectives. Yet, the aim has been to illustrate how constraints of action can make some participants more inferior than others in some respects. Taking this type of biased view denotes that the perspective of *the weak* has been overemphasized.

This thesis cannot emphasize the pervasiveness of societal constraints of action. Some overarching ideologies of the present day, for example, have not been emphasized in this thesis although they could have been very powerful in explaining why the final system took its particular form. For example, the very common 'effectiveness' ideology of the present day could be seen to manifest itself as the final technical IS. The contemplation of ideologies was consciously excluded from the analysis. Instead, institutional boundaries appeared sufficient to give a scope for this research. Moreover, the analysis of situational constraints of action is incomplete in this thesis. As was mentioned earlier, however, situational constraints were implicitly touched upon when analyzing talk in interaction. This thesis may, with its biased focus, give a rather pessimistic view of design since it has concentrated on issues such as influencing, persuading, power, and constraints of action. Of course, a partial view has been provided, and design is by no means that desolate a business.

5.4 Future research

The following areas for future research within the concerned topic can be recognized. First of all, the framework is by no means exhaustive and, therefore, it has not been sheltered from any constructive criticism. New instances of design practices need to be studied in order to 'test' and supplement the included categories of the framework and to exclude some of them if appropriate. One related area of research is the emergence of an intersubjective understanding around representations and their uses. This issue has been touched upon in the studied project, but it has not been emphasized more than in one paper from a limited perspective. What sort of role human mediation

may have in the processes of design could appropriately extend the representation focus.

How the developers could make use of the findings of this thesis needs to be found out to evaluate the benefits of the suggested framework as part of real design practices. With the understanding gained in this thesis, the method engineers could construct better ISD methods or modify the existing ones. They could outline some practical and tailorable guidelines for the practicing developers to help them become sensitive to represented viewpoints, the interpretation and construction of these, even conflicting, viewpoints, and the influence of the (enablers and) constraints of action on the ISD practice itself.

How to integrate a critical approach into functionalist approaches is one of the main concerns. Especially, how to do this in practice is what deserves increased attention in the future. Bringing insights into the practical education of reflective and critical developers is another great concern. For example, some sophisticated educational tools for training sensitivity skills are needed, and these could derive from the finding that methods are only frameworks for learning (Mathiassen 1998) and that problem solving needs to be prioritized over blind uses of methods as unchallenged ones (Mathiassen & Purao 2002).

5.5 Conclusions

As the main contribution, this thesis provides the framework for understanding the constitution of design discourse. With this framework, the design interaction has been shown to be a composite of three dimensions that are representation, representational practice and social practice. Through it, viewpoints of a new IS are shown to be interpreted and constructed by means of verbal and visual representations in the processes of design whereby some participants are socially more constrained than others. The suggested framework originates in its theoretical foundations, but also from real design interactions that have been studied. Therefore, it is robust enough to serve as a framework to be applied and further modified in future research where the interaction view is taken. It is, however, also general enough to be understandable to the IS practitioners at some level.

Many types of classifications that might have been built in system, social and deconstructed descriptions of representations, and different ways of interpreting and constructing both verbal and visual representations, together with situational, institutional, and even societal constraints of action have important consequences for how design discourse is constituted. To support research and practical efforts in the attempt to understand different viewpoints during socially anchored interactions of design, the individualist, socio-psychological perspective, taken in this thesis, made it possible to uncover acts of representing viewpoints and how these viewpoints are not only socially enabled, but also socially constrained. The interdisciplinary lens of this type is

needed to extend the functionalist perspective that has many times been taken on technical and social issues in the IS field. Through this sort of 'cross-fertilization', this thesis is capable of showing that both verbal and visual representations are a central unit of design. My findings seem to support Robinson's (1991) argument that visual representations are needed in design, for example, to support talk whereas verbal representations, produced in talk, are needed to understand visual representations. This thesis also shows that design is, to a great extent, based on acts of interpreting and constructing viewpoints with representations. Last but not least, it shows that the interpretation and construction of viewpoints cannot be conceived of as detached from social determinants provided by the underlying context, but it is instead directly influenced by it. The discursive perspective, provided by this thesis, is thus capable of both offering descriptions of what, interpretations of how, and explanations for why different IS viewpoints are produced. The framework provided can be speculated as having a lot of potential in helping both the researchers and practitioners to understand design in its micro-level domain.

This thesis emphasizes through its interdisciplinary approach that the construction of a new IS is not only a matter of solving technical problems related to the system requirements that are simply enumerated by representatives of the client. What is emphasized to be more important is that requirements are the products of complex human interactions, and interactions between representations, their producers and interpreters and the underlying social context. This thesis provides one potential critical approach for understanding interactions of design in more comprehensive ways compared to earlier attempts. Yet, the process of gaining intersubjective understandings of a new IS in heterogeneous groups is one of those major related themes that could not fit inside the scope of this thesis. Not only understanding design as a particular type of discourse from the individualist perspective, but also this intersubjective understanding, as a central dimension of design, is critical for success. It also needs to be studied in future research. Moreover, given that the field of design is very practical cries out for the link between theory and practice. Real problems are encountered in real practices of design. Even though practices of ISD have been extensively studied, they many times remain at a very general level. A deeper interaction view that comes closer to what participants of design are doing in practice has rarely been taken. Many studies still are light years away from being really helpful in real practices of design. One way to approach this concern could be to apply the suggested framework in some modified form in real educational development encounters. It is in the first place education through which some developments in the field can finally be achieved. Interventions may finally turn out to be unsuccessful in the field of design. That is why a key for augmenting sensitivity of both researchers and developers is through advanced education. The point here thus is that the suggested framework should not be used in practices of design, but in education.

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APPENDIX I

Dates of interdisciplinary encounters	Description of encounter	Article	Analysis approach/ method	Core units of analysis
14.2.2000	The current payment process, presented as a wall chart, was walked through, and unnecessary tasks and processes were removed from, and new ones added to the wall chart to outline a new payment process.	II	Theoretical interpretation	1 minute and 20 seconds of video; talk as transcript
		IV	Critical Discourse Analysis, Interaction Analysis, Frame Analysis	A short sequence of video; talk as transcript
25.2.2000	The new payment process was walked through by the developer and two users.	V	Critical Discourse Analysis, Interaction Analysis	4 minutes and 30 seconds → 2 minutes and 30 seconds of video; talk as transcript
2.5.2000	The participants endeavoured to ensure appropriate screens and the information needed within them have been included in the system.	III	Interaction Analysis	7 minutes of video; talk as transcript
30.-31.5.2001 and 5.-7.6.2001	The participants looked for and repaired significant errors in the software code before the system went into production use.	I	Deconstruction	One sequence of a test scenario

APPENDIX II

Development phase	Year/month	Dates of interdisciplinary encounters	Researcher attended	Data collection efforts
Requirements determination	2000/1-2000/6	12.1.2000 19.1.2000 2.2.2000 14.2.2000 25.2.2000 6.3.2000 20.3.2000 3.4.2000 17.4.2000 2.5.2000 9.5.-10.5.2000 24.5.2000 30.5.2000 7.6.-8.6.2000 21.6.2000	YES YES YES YES YES YES YES YES YES YES YES YES YES YES YES	Participant observation and *in situ* ethnographic interviewing; writing field notes tape- and video-recordings; collecting documents (including emails)
Phase 1:	2000/7-2000/11	Design: ? Construction: - System testing: ?	NO NO NO	-
Phase 2:	2000/11-2001/3	Design: ? Construction: - System testing: ?	NO NO NO	-
Phase 3:	2001/2-2001/6	Design: 22.3.2001 Construction: - System testing: 30.-31.5.2001 5.-7.6.2001	YES NO YES YES	Participant observation and *in situ* ethnographic interviewing; writing field notes tape-recordings; collecting documents (including emails)
Acceptance testing; implementation	Summer 2001	?	NO	-

APPENDIX III

14.2.2000/ MD-Levy 2 / Raita 1

00:39   00:00

LIITE VÄIKKÄRIIN ?

I

1 ●: Mä voisin tota mä tos viikonloppuna (.) hahmottelin itselleni (1.0)

2 ●: Aha

3 ●: Jonkinlaista kuvaa (1.5) ihan huomioiden vaan (.) tiettyjä asioita (1.5) nyt esimerkiks noi mitä ●●●kin nyt mainitsi et jälki- nuo jälkiseuranta sun muut niin (1.0) n:iitäh en oo ollenkaan huomioinu mut mä vaan (.) hahmotin eräänlaisen (1.0) prosessin mää aattelin (.) voisko tätä ehkä pitää lähtökohtana tai tos on joku pohja (2.0) tai sitten hylätään saman tein

4 ●: °Hylätään° ?   *vähätellen peittelee intentioitaan*

5 ●: Jos tota (3.0) mä aloin sitä miettimään että pakko pistää paperille ( ) ((taustalla puhetta, ei selvää))

6 ●: Mä annoin ●●●●●lle luvan jakaa tän sillä sillä tota välipuheella että öö: su- (1.0) ette ota sitä annettuna (1.0)

7 ●: Mmm

mutta jos moneen niin kirjataan ylös, voiko sitä enää muuttaa ?

8 ●: Niin siinä on (.) se vaara että ruvetaan kattoon tästä ( ) *pehän juuri avellaa roanit !*

9 ●: Ei täss on niin ylätasolla pää että-eh (1.0) ei oo (1.0) ei oo paljon vaaraa

vähättelee yhä enemään

10 ●:   [heh-heh *mitäs vihjaa?* → *vähätellä peittelee intentiotaan vahvistakseen sitä*

11 ●: Mut mä kirjotin-kirjasin vaan tiettyjä asioita tähän ylös mitä mulla itellä oli mielessä (5.0) mul- mul ei oo (kaavaa/kalvoo) mut tota (2.0) s:emmosen idea mitäh mäh sillonh mistä keskusteltiin sillonh (1.0) koskas se ny ol perjantainakin (4.0) niin sen voisin (ehkä) kertoo mikä tässä on ideana minkä pohjalta tää lähti (1.5) niin tässä on (3.5) mä on tästä poistanu ton (1.0) maksatus:::ksen aloitustoiminta että sinnekkähän ei juuri enää (.) tehtäviä jää (1.5) kunh (.) kun kun tota niitä maksatustaskuja ei tarvi jatkossa enää tehdä ((ja niin edelleen))   *SELITYS AUKAA !*

33:32   12:36

vetoaa siihen, että on tästä jo keskusteltukin °

III

((Yksisuuntaista tarinointia. ● kertoo mitä on miettinyt. ●tukee. Ennen episodia on pitkä tauko))

YHTEENVETO (FINNISH SUMMARY)

Organisaatioiden tietojärjestelmiä kehitetään ja uusitaan jatkuvasti. Niiden vaikutus näkyy lähes jokaisen ihmisen päivittäisissä työrutiineissa. Tietojärjestelmätieteen tutkimuksen yhtenä tehtävänä onkin tukea erilaisten näkökulmien mukaanottamista tietojärjestelmien kehittämistyössä, ja näin tehdä työprosessien ja työtehtävien yhteensovittamisesta mahdollisimman kivutonta. Erilaisten näkökulmien korostaminen mahdollistaa ymmärrettävien ja merkityksellisten järjestelmien kehittämisen niin johdolle kuin suoritusportaan työntekijöillekin. Järjestelmälle asetettavia vaatimuksia ei kuitenkaan voida vain luetella eri näkökulmista, vaan ne ovat suunnittelun kohtaamisissa kaiken aikaa sosiaali-sesti tuotettuja ja monin eri tavoin tulkittuja osana organisaation kontekstia.

Tarkastelen ihmisten kohtaamisia suunnittelussa monitieteisestä näkökulmasta, jonka ytimessä on tietojärjestelmätieteen ja vuorovaikutusta korostavan sosiaalipsykologisen näkökulman yhdistäminen. Tavoitteena on ymmärtää millaisista elementeistä suunnittelun diskurssi rakentuu. Lähtökohtana vuorovaikutuskohtaamisten analyysissäni on Norman Faircloughin kolmiulotteisen diskurssin malli. Väitöskirjatyössäni tätä mallia kehitetään ja laajennetaan suunnittelutilanteisiin sopivaksi käytännön kohtaamisten pohjalta. Vuorovaikutuselementin mukaan ottaminen diskurssin tutkimukseen ja tämän kokonaisuuden huomioiminen suunnittelukontekstissa muodostaa tämän väitöskirjan keskeisen annin. Tämän annin mahdollisti mukanaoloni puolitoista vuotta kestäneessä tietojärjestelmäprojektissa, jossa kehitettiin uutta taloushallinnon tietojärjestelmää työprosessien samalla muuttuessa. Olemalla mukana kehittämistyön istunnoissa, videoimalla kohtaamisia, kirjoittamalla muistiinpanoja ja haastattelemalla kahden kohtaavan organisaation ihmisiä aidossa ympäristössä pystyin keräämään hyvin rikasta aineistoa. Tätä aineistoa diskursiivisesta näkökulmasta analysoiden muodostin käsityksen suunnitteludiskurssin rakentumisesta.

Tutkimukseni perusteella väitän, että suunnittelun vuorovaikutustilanteita voidaan lähestyä kolmesta toisiaan täydentävästä näkökulmasta. Tutkimuksen pohjalta muodostetaan ns. "ymmärtämisen" kehikko, jonka avulla suunnitteluistunnot avautuvat pintaa syvemmältä sosiaalisina kohtaamisina. Kehikon keskeisiä elementtejä ovat representaatiot (objektien kuvaukset), representationaalinen käytäntö (tapa jolla kuvauksia tuotetaan ja tulkitaan) ja sosiaalinen käytäntö (se miten kuvausten tuottaminen ja tulkinta ovat sosiaalisesti mahdollistettuja tai rajoitettuja).

Tätä "ymmärtämisen" kehikkoa voidaan käyttää perustana silmät avaavalle tavalle nähdä mitä objekteja tietojärjestelmäprojekteissa tuotetaan, miten näitä uusia objekteja todella tulkitaan ja tuotetaan, ja kenen ehdoilla tai millaisin 'näkymättömin' rajoituksin uuden tietojärjestelmän objekteja rakennetaan. Kehikko tarjoaa uuden tavan tutkia suunnittelun diskursseja. Käytännössä tällainen tapa ymmärtää tietojärjestelmäprojektien ihmisten kohtaamisia voi mahdollistaa ymmärrettävämpien ja merkityksellisempien järjestelmien rakentamisen.