Prototype as a Representation in Establishing and Maintaining a Rhetorical Participation Structure

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ABSTRACT
Representations are considered to be means for better communication and collaboration in determining software requirements. Uses of representations have normally been studied in artificially created situations characterized by a harmonic common interest. Representations then can be seen as props for hearing the users' voice in requirements analysis. Two episodes in a 'real world' requirements determination session are analyzed not only in a responsive but also in a rhetoric light. A high-fidelity prototype as a representation in concert with a free flow of control could be seen to hinder the democratic determination of the requirements, and to enable rhetorical persuasion.

Keywords
Representations, requirements, participation, interaction

INTRODUCTION
Representations such as process models, use scenarios or prototypes play a salient role in the craftsmanship of the analysis and design of information systems. They can be roughly fitted into either representations of work or representations of the information system [12]. In the first one, also use scenarios of the envisioned future system are included. In both cases, a representation is not a mirror reflecting reality. Instead, it is intentionally used to represent only some of the qualities of that which is represented, i.e. *the represented* [12]. In acting as intermediaries between the participants, representations help people to focus on *the represented* in terms of opportunities and constraints [12]. Whatever *the represented* is, people intentionally construct it for the purposeful interest [24] that may be individually or collectively created (e.g. emphasis on the decrease in work load). The meaning of representations is "not simply to create images that can be appropriated to the interests of design but to understand our relationship, as work researchers, designers, and other practitioners, to those images and to the practices of representing that create them" [24, p. 63]. The represented qualities are unique, chosen and many times value-bound, even biased, interpretations of the world.

Representations can be regarded as "boundary objects" in an intentional act. Boundary objects are "plastic enough to adapt to local needs and constraints of the several parties employing them, yet robust enough to maintain a common identity across sites" [23, p. 46]. They can be located in between or amongst the participants in their direct and artifact-mediated presence. This view, by implication, presumes the material nature of boundary objects. This then means that language and even body language are both excluded. Material boundary objects maintain meanings across communities of practice so that the participants (e.g. users and designers) are enabled to make sense of *the represented* from their own perspectives [2]. Boundary objects should not be seen as prescriptive intermediaries, by definition, but as "common artifacts" [19]. A common artifact is not only predictable but also a partial and negotiable model of the situation [e.g. 19]. If a common artifact crosses the boundaries of another semantic community, it will be transformed (i.e. re-interpreted). Robinson and Bannon [17] use the term "ontological drift" for this phenomenon. Robinson [18] stresses that the common artifacts that make it easy for people to know what others are doing (peripheral awareness), enable implicit communication through the used material and a common focus for resolving difficulties and negotiating compromises.

We are interested in the use and effects of employing representations in user-developer interaction. This is studied from different perspectives: A representation can be seen as a prop creating harmonious interaction, a prop that is contextually regarded either as a facilitator or an obstacle or seen even to act as intermediary in the power struggle.

Coble et al. [4] reveal the harmonious nature of communication around the User Requirements document comprised of scenarios. The authors emphasize that the document brings a common focus into the debate, serves as

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a common memory for the participants and renders smoother communication between the participants. In the project, there was also a person (on the customer team) who was able to make his visions concrete as paper prototypes. Mogensen and Trigg [14] are in step with Coble et al. in that they discuss the so-called "situation cards" as triggers for harmonious participatory design. They recognize three stages that unfold during the course of the design of an evolving artifact: the appropriation of the artifact to be used (or representation if you like), the transformation, and confronting the old and the new in the work practice. Trigg et al. [26] analyzed the level of involvement or engagement and shifts in control and initiative. Even though they show that the user in their case reacted negatively to what she saw, the prototype they used encouraged the user to tell true stories of her work and reflect on her own work practice. This was seen to result in mutual learning in a harmonious manner. The authors then stress that the way users absorb themselves in the unfolding practices varies.

Madsen [13] also reveals the harmonious nature of communication around one kind of representation, here the documents from the work files. They are shown to bear influence over how initiatives are shifted. These documents as a representation have a twofold role. In this case, they helped designers join in on discussion. First, if designers ask questions, based on those documents, they may serve as a trigger for designers to enter the ongoing discussion. Second, designers can use these documents to bring the discussion back into the current work practice. O'Neill et al. [15] then discuss the representations in user-designer interaction in terms of their form, use, and users. If used in design, representations provide participants with a shared external model to support the cooperative activities and to delimit the interaction space of participants (that is a positive facilitator). In this case, the authors claim that the users, however, are very passive in transforming these representations. However, these external models are seen to maintain symmetric relationships between the participants.

Wilson et al. [28] then go on to show that representations can either be obstacles or facilitators in user participation. Thus they do not always invoke positive feelings. The authors noticed that users may act as passive or active participants. Some of the users found the prototypes and notations cumbersome, whereas the others did not. However, representations based on the whiteboard turned out to create a common focus for communication. Still, this interaction is rather harmonious in essence.

However, representations cannot always be seen to maintain harmonious interaction. For example, Bowers and Pycock [3, p. 303] describe requirements as "a negotiated product of argument and resistance". They also argue, using Woolgar's terminology [30], that both users and designers are in equal positions to *configure* each other. In the prototyping session they studied, it became evident that users and designers were acting so that direct refusals, requests, disagreements, and suggestions were rarely needed. Refusals, on the part of the user, were normally made in an indirect manner, for example, by reformulating the idea. Designers substituted indirect anticipation of users' troubles for direct requests. Timpka and Sjöberg [25] then studied a design session in which conversations on a certain topic were based on a scenario representation. The rules of "democratic dialogue" were followed. They recognize the rhetoric nature of interaction. The authors, however, did not explicitly reflect on the role of the scenario. They recognized three voices in the unfolded conversations: the voices of participatory design, of practice, and of engineering. The latter two talk of the product as an object. The voice of practice confronts the product in the work practice, whereas the voice of engineering addresses the opportunities and constraints of the technology.

Representations in requirements analysis do not prescriptively shape collaboration [2]. Based on this statement, I recognize that people are employing representations in their intentional acts, and in this manner, even exerting power upon others. Power can be defined, according to Fairclough [6, p. 89], as located in both ideological structures shaping social events and those events themselves reproducing and transforming the underlying structures. So far, however, the use of representations is mainly studied in participatory design sessions where the participation structure is based on the rules of "democratic dialogue" to some extent. By contrast, I have also analyzed the rhetoric nature of a session in which interacting participants use representations to create situational conditions for the emerging interaction.

In many of the past studies, the responsive (i.e. reciprocal, symmetric and harmonious) nature of the user-designer interaction is first created and then studied. Bowers and Pycock [3] make an exception, but even though they recognize the existence of arguments and the resistance in human acts, they still build upon the rules of the "democratic dialogue". Another exception is a study by Timpka and Sjöberg [25] who recognize the rhetoric nature, but for their part, they do not build upon the use of representations *per se*. In addition, Sjöberg [22] discusses conflicts as outcomes of the aim to control.

In the case studied here, the use of representations is not based on the "democratic dialogue" in which the users are guaranteed an equal voice, but on a business negotiation framework. However, in both, we need to understand how typical conflicts emerge to be able to avoid unwanted interaction patterns [22]. In my study, the participation

structure is situationally being negotiated by means of representations in a flow of responsive and rhetorical acts.

CASE

The software house *Incognito* and its *group Q* were involved in the implementation of a software development project for The Finnish Slot Machine Association (RAY) Funding Department to enhance the management of affairs and the communication within the interest group. RAY professes to be "a significant, widely-known organization with a legal monopoly to function as a gaming operator. (...) RAY's basic function is to raise funds through its gaming operations in order to support the work as voluntary health and welfare organizations" [www.ray.fi].

Group Q is hired to take part in the analysis, design and implementation of an information system for paying the funds to those organizations. In the project term definitions, (dated May 4, 2000) *funding proposals* are described as follows: "At the beginning of each year an organization can mail a funding proposal for the certain due item with the expected due date and installment". So far, RAY has not used any computer support for creating funding proposals. The focus here is on the requirements analysis. According to the project plan, the task of the project was "to determine the system to support the payment procedure so that this system and those supporting the supervision and preparation form a coherent whole, integrating all parts of the system".

The project was established on Dec. 29, 1999. According to the original project plan (dated on Feb. 9, 2000), the project was planned to come to an end "not later than April 30, 2000". The first of the definition meetings was already arranged in the client's meeting room on Jan. 12, 2000. Contrary to the original project plan, the definition project was finally completed only at the end of June.

I have analyzed two episodes in a meeting held on May 2, 2000. The project was approaching its end at that time. During the meeting, the new procedure for creating long-term funding proposals in the system was being negotiated. Funding Secretary Marja did not participate in the session even though she was liable for the task of creating the funding proposals, as mentioned in the documentation. It is unsure whether she was even invited. The following persons attended this session: Senior Supervisor Asko is responsible for supervising the process, taking care of the smooth proceedings of the process and ensuring that problems do not exist. He audits the Funding Secretary's suggestions, i.e. accepts, revises or rejects them. Junior Supervisor Erkki plays the same role. Manager Timo is in charge of the final acceptance of single installments, done as a kind of mass confirmation. Project Managers Keijo and Sami are from RAY's Information Systems Unit. Sami is similar to an observer, learning from the project. He joined the requirements analysis project since he was to be a project manager in the design and implementation stages. Two Designers from Incognito, Pekka and Jouni were present at the meeting. Pekka was a Project Manager on the part of Incognito. His task was to control the proceedings of the meeting. One Researcher attended the session as an observing participant. However, she did not explicitly intervene in the flow of conversation.

REPRESENTATIONS USED IN THE SESSION

So far, the participants had typically discussed around the paper-based documentation. They had had three types of primary representations: process descriptions, use cases (as diagrams and verbally described) and screen models with the accompanied verbal descriptions. This time, Designer Pekka sent a meeting invitation to the others for the next session held at RAY on May 2: "Let us aim to ensure that we have the screens that are needed". This email invitation was accompanied by screen models, a map of the transitions between the screens and a functional demonstration prototype.

The process description was a rich picture representing the whole payment procedure on a high level, as comprised of the tasks and their interrelationships along with the roles that people play in this procedure. The computerized tasks were specified verbally in the use cases from the users' point of view. These use cases included the title of the task, a general description, the actor(s), the frequency of use, the pre-conditions for use, usability requirements, how the task was to be performed, breakdowns in performance, alternative steps for performance, outcomes and additional information, if needed.

The functional high-fidelity (demonstration) prototype (projected on the silver screen during the meeting) was used to support conversation. The screen models (printouts) were duplicates of those in the demonstration prototype (see Figure 1).

METHOD

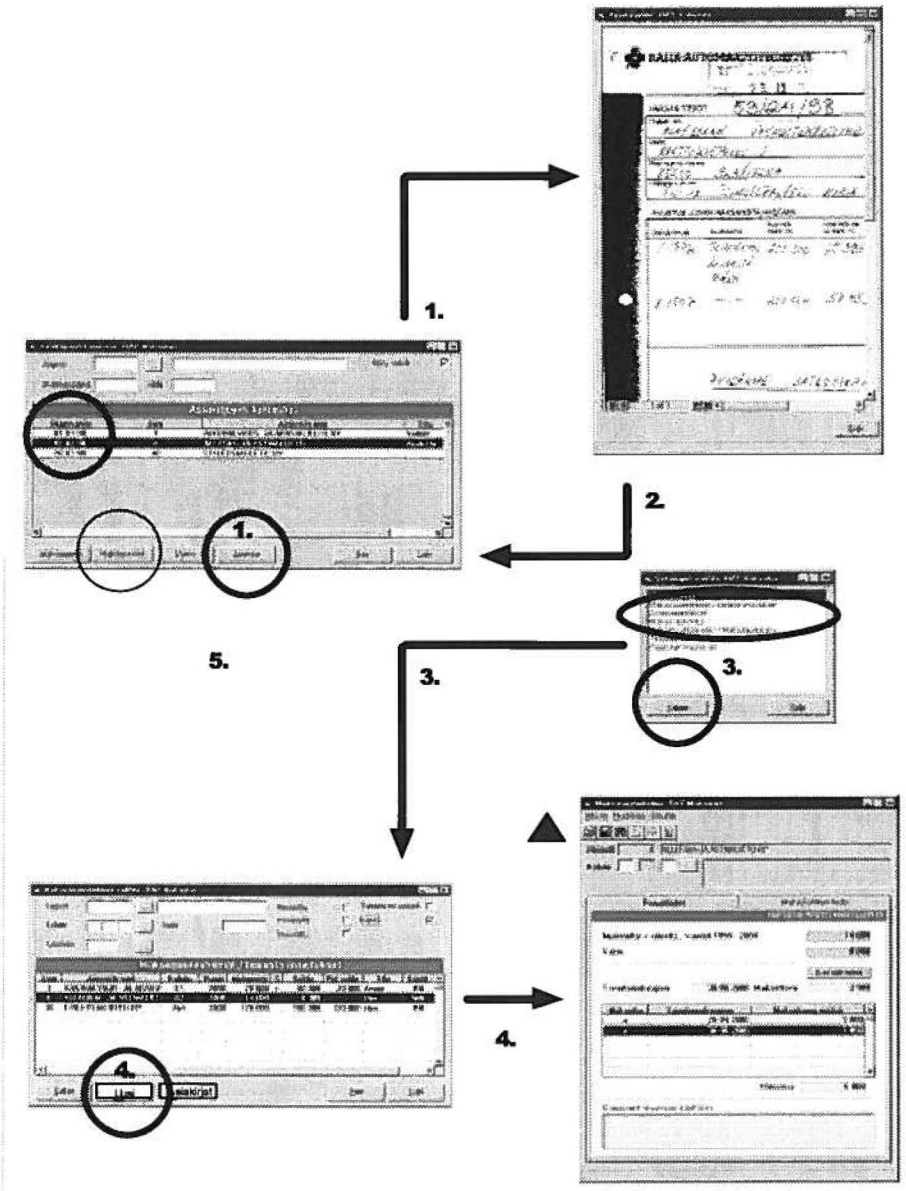
To identify the unfolding use of representations in establishing and maintaining the action, I committed to fine-grained analysis of interaction. The session was videotaped, because "video records social events as they occur and with a level of detail that is unattainable for methods that rely on reconstruction" [11, p. 13]. Selected parts of the video were transcribed. The transcript chosen for analysis is about one minute and 20 seconds long. The transcript notation by Jefferson [29] is used (see Appendix).

I based my analysis on Fairclough's Discourse Analysis (DA). In DA, whatever the specific orientation, analysts consider language as action [6,29]. The central point is that turn-taking provides means for people in interaction to organize their inter-subjective world [27]. It is characteristic

of DA that researchers recognize the existence of social discourses or 'meaning potentials' as resources that actors harness in talk-in-interaction or (re-)produced accounts [10]. DA researchers are reluctant to interpret mental intentions of the actors. Instead, they embrace whatever target-oriented action emerges, as humans act in interaction: "they [the intentions] are socially relevant because they manifest themselves as social activity" [27, p. 8]. Discursive action is rendered "socially real" in terms of its consequences [27]. If strategically or politically harnessed, this action may produce (or reproduce) asymmetric dominance and biased institutional power relationships [6]. Compared to Conversation Analysis (CA) in which a harmonious and cooperative view of interaction is produced, Fairclough's DA is sensitive to the sources of exercises of power, as well [6], and therefore used in this study.

Jordan and Henderson [11] introduce Interaction Analysis (IA) in which both the social and material worlds are analyzed in depth. I use this method in order to reveal how people support their verbal acts. In employing both DA and IA, I revolve around the language use as action supported by social and material resources, noting that text, discursive practice (i.e. the production and interpretation of text) and social structures are dialectically connected. IA introduces analysis foci for interpreting interaction [11].

Figure 1: The early stages of creating a funding proposal.



First, I identify the structure of events by defining the boundaries of events. This means recognizing the beginnings and endings of the unfolding events and transitions between them. Second, the participation structure [11] or participation framework [9] helps me to identify the way in which people establish and sustain mutual engagements and disengagements. IA also addresses the uses of artifacts and the utilization of a physical and social configuration in the unfolding interaction. Often during the course of the interaction the participants may aim to reveal their commitments to the common task orientation and focus by way of using body alignment, eye contact, tone of voice and other affordances of the situation [9,15].

To emphasize, speech acts can be used to establish either rhetorical or responsive action. If rhetorical action is established, one is presenting one's own thoughts as correct, trying to make the others to take one's side. By contrast, if responsive action is established, one acts reciprocally, reacting to the others' acts, taking turns. As a consequence, meanings are co-constructed. [20,21]. Moreover, I use the analytical concept "cultural dance" [8] to interpret the interaction. It is a metaphor to illustrate the events in which: "initiatives are like asking someone to dance with you in a way that the other(s) can either commit to acceptance or refusal" [10, p. 114].

THE CHANGING FACE OF NEGOTIATIONS

In Figure 1, the screens are taken from the final documentation. However, they are similar enough to those used in April and May to the extent that the sequence of the steps taken to create a new funding proposal can be demonstrated. These are the steps 1-4 in the use cases dated on April 14. The analyzed session was held on May 2. After this meeting, there was the new sequence for the performance of the task that is illustrated with steps 1-2 and 5 in the Figure 1. The window "Selailujen valinta" [Browse] is open, where a user can choose and open different list windows for browsing purposes. Step 1: A user finds a scanned document (a funding proposal) on the list and hits the "Asiakirjat" [Documents] button. As a consequence, the scanned document is shown on the viewer window. Step 2: The user finds out that the document is a new funding proposal. Step 3: To change the window from this to the screen "Maksusuunnitelman valinta" [Selecting the Funding Proposal], she locates "Valitse" [Choose] button and then hits it. Step 4: The user pushes the button "Uusi" [New] and is taken to the screen "Maksusuunnitelma" [Funding Proposal] to create a new proposal. She then enters the suggested due dates and installments. Since May 5, the direct link to the window "Maksusuunnitelma" was substituted for steps 3-4 (hairlines and dotted lines).

I identified two episodes in the analysis where the participation structure is changed during the course of interaction.

Episode I: Establishing and maintaining responsiveness

In this episode, the attendees are trapped by the demonstration. As a consequence, both the common object and the participation framework are created. The interaction develops in this participation framework as follows:

1 **Timo:** (1.5) that is, from here, er: (1.5) well those documents have been scanned (1.0) and that is then (.) is changed to be a funding proposal (4.0)=

=and it is [chos-((en))

2 **Keijo:** [HOW does this Marja do it now that she (.) well let us look at the (.) °document identification° (.) yeah and there's only °funding proposals°

3 **Timo:** Yeah

4 **Keijo:** >That is um:< (.) there's a document clicked open

5 **Pekka:** The document ((Keijo: "Yeah")) is first checked to be open there, after that she finds that it is a propos[al

6 **Timo:** [Yeah and then she hits that button yes (4.0) she pres[ses it

7 **Jouni:** [Opens there and then (.)

Gearing up to establish responsiveness

Timo has troubles establishing collaboration **[turn 1]**. This is indicated by the manner in which he browses through his papers, trying to find something. At the same time, he verbally tries to describe his view on the tasks. He, however, has several breaks, er's and well's that indicate ambivalence to some extent. It seems that he cannot find what he is looking for. At first, the others, except for Asko, are immersed in their printouts. After taking a glance at Timo who is faltering, Jouni examines his papers and takes a look at the demonstration prototype. He starts preparing a demonstration to support Timo's efforts. By glancing at the demonstration, Keijo also shows an interest in it. Jouni again takes a look at Timo, as if trying to avoid losing contact with Timo's monologue. Soon, he starts clicking his mouse buttons. As a consequence, Asko immerses himself in what is happening on the demonstration screens. First, he corrects his posture. Then, he leans forward to look at the demonstration.

Co-establishing a participation framework

There is much faltering in Timo's speech, which makes it possible for Keijo to intervene and, by implication, consolidate collaboration. The 4 seconds break in Timo's speech opens a window for intervention **[turn 1]**. Keijo intervenes by asking: "[HOW does this Marja do it now" **[turn 2]**. His question indicates that Timo's monologue **[turn 1]** is not sufficient for creating a mutual understanding. Simultaneously, Keijo turns to the demonstration prototype. In this way, he gets the others to join in to scrutinize what is in the demonstration.

Soon, Timo takes his eyes off his printout documentation. Immediately after turning to Keijo, he notices that Keijo is immersed in the demonstration, and therefore he looks at the same object. Before his utterance "(.) well let us look at the", Keijo has a break **[turn 2]**. In this context, this is a sign of a break in his thoughts: Keijo suddenly becomes aware that what he wants to initiate is already in progress. He states "°document identification°", rendering his view shared. He is not only clarifying his own understanding of the task, but also that of the others. This is indicated by the manner in which the others soon join the unfolding participation framework.

References to the demonstration are a trigger for engaging attentions. Independent of their acts, Jouni and Keijo seem to invite the others to the dance *refreshing the memory*. During this time, the others overtly accept the invitation by re-orientating themselves towards the silver screen, one after another. It is the uttered word "document identification" that makes the others wake up. Sami becomes aware of the demonstration first. Immediately after Sami's re-orientation, Pekka looks at the demonstration, nearly shaking when waking up. Shortly, Erkki is looking intently at the silver screen. Thus, Keijo's invitation is commonly, implicitly, and even inarticulately accepted.

Unfolding responsiveness

Keijo accepts "°document identification°" as it is by uttering "yeah" **[turn 2]**. He is maintaining the dance *refreshing the memory*. As an indication of this, he continues: "there's only °funding proposals°". Timo has already been tempted to join this flowing 'waltz'. This is indicated by his responsive utterance: "Yeah" **[turn 3]**. He is maintaining the discussion without Keijo's explicit request. Sami seems to be with them in spirit. He, however, had decided to be disengaged from the definition. Asko is in 'spirit'. However, he is not sitting so erect. This may indicate a sort of partial disengagement. Erkki has, for some reason, disengaged. He is setting his wrist watch.

Maintaining responsiveness

In his initiative ">That is um:<", Keijo launches a recapitulation **[turn 4]**. He is shaking his hand, pointing out the demonstration. By means of this symbolic act, he is engaging the others' attention towards the theme that he is accentuating. The inquiring utterance "[the document] is first checked to be open there" is a reference to the past event. He refers to the recently discussed document identification screen **[turn 2]**. This indicates that Jouni has proceeded to the next screen (i.e. the viewer window on which the document is shown). Thus, Keijo implicitly requests going back to scrutinize the document identification screen. This is done by his utterance. He may, for example, find that the understanding of the screen has been weakly co-constructed (if at all). He seems keen on discussing this task in more precise detail. Pekka behaves responsively by affirming and elaborating the utterance **[turn 5]**. He verbally shares the designers' interpretation of the task. It is Jouni who then transforms this speech into the more concrete form with his demonstration. He follows Pekka and transforms verbal utterances into the concrete acts on screen.

Pekka's utterances, such as "document", "first" and "there" **[turn 5]**, indicate that Jouni has already opened the document identification screen. Pekka then utters: "she finds that it is a proposal". It cannot be known that it is a proposal before the document has been shown on the viewer window. Jouni makes use of the demonstration in order to respond to Keijo's inquiring utterance **[turn 4]**. It is Pekka who verbally echoes the steps to allow things to be shared. Actually, he is talking to the demonstration. This is, however, not a problem. The demonstration serves as a focus to be seen. It appears that Keijo already knows the answer. This is quite apparent since Keijo says "Yeah" before Pekka has even finished his response **[turn 5]**. By getting the others to revise procedures, Keijo seems to render the demonstration shared within the group.

Introducing power

Timo enters the conversation, taking this 'drifting' floor. In being responsive, his talk even overlaps the ending of Pekka's **[turn 6]**, as if ensuring his floor and being able to join in the negotiation. In responding "Yeah and then she hits that button yes", Timo verbally shares the demonstrated step **[turn 6]**. His utterance "yes" at the end is a sign of the acceptance of this step. A break follows. Jouni seeks to find the next step from his demonstration during this break. Meanwhile, the others, except for Erkki, are waiting for the next step, being all eyes. Jouni then demonstrates the step. For some reason, it is again Timo who accepts the step as it is: "she presses it" **[turn 6]**. He is not only verbally sharing but also accepting what he sees. Compared to Timo who is active, the others are passive. This control of the situation reflects the existing and unfolding power structure. For the first time, Jouni acts verbally: "Opens there and then" **[turn 7]**. First, he says "and then". Then, he has a break. In this way, he is handing the floor over to be taken by the next person. In doing so,

he is still trying to sustain the responsive mode.

Episode II: Using rhetoric power

In this second episode the mode of negotiation is shifting from a responsive and commonly co-constructed acceptance to that of rhetorical acceptance of the task:

8 **Timo:** And then comes that yes (4.0) well that is that (.) that works (.) ((mumbling in the background)) and then when er Marja or somebody wants to er update the funding proposal then she or he goes er there to the list screen (1.5) via the list screen (4.5) there (.) and chooses the=

=organization (.) and due [i-((tem))

9 **Keijo:** [Wa:ait now

when first we (.) we go there so that we will not go so fast

10 **Timo:** Aha

11 **Jouni:** Do we close down this one?

12 **Keijo:** Yah

Taking over

Timo takes the floor, making it verbally visible, and accepts what is demonstrated: "then comes that yes" **[turn 8]**. Even though he is alluding to the last screen in the sequence with the abstract term "that", the others are able to see the common object. Timo has become the person who is in a position to give approvals to pin down the steps. In nodding his head and saying "yes", he accepts the task as it is. A break of 4 seconds follows. It is an indication of the ending of the task.

Timo, as an authority, gives a symbolic look at Keijo, Asko and Erkki, emphasizing the weight of his approval. He does not ask for alternative opinions. This is indicated by the verbal confirmation: "well that is that (.) that works (.)". Being rhetorically symbolic is a manner in which he rules different alternatives out. This is supported by the manner in which he immediately takes his eyes off the others in order to continue. He has a look, as if saying: "This is fair enough, isn't it?" However, none of the attendees notices this symbolic gesture. All but Erkki are still captured by the demonstration prototype. This gesture contrasts sharply with the others immersed in the demonstration. This implies a sharp contradiction: the others are not in line with the decision or they are still unsure of it. As this 'waltz' comes to an end, Jouni commits to a symbolic and practical act: He turns the page in his paper documentation. Thus, he re-orientates himself to a next task. He glances at the client participants, which also indicates his re-orientation to the next task to be discussed.

Exerting power

Immediately after his symbolic act, Timo begins with the new task. During this time, the dance in which he brings the others is in the rhetoric mode. I call this dance *forced acceptance*. Timo is not trying to establish a reciprocal process for the negotiation. Timo starts describing the new task verbally and rhetorically. Even though he frequently uses the filler "er", thus constructing an unsure image of himself, he still seems to hold sway over the others **[turn 8]**. This is in contrast to the others who are not reacting to Timos's rhetorical acts.

The others are still under the spell of the prototype. Jouni turns to Timo in order to understand his speech before the demonstration. Timo has changed the topic. His monologue becomes an initiative for Jouni to start the demonstration. Timo discusses updating the funding proposal: "Marja or somebody wants to er update the funding proposal" **[turn 8]**. As he mentions "via the list screen" with a break of 4.5 seconds, it becomes clear for Jouni that the step that Timo verbally and rhetorically shared, should be demonstrated. Timo seems to use this break to show he is waiting for the demonstrated step. Jouni opens the correct screen even without an explicit request to do so. This reflects the existing and unfolding power structure. For some reason, the others seem to be silently accepting this shift of initiative. During this break of 4.5 seconds, Jouni is expected to demonstrate the step. This is indicated by how Timo waits on Jouni's response, being all eyes. He rests quite self-confidently back in his chair, hands wide away from each other, as if creating an image of himself as a kind of authority. Jouni accepts the invitation to this rhetorical dance. He grasps the mouse and echoes what was implicitly expected. Keijo is immersed in what happens. Instead, Pekka, Erkki and Asko suddenly fidget around. Soon, Pekka and Asko are browsing pages of the paper-based documentation, as if seeking to find something.

Immediately after he is finished with his wrist watch, Erkki rests back in his chair. He remains as a passive and disengaged attendee. After a break of 4.5 seconds, Timo accepts the step he verbally constructed by neutrally stating: "there" **[turn 8]**. He uses talking aloud as a strategy to share explicitly his decision with the others. In this way, he exerts power over the others. The utterance "there" serves as a trigger for Asko and Pekka. They immediately react by glancing at the demonstration prototype. They may aim at getting a grasp of what Timo is talking about. In doing so, they seek to find a focus of Timo's monologue. They try to succeed in it by comparing the demonstration to their printouts. Timo still goes on to carry this waltz by uttering: "chooses the organization (.) and due i-((tem))".

Interrupting and accounting

Jouni is the only person to accept the invitation to this

dance. Now Keijo commits to an intervention. Keijo breaks in on Timo's speech by his statement overlapping that of Timo's: "[Wa:ait now when first we (.)" **[turn 9]**. Timo is forced to cease talking. After the intervention, Pekka takes his eyes off his document in order to turn to look at the demonstration. Nevertheless Keijo is not allowed to proceed without an account. As he interrupts, he becomes accountable. Timo's quick and sharp glance at Keijo serves as a signal for Keijo to give an account. Keijo pleads as follows: "we go there so that we will not go so fast" **[turn 9]**, making it clear that he has lost the point. By turning to the demonstration, Pekka also indicates implicitly that he has also lost the subject. By contrast, Asko is still browsing through his papers. In interrupting Timo, Keijo points his finger at the demonstration prototype. This seems to mean there is something wrong with the demonstration. Thus, he rejects the dance *forced acceptance*. Timo accepts the offered account with an astonished utterance: "Aha" **[turn 10]**. Jouni also accepts this intervention: he responsively and empathetically makes a suggestion: "Do we close down this one?" **[turn 11]**. Keijo is satisfied with the suggestion and responds positively: "Yah" **[turn 12]**.

DISCUSSION

What does it mean to employ the demonstration prototype responsively and rhetorically? Both the representation, the manner in which it is used, and who has the control or initiative have profound implications for how successful a negotiation is. Both episodes are characterized in this respect in Table 1. The implications of these locally unfolding interaction modes on the negotiation of requirements are then outlined.

Table 1: Nature of interaction during the episodes.

Episode I		**Episode II**	
		Before intervention:	After intervention:
-Responsive collaboration -Common object and participation framework exist -Reciprocal control	⇒	-Rhetorical persuasion -Common object and participation framework → Individual participation frameworks -Control by one person	-Neither responsive nor rhetorical -Individual participation frameworks -Control by no one

Representation as a prop in establishing and maintaining rhetorical or responsive action

To be responsive in negotiations, the negotiators need to create a common object (i.e. a common focus) as a condition for successful interaction. To maintain smooth interaction, it is also essential to create a common participation framework [15]. The interaction space within the participation framework created by the external shared model [15] (a representation if you like) appears to be focal in shaping successful interaction. The common artifacts allow *the represented* to be negotiated [18].

In episode I, the demonstration prototype, a common object, was projected onto the silver screen in front of the room. Jouni seemed to create this common focus on which the participants' task orientation was concentrated. During this episode, both the participation framework and interaction space was created. The common task orientation was, in turn, bodily maintained along with the clear eye contact with the demonstration. Wilson et al. [28] point out that the user attitudes towards the use of whiteboard and paper prototypes as common artifacts depend on the person. In this case, everybody, except for Erkki, accepted tacitly the demonstration prototype as a common object. Erkki disengaged himself. No doubt a person may choose the state of inaction as negotiating [16]. In the course of their responsive action, in episode I, the participants communicated via the demonstration prototype (the screens/task sequence) as a boundary object that let participants maintain the common identity and to approach *the represented* from the perspectives that make sense to single individuals. If participants sit near each other, they can successfully create an interaction space [15]. In the case that I have studied, it does not matter, if the participants are sitting apart from each other. This is because the limitations of physical space are overcome by means of the projected demonstration serving as a common artifact enabling implicit communication [18]. Concrete terms enabled Jouni to follow the discussion and demonstrate the steps. The others sustained the task orientation by verbally repeating the demonstrated steps. Negotiation was based on the reciprocal and responsive action. Basically, everyone who wants to join in on the discussion is offered, at least, a chance to do so. The use of the demonstration prototype effectively encouraged the others to join in this unfolding participation framework. There were no apparent communication problems at all. This is, however, true only for those who really participated and did it actively. The perspectives were shared by references to the demonstration prototype. As a consequence, the interaction was rendered smooth.

In a study by Trigg, Bødker, and Grønbæk [26], control is given to the users by means of a common artifact. By contrast, in episode I, the representation type and control became locally defined as common resources in the course of interaction. Madsen [13] has noted that, for example, documents from the work practice, if used as common objects, may trigger active participation. In episode I, the demonstration prototype encouraged only some of the

participants to be active. No one was explicitly exerting power over the other. In a situation like this, it is more about who is taking part actively. Although the participation framework was created, it is only Timo, Keijo and the designers who were actively taking part. This implies the existing power structure that is reproduced by managerial 'muscles' or the technology that was introduced.

On the other hand, we need to ask whether a prototype can be too complete, 'blinding' the participants. We can ask whether a demonstration drives the discussion too much. Low-fidelity representations are shown to create lower thresholds for users to interact with the implementation [5]. According to Shotter [21, p. 180], if responsive, a person reacts in the form of affirmation, disagreement, puzzlement, elaboration, application, etc. In episode I, the implementation was in effect not questioned. It was accepted as it is. Related to why the demonstration, however, was later rejected, Jouni answered as follows:

> "It suddenly crossed my mind that the participants became too glued to the demo. As a consequence, this could delimit the amount of options to be discussed. At the same time, I was reflecting, and terrified of, the thought that whether we implement the application based on this demo ;)" [sic].

Supported by Jouni's view, I conclude that although the common focus and participation framework were created by means of the demonstration, it was not encouraging the participants to embrace design options. In the testing phase of the system, after one of the sessions (held on May 31, 2001), I came back to this theme. I wrote in my notebook:

> "As to the demonstration program, Jouni stresses that it shouldn't have been used to that extent. The demo was showing the route for discussions, maybe too much, as he suspects (...) He talks about having both tech and use cases. User interface, in turn, is at the other end of the line. He's making a fascinating cut-off. (...) As to doing things differently, Jouni says that he could have employed screens and use cases in tandem."

The control was moved from the collective to an individual (the Manager) on the quiet during episodes I and II. After becoming a 'rubber stamp' (i.e. accepting things as they are) at the end of episode I, Timo began to act like a person who wants to persuade the others to accept things as they are. The control and initiative was not only handed over to him, but he also seemed to keep it. Thus, he finally started exercising power. At the outset of this episode II, it is apparent that all but Erkki got stuck on the previous task orientation. As a consequence, Timo was offered a channel for persuasion. The high-fidelity prototype, a sort of 'lure', maintained the task orientation. Before the breakdown of the participation framework, Timo had an effortless task to enter this task orientation maintained by the shared common artifact. Even low-fidelity mock-ups may allow mutual disagreements to exist [3]. Timo rhetorically constructed his monologue, having no interest in responsive reactions. If being committed to a monologue, the authority is "deaf to the other's response" [1, p. 293]. Timo succeeded in engaging Jouni in his biased participation framework. Jouni's task was to render the rhetorical speech concrete. Hence, Jouni supported Timo, likely unconsciously, in the attempt to persuade the others to the managerial view. Bowers and Pycock [3] emphasize that resistance and arguments are rarely explicitly expressed but here, in episode II, there was even no indirect or implicit resistance. The exception, a brave one, is that by Keijo. He was forced to interrupt Timo with a direct utterance, if he wanted to succeed. In this case, the participation framework was subject to breakdown. As an indication, Asko and Pekka re-orientated themselves by turning to look at their paper documents. This created individual participation frameworks.

According to Timpka and Sjöberg [25], the voice of engineering is a powerful strategy with which to win arguments. It has the elusive vocabulary for outsiders. I use the term "the voice of management". It is natural that the manager exerts power over others, but in this case, the manager was not only using his speech to persuade but also other means he was offered in the local situation. One of those was an emerged communication channel. The others were not yielding [16], but they were yielded. Timo was not contending. Instead, he had already won the argument. It is difficult for the others to resist rhetorical acts like this. The only means for successfully breaking the rhetorical action is a direct intervention. However, an intervention in a situation like this always requires an "account" [7], justifying the act to which one is committed.

CONCLUSIONS

Rhetorical persuasion appeared to hinder successful requirements determination. The participants need to be able to maintain a responsive mode when interacting. In this study, some questions, however, arose. Why were the work practitioners passive? Why did the group fail to maintain responsiveness?

The prototype opened up the hidden channel for rhetorical purposes since it appeared to be 'blinding' the participants. Thus, a prototype does not create a democratic participation structure *inherently*, but it can be used to exert power, as well. The study implies that a common artifact should be like a sketch rather than a high-fidelity prototype. The latter may create a channel for exercising power.

In a more democratic user-centered dialogue the shift of control should be controlled in a way that the exercise of power can be mitigated. If control is freely established, it depends on the existing and naturally unfolding power of relationships on how the control shifts or moves (if at all).

According to Bowers and Pycock [3], reflexive participatory design is a potential way for involving users. The participants, in that case, are reflexive, that is, conscious of the means of their interaction. Power cannot be avoided [22]. Thus, we need methods that help being (self)-reflexive about the potential use of power. Each participant should be encouraged to participate, to be actively constructive, and to reflect on the continuously emerging power relationships. In this way, exercises of power could be curtailed and a responsive mode maintained. It is then a matter for some sort of a methodology to enable a participation structure like this.

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APPENDIX

Transcript symbols [29]:

.hh	= Audible inbreath
hh	= Audible outbreath
((aba))	= Double parentheses enclose transcriber's descriptions of non-speech sounds or other features of the talk or scene
(.), (1.0)	= Pause as untimed and timed (to the nearest tenth of a second)
aba-	= A sharp cutoff of speech
[aba	= The onset of overlapping talk
ABA	= Talk that is noticeably louder than surrounding talk
°aba°	= Talk that is noticeably more quiet than surrounding talk
>aba<	= Talk that is noticeably faster than surrounding talk
end of line=	
=start of line	= Latching (no interval) between utterances