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The Anchoring Concept

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Abstract

This paper introduces the term 'anchoring' within systems development: Visions, developed through early systems design within an organization, need to be deeply rooted in the organization. A vision's rationale needs to be understood by those who decide if the vision should be implemented as well as by those involved in the actual implementation. A model depicting a recent trend within systems development is presented: Organizations rely on purchasing generic software products and/or software development outsourced to external contractors. A contemporary method for participatory design, where anchoring is considered to be a main activity, is outlined. The task of anchoring visions is described, and techniques and activities are suggested with respect to those actors that have to act on the visions and the recommendations from a design proposal. The paper concludes that obtaining appropriate anchoring requires designers to take on a role compared to that of an architect.

Keywords: Anchoring, visions, participatory design, design method, project management

BRT Keywords: EE, EG, EH, EL, FA, FC

Introduction

This paper presents experiences from a larger research program, the purpose of which is to develop *theories of and approaches to* early systems design in an organizational context (Kensing, Simonsen, and Bødker, 1998a; 1998b).

We use the term 'design' in relation to the analysis of needs and the preliminary design of functionality and form. This is in contrast to what is common within computer science, where the term 'design' is borrowed from engineering - focusing on construction and implementation.

Designing in an organizational context focuses on the application area: Complex administrative, managerial, and professional work within a specific organization, and the process of designing relevant computer support for this work. This is in contrast to detailed design for generic products aimed for a (larger) market.

By a design project, we refer to the early processes of systems development, where a vision of a future computer-based system is developed, outlined, and possibly prototyped. Later design/development-processes are referred to as the realization of this vision, which may include e.g. prototyping, purchase/development, and the technical and organizational implementation of systems components. (Throughout this paper, 'realization' refers to making the vision a reality as opposed to referring only to grasping

or understanding it clearly.) The result of a design project includes representations of visions of computer support, which thus form a basis for the organization to decide on and subsequently purchase/develop, and implement computer-based systems.

The paper takes its starting point in a critique of the participatory design tradition, claiming that this tradition tends to ignore project management and the recognition of a trend where organizations rely on purchasing generic systems products and/or outsourced systems development. First, we present a model depicting this trend. This model identifies three main tasks within an overall systems development project: The (early) design project developing the visions; making the decisions regarding the visions; and the further realization of the visions. We continue by briefly outlining a contemporary method for participatory design: The MUST method (MUST is a Danish acronym for theories of and methods for initial design activities). In the MUST method anchoring is considered to one main activity (out of five overall main activities). We then describe the task of anchoring visions with regards to design, decision, and realization. We conclude by summing up the main points stating that organizations need designers taking a role similar to architects: Besides designing a building, the architect is in charge of the overall supervision when the building is being constructed.

A Model for Systems Development within an Organization

A vision represents a future computer-based system. A computer-based system includes the technical system and the organizational change affecting working practices, i.e. the new work organization (Andersen et al., 1990). In other words, a vision means a coherent idea of the proposed information system and the technical, organizational, qualificational, and social work context it involves. The concept *anchoring* addresses the concern of taking care of communicating or assigning visions - and the rationale underlying the visions - to those actors that are to decide upon and further realize visions by means of computer-based systems.

Those who decide if a proposed vision should be implemented and those who actually implement a vision are not necessarily the same as the main participants in the design project who developed the vision. Papers within participatory design (CACM 1993; Greenbaum and Kyng, 1991; Schuler and Namioka, 1993) mainly focus on anchoring (to use this term) *within* a design team, i.e. between designers and current/future users, focusing on learning processes. From our projects in private and public companies we have experienced that those who are to decide if a given system should be implemented often participate in a design project only in its start (project establishment) and when its results are presented. Those that are to realize a given system might often not be involved until after a design project has been presented and decided upon.

Often organizations rely on purchasing generic systems and/or the development of systems is outsourced to a vendor or external software-house. This situation is characterized by Bansler and Havn (1994) as the 'industrialization' of systems development. A model for this development process is outlined in figure 1 (the model is inspired by Bansler and Havn, 1994 and Kensing, Simonsen, and Bødker, 1998a). We argue further for this model in section 6.

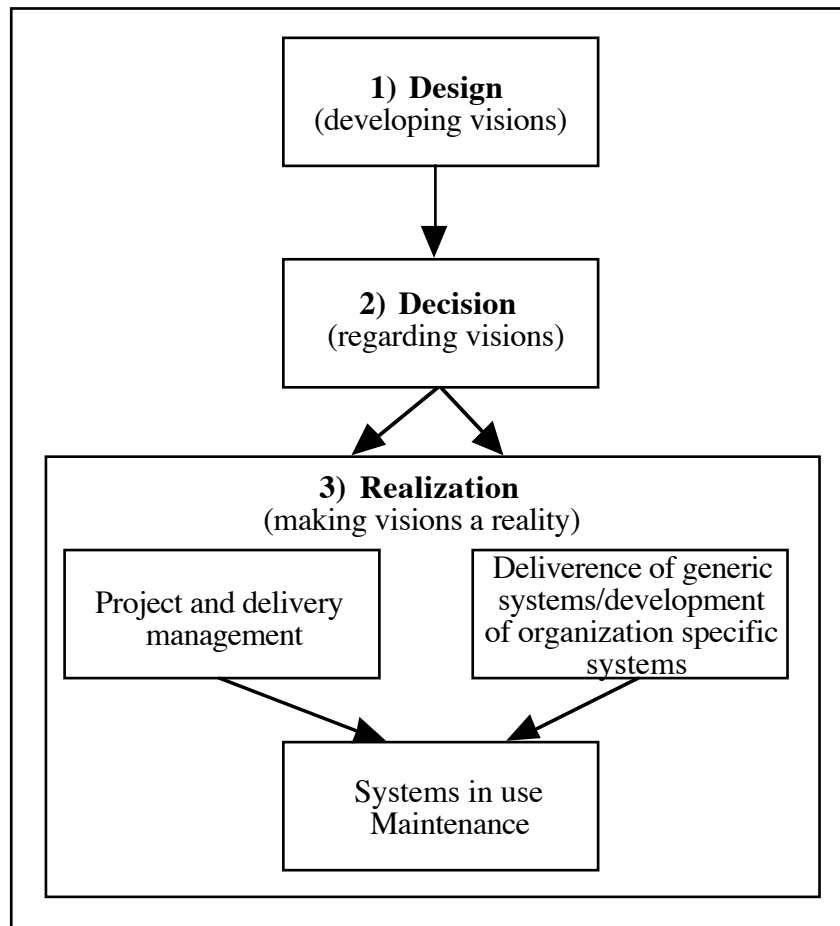


Figure 1. A model for systems development within an organization relying on purchasing generic systems products and/or software development outsourced to external contractors. Within the organization, design and specification of a vision for change are developed, decided upon, and prepared for a contractual bid. The chosen external contractor delivers generic systems and/or develops organizational specific systems. In parallel, within the organization, project and delivery management facilitates the organizational implementation with the users, external contractors, and other involved parties.

The model (figure 1) identifies three main tasks which different actors have the responsibility for:

1. The (early) *design* project developing the visions. Persons responsible for this are referred to as the designers.
2. Making the *decision* regarding this vision and its recommendations. Persons responsible for making the decision are management (in dialogue with employees) in the user organization in question.
3. The further *realization* (purchase/development, and implementation) and maintenance of the vision. This includes the following persons:
 - ∑ system developers in a contractor organization, offering hardware and software products (or, alternatively, in an IT-department within the user organization),
 - ∑ a project manager within the user organization managing the overall project, its deliverables, and the organizational implementation, and, finally,
 - ∑ people taking care of training, education, and subsequent maintenance of the systems.

In this paper we argue that designers in charge of 1) need to *anchor* the vision in the

organization, in order that the participants within and related to the design project, along with the actors responsible for 2) and 3) understand the vision properly. Users (both management and employees) as well as those realizing a vision need to understand the vision and its underlying rationale. Anchoring visions thus implies involving different actors and discussing/negotiating descriptions of both the vision of a computer-based system, as well as the plan for the process of further realizing the vision.

The MUST Method

The MUST method supports participatory design in an organizational context. The method has been developed throughout 10 projects in Danish and American organizations, and it has recently been evaluated and adopted by IT professionals within 3 large Danish organizations. The method is inspired by ethnographic approaches and by Scandinavian participatory design approaches. The method is described in (Kensing, Simonsen, and Bødker, 1998a) and an example of a large project using the method is given in (Kensing, Simonsen, and Bødker, 1998b).

The method offers a set of techniques and ways of representing current work and the envisioned computer based systems. In the MUST method the overall design process is constituted by five main activities: 1) project establishment, 2) strategic analysis, 3) in-depth analysis of selected work domains, 4) developing visions of the overall change, and 5) anchoring the visions. They support a stepwise decision making process. Iterations are recommended, especially between activity 1 and 2 and between activity 3 and 4. The fifth activity, which is in focus in this paper, should be seen as an ongoing concern throughout the project.

Project establishment

We recommend always to start with Project Establishment - a systematic way of supporting the clarification and negotiation of the aim, level of ambition, scope, and conditions of the project. Project establishment also suggests activities for the design team to decide which tools and techniques it will use to conduct the project, as well as for establishing the team as a social unit. While many projects start out from a rather loose description, project establishment provides management and the design team with a sound basis for the succeeding project activities. For an introduction to project establishment see (Andersen et al., 1990). A thorough example of project establishment is described by Simonsen (1994).

Strategic analysis

The purpose of the strategic analysis is to clarify and delimit which work domains should be in focus in the design project. Strategic analysis is a management related activity which clarifies the alignment between business strategy, IT-strategy, and the overall purpose of the design project. In case such issues have been dealt with before a project starts, the design team simply has to understand the implications for the current project and include this in the Project Establishment. However, more often than not we have found that such issues are still unclear when a design project starts. Strategic analysis is described by Simonsen (1994) and an example is given by Simonsen (1996; 1997).

In-depth analysis of selected work domains

The work domains pointed out by the strategic analysis are in focus when in-depth analyses of current work practices are performed. The purpose is to reveal and develop an understanding of the rationale behind current work practices. The intention is not to map old practices into the new computer-based system. However, we have experienced that users have good reasons for what they do and that the rationale underlying current work practices is relevant for the design, even if the management aims at rather drastic changes. For examples of in-depth analysis of selected work domains see Kensing, Simonsen, and Bødker (1998b) and Simonsen and Kensing (1994; 1997). A further discussion of this main activity is given by Simonsen (1994) and Simonsen and Kensing (1998).

Developing visions of the overall change

Developing one or more visions of the overall change is the central activity. We emphasize that the visions should not only deal with the functionality and the user interface of the suggested systems, but also include organizational change and changes in qualifications needed by the users. Ideas and visions are developed throughout the project, and they are often voiced in the very beginning of the project. They emerge in nearly all activities conducted in the project, but the purpose of this activity is especially to develop ideas and visions, and form these into one or more coherent visions for change. For examples of developing visions of the overall change see Bødker and Kensing (1994), Kensing, Simonsen, and Bødker (1998b), and Simonsen (1994).

Anchoring the visions

We use “anchoring” as a metaphor that moves beyond the design/implementation dichotomy. In order for a vision to materialize, it needs to be deeply rooted in the organization. The purpose of anchoring is to ensure that the visions rationale is understood by the users who will have to live with its consequences, the management who decides if it should be implemented, and those who will realize it by carrying out the technical and organizational implementation. Since the above mentioned actors are not all directly involved in developing the visions, time and resources must be set aside in order to make it possible for them to get to know the visions. The designers have the responsibility for anchoring the visions and they should prepare and carry out activities relevant for this job. The job of anchoring is supported by the design team and the management of the involved parts of the organization.

In the following we discuss the main activity “anchoring the visions” with regard to design, decision, and realization (see figure 1).

Anchoring Visions with regard to Design

Anchoring visions, with regard to the design team conducting the design project (*design* in figure 1), has been in focus within the participatory design tradition for a number of years and will only be briefly touched upon in this paper. The participatory design tradition (CACM 1993; Greenbaum and Kyng, 1991; Schuler and Namioka, 1993) has developed an extensive number of tools and techniques in order to support users and designers designing systems as a cooperative effort in design teams (see Kensing and

Munk-Madsen, 1993). The mutual learning process between designers and current/future users establishes the anchoring of visions within a design team. This mutual learning process is initiated through project establishment and idea-generating workshops, by incorporating for instance affinity diagramming (Brassard, 1989) and future workshops (Kensing and Madsen, 1991). The learning process is supported throughout the project by techniques such as meetings, workshops, and reviews. In the MUST method, we pay particular attention to workshops where the design team, perhaps supplemented by affected users, sketches current and envisioned work organization and its relation to new IT (Bødker and Kensing, 1994; Kensing, Simonsen, and Bødker, 1998a; 1998b; Simonsen, 1994).

Anchoring Visions with regard to Decision

Visions and their recommendations from a design project have to be decided upon by the organization, and most often designers only have a consulting role in this decision. The main actors are the future employees, involved in the vision, and the management, who decide whether or not to realize a vision.

Ideally, this decision implies (and should be made on the basis of) at least four types of arguments:

- ∑ First, an overall *priority* of investment into the domain addressed by the vision is needed. It is mainly a managerial concern to make this a priority and it requires some kind of overview e.g. of all major business functions. We have experienced that all interested parts, employees, along with managers, were concerned with this issue: Would they get a desired system after all, or would “others” (e.g. another department) be given first priority, leaving their vision in an unpredictable future.
- ∑ Second, a coherent *picture* of the vision is needed. This picture needs to be detailed enough for employees to recognize the effect on their own work practice, while management at least should feel confident with the outcome. Both employees and managers are reluctant to make decisions if they feel they are unclear about the vision and “what it is all about”.
- ∑ Third, employees and management should be convinced that the vision is relevant, i.e. actually supports or solves problems without imposing new major side effects, in other words, that it is *worth it*. The picture of the vision has to imply that you believe in its potentials and in the benefit you will achieve from it: Otherwise the problems in changing and adapting current work to fit the system will not be considered worth while, especially for the employees, this is often the case (Bullen and Bennett, 1990; Orlikowski, 1992).
- ∑ Fourth, the vision must be regarded as *possible* and realistic to realize, with respect to the financial and organizational concerns, as well as the qualifications available. To management, this e.g. implies that the financial and human resources are available. The employees should feel confident that they would be provided with the possibility to be trained and educated in using a new system. Also, the degree of organizational change embedded in the vision should “fit” the organization's potential of being dynamic.

Hence, the employees should (ideally) be able to argue for statements like:

- ∑ I understand what the vision is about and how it will affect and change my work practice.
- ∑ I am convinced that it is worth investing the time and effort to learn and “convert”

to this vision - that this effort will be paid back by what I achieve by the vision.

- ∑ I am convinced that it is possible for me to accomplish this change and that I have or will be provided with the necessary qualifications needed - that I have or will be provided with the time and training/education needed.

Similarly, management should be able to argue for statements like:

- ∑ I give priority to an investment in this function/work area/group of employees, compared to other alternative and possible investments in the organization or within my area of responsibility.
- ∑ I have a sufficient understanding of this vision to the extent where I am confident with what it is all about.
- ∑ I am convinced that an investment in this particular vision would be preferable when compared to other possible alternative improvements.
- ∑ I regard the costs foreseeable to be worth the investment, and I am able to raise the financial means, manage the reorganization of work practices and other organizational changes, obtain needed qualifications, etc.

A participatory design approach, more specifically the MUST method, provides users (employees and management) with information related to the above mentioned statements.

We have experienced that project establishment (resulting in a project charter) constituted the initial basis for a decision concerning the vision and recommendations that were expected as results from the design projects. Establishing the design projects creates expectations in the organization that “something” is to be done. Hence, any satisfying solution from the design projects is expected to be treated seriously, decided and acted upon.

Formally, a decision might be reached during a particular meeting by for example the steering committee. But the decision process is affected by preceding design activities and especially from the results (descriptions/products) from these activities. From our experiences, the outcome from the following activities seems important as a basis for the decision:

- ∑ Drawing rich pictures (Checkland and Scholes, 1990), freehand drawings and collages (Bødker and Kensing, 1994) resulting in informal descriptions, outlining the current and envisioned future work practice. These pictures highlight how the computer-based system would work and how the current work practice would be changed, simplified, and supported.
- ∑ Which current problems the system would solve, which it would not change, and new problems which could arise due to the system, have been identified by mapping problematic situations (Andersen et al., 1990; Lanzara and Mathiassen, 1984).
- ∑ Wall-graph sessions, where users participate in sketching overall work practices (Simonsen, 1994; Simonsen and Kensing, 1994; 1997). This has provided a coherent picture of the cooperative aspects in current work practice. These sessions have been important for management and employees in order to realize the complex cooperative work involved in selected business processes. The wall-graphs have formed the basis for discussions among future users about “who is responsible for what” in an envisioned future work organization.
- ∑ Developing simple mock-ups and prototypes to demonstrate key aspects of the proposed systems (Kensing, Simonsen, and Bødker, 1998b; Kyng, 1995)
- ∑ Visiting related organizations that use systems similar to those considered, or having demonstrations performed by potential vendors. The former has given

important input regarding users' experiences with the systems and the relation between systems, work organization, and needed human qualifications (Kensing, Simonsen, and Bødker, 1998b; Simonsen, 1994). The latter has clarified for example the functionality offered by a potential generic system.

- Σ Describing an overall picture of the visions as a scenario of the future computer supported work practices (Clausen, 1993; Kensing, Simonsen, and Bødker, 1998b; Kyng, 1995; Simonsen, 1994). Scenarios describe the new work organization in a narrative form, which we have found especially appropriate in an evaluation of the consequences of realizing the suggested systems.
- Σ Planning how to realize the suggested vision. Realistic planning includes plans for purchasing/development of the systems, for delivery management (including organizational implementation), and for the training of users (Kensing, Simonsen, and Bødker, 1998a).
- Σ Conducting hearings where managers and employees, who have not been directly involved in the design and decision process, may comment on the various descriptions and recommendations (Kensing, Simonsen, and Bødker, 1998a; 1998b).

Anchoring Visions with regard to Realization

Ideally, the main actors taking care of the main task described as *design* are the same actors participating in the main task described as *realization* (see figure 1 in section 2). This means that in an ideal situation those responsible for developing visions in a design project also participate in realizing these visions. Referring to figure 1 in section 2 a division of labor between actors managing design and the system developers in the contracting organization is observed. Hereby an (ideal) overall learning and communication process is in some way disrupted, introducing the problem of anchoring the vision to actors involved in realizing visions. This paper does not address the problem of why and how to avoid this situation, but instead how to deal with it. Our studies show that this division of labor is likely to be the situation in most industrial settings (see also Bansler and Havn, 1994). There are three general reasons for this (discussed further below): Due to a more general process of industrializing and outsourcing of software development; due to a specialization among individuals; and due to aspects of confidence.

Bansler and Havn (1994) recognize a growing tendency, that is referred to as the *process of industrializing software production*: A trend to purchase generic software products rather than relying on in-house development. Generic software spans from packages "off the shelf" with no tailoring, packages with prespecified options for tailoring of features and selection of procedures by the customer, and packages installed with custom tailoring by customer or vendor, to sophisticated development tools, including a dedicated programming language for use within a limited and specialized domain. The industrialization of the software production leads to an approach to the development of information systems referred to as configuration development, "putting generic components together" in building an information system. According to Bansler and Havn, configuration development comprises: Feasibility study and requirement analysis; selection and purchase of a generic system; implementation of generic component configurations; and finally, operation and maintenance of the system. Hence, a main actor needed in an organization practicing configuration development is described, by Bansler and Havn, as the analyst, analyzing local work practice in order to

establish systems requirements. He needs skills in organizational analysis, a basic technical knowledge, and insights into the market of generic software and hardware and evolving industry standards. This actor is close to what we refer to by the designers in the main task described as *design* above (see figure 1 in section 2), and the project manager in the main task described as *realization*.

We agree to the growing tendency (or industrialization), as pointed out by Bansler and Havn, and its consequential configuration development approach, as it corresponds to our own experiences. The configuration development approach is perhaps especially relevant in smaller organizations, where there is no capacity to have an internal IT-department. In addition to Bansler and Havn's configuration development, we and many others (see e.g. CACM 1996) recognize the growing trend of outsourcing. Development of specialized systems for the specific organization, which does not exist on the market as generic systems, may be obtained by contract-development by a vendor or a software-house.

As part of the industrialization of the software production, we have experienced a division of labor between designers and systems developers, due to both individual reasons and to aspects of confidence:

- ∑ The rapid change in technical development environments and the high complexity of generic products results in a *specialization among individuals*, e.g. into a division of labor into two groups within a vendor organization: One mainly taking care of customer related issues (the initial parts of a project where the bid, negotiation, and contract are made) and others dealing with the succeeding tailoring of generic systems and/or development of new information systems.
- ∑ A vendor organization will engage a potential customer with its repertoire of solutions and know-how in mind, and thus tends to “find problems suited to existing solutions”. Hence, due to *aspects of confidence*, the user organization needs designers advocating their interests rather than the vendors' interests. This could also be the situation in larger organizations within the relation between a “user”-department and the internal IT-department, as pointed out by for example Bødker and Kensing (1994).

System specifications, prototypes, and other descriptions of the systems the organization has decided to realize cannot convey a coherent vision (Naur, 1985). Visions are often “carried” through a project by few actors or by a single actor (Frøkjær and Korsbæk, 1997). Therefore appropriate anchoring requires that (part of) the design team has to cooperate closely, at least in an overlapping period of time, with those taking care of realizing the visions. As outlined in section 2, a project manager is needed to conduct the negotiation with contractors offering generic products, and to perform project and delivery management in the overall task of realizing the visions. For the designer, this means/suggests having a role similar to the *architect*: Besides designing a building, the architect usually is in charge of the overall supervision when the building is constructed. For the organization, this points towards a need for establishing this competence.

We have experienced that it is important for the designers to be able to conduct project and delivery management during project realization. Even small projects with situations characterized as problem solving (Andersen et al., 1990), where a detailed specification of the system form the basis for the competitive bid, might be problematic during realization if the designers from the preceding design project are not involved. But if the designers are allowed to establish and maintain a cooperation with the vendor that deliver the system, appropriate anchoring with regard to realization can be achieved (Simonsen, 1994).

Cooperation with the vendor organization is increasingly vital in larger projects

with situations characterized as problem setting (Andersen et al., 1990). In such situations the resulting visions might outline future computer-based systems involve major changes in current work practices, further experiments with prototyping, development of organizational specific systems along with delivery of generic systems, etc. (see e.g. Kensing, Simonsen, and Bødker, 1998b; Simonsen 1994; Simonsen and Kensing, 1994). If designers do not participate during realization the result may be fatal (Simonsen 1994; Simonsen and Kensing, 1994). If designers do not participate during realization the envisioned results may be radically changed or unfulfilled (Simonsen and Kensing, 1994). From our experiences, the appropriate anchoring with regard to realization has included the following activities (see Kensing, Simonsen, and Bødker, 1998a; 1998b):

- ∑ A re-establishment of the project as part of the negotiation with the vendor organization. This includes defining the overall project and delivery management through the realization, and the designers should be delegated this responsibility (hereby established in an architect role).
- ∑ Reviews of the design reports, various descriptions like problem maps, drawings, mock-ups and prototypes etc., involving both members from the design team and developers from the vendor organization.
- ∑ The developers from the vendor organization perform observations of key work practices that the systems should support. This they do in order to achieve first hand experiences with the involved work practices (Kensing and Munk-Madsen, 1993; Kensing, Simonsen, and Bødker, 1998a).
- ∑ The developers from the vendor organization work (and are located) within the user organization during the programming of organizational specific systems. This is done in order to ease communication when questions arise during the process (Kensing, Simonsen, and Bødker, 1998b).

Conclusion

We have argued that systems development within specific organizations may be characterized by three main tasks: The design project developing the vision, making the decision regarding this vision and its recommendations, and further realizing the vision. Furthermore we cannot expect that the actors conducting the design project are the same as the actors deciding upon and further realizing its vision. We have argued that this division of labor seems to be strengthened when organizations rely on purchasing generic systems and/or software development outsourced to external contractors.

Organizations need the designers, who are conducting the design project, to take the responsibility for anchoring the vision with respect to the actors involved in decision-making and realization. This could be stated as the following general guideline:

Organizations need designers responsible for the development of a vision of a computer-based system. In order for the vision to materialize, a main concern and activity must be anchoring the vision in order that those actors who are responsible for deciding upon and realizing the vision understand it properly.

	Design	Decision	Realization
Main actors	Design team	Users and management	Project manager from user org. and developers from vendor org.
Focus	Participatory Design	Outcome from design	Close cooperation

	approach Mutual learning process	project: Descriptions of IT and future work organization	between user org. and vendor org.. Developers achieve experiences with key work practices
Suggested techniques and activities	Project establishment, meetings, reviews Idea generating workshops like affinity diagramming and future workshops Workshops sketching current and envisioned work organization with new IT, like wall graph sessions, prototyping, prompted reflection, etc.	Visits to org. using the considered IT Meetings and hearings presenting: - Rich pictures/drawings - Collages - Problem maps - Wall graphs - Mock-ups and prototypes - Scenarios - Plans for realization	Project re-establishment Establishing of architect role Project and delivery management Review of descriptions such as reports, drawings, prototypes, etc. Observations Developers work within user org.

Table 1: The main actors involved, the focus, and the suggested techniques and activities related to three areas from the model depicted in figure 1.

We have discussed anchoring visions in the organization and based on our own experiences, we have suggested techniques and activities supporting this task.

The concept of anchoring visions in organizations should be considered from the very start (project establishment) of a design project.

Anchoring with regard to design may be achieved by conducting the design project with a participatory approach.

Supporting the participatory design approach by including a focus on overall management aspects, as in the MUST method, has proven successful in anchoring visions with regard to decision (Kensing, Simonsen, and Bødker, 1998a).

Anchoring with regard to realization points to a critical role of project and delivery management within the organization. In design projects characterized as problem solving, where the vision and related systems can be specified in a relatively detailed manner, anchoring with regard to realization may be achieved simply by allowing the designers to participate in the negotiations with the chosen contractor and to possibly conduct some follow up on the delivered systems.

In more complex design projects characterized as problem setting, anchoring with regard to realization might be far more complicated. Planning the process of further realizing the vision becomes critical. The organization needs a specific project and delivery management. Appropriate anchoring requires that the designers conducting the development of visions must continue their role in the project and cooperate with those actors taking care of realizing the visions. This architect role requires competence and skills in conducting participatory design projects as well as in managing the cooperation with external contractors and the organizational implementation of the computer-based systems.

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