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Introduction

This chapter discusses activities in three IT-organizations to change work practices in design. The endeavors were related to the introduction of a new method for design in an organizational context, developed by the authors (Kensing et al., 1998a, Bødker et al., 2000). The method has been developed through a combination of theoretical studies and experimental development (Kensing, 1999). In the experiments we - as designing researchers - have carried out ten design projects in various organizations in Denmark and the US in co-operation with designers and users from the involved companies (Bødker and Kensing, 1994; Kensing et al. 1998b; Simonsen, 1997; Simonsen and Kensing, 1997).

Following the ten projects with industrial partners we have demonstrated that the method and the conceptual framework worked well when we in co-operation with designers and users from the companies carried out design projects. To put the method to a

"reality test" we recently completed projects in three Danish IT-organizations. Our role in these projects was restricted to method dissemination – analyzing the IT-designers' current work practices, proposing changes, teaching, supervision, and coaching – and evaluation of the method in close co-operation with the designers in the three companies. In this chapter we reflect on our experiences in relation to the method dissemination activities, i.e. changing work practices of designers doing real life industrial projects.

The chapter is structured as follows. Following this introduction, section two contains a description of the research approach applied. In section three we briefly present the method that we have developed and introduced in the three organizations. In section four we present the three organizations and the activities performed in each organization. Section five concludes the chapter with lessons learned.

Research approach

The research was carried out in co-operation with three Danish companies: The Radio Station, The University Hospital, and The IT Consulting Company, and sponsored by The National Danish Centre for IT-research. Our responsibility was method dissemination activities (teaching, supervision and evaluation), and evaluation of the practices of IT-designers in real life

industrial projects. The project was organized as an action-research project with *two co-ordinated agendas:*

1. The industrial agenda aimed to increase the method repertoire and the understanding of early design as part of system development activities. Each company received support to start experimenting with new work practices in design based on an understanding of the current practice in design projects. The researchers facilitated these activities in co-operation with designers from the three companies. Teaching and supervision of relevant issues in new work practices was an integral part of the researchers' responsibilities.

2. The research agenda focused on contributing to the further development of a conceptual framework about and a method for design in an organizational context. More specifically, the *research questions* of the project were formulated as follows:

   - What are the strengths and weaknesses of current approaches to design activities?

   - How is the method evaluated by designers in the three companies in relation to other approaches to design in an industrial context?

   - What are appropriate ways of introducing the method supporting designers in an industrial context?

- How can the method and the conceptual framework be revised based upon experiences and dialogue with the involved designers?

The project was organized as three independent projects, one in each of the three companies. We had deliberately chosen three quite different companies in relation to market situation, products, IT-strategy, etc. in order to facilitate cross company learning, as well as to test the method in varied settings.

Due to space limitations we will focus on the method dissemination activities, the most central research question thus being: *What are appropriate ways of introducing the method supporting designers in an industrial context?* The other research questions are however also relevant, and will be touched upon when appropriate. We refer the reader to (Kensing, 1999) for a presentation of arguments in relation to the design of the method.

Our approach to method dissemination was based on two *basic premises.* Firstly, introduction of a new method should be coupled very straightforwardly to experienced challenges in design projects. Designers do not change work practices just by "fashion" or "accidentally". They need good reasons for engaging in time consuming activities like learning a new method in a stressed working situation. So, "challenges" like experienced problems, new technology, a new user domain or the like, were

assumed to be good starting points for introducing a new method. Secondly, traditional teaching cannot stand alone in method dissemination. There is obviously a need for general presentations and written material to introduce a new method. But designers also often need guidance on how to undertake specific tasks in a project or feedback on material they have produced. Furthermore, we knew that for some designers getting to work very closely with future users, i.e. often highly skilled professionals, was new – so some kind of personal coaching might be necessary.

The MUST method

The MUST method supports participatory design in an organizational context, this being in-house or contract development (cf. Grudin, 1991). We use the term design in the same way as architects do - focusing on the analysis of needs and opportunities as well as the design of functionality and form. We acknowledge that in a succeeding development process further design is needed, and that when applying a computer system users might very well find new ways of utilizing the system, as well as come up with additional demands.

We see a method as a resource for action (Suchman, 1987), and as a learning tool that practitioners have to experience and adapt in ways they find suitable to their current project (Mathiassen et al., 1996). In this vein the MUST method is

presented as offering four types of resources (Bødker et al., 2000):

- a conceptual framework identifying the basic elements of design in an organizational context,
- four principles to guide the design project,
- four phases designed to organize the design project as a stepwise decision making process,
- a broad set of techniques and representation tools to be used in concrete activities based on the designers' preferences and understanding of the situation in question.

We consider the four principles to be indispensable as they express the "soul" of the method, and hereby guide the design process:

1. A coherent vision: We see the design activities as a first step in introducing sustainable IT. We deliberately use this ecological concept as a metaphor in an attempt to capture an overall perspective of the use of the method. A design project needs to address and take into account the technical, organizational, and educational issues. A sustainable basis for the organization's decision making, and for the technical and organizational implementation should also include an evaluation of foreseeable consequences and an estimate of the costs of implementing the design.

2. Solid user participation: User participation enables establishing a mutual learning process. The designers need knowledge of the work domains to be supported by IT, and the users need knowledge of the technological options. This is the pragmatic argument for user participation. Also for political reasons we advocate user participation, i.e. users have a right to influence their work situation, including the IT-applications.

3. Work practice experienced by first hand encounters: Designers can get valuable information about a particular domain from reading about the field or from interviews with experienced professionals. But in design we also need to know how work actually gets done, and that requires first hand encounters – for example by observations or other ethnographic techniques.

4. Anchoring: 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, i.e. with management and the steering committee, who decide if it should be implemented; with those who will carry out the technical and organizational implementation - the latter including educational/training activities; and with the users who will have to live with its consequences.

Design in an organizational context is perceived as an open-ended process. Often, there is no clear statement of

problems which all groups can adhere to, there is no clear idea
of the kind of IT-support needed, or there is no clear idea of
how the project should be carried out. To cope with this
situation of uncertainty we propose to organize the design
process in a way that supports a stepwise decision making
process in the organization. This is facilitated by identifying
a number of documents and prototypes supporting an increasingly
focused decision about the kind of technology needed.

Activities in the three organizations

In this section we describe the three organizations and the
method dissemination activities carried out in each.

The Radio Station

The Radio Station had embarked on a major project the
technological goal of which was to substitute the analogue
platform for production and broadcasting with digital technology
over a couple of years in all its branches.

The MUST-group got involved in this due to positive
evaluations of earlier projects between one of the branches, the
internal IT-department, and researchers from the MUST-group
(Kensing et al, 1998b and Kensing, 1999). For the project
reported on here, a senior and a junior researcher together with
two graduate students co-operated with one of the first local
branches to get the new technology. It happened to be the same

branch that had worked with the MUST-group before – hereafter referred to as the branch. An important difference however was that this time the primary contact was the business unit, while in earlier projects it had been the IT-department. The co-operation with The Radio Station ran over two years. The most intense period was during the five months that the branch carried out the design part of its project. The Radio Station invested two man-years in the co-operation and so did the researchers.

A central project group prepared guidelines for the local projects in each branch. First a design project should be carried out investigating the organizational goals of each branch and their relations to the new technological infrastructure. The central project group would for the projects in each branch review a design report before a realization phase could be embarked. The divide into design and realization projects and the content of the design part was inspired by the MUST-method.

The researchers arranged a two-day workshop on the MUST-method for the branch's project group and steering committee. The workshop consisted of lectures on the overall approach and some details about the tools and techniques for project management, which were tried out in group-work. The participants from the branch expressed concerns that the method was difficult

for them to comprehend. However, they decided to use the method based upon the positive evaluation of its use in an earlier project. The researchers were concerned too, primarily because the branch's project group was comprised of users only. But the researchers agreed to the changing conditions for the test, even though they had IT-designers in mind as the primary target group of the method.

The researchers familiarized themselves with the technical and the organizational conditions of the project. They read strategic plans about the project and interviewed managers and other individuals considered central to the success of the project. Finally, they observed the various work processes involved in radio production. All of these activities are considered important as part of the researchers' preparation for the supervision.

The researchers organized another two-day workshop for the project group, this time focusing on the MUST-method's tools and techniques for data collection and analysis: How to carry out interviews and observations? How to deal with the data collected in systematic ways? A major proportion of the MUST-method was used by the branch's project group that every now and then asked the researchers for supervision or the researchers intervened themselves when they found it necessary. Also the chairman of the steering committee was supervised on his role as to the

overall progression of the project. The researchers kept track of the project through meetings and informal contacts. Also they observed the project group (seven times, primarily during meetings) and the steering committee (three times, only during meetings).

The project group of the branch used the following elements of the MUST-method:

- The overall layout of the project: A separate design project followed by realization, and the suggestions for structuring the design project was followed to a large extend

- A specific technique for project establishment

- Interviews and observations for data collection

- Scenarios and theme-based analyses and presentations

- A high degree of user participation leading to well anchored visions for change at the branch.

Around twenty supervision sessions were held during the five months of the design project. The researchers gave specific advice as to how to carry out various activities as well as feedback on the intermediary and final reports. After the branch had finished its design project and waited to proceed to the technical and organizational implementation the researchers wrote a report about their evaluation of the test. The report remained for internal use only, but later design projects in

other branches draw on experiences from the design project of the branch.

The University Hospital

The University Hospital is a large, modern hospital with many specialized hospital wards. In 1990, the hospital's IT-department changed its strategy for IS development from in-house development to acquisition of (customized) generic systems or development of customized systems by external vendors/software houses. The change had two main reasons. More and reliable generic systems became available on the market from multiple vendors, and the IT department had difficulties in maintaining a staff with core competencies on modern platforms and modern development technologies.

When the project started the IT-department was at the end of a five-year action plan of 100 MDKK (app. 15 M USD). The projects in the action plan ranged from small projects with a budget of 2-300,000 DKK and less than one-year development time to large multi-million DKK projects with a development cycle of several years. Thus they had profound experience with IS development in an outsourcing context but needed time and other resources to reflect systematically on their experience to identify areas for improvements. They saw this project as a perfect opportunity to do this. The aim of the project thus was to contribute to improved work practices in IS development. The

project group consisted of two IT-consultants and two researchers. The total effort amounts to 12 months divided equally between the two groups.

The new project model had meant several changes in relation to competencies compared to the situation in in-house development. Job titles had changed from analysts and programmers to IT-consultants. Some of the "old" analysts and programmers had left the IT-department, and new had been recruited. Still, core competencies were technology related, and the IT consultants openly admitted facing challenges related to the new situation. They often discussed during lunch how they could better learn from each other's experiences, and there was an open attitude about the need to learn from experience and failures.

The project was divided into 3 main activities, each resulting in a report that was presented and discussed among the department's IT-consultants and acted upon management. In the terminology of the hospital, the activities were named "screening", "diagnosis", and "proposals for cure". However – unlike in hospitals – in this project the "patient" had the full freedom to choose whatever of the proposals they would continue with.

In the "screening" activity all 20 projects were characterized along a number of key parameters on the basis of a

survey questionnaire to all project managers. This gave an overview of the projects, which enabled management to select five projects for further investigation.

In the "diagnosis" activity the five projects were studied in detail. Interviews were carried out with all involved IT-consultants, management of the IT-department, as well as with representatives from the user departments, who had taken part in the projects, and with representatives from two suppliers. Furthermore documents from the projects were studied. The aim of this activity was to find areas where the section with its background and experience could improve quality in its work practices through the use of new methods or by the use of new tools. All together the investigation gave voice to 71 problems, 12 from the user representatives, 7 from the suppliers, and 52 from the IT-consultants and their superiors. Not all of these are mutually exclusive, and in the report they were grouped into 10 problem areas.

For the final "proposals for cure" activity three areas had been chosen as subjects for potential improvements:

- work practices in pre-analysis and specification,
- project models and contractual models,
- roles.

A number of proposals, based upon literature studies and the MUST-method, were presented. First of all, a more elaborate

project model was suggested. The elaboration concerned the design activities to be organized to more explicitly support an ongoing decision process, and to involve users more actively in the projects. Next, it was suggested to allow for a broader view of tendering. In some projects a tender could be made very early to include innovative visions from suppliers (with inspiration from architectural competitions and Euromethod (1996)). In other projects a tender could be made on the basis of a more detailed specification. Finally, it was suggested to develop a project handbook framework including a description of the division of labor and responsibilities between roles in the user departments and the IT-department.

For reasons outside the scope of the project, it turned out that no new design projects would be started in the project period (due to delivery problems with a new central IT-system the IT-department had to re-staff all projects to cope with Y2K-problems). So, despite positive commitment to the proposals from management and the IT-consultants it was not possible to carry on with implementing and testing the proposals.

The IT Consulting Company

The dissemination project in the IT Consulting Company took place in a department that offers a platform for advanced tax audit solutions within the compliance area. The customers consist of central tax and audit administrations in a country or

state. The generic IT platform offered is highly tailorable and an engagement with a new customer is introduced by a design project that identifies the customers needs and the potentials with regard to implementing (parts of) the IT solution. The preliminary design project is financed by the IT Consulting Company and carried out by senior consultants from the department. Tender-, purchase-, development-, and implementation processes may later follow the preliminary design.

The co-operation with the IT Consulting Company took place in two phases: First, an initial preparation phase mainly conducted by the researcher. The MUST method was introduced by a series of presentations. In parallel interviewing managers and consultants in the department served to identify different problem issues in the department where it could be relevant to experiment with the MUST method. Here a primary focus was placed on the method's anchoring principle. The preparation phase resulted in a project charter and a baseline plan for a following project phase.

Secondly, a project phase mainly conducted by consultants from the company with the researcher observing, supervising and reviewing written materials. A design project with a new customer was chosen as the project where the IT Consulting Company would experiment with the method. Specific techniques related to the anchoring principle were practiced and later used

at the customer site. The project phase was concluded by an evaluation of the overall experimentation with the method.

During the project the IT Consulting Company experimented with the following new work practices as suggested by the MUST method:

1. Project establishment with the customer including the production of a project charter and a baseline plan.

2. Tape recorded interviews and transcriptions from the tapes.

3. Affinity diagramming.

4. Diagnostic and virtual mapping.

5. Review of a baseline with the customer (including top management) presenting preliminary findings and conducting a mapping session.

6. Writing scenarios.

7. Reporting and presenting the findings for the customer in accordance with the guidelines from the method.

The project was evaluated as a success. The customer chose to continue the project with The IT Consulting Company, and the IT Consulting Company decided to implement the MUST method both within the department, where the co-operation took place, as well as a part of the company's overall and general model for design and implementation of IT.

Lessons learned

In section two of this chapter we described our approach to method dissemination as being based on two basic premises:

1) Introduction of a new method should be coupled very straightforwardly to experienced challenges in design projects.

2) Traditional teaching cannot stand alone in method dissemination.

These premises have emerged from earlier projects. As described by Kensing (1999) a combination of lectures, making room for reflections on current and emerging practices, establishing apprenticeship relations, and supervision of technical as well as personal skills has proven instrumental in changing work practices. The central point is to *get beyond a detached reflection* in the interaction between a researcher and designers in relation to changing the designers' work practices. A designer who is given a general presentation of for example a new technique is left on his own when relating it to his or her individual work practices. And a researcher who is told about events and changes in a recent project is left with the question about what *really* happened. So, to get beyond the say/do problem (Blomberg et al., 1993; Goguen and Linde, 1993) we advocate that the researcher get involved in the work practices of the designers, which subsequently makes it possible for him or her to reflect upon problems in designers' current practices when

presenting a new technique or proposing changes in design practice.

Next, we turn to a closer inspection of lessons learned about method dissemination activities. We do this under three headings, which capture important issues in relation to our central research question: *What are appropriate ways of introducing the method supporting designers in an industrial context?* Along the way we also touch upon issues in relation to the other research questions mentioned above. The headings are:

- commitment to change,

- observation lead to breakthrough in the dialogue

- accepting the stranger.

Commitment to change

A commitment to change is an important success factor in any change process, and thus also for method dissemination. It is general wisdom that management commitment is pivotal. In The IT Consulting Company, for example, it was the department manager who originally took the initiative. The manager was highly engaged in the project and took part in it as the project manager. In The Radio Station the IT-manager took the initiative. When he left, two levels of management in the business unit with whom we worked confirmed the commitment. Both companies had originally taken the initiative to engage in the method dissemination project by contacting the researchers and

requesting our help. In other words, they new beforehand that they could do things better and they had decided to spend resources in trying to improve their design processes.

Experimenting with the new method in the IT Consulting Company took place in a commercial project with an important customer. The project in The Radio Station had the highest management attention since it was a major investment. This encouraged the companies to take a serious and critical approach in learning, using, and evaluating the different activities and techniques from the method.

In the University Hospital a large number of projects had been carried out following the outsourcing strategy. There was a very positive attitude to the need for changing work practices in design – the IT-consultants openly at lunch and at their weekly meeting discussed problems in the projects. However, they did not have the time and resources to investigate these problems deeply and thoroughly with the aim to identify similarities across projects. For these reasons we chose to design the project in two steps. Step one focused on identifying problems, investigating similarities and proposing improvements. In the second step, the IT-department would choose which of the proposals they wanted to carry on with. Unfortunately, for reasons outside the scope of the project (to be explained below), we never made it into step two.

The very organization of the project into two steps reflects our understanding of another aspect of the importance of commitment to change: Changes should address areas needing improvements. In order to locate these we had to spend time identifying common problems and their nature across the projects. The projects chosen for detailed investigation were carefully chosen to reflect the diversity of IT-projects at the hospital. And great care was taken to present preliminary findings to the whole group of IT-consultants before reporting to the management. Such presentations were done at a regular basis throughout the project; it was arranged as a meeting, or a part of their weekly meeting, where our findings documented in a report had been distributed to the participants in advance. The discussion often resulted in changes and additions to our report.

An important message can be drawn from this project: Methodological work in an IT-department serving business needs always have to respect operational issues. So when in this case, the delivery of a central new IT-system caused problems – reinforcing Y2K problems – all attention and energy of the IT-department had to be turned to deal with this serious situation. And that also meant away from our project.

Observation led to breakthrough in dialogue

In order for researchers to communicate effectively with designers in industrial companies they benefit from observing the designers while experimenting with the new work practices.

In the project with The IT Consulting Company the researcher made general presentations of the method before the project with the customer took place. In retrospect we realized that these presentations were basically an account of abstract knowledge that the designers had to relate to their individual experiences, not shared by the researcher. The researcher could only relate to, and give examples from, his individual experience from projects and situations that the designers had not experienced. We often experienced struggles to understand each other since both the researcher and the designers were interpreting the abstract method descriptions from different practical and situated experiences. This changed dramatically when a common ground was established. During the project at the customer site, where the researcher participated as an observer, a shared base of experience was developed. This lead to a breakthrough in the mutual dialogue: Different aspects of the method (and its general guidelines) could now be related to situated project conditions and events which both the researcher and the designers had taken part in. This shared base of experience established possibilities for discussing how the method could be applied in specific situations. Discussing the

method based on shared experience also gave the designers a confidence in that the researcher was able to understand their conditions and work situations. In other words this contributed to a confidence in the researcher, which is another premise for the designers' commitment to change.

In presentations of the method at seminars in The Radio Station the senior researcher was able to relate to the earlier project with the branch in which the method was used and from which he had also learned about the production of radio programs. This established some kind of a common ground for the communication. However, the researchers did not experience the project group while striving to use the method, except for a few techniques used at project group meetings or during supervision sessions.

Accepting the stranger

Accepting the stranger is primarily a message for the participating industrial company – but also a lesson that presents food for thought for the researcher. Observing the activities of designers is vital for the researcher in order to be able to communicate his knowledge/method to the designers (as discussed above). On the outset project members from all three companies agreed to this condition. But to some of the participants in the projects this issue became a reason for concern later on:

In the IT Consulting Company the project members were all senior consultants with highly established and well experienced work practices. They felt concerned when the researcher, through his observations and "following them around", came close to their work practice and organization: One consultant explained during the project, that they in fact had already "written" 80% of the final report for the customer even before they had the first visit at the customer site. This was immediately recorded by the researcher and later it turned out that the consultant had felt very annoyed by this: He was concerned how the researcher would interpret this "work practice" and how it would be presented to other colleagues and managers. The "80%-rule" could be explained in a very positive way: The consultant was a highly experienced and knowledgeable domain expert and 80% of his findings in general had been experienced before with other customers. But it could also be explained in a less positive manner: The consultant had a tendency to jump to conclusions and recommend IT solutions to a customer based on his knowledge of the company's IT portfolio rather than on the needs and problems observed at the customer site.

The diagnostic analysis performed at the IT Consulting Company was based on a series of interviews and led to a report pointing out four different problem issues in the company where it could be relevant to experiment with the method. One of these

problem issues exposed an internal conflict within the company. The conflict was rooted in a dilemma of prioritizing the IT platform: On the one hand they could prioritize the IT solution as a generic system where new releases could be offered to all customers. On the other hand was an approach, where the individual customer's specific needs were prioritized in a way that could lead to different tailored systems, hard to maintain through new versions of the generic system modules. The manager did not appreciate that this conflict was identified in the report and suggested that his employees did not read the report – a suggestion that did not align with the dissemination approach.

Also in The University Hospital the concern about accepting the stranger was important. The approach was that changes in work practice had to be based on a common understanding of the areas for improvements. That clearly involved some kind of evaluation of past and present performance, which implied evaluations of individuals as the projects were staffed with often very few IT-consultants. And strangers (dressed as university researchers) took part in this evaluation. For a project completely dependent upon a constructive dialogue with all involved IT-consultants this dilemma seemed somewhat unresolvable. So, how did we handle the situation? First of all, for a considerable part of the project period the researcher

spent full days in the IT-department, which meant that he took part in lunch and various meetings, and thus became less a stranger. Secondly, we always sent out interview summaries to the interviewed persons in order to allow them to correct what would become the project's record. Thirdly, again and again we stressed that the purpose was to identify general problems, and not to identify success stories or failures. And finally, we took great care not to name individuals in the reports or oral presentations.

The lesson thus stresses that to succeed in establishing and maintaining a positive attitude towards dissemination projects requires considerable attention towards confidentiality and personal integrity issues.

Summary

In this chapter we have described method dissemination activities in three IT-organizations and reflections on the course and outcome of the activities. The activities were related to introducing a method for design in an organizational context as part of changing work practices in real life industrial design settings. The reflections were presented as three lessons, commitment to change, observations lead to breakthrough in the dialogue, and accepting the stranger.

Under the heading "commitment to change" we illustrated the importance of management as well as designers' commitment to the

activities. Management commitment was given serious attention. However in one of the projects we came to realize how upcoming problems in relation to basic business functions of the IT-organization meant that management attention was directed away from our project. Designers' commitment was achieved by a constant focus on presenting and discussing preliminary findings and results with the designers in the respective organizations.

Under the heading "observation led to breakthrough in dialogue" we described how the interaction between researcher and designers changed dramatically when the researcher closely followed designers trying out new work practices in a project. Until then presentations and discussions had somehow been blocked since both designers and the researcher were interpreting method descriptions and descriptions of design practice from different practical and situated experiences. The researcher's observation of the designers' work practice established a common ground from which experiments could take off.

Finally, under the heading "accepting the stranger" we described our experience from engaging in the work practices of designers: As an outsider, the researcher has to be constantly aware about finding a delicate balance between identifying areas for improvements and not blaming individuals. If individuals are blamed, they draw back, and their commitment is lost. Since

designers' commitment to dissemination activities, and to changing work practices in design in general, is pivotal, focus upon the balance between general problem areas and problems caused by individuals should be maintained throughout the activities.

A basic premise of our approach to method dissemination has been to get beyond a detached reflection in the activities between researchers and designers. The actual interactions in the organizations, and their outcomes, have demonstrated that for the kind of method dissemination activites reported on here, knowledge of actual design practice and joint activities have proven instrumental.

The activities reported in this chapter were part of a research project with the aim to test and revise an approach to design in an organizational context developed by the authors over several years. The feedback from the activities described in this chapter, as well as other activities, was incorporated in a revised approach, documented by the authors (Bødker et al., 2000).

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