Using ETHNOGRAPHY In Contextual Design

Ethnography originates from anthropology where anthropologists spend extended periods of time with primitive societies making detailed observations of their practices.

In a design context the aim of ethnography is to develop a thorough understanding of current work practices as a basis for the design of computer support. A major point in ethnographically inspired approaches is that work is a socially organized activity where the actual behavior differs from how it is described by those who do it. This implies that detailed studies of work must include observations as well as interviews [for example 1, 4, 12]. Blomberg et al. [1] characterize ethnography with four principles and three main techniques: It takes place in natural settings; it is based on the principle of holism, that is, particular behaviors must be understood in the respective context; it develops descriptive understanding in contrast to prescriptive; and it is grounded in a member's point-of-view. They use observation, interview, and video analyses as main techniques.

Using ethnography in the design of computer-based systems has become increasingly prominent, especially within the research communities of computer-supported cooperative work (CSCW), but also within participatory design, and human-computer interaction.

Plowman et al. [9] recently reviewed all studies using ethnography published within the CSCW literature. In this review, three issues (of particular concern to us) are raised. First, the dominant approach is sociologists conducting the ethnographic studies and informing computer scientists of their findings, such as in debriefing meetings [for example 5, 6]). Second, reports on concrete consequences of a specific design due to such an approach are typically absent. Third, a "need to consider developing hybrid and tailored forms of ethnography that can play different practical roles in the various phases of design" is argued [9 p. 321].

As computer scientists, we have adopted and experimented with ethnography in design [2, 10, 11]. We have developed a method for participatory design where ethnography is an embedded part of the overall design activities [8]. Participatory design refers to an approach where users play an active part. Users and designers engage in mutual learning activities in order to understand users' current work and generate coherent visions for change [3].

We believe that practitioners can benefit from using ethnography in contextual design (particularly when designing systems in a specific organizational context), but they must be aware of the conditions needed for such an approach.

An impressive design approach for determining user needs incorporates keen observations of workers as they go about their daily routines.

This article presents a case from our research in the form of a design project for the Editorial Board of a Film Board (detailed in [10]). The project was conducted in two parts. Traditional techniques like meetings, interviews, document analysis, rich pictures, and mock-ups were used in Part One leading to a first design proposal. In Part Two, experiments with ethnographic techniques like observation and videorecording were applied and the effect was evaluated in light of the first design proposal.

Here, we present the organization and describe the Editorial Board design project. We spent approximately 14-person weeks over a period of 10 months on the project because it also served as a research project. Had it been a real-life consulting job, our estimate would be approximately 10-person weeks.

The Organization

The Film Board is a public organization in Northern Europe under a Ministry of Cultural Affairs. The organization has approximately 50 employees and a budget of $7.5 million a year.

The Film Board's main function is to promote information, education, and artistic and cultural activities by producing and buying films along with distributing such films to educational institutions, associations, and individuals.

The film categories of The Film Board include cultural and social conditions, such as documentaries, portraits, and debate films; education; and art, such as experimental video art.

The production of films involves funding and supporting directors and producers, and to some extent, managing the production. This is conducted by the Editorial Board. Nine people work here: three editors who consider applications (about 800 per year) and decide which productions should be funded (about 100 per year); one production manager in charge of financing all productions; three secretaries; a consultant specialized in buying and managing the translating of foreign films and videos; and one technician. The overall production of films—from the producers' ideas, to the distribution to the consumers—comprises an editorial process, a production process, and distribution as depicted in Figure 1.

The Editorial Board handles all applications for films and videos productions, decides which ones to support, negotiates contracts, and manages the production of films and videos. Three editors (hired only for 2-4 years to secure a broad selection of productions) are in charge of this task. They are responsible for four different areas of productions (16mm. film; video; film and video for children; foreign film and

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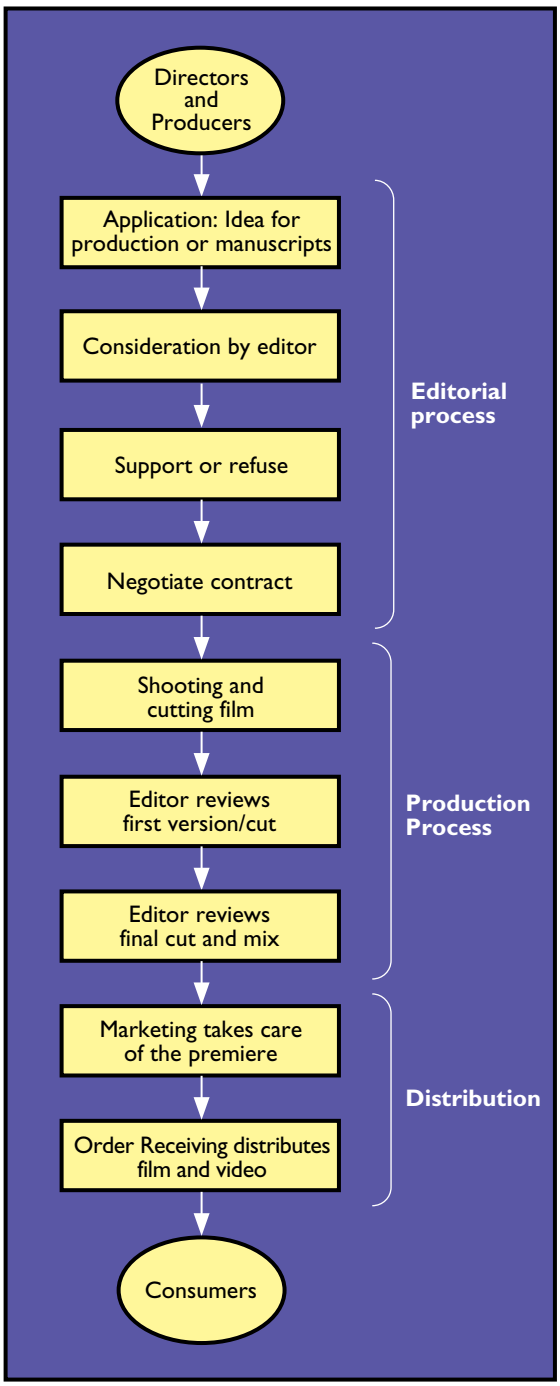


Figure 1. The overall production of films in The Film Board.

video), each of which has its own budget. Deciding which productions to support, and coordinating different productions with various Film Board departments, is done at the weekly production meeting. At this meeting all employees from the Editorial Board, along with the president and the managers from the order receiving and marketing departments participate. Here, information regarding applications, status, and actions for each production currently in progress is exchanged, and the necessary decisions and coordination are made.

The editors primarily take care of the applications and production in regard to content. They are supported by the production manager who is responsible of the overall budget, and by three secretaries who handle most of the administrative follow up: fielding calls, informing relevant parties, receiving and filing applications, and all succeeding data that concerns the productions (budget, funds, expenditures, technical data, correspondence, among others).

In recent years video has been introduced as an additional medium besides the traditional 16mm film. This has raised the number of productions from about 25 per year to nearly 100 and the number of applications from about 100 to about 800. The organization was not geared for this. All work in the Editorial Board was paper-based, except for word-processing chores.

The secretaries especially felt the increased number of applications and productions was an overwhelming and cumbersome administrative burden; the paperwork and manual updating of all the paper files engrossed most of their time. This left little time for their previous skilled and qualitative support to the editors, producers, and directors of the films and videos. The secretaries wanted computer support for recording all the information on each production, and for the financial management of the productions. One key issue was to get rid of repeated work within and outside the department. Another issue was to keep track of the current status of the productions for cooperative purposes.

The Design Project (Part One)

To get an initial overview we conducted unstructured interviews of all nine employees individually. Each interview lasted 1-2 hours. In parallel, we did thorough document analysis of written materials (leaflets, booklets, production plans, minutes from various meetings, the Act for the institution) along with studying the different paper-forms in use.

Since the editors saw no relationship between their problems and computers and had no idea of their needs besides word processing, a second round of interviews was performed with the secretaries. These interviews were conducted as dialogues, where the secretaries often showed how they carried out specific tasks. Often, specific design ideas emerged during these interviews. Thus, the interviews established mutual learning situations where relevant structures of the secretaries' current work were developed on the basis on their concrete experiences [7]. The outcome was drawings that captured aspects of their current

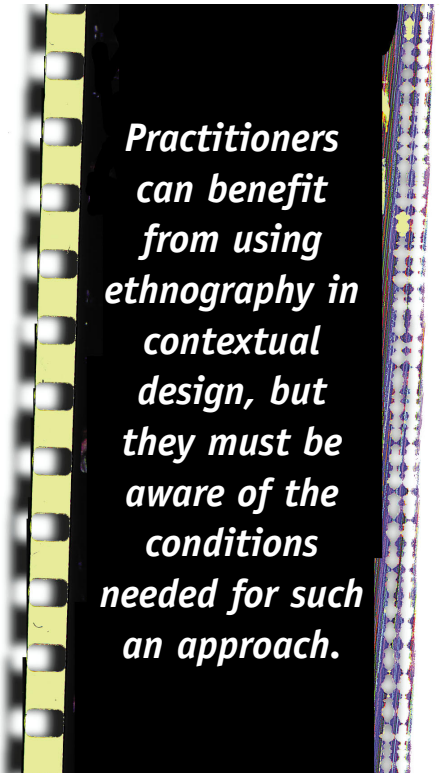
work as well as design visions.

Our preliminary design was drawn as rich pictures and mock-ups on flip-overs and presented at a the meeting with the Editorial Board and its technology committee. We had identified and sketched two systems: A production-management system that assures all data on a production was recorded only once in a central database; and a financial part of the production-management system that supports a general view of the budget and money spent on all productions currently in progress.

The systems were evaluated as very appropriate by all Board employees and by the technology committee. If the project had not been part of our research agenda, and a preplanned Part Two, the next appropriate step might have been refining and prototyping the design proposal.

The Design Project (Part Two)

The design proposal from Part One primarily supported the secretaries, the production manager, and the consultant. Their jobs are to support the editors. The editors handle The Film Board's main function in relation to the film producers. This function is complex and somewhat invisible to the rest of the organization, and, as stated earlier, the editors had no better ideas for computer support except as word processors. On this basis we decided to focus our experiments with ethnography towards the work practices of the editors.



To obtain a thorough understanding of the editors responsibilities, we observed them in their daily routines. This was done simply by following them for several days at their office and in the field. We observed them having meetings with applicants; negotiating new productions with directors and producers; reviewing versions with directors, producers, photographers, and cutters; and participating in the weekly production-meeting. The editors themselves helped by suggesting days and times where we should join them. This assured that we observed the variety of different tasks involved in their job.

We videotaped some of our observations. The main use of the videotapes was to replay them and discuss what happened at the tapes. This was done at our University's lab; Editorial Board employees did not participate.

The observations and reviews of the videos posed a great deal of questions that we subsequently followed up by interviews with all employees in the Editorial Board. The focus was on the cooperative aspects of the work both internally in The Film Board and externally with applicants, directors, and producers from the film and video industry. Most of these interviews were audiotaped and roughly transcribed.

The observations revealed a complex cooperative pattern in the lifecycle of a production, involving all employees in the Editorial Board. In order to obtain a coherent picture, we organized a series of *wall-graph sessions* where the work involving various people and competencies were described coherently in the sense it detailed the flow of a production from the employees' point of view. We asked them to write down all activities and functions and who was in charge of them (on the upper part of the wall graph), and related data and information (on the lower part of the wall graph). Everything was written on one piece of paper with an application received in one end, and the film or video discharged and taken out of distribution in the other. Each participant used his or her own color writing on the wall graph. The wall graph sessions were important for all to realize the complex, cooperative work involved in the life span of a production. It formed a coherent picture of the cooperative aspects of their work. Hence, the wall-graph served as a reference in the succeeding discussions concerning possible computer support.

In order to revise and refine the design, we conducted two sessions with the secretaries discussing detailed functions and data in the system, screen layout, and so on. This was followed by a visit to an institution using a standard system supporting registration and file/project management. This visit was succeeded with a demonstration and discussion at the computer company which offered the system.

Finally, we wrote a design report and had prepara-

tory meetings with the president and the production manager before we presented the final report to the Editorial Board and the technology committee. The report suggested a revised version of the two systems originally suggested.

Effects from Using Ethnography in the Design Project

Analyzing the work in Part Two led to two essential findings which, again, had several impacts on the final design proposal:

We realized there was a difference in how a production was perceived by the secretaries and by the editors. To the secretaries, a production starts when the editor decides to fund it (from "negotiate contract," as shown in Figure 1). Besides correspondence, they mainly take care of a production from the point where the contract was made and hence a production becomes relevant (in terms of being cumbersome/problematic and, therefore, considered a candidate for computer support) after an editor has decided to fund it.

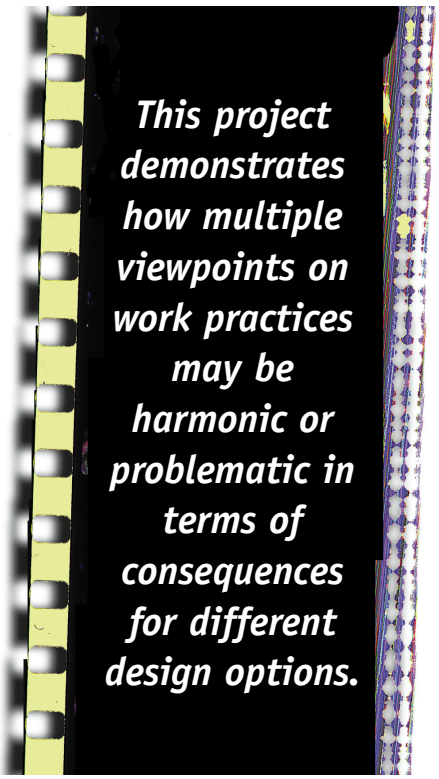
To the editors, the main considerations and decisions occur before it reaches this status.

We realized there was a power-struggle between the production manager and the editors. The editors are responsible for deciding which projects to fund and by how much. The production manager is responsible for the overall budget, including considerations about whether the total budget for a production looks sound and realistic. The main concern of the production manager, who holds a permanent job, was the total amount of productions the organization could handle simultaneously, as well as ensuring that each production was sufficiently funded from the very beginning. The production manager wants fewer productions to be funded with more money.

The editors, hired for just 2 or 4 years, want as many of their preferred applications as possible to become productions. Since they are recruited from the film milieu to which they usually return, they also had to take into account their reputation in that milieu, thus preferring to give many producers and directors a possibility to produce films. In informal talks this was referred to in terms like "unavoidable incestuous relations," unavoidable due to the size of the film and video industry in question.

The first finding led to the following impacts:

- Support of the editorial process, where our first design mainly supported the production process (see Figure 1).
- Allow all applications (also those refused) to be recorded. This provided support for the editors, such as allowing a new editor to check if a similar application had been considered by a predecessor. The first design did not consider applications refused by the editors.
- Record data about "who has funded which kinds of productions" giving editors support in fundraising activities.
- Involve the Registry Office (the department that handles incoming mail and the central files), allowing the production (or the application as its status is at this time) to be recorded when the first mail is received. The first design did not involve the Registry Office.
- Require the design to be portable, as the editors are frequently "out of the house." The first design did not take this issue into account.



The difference in perception of what constitutes a production between the secretaries and the editors was found through observation and elaborated in the wall-graph sessions. The difference was harmonious in the sense the functionality needed for the editors could easily be added to those functions needed by the secretaries.

The second finding divided the financial system into two parts—a private part for the editors and a public part for all employees in the Editorial Board.

Financial support of productions considered by the editors should be strictly confidential. None of the editors' personal calculations (about which productions they were considering to fund and with

how much) should be public unless made so by the editor managing the production. If this had not been included in the design, the editors simply would not have used the system for this complex task, and the financial part of the production would only have been supported by the system after the final decision to fund it had been taken.

The difference in viewpoints between the production manager and the editors was found through our observations and elaborated in succeeding interviews. For example, one of our videotapes shows the production manager trying to ensure a production in question was sufficiently funded, eager to increase the support, while the editor was reluctant to do so, because it would be difficult for the editor to support other projects currently under consideration.

This difference was more problematic and challenged our role as neutral experts. It was not possible to allow the editors to keep the current amount of funding for productions under consideration to themselves and, at the same time, to allow the production manager, who had the responsibility for the total budget, to have access to the same data. We realized this contradiction was crucial to the design of the financial system. Either the system is open to all (and that means supporting the production manager, as in our first design), or it allows the editors to work with their budget in confidence.

We brought up this conflict by proposing a redesigned system supporting the editors in budgeting the productions, and allowing the production manager access to the data only when the editors have decided to make them public. Therefore, this would potentially reduce the production manager's influence. The situation was tricky since few of the editors, now and in the past, had been good at estimating production costs. The job of production manager was created for that reason. The current editors agreed to the need for such a job, however they expressed concerns that the production manager implicitly would take over part of their responsibility.

The production manager ended up agreeing to this proposal. It was, however, quite controversial for some time. Indeed, at one point, it led the production manager to suggest to the president that our detailed analysis of their work should be brought to an end.

Lessons Learned

This project demonstrates how multiple viewpoints on work practices may be harmonic or problematic in terms of consequences for different design options. Using ethnography did result in specific changes of our first design proposal. To some extent, that was a surprising result, as both we and the users found the first design proposal very appropriate. Thus, it serves as a concrete example of how an understanding developed by using ethnography may challenge an immediate understanding developed mainly through meetings, interviews, and document analyses [2].

The first design proposal did not offer much direct support to the editors. They did not have any ideas as to what kind of IS support they needed and they accepted the first design proposal. However, our observations in the second part of the project revealed that editors could benefit from a redesigned production management system as well. Also, the public access to the financial data in the first design proposal was redesigned as it could have lead to a situation where parts of the system would not have been used as intended.

Observations, in general, had the effect of generating immediate questions for later interviews and provided us with an experience of their work which formed a qualitative input to succeeding interviews. The point is to be present when things happen and not only to have things referred after they have happened. The observations unveiled and illuminated the amount and complexity of the work performed by the editors, such as before an idea for a production reaches the process of negotiation of the contract and their struggles with fundraising. Such concrete experiences with their work provided a substance and richness that developed the interviews into mutual dialogues and discussions. It was through such additional and substantial discussions that the conflict with the production manager was conceptualized.

Time was also an issue. The fact that Part Two of the design project was performed during a period of approximately three months is also significant. It gave us time for developing the insight into the editors work, thinking through different design possibilities, and discussing and reflecting design proposals against current work practices.

Summarizing these experiences, two lessons might be learned from the project: Firstly, designers may have to observe users while they are involved in their everyday activities. Observations may be necessary in establishing a mutual learning process with users, aiming towards a shared understanding of the current work practice and in developing realistic visions of future use of computers. Secondly, using ethnography may unveil users' multiple viewpoints on the current work as well as on future use of computers. Multiple viewpoints might be harmonious or problematic in terms of the possibilities of integrating them in a coherent system. In the case of conflicting viewpoints, leading to different design solutions, design-

ers should bring up the conflict and its consequences in terms of different design proposals.

Conditions for Using Ethnography in Contextual Design

Since the design was conducted as part of a research project, a relevant question is what conditions should be considered for using ethnography in commercial design projects? Would a consultant in a commercial situation be provided with the possibility, time, and resources to conduct such types of studies and analyses? Ethnographic approaches are rather unknown within information systems design in industrial settings. For an organization to invest a relatively large amount of time and resources doing observations of current work practices, the following preconditions should be required at the very least:

- The designers and the user organization must have a positive attitude towards investing needed resources, and these resources must be available. When using ethnography, you may not know in advance what effects it will have on the final design. Investing resources in such an approach requires that the organization has its own positive experiences with it, is provided with experiences from others, such as in the form of convincing examples, and/or has the resources to do it as an experiment.
- Using ethnography in contextual design means getting very close to the current work practices of the users in question. In order for the users to accept and participate, they must be confident with the overall purpose of such an approach. Therefore, a requirement might be that the purpose is to support the existing workforce rather than attempts to de-skill users' work and/or attempts to reduce or replace their function and competence.
- The designers must have the competencies to conduct such an approach and to handle the (possible conflicting) situations that such an approach may imply. Alternatively, external help might be needed.
- The designers and the user organization must be able to identify potential domains in terms of work practices, where applying resource demanding ethnographic techniques seems appropriate in relation to systems design. The Film Board's overall function in relation to the directors and producers of the film milieu was a guiding factor in this case. But the need for general guidelines for such a zooming method remains. [4]. C

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