

# Ethnography in design: tool-kit or analytic science?

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## ABSTRACT

The role of ethnography in system development is discussed through the selective application of an ethnographic easy-to-use toolkit, Contextual Design, by a computer firm in the initial stages of the development of a health care system.

## Keywords

Contextual Design, ethnography, system development.

## INTRODUCTION

In the spring of 2001, Electronic Formations (a fictitious name. EF onwards) engaged upon the development of software to be used in hospitals. The firm had little previous experience with hospitals and health care in general and thus found it necessary to introduce a much higher degree of user-involvement than it had previously practiced in system development. It came to rely heavily on Contextual Design (CD) (Beyer & Holzblatt 1998), which is a toolkit for computer scientists through which to obtain domain knowledge through qualitative methods used in ethnography in combination with paper-prototyping (Kyng 1988).

I use the case of EF and their use of CD to discuss to role of ethnography in system development. Sociology, psychology and now ethnography have been introduced to system development over the last 15 years as a way of gaining knowledge about users, but their role and use are disputed (See e.g. Anderson 1994; Rogers 2001).

## ETHNOGRAPHY AND SYSTEM DEVELOPMENT

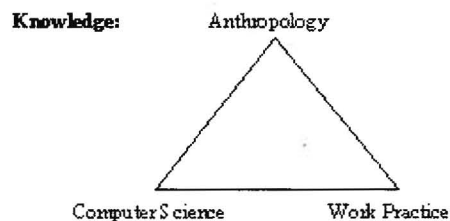
The interest for the social sciences has developed from practical experiences within Participatory Design where direct interaction between developers and users forms the central axis in the design of new computer systems (Bødker 1989 and 1996; Greenbaum & Kyng 1991, Kensing & Blomberg 1998). A more academic root has been has work such as Lucy Suchman's *Plans and Situated Action* (1986).

As the fields of HCI and CSCW have developed, cross-disciplinary cooperation has expanded and can look upon

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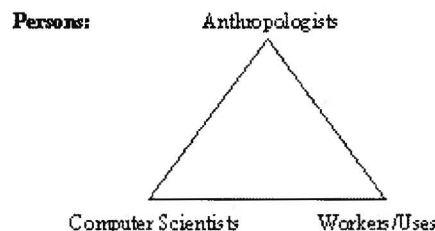
at two levels: a) the transfer of knowledge from one field to another and b) inter-personal collaboration.

At the level of knowledge the problem is how to achieve a transfer from one field to another. One suggestion is to develop a lingua franca and poignant metaphors that enable communication between developers and the social sciences has been proposed (e.g. Rogers 2001:25). The concept of 'common information spaces' from the CSCW field is a way forward in this direction (Bannon & Schmidt 1992; Bannon & Bødker 1997). Another suggestion is to create a new field, 'techno-methodology', in which the social and the computers sciences could meet and merge (Button & Dourish 1997). Figuratively, this level can be represented as below:



(Figure 1: The Level of Knowledge)

At the level of persons, the question arises how and in which stages ethnographers should be incorporated into system development. Hughes et al (1994) present four models: concurrent ethnography (ethnographic studies are carried out and reported concurrently with system development); quick and dirty ethnography (brief ethnographic studies undertaken to inform designers); evaluative ethnography (design decisions are evaluated by an ethnographic study); and re-examinative ethnography (previous studies are re-examined to inform initial design). Figuratively this can be represented as below:



(Figure 2. The level of Persons)

Bob Anderson argues that system developers are only interested in ethnography's data-gathering techniques, but not in its investigations and analysis (Anderson 1990: 178-9. See also Forsyth 1999). Ethnography implies prolonged periods of fieldwork and is therefore time-consuming, costly and has a long 'deliverance'-horizon. Therefore, it is usually used in its 'quick and dirty'-variety (Millen 2000), or by adoption of some of its methodologies: observation of informants in context and qualitative interviews. The question is whether this is really what designers want? I discuss this through the case of EF.

### CONTEXTUAL DESIGN

CD has been developed by Hugh Beyer and Karen Holzblatt (1998) who have worked as consultants for system developers for some years. The concept's ambition is to cover the whole process of design from initial information gathering, visioning of a new system and actual coding and implementation. Focus here is on Contextual Inquiry (CI), the proposed method of information gathering.

The theoretical social science background seems to lie in grounded theory and ethnomethodology (judging from their references), and CD shares with these an emphasis on observation of people in their working context, a elicitation of tacit knowledge and an inductive approach to observation and description. It is tailored to be practical, close to the concerns of developers and without time-consuming (and costly) processes of ethnography(ers). It is a commercial product and has reportedly been successfully applied by developers (See *interactions* Jan-Feb 2001).

CD proclaims itself to be a 'customer-centered' approach to design which means that data gained from customers should inform the design process from start to end. The method for gathering information is CI (Holzblatt & Jones 1993), which applies the ethnographically well-established techniques of qualitative interviews and observation of actors in context: "Contextual Inquiry is a field data-gathering technique that studies a few carefully selected individuals in depth to arrive at a fuller understanding of the work practice across all customers. ... Contextual Inquiry is based on a set of principles that allows it to be molded to each situation that a project encounters: context, go to the customers' workplace and watch them do their own work; partnership, talk to them about their work and engage them in uncovering unarticulated aspects of work; interpretation, develop a shared understanding with the customer about the aspects of work that matter; and focus, direct the inquiry from a clear understanding of your own purpose. These principles guide the creation of a data-gathering technique to collect the best data possible given the constraints of the situation." (Beyer & Holzblatt 1998:38).

The central persons in this process are the designers, since neither customers, user representatives, marketing people or the it-department, according to CD, can combine the necessary focused interest in knowledge about technology and users' work (Beyer & Holzblatt 1998: 30, 33, 34, 217).

CD describes how to conduct interviews and the role developers should have when talking to users (apprentice-master). The roles interviewee-interviewer; novice-expert and host-guest should be avoided (Beyer & Holzblatt 1998:56). Interviews and observations are followed up in interpretation sessions where interviewers present their findings to others and models of work are jointly constructed through five graphical work models: flow-models describe people and artifacts in a work process; artifact models describe the props employed; sequence-models describe the sequentiality of a work process; and physical models describe the physical environment. Initial models should represent the empirical observations of one user only, while latter models through a process of 'consolidation' become generalized representations of the work of a group of users. These are validated by presenting them to customers.

### Critical assessment

From an ethnographic point of view the emphasis on primary data gained through something similar to participant-observation, ethnography's central method, as the basis for system development does of course seem sound. From the same point of view, however, certain reservations come up. Firstly, while CD proclaims to be 'user-centered', 'designer-centered' might be a more appropriate label, since these are the central persons in the process. Users primarily provide data and evaluate ideas, but are not active in design itself except if paper-prototyping is engaged upon. With this positioning of the developer, the methods provided for data-gathering becomes essential and here CD seems naïve and avoiding central issues. While time-pressure within system development might make it reasonable to assert, as CD does, that 10-20 interviews lasting 23 hours are sufficient to gather the required information. It does seem rather naïve however to claim that a 'true partnership' (Beyer & Holzblatt 1998:53) between interviewer and interviewee can develop within such a short time. Gender, status, ethnicity and class will almost always be at play in human interaction and will not be overcome by an even benevolent and polite designer. Within such a short time, the risk of developers (and users) not moving beyond common sense and/or mutual preconceptions is great and enhanced by the inductive form of knowledge construction advocated and CD does not offer any means as how to reflect and become aware of this. This 'naïve' approach, is also seen in CD's use of 'customer' as cover-term for contractor, management and end-users, and thus glazing over the differences between them. According to CD "a system must meet the needs of

all those who depend on it..." (Beyer & Holzblatt 1998:2) and according to CD system development is always also the design of a new work practice. However, different groups and people would have different interests and positions of power in such a process. Instead of confronting this problem head on, CD only spends a few lines on power within a discussion of the cultural work model. Finally, analysis of data is absent unless the graphical work models are taken as such.

Thus, while the sound core of CD is its emphasis on first-hand data collection by developers, its 'naïve' model of how developers and users relate to each other, a disregard for the role of power, class, gender and ethnicity in system development and an absence of analysis of data seem to call for caution. On the other hand, the CD is the product of two successful consultants and is apparently bought and applied by many system-developing firms. It would seem, that the tool-kit provides the support that is 'designers, themselves' want? I will return to this question after having presented the case of Electronic Formations.

### ELECTRONIC FORMATIONS

In the spring of 2001, I followed the initial design process of EF closely, and the following is based on recording and extensive notes from that fieldwork, as well as on documents from EF.

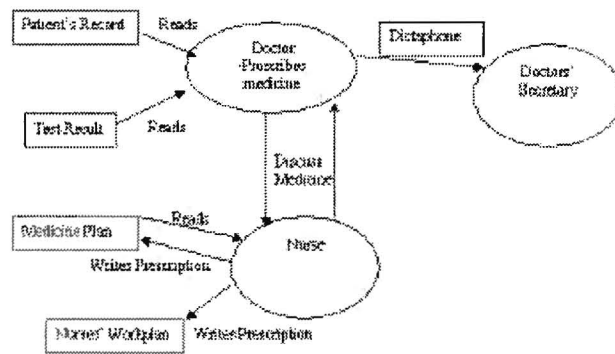
EF has successfully programmed software and expanded considerable during the last 10 years. In 2001, it engaged upon a project with healthcare of which it had little domain knowledge and therefore commenced a process of user-involvement of which the firm had little previous experience. My focus in the following will be on the two initial stages in EF's development process, since this is where the ethnographic methodology of CI was mainly applied. In the first knowledge-gathering phase, the team was to a series of field trip to different hospitals, while the second phase consisted in a series of vision workshops where the new system to be constructed would be outlined. Thereafter, requirements specifications were formulated and a contract between the contractor and the firm was finalized. In a fourth phase, the final product is developed through an iterative process with four steps.

#### The phase of knowledge-gathering

The people involved stressed that they did not follow any method, nor CD, by the book, but adjusted it to what they thought worked best. For example, the firm had hired a nurse and a laboratorian to gain user knowledge about health care, thus deviating from the reservations in CD towards user representatives. The nurse had written a document in which he explained central concepts and listed a number of acts and phenomenon, which they ought to observe during their

field trips. This list helped the developers to have a specific focus during their field visits, and it was used almost as a checklist to whether they had seen all they wanted. Whether it also worked against grounding observations on the information gathered from clinicians in context, as recommended by CD, by preconceptualising the developers remains an open question.

The trips were planned together with a physician who worked at a hospital and who was the contractor's representative towards the firm. Every week, two days were planned for field trips each followed by an interpretation day. All in all, 7 developers conducted 18 field trips at three hospitals and the central hospital pharmacy during three weeks. During these fieldtrips the developers (including the nurse) were to conduct an interview with a clinician - a nurse, doctor or pharmacist - whom they followed around during work at their respective wards. The next day usually started with 2 to 3 hours where each developer individually wrote up the observations from the preceding day in prose as well as representing them in on or more of the work models of Contextual Design (Similar to figure 3).



(Figure 3. Flow Model of Prescription of Medicine)

Thereafter, the whole team met and spent the next 3 to 4 hours presenting their work models to the rest of the time. These sessions were modeled rather closely to the roles and ways of the interpretation sessions described in CD, and as intended here the sessions led to a significant degree of knowledge-sharing. The 3-week information-gathering period was concluded with a one-day meeting between the developing team and a group of doctors, nurses, doctor's secretaries and pharmacists. Here the team presented their findings via general work models of e.g. a doctor's prescription of medicine, a nurse's giving of medicine or a pharmacist's ordering of.

#### The phase of visioning and requirements specification

The knowledge-gathering phase was followed by 6 workshops that were to create visions for the new healthcare system and lead to specification of user

requirements upon which the commercial contract between was based.

The workshops were divided into the themes of prescription, administration and ordering of medicine, which were repeated twice. The workshops were organized around paper mock-ups as described in CD which refers to Kyng 1988 and Ehn & Kyng 1991). The developers had prepared a series of work-scenarios that gave the context for the clinicians' construction of a paper prototype of a user interface. There was no collective conclusion of this phase between clinicians and developers other than the official requirements specifications agreed upon by the firm and the contractor. The knowledge gathered from these two initial stages is the basis for the final, iterative design process that started a few months afterwards.

### **Methodological choices**

In this process, the team from Electronic Formation took a number of methodological choices which I will discuss below. At issue is neither the extent to which they followed CD to the book nor whether their deviations were right or wrong.

Firstly, the firm had opted to include a nurse and a laboratorian in the development of the system. This obviously helped the team to get direct access to expert knowledge on health care and helped them understand the field's expert terms and having a focus during the field trips.

Secondly, the team almost solely developed flow models of the work processes observed and collected numerous plans and schemes that could be used as artifact models. Only one cultural model was made. Because of time-pressure there was no time to first make empirical models and then 'consolidate' as it is termed in CD, and instead the empirical observations were often generalized on the spot. The focus on plans and schemes that formed the basis for artifact models came naturally from the kind of healthcare support the team was about to develop. The sole focus on flow models, however, needs some explanation. No doubt the flow models are the ones within CD that most broadly describe the relations between persons, artifacts and acts and therefore most relevant to the team. While the physical models do not seem immediately relevant to the product they were to develop, the absence of sequential and cultural models could be a restraint. There is a kind of sequentiality in the prose descriptions of the work process that follows each model, but sequence models as such were not made. At one point, the team began to put numbers on the arrows leading from 'roles' to 'artifacts' in the model in order to overview this process, but this was not done in other cases, since it was not in line with how the flow modeling of CD is described. The absence of cultural models can in part be justified by the relatively clear division of work between physicians and nurses.

The primary benefits of the field-trips and the follow-up sessions were the first-hand experience of hospital work, the factual knowledge gained, the sharing of knowledge with other team members and a gradual overview of work-processes of clinicians. Tacit knowledge at which CD also aims at capturing was not elicited. The short duration of the single visits, recourse to explanations by the firm's clinicians and possibly a pre-conceptualization by the checklist worked against this.

At the vision-workshop, the intent to let clinicians construct the user interface of the future health care system through paper mock-ups of screen pictures was only partially successful since the clinicians were more prone to engage in discussion than to design with the pencils and notepapers provided. Instead the developers themselves often took the initiative to draw out ideas suggested by the clinicians and as the workshops proceeded they began to prepare paper mock-ups that fitted to the scenario in question and from which the clinicians could go on.

However, the numerous discussions at the workshops did provide a check on and deepening of the knowledge gained during the fieldtrips, suggestions for the design of the new health care system and pointed at what the user requirements should include.

### **DISCUSSION**

There is neither in ethnography nor probably in system development a recipe that will fit all projects and contexts. Probing into other worlds, cultures or professions is a situated process where initial focus, methodology and plans might have to be revised in context. The developer-researcher-designers have to be seen as "self-organizing systems with constructive as well as reflective skills." (Löfgren & Stolterman 1999:14) and not as actors executing prescribed methods or plans. This is reflected in the selective use by EF of CD, and this is, I suggest, what made them work around the difficulties inherent in CD.

As previously stated, EF had employed a nurse and a laboratorian that helped the team with their information gathering process. This enabled knowledge of central clinical terms and a rather close focus on what which parts of health work was deemed relevant for the team's product. The nurse and the laboratorian thus provided a means of bridging the team's gap of knowledge as did the continuous contact and close cooperation between the team manager and the physician that was the contractors representative. CI on the other hand provided the team with first hand knowledge of health care at hospitals and with more detail on the relevant work processes. The knowledge from the information gathering phase was seen as valuable by the team, but equally so was the self-experience of what hospitals were like. Depth and detail of knowledge about hospital work was gained mainly through the vision-

workshop and the discussions that came up here. While many ideas were conceived at this phase for the future system, little design itself was made by the use of the card-box mock-ups. This was mainly done in the iterative, fourth phase of system development at EF. Because of time pressure there was little time for in-depth fieldwork, careful generation of generalized models of work from empirical models nor any kind of analysis other than the implicit reflections it involved to construct these models and prepare the card-box mock-up workshops.

The team itself considers CI a valuable tool because of the emphasis on fieldtrips and the knowledge sharing that took place at the interpretation sessions that followed each field-day. They do not see the need for an ethnographer in this process and object to this idea, because they fear that this would deprive them of exactly the first hand experience and knowledge sharing that they found useful. They are willing to experiment with a different combination of field- and interpretation-days, but in general found CI useful. The case of EF apparently suggests a rather meager role for ethnography in design. What is needed in design is apparently an ease-to-use ethnographic toolkit.

However, while first-hand experience and self-constructed overviews through the work models of CD are without question valuable, I would argue that the team could work around the weak points of CD because of the combination of approaches they applied. The engagement of a nurse and laboratorian and the close, continuous contact with a physician probably helped them overcome the limitations of short field work: low-depth information, risk of preconceptualisation and lack of analysis. While a meager kind of knowledge transfer as inherent in CD is workable, as the case of EF suggests, this case also suggests that prolonged user-contact is central and that more ethnographic knowledge can usefully be employed: e.g. ethnographic reflections on how to engaged with informants; examples of how preconceptualisation continue to pop up; and examples of how work processes can be analyzed from different points of view. This could enrich the information gathering process of designers.

This is but one case that looks at the use of ethnography in design. Basically, we need more analysis and reflections on such in order to access what kind of knowledge developers need and how ethnography can be applied to provide it.

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