# A Lost Cause:
# The Ever-Improving Developer's Map

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## ABSTRACT

In this paper we describe our work in the Danfoss User Centred Design Group on the design for a frequency converter, a device which controls the speed of an electric motor. A significant part of this project lies in getting to know often unfamiliar users and use contexts. We feel that developers often look at the user's problems through *developers eyes* rather than through the *user's eyes*. Having researched and actively used ethnographic field methods over the past few years, we argue that it is necessary to create an awareness of this perspective issue, its consequences for how we interpret field sessions and its influence on product development. We present a collection of existing methods that can be applied to challenge our perspective as developers and to shift our view to that of the users. To illustrate how these methods may lead to a deeper understanding we start with a portrait of one of our informants. We present two provotypes to show how we try to incorporate the users' perspective in our design solutions. Finally, we reflect on the interaction language which products speak and argue that usability studies without awareness of the perspective issue make products more clear for the developers only.

## Keywords

Ethnographic field studies, tangible interaction

## PRODUCT AND PROBLEMS

Like in consumer electronics, the number of features of industrial automation components has increased exponentially in the last few decades. The excitement felt by companies about 'virtually cost-free' software features, coupled with a fear of omitting features which could be important to unknown numbers of users, has resulted in an awkward accumulation of features which are of little use to the majority of users. The current generation of Danfoss frequency converters confronts the operator with over 300 parameters accessible through a display and push button interface. It may come as no surprise that with this many parameters, navigation is non-trivial.

## PORTRAIT: JOHN THE SAILOR

John is a mechanical engineer working in a sausage factory using Danfoss frequency converters. He regularly makes his round of the factory to ensure everything is running OK. Having worked on a ship, John is highly experienced in practical mechanics. When it comes to electronics and computers, however, he is less confident. Confronted with the many parameters of the frequency converter he feels lost. The interface seems like a maze to him. We came to think of him as 'John the Sailor': he needs to keep his sausage factory sailing. This means that rather than needing to be a frequency converter expert, he needs a feel for whether things are running alright and be able to make temporary fixes until he enters a harbour where a service engineer can carry out expert repair.

### How come this intelligent man is lost?

We think that part of the problem lies in developers taking themselves as a reference point. They may look at the users' world and carry out usability tests, but there is the risk that they see it from their own perspective and not from the users'. Developers thus interpret the parameters in a fashion that makes sense for developers only. Having made a map of what they see as a logical hierarchy of parameters they base the interaction of the frequency converter on this hierarchy. In this kind of approach two crucial mistakes are made. One is basing the interaction on a 'developer's map' that makes sense to themselves, but not necessarily to the users. The other mistake is to not supply the user with this map. This turns an already difficult route into a complete maze. Usability testing has the potential to improve the 'developer's map', yet is not sufficient, as the starting point is inappropriate.

## TOOLS FOR CHANGING PERSPECTIVE

In this project we applied a collection of methods which helped challenge our perspective as developers and shift our view to that of the users. We think of this collection of methods as a toolbox. In the box we have three categories of tools.

*1. Exploring the users world.* We familiarize ourselves with the users and their world through ethnographically inspired field studies [2]. At this point we try to put all our pre-assumptions aside, interfere as little as possible and let the users set the agenda. We focus on them and their world, what they really do and what matters to them, rather than on what design solution we think they would need. Participant observation and open-ended interviews are some of the tools that we use here.

*2. Expressing, challenging and testing our understanding.* During design sessions in the field we express our understanding of the users' world in terms of design suggestions. Rather than enforcing our interpretation upon them in the form of statements and hypothesis, we aim for more open and tangible interpretations. Here we use tools such as props, mock-ups and scenarios to spark a dialogue with the users and challenge our perspective on them and their world.

*3. Incorporating users and their perspectives directly in the design process.* In workshops we incorporate the users' perspective directly in the design process. We use tools such as video card games and design games to ensure collaborative interpretations and design solutions [1].

None of these methods are recipes which can guarantee developers a pair of 'user eyes' by simply following the instructions. In order for us to challenge rather than reassure our understanding of the users' world and avoid objectifying users rather than involving them as real people, we strive to apply tools from each category in a project. Below are two examples which came out of using these methods in this project. Intended to challenge our understanding, these should be viewed as our way of bridging field studies and product development rather than as complete concepts.

### PROVOTYPES: KEEPING JOHN SAILING

To return to the John the Sailor metaphor, we feel that much usability work is focused on improving the developer's map. Sadly, John does not understand this map, no matter how good it gets. Not because he lacks the intelligence, but simply because the map is drawn up in an interaction language that is not his, shows him routes he does not care for and neglects the areas that he is interested in. We chose to enable John to make his own map with a map-making toolkit appropriate to his work practice.
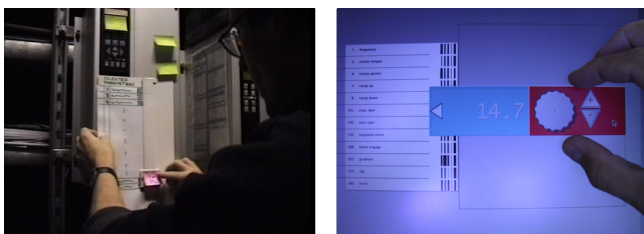


Figure 1: Parameter Shortlist Slider as provotype in context (left) and as Director prototype (right)

### The Parameter Shortlist Slider [Figure 1]

In the case of the Parameter Shortlist Slider, the user is enabled to choose a subset of parameters, thus throwing overboard the superfluous ones. This approach tackles the navigation problem at the parameter level. It makes no attempts to create a meaningful structure within the parameter subset. For the initial set-up of the frequency converter, the user can tick the application relevant parameters in a spreadsheet on a PC. When printed, the result is a parameter shortlist represented both in words and barcodes. This printout is mounted on the front of the frequency converter and a bar-

code scanner which slides vertically up and down over it allows physical navigation of the parameter shortlist.
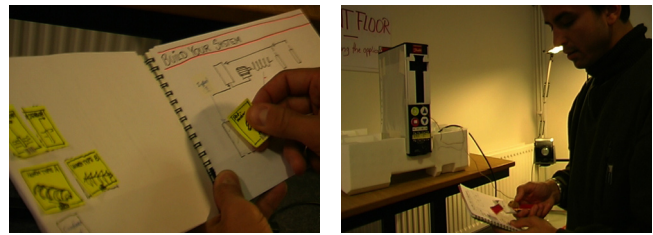


Figure 2: Assembling and using the visual flow diagram

### The Do-It-Yourself Manual [Figure 2]

The DIY Manual goes one step further. It tries to provide a collection of frameworks of frequently occurring tasks in which users can fill in the details themselves, thus assisting them in choosing the appropriate parameters.
The frequency converter has a detachable display, which doubles up as a barcode scanner. Danfoss provides a booklet in which each set-up situation takes up a spread. The right page is taken up by a visual flow diagram of the steps involved in completing the task. Some parts in this diagram are blank. The user can tailor the visual flow diagram to his situation by inserting the appropriate labels from the left page. Once complete, the user can follow the flow with the barcode scanner. The parameters appear in the display and can be adjusted and confirmed using the thumbwheel control.

### CONCLUSION

Our toolbox allowed us to 'pick 'n mix' methods to facilitate seeing the world through the user's eyes as well as incorporate users and their perspectives in the design process. If we merely interpret field studies through our own eyes, the best we can hope to achieve are concepts which are written more clearly in the interaction language of the developers.

### ABOUT US

The Mads Clausen Institute for Product Innovation is a research and teaching facility of the University of Southern Denmark and home to the User Centred Design Group of Danfoss, a Danish manufacturer of industrial components. The users of these products work with complex technical installations in a wide variety of industrial settings. Since 1992 the Danfoss UCD Group has made an effort to build competence in this area and to develop the work practice of Danfoss' development departments towards user orientation [1].

### REFERENCES

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