Jacob Buur
University
of South
Denmark

**is Professor of User-
Oriented Product
Development at
the Mads Clausen
Institute at the
University of
Southern Denmark.
His research focuses
on the study of
people, technology
and work in order
to create innovative
products.
Before he was
Senior researcher
and manager at
Danfoss A/S.
He has designed
user interfaces for
a range of products,
including joysticks
for excavators,
electronic
controllers for
heating and
refrigeration, valves
and frequency
converters.**

ethnographic provocation

participatory innovation, and how ethnography helps

I'd like to discuss ethnographic provocation. I'll start off by expanding on the preceding observation, that companies love predictability. Since innovation is not about predictability, maybe there's something in the way we sell ideas and convince people that we could change to our advantage.

I'll be discussing two case studies from my prior work with the large Danish manufacturer Danfoss – concerning strange plant stuff, products that are hidden away in refrigeration or heating systems or waste water plants.

I spent about ten years with the company, in charge of building a group on user-centred design, from 1991 to 2000; then in 2000 we moved the group into a university and expanded into both research and teaching. Today, I'm head of a research centre that we call SPIRE, which is an attempt to move from *user-centred design* into *user driven innovation.*
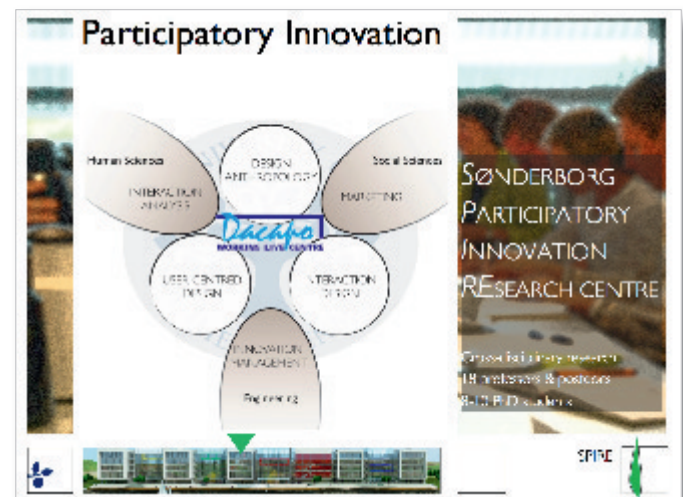
The way we do this is to take the three disciplines that we've developed over the last few years – we have a user-centred design competence, an interaction design competence and

a design anthropology competence. We expand these with colleagues from the human sciences who are good at doing detailed interaction analysis; we have social science in there with the business side and we have engineering with innovation management. We are in a brand-new building located on the waterfront in a place called Sønderborg, which is about as far as you can get from Copenhagen, down by the German border.

We have 18 professors and postdocs and we are training eight to ten PhD students. We're collaborating with an organisational theatre as we also need the competence of organisational change, and they bring that in.


Three approaches

Here's a map of the three dominant 'religions' in the field. Many of you will have heard of the **lead user approach**, defined by Eric Von Hippel of MIT. The idea is, let's find the users who are so dissatisfied by what the market offers that they tinker and build new innovative stuff – kite surfing is an example – and then you pull these ideas into companies and make money from them.

Design anthropology dates back to the 80s, with Lucy Suchman in a prominent position; but around 2005 it gathered momentum when Intel and other large tech companies began hiring numbers of anthropologists to help them understand what people do with their products.

Paticipatory design is my own background: it's a way of working with users that originated in Scandinavia in the 1970s. It banks on a continuous engagement with users throughout a design project.
One reason we had to map these approaches was to explain why it was so difficult for us in participatory design to talk to lead user advocates, and it's simply because we see the world
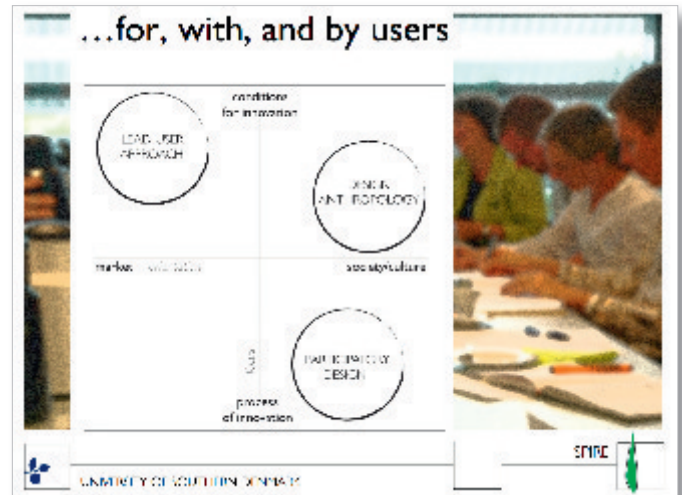
so differently. The lead user approach is typically explained in terms of market, and it has a fierce grasp of the terminology that is used in the business world. It is also very good at explaining the conditions for innovation, and it argues through broad studies of a number of companies and how they work.

On the other hand, in participatory design we are very focussed on the process. We can spend hours discussing how the chairs should be arranged around the table, the colour of the post-its, and exactly which people should be invited to participate in innovation sessions. And of course the reverse way of talking about things is that the lead user approach has very little to do with what actually goes on in a company; it believes that once an idea is in place, there's a process that just makes it happen. Participatory designers believe that because we've tried it in one company, it will probably work everywhere. Design anthropologists aren't very excited by the business side of things but bring an understanding of culture.
So all in all, I think that if we can borrow from each of these approaches, we can gain an interesting understanding.
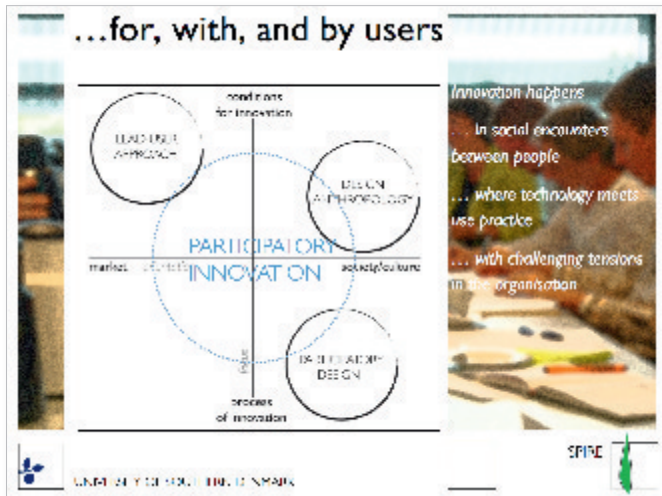
challenging organisational tensions

What we call **participatory innovation** starts from the understanding that innovation happens in the social encounters between people; it's seldom the individual creative designer alone at his or her desk that makes the great leaps forward. It happens where technology meets user practice. And then user knowledge challenges what companies believe, so you

can't generate innovation without creating tension in the organisation.

It's that last topic – the innovative tension in an organisation – that I want to address. It's a positive story, but the message is that innovation hurts. You can't innovate unless it hurts in the company.

To develop participatory innovation, we've identified six research strings. They are named in a way that reflects the collaboration between our different research disciplines.

For instance, **horizons of imagination** is about how people imagine the future, or how they locate the future in the present. That sprang out of a discussion between *innovation management*, which is concerned with how technology develops and needs to look 15 or 20 years ahead, and *user-centred design*, which can only look a couple of years ahead. So there's a tension there, and we realised that this isn't just about users and producers – it's also about marketing, sales, service technicians and others; and everyone has a different way of imagining the future. If we understand that, then we can support innovation better.

The last one of the six themes, **ethnographic provocation**, is the one I'm going to focus on. The way we do our research is to work with industry projects to explore one or more of the research strings.

Many people think ethnography is a method. It isn't quite. An ethnography is a description of people. As Malinowski, one of the founders of ethnography, wrote in 1922, the point of ethnography is to: "Grasp the native point of view... his relation to life... to realise his vision of his world."

This study of people has the goal of creating a theory as to what goes on in another culture. Why would we want to do that? Well, as Andersen, who was head of Xerox Parc in the
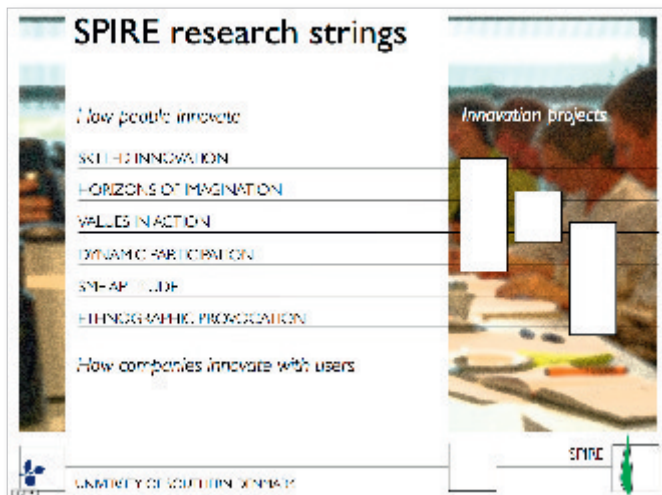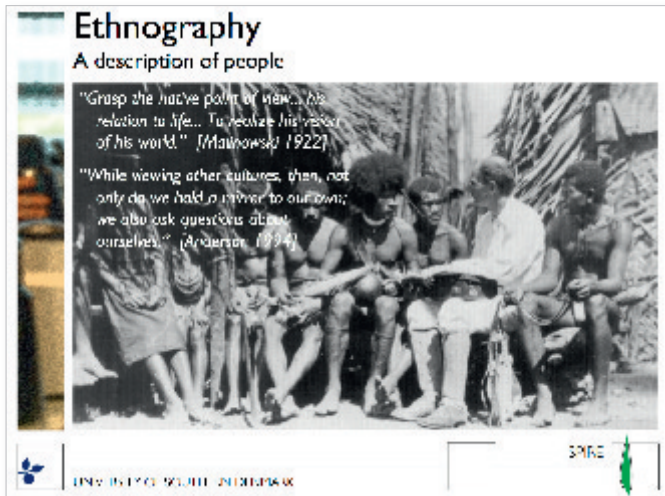
1990s, said: "While viewing other cultures, then, not only do we hold a mirror to our own; we also ask questions about ourselves."

The value of an ethnography is not just to get excited about another culture, but to also discover more about your own.

There was a short film made at a conference of industrial ethnographers – people with an anthropology background who get together to talk about user studies. It was made at EPIC, the conference of Ethnographic Praxis in Industry. We were in charge of the panel last year in Copenhagen, and we wanted anthropologists to discuss the future of doing these studies. So our theatre partners played out a scenario about an ethnographer bringing an engineering manager along to a user study for Rubber Band Inc, to meet the users of rubber bands.

The film is a humorous look at the things ethnographers discuss. It is a parody, but it underlines the essential facts. What matters is how you build the relationship between you as researcher and the company people, and how you engage the users and informants out there.

applied anthropology

We've learned from anthropology. Anthropology is the science within which ethnography lives. Applied anthropology is about understanding invisible working practises as well as exotic tribes. You may have heard of the paper about the tribal office, describing what goes on in the office as if it were a tribe. Field-study periods can often be much shorter than in traditional anthropology, and it is concerned with work and products rather than general culture. Its goal is to think about new ways of working and organising, more so than creating new theories about norms and societies.

The first case study I'd like to discuss is a rather old one, from 1999. We happen to have video recordings of this company encounter. The beauty of recording is that you can actually go back and figure out, when things are nagging at you, what exactly happened. I'd like to focus on an exchange that was very central in a particular half-year meeting. There was a lot of tension at this meeting and it somehow felt quite unpleasant. But we couldn't figure out what it was that was wrong. Years afterwards, I put a student to work transcribing it, and we took

the transcript to our conversation analysis experts They pointed out how and why the team loses ground to the company.

The project was one concerning control products for wastewater plants. We started studying what people were doing and shadowing them with video cameras in several plants, and we used that to try to build an understanding of what goes on there.

We filmed a discussion in a meeting between a team of 10 or 11 people (anthropologists, computer scientists, engineers, designers), and a sales engineer from one of the business units who was giving a presentation on flow meters. The team was there to learn what a flow meter does, which is to measure sludge or other liquids, but at some point a discussion started about whether future products would have a display or not.

The sales engineer was very certain that there would be no displays at the plant in the future, because all the information would be fed to the computer screen of the central control system. He says: "You don't need to go outside the control room, you can see everything on the screen." There was a certain silence, an uneasiness, because we hadn't really discussed yet what the practice of plant operators is, but this felt wrong. One of the team members tried to formulate it – that the operators seemed to walk around in the environment all the time; and that was just what we had seen. So the marketing guy says, "We don't mind that, if you have to sweep the floor it's ok to go out, but it's not really necessary. In the future, all the work will take place inside the control room."

The language researchers showed us line after line how we lost terrain in this discussion. We were a team of ten, and we'd all seen people race around the plant, but this one lone sales engineer managed to win the discussion! This had a huge effect on the team, because we suddenly realised that we knew something the company didn't know, or didn't want to know.

So we put more effort into understanding the practice of the operators, and it turned into three videos, and also a text description with three headings: feeling the process, watching the components, and controlling the control system.

They seem powerful, but when you start discussing this with engineers in the company, things go rather wrong. Because 'feeling the process' essentially means that people have to be there in order to feel what goes on. You can't just rely on sensors. 'Watching the components' means that the components break now and again; you can't rely on technology lasting forever. People need to be there to check that the components still work. And 'controlling the control system' means that the control system doesn't control the plant: people do. Sometimes, they switch the contol system to manual, because they know that under certain conditions it's better to control it manually. So there is lots of power in all of these three statements.
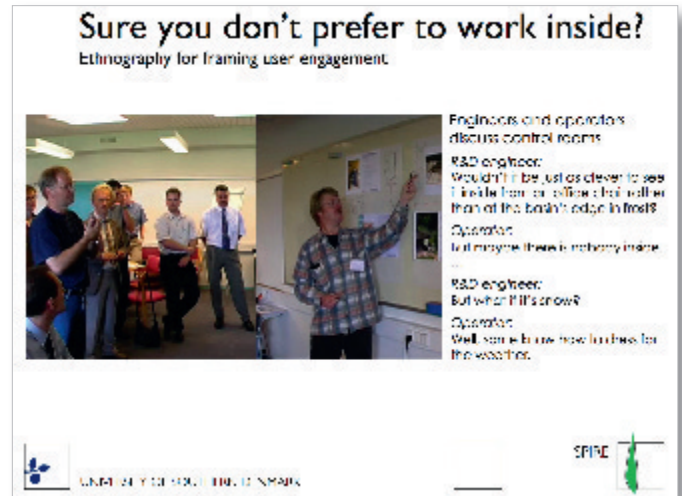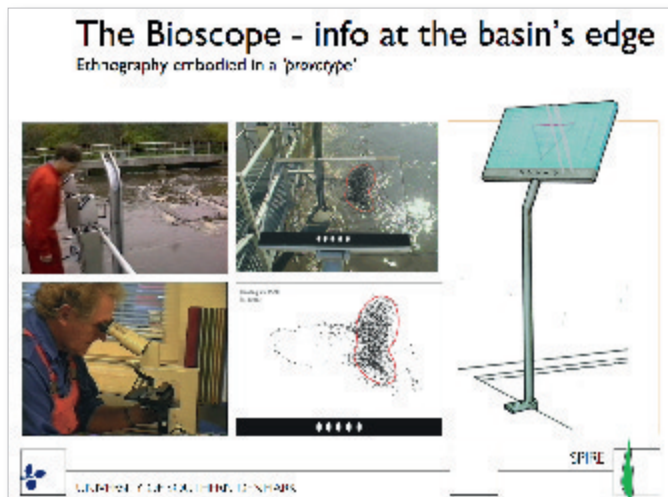
Is it a theory? Pieter Jan says designers don't need a theory. You could say that this is a very small theory. If we think about ethnography as having the goal of creating a theory about people, practice and culture, then as Wadel says, a "theory

may be defined in all simplicity as statements that structure an amount of data."

It sounds easy, though to me as an engineer it was scary to hear that from an anthropologist, because theory in an engineering understanding is something you learn from books. Theory is created by professors in labs, it's tested and reliable and you can use it. But anthropologists talk about actually generating theory in the field. Tom Erickson says: "Theories play multiple roles. At the most basic level, a theory is a useful mechanism for imposing a framework on the blooming, buzzing confusion that is reality."

This is a rather relaxed idea of what theory is. It's something that can help us discuss the world, and within which we can discuss.

We started designing and one of the concepts that came out was a computer screen positioned outside, near the basins in the wastewater plant. We worked with what it should show. And this was because we'd seen the operators walk around the plant and seen them in the lab using the visuals a lot.

The Bioscope - info at the basin's edge
Ethnography embodied in a 'prototype'

Sure you don't prefer to work inside?
Ethnography for framing user engagement

In a later meeting, the same discussion came up again: why on earth do we need an information screen outside in the plant, when everything is available on a screen inside, and you can sit there nice and cosy and do your work? In a user workshop with operators, one of the engineers asked, "Wouldn't it be just as good to see it inside?" And an operator answered: "But what if there isn't anybody inside?"

This is a clash between two different ways of understanding work. The engineer thinks work is about sitting at a desk behind a computer. For the operators, work is about walking around and doing what you do at the plant. They may have a control room but nobody really wants to sit there.

When the student transcribed the text of this meeting, the same topic – the weather – came up four times within 20 minutes, and the weather got worse and worse! What if it's cold, or raining, or snowing: wouldn't you rather sit inside?

We completed the project with some tangible prototypes that could hopefully challenge the company developers' understanding of what they were actually doing – but it took a while to figure out what we were really working with.

Case 2: Refrigeration plants
A research collaboration with Danfoss Refrigeration (2006)

provotypes: experience modelling

In another Danfoss project, a few years later, our research unit worked with refrigeration, and the controllers that run compressors and valves and whatever else you need to refrigerate goods in a supermarket. This time we were prepared: we knew we might see things that wouldn't go down well with the engineers, so we prepared material and video

Video stories
Ethnography as shared material

stories and tried to challenge the engineers that we collaborated with to make sense of it.

In a discussion about this project, two engineers were talking about whether a problem is a configuration problem or not. One says to the other, "I wouldn't say it was a configuration problem, I'd say it was a natural language problem." These two guys are software engineers, they're interested in configuration – meaning, how do you set all the parameters inside the control box to run this particular part of the plant? It's a very challenging task. These boxes have maybe 1,000 parameters that need to be adjusted. Everything around that,

Is this really configuration?
Ethnography as shared material

the mechanical stuff that we'd seen, that doesn't really qualify as being a configuration problem to them, that isn't seen as a real development challenge. We used our field studies to create a diagram of the work practice of these refrigeration plant technicians - this time in the form of what Liz Sanders would call an experience model. How do they make sense of what happens, what do they do when they're in the plant setting things up or doing repairs, and how do they anticipate the future?

Making sense and anticipating
Experience model as 'user ethnography'
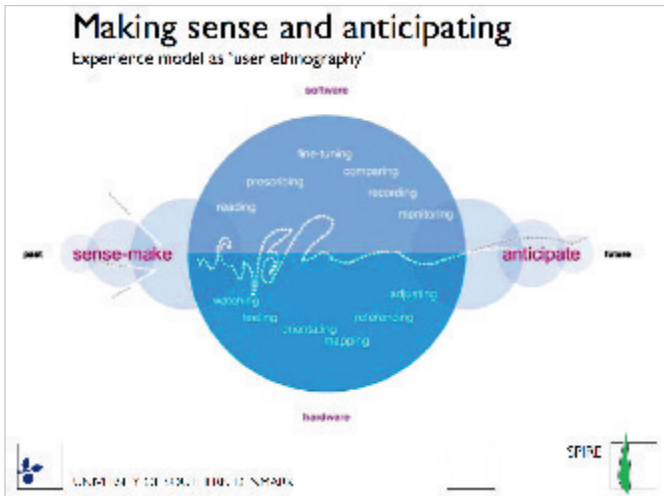
Here, the light blue and the dark blue are about the relationship between what goes on with the software and what goes on in the plant with the screwdriver and the hammer and the real physics. We have a wonderful shot of three engineers inside a control room with a computer adjusting parameters: and then someone outside shouts, "Hey! There's smoke coming out of this thing!" And that shows you that there is a reality outside the computer, that what you do does sometimes have an effect in the real world.

The Compass - tangible configuration
Ethnography embodied in a 'prototype'

Also here we're trying to work with prototypes, or **provotypes** you could say, as a way of putting a point across. Can we change controllers from computer interfaces into something tangible, so technicians can actually use their bodily skills? We use that with the engineers in the company, and out in the field with the users. So we're beginning to learn to see the shaping of ethnographic material as something you share within the organisation, team and users. It can be something you embed in provotypes or prototypes, or it can be a frame for user engagement.

A guiding quote is from another Andersen paper: "The contribution that ethnography may make is to enable designers to question the taken-for-granted assumptions embedded in the conventional problem-solution design framework."

That is, the best that we can get out of user studies is if they challenge the way we see problems and solutions: that's where they have their real value. Unfortunately, that's not even close to predictability, but it's what you need if you want to create innovation.

I heard a wonderful conversation some where between an anthropologist and a project manager. The anthropologist had finished a pre-study of various sites, and had come up with a list of 18 problems because she thought it would be best to present the pre-study in such a way that people in the company could really see that something was coming out of it – so she had identified 18 problem areas you could start working on, and now she was going to do the main study. The project manager asked, "Do we really need to do that? What can we get out of it?" Because in his view the list of problems would – presumably – get three times longer. She replied, as an anthropologist, quite sensibly: "You never know!" You never know what's out there, and that's the beauty of it, that you need to expect the unexpected.
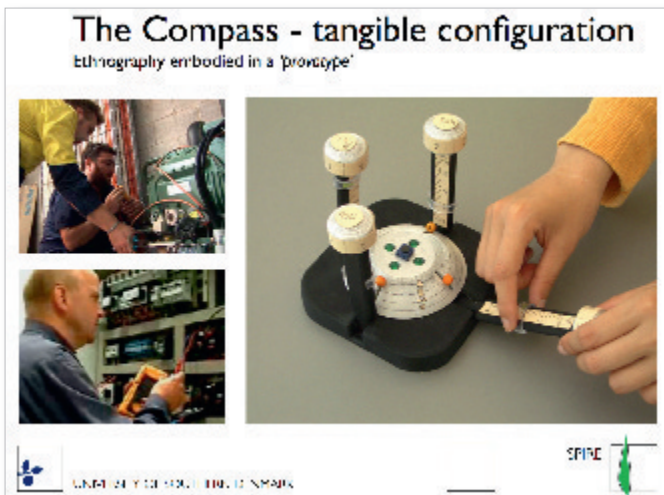
Over the years we've developed a variety of tools, mechanisms, ways of engaging both the team and people in the organisation in making sense together, and in this way finding out what is challenging in the field – video collages, site plan models, theatre, interaction mobiles, silent games and so on. I'll talk about just two of them.

One is the **silent game**, it's a way of acting out a situation that you've seen in the real world, and you take away one means of communication: you can't talk. It's about people building with very simple bricks together. This one we called the 'corporate identity game.' You've got the R&D departments of three different business units in the company. They all build something out of their own imagination. Then you've got another player, the corporate design person, who needs to ensure that there's a corporate identity across the three business units. The R&D people in the game had an advantage. They were allowed to move three bricks at a time, whereas the corporate person could only move one. Within ten minutes in this game, because they couldn't explain what bricks to move and why, you got all the emotions of being in a business unit and doing the best you can and suddenly someone comes in

from corporate identity and destroys your beautiful creation. And meanwhile the corporate designer was thinking, "I've explained exactly how it needs to be, yet they mess it up again."

 The other is the **tangible business model**. This is a way of talking about business using designerly stuff. In this case, we have a collaboration with a Danish hearing aid company, and the model is trying to demonstrate how hearing aids are sold. So the little marbles are hearing impaired people who need a hearing aid, and at the bottom you've got the company products and competitor products. The flippers represent the audiology clinics, because you need to go through a clinic to get a hearing aid, and these typically have a preference for one or the other manufacturer. Then there are product features that drag you to one side or another. And now you can start a discussion about whether to do a supermarket model before the flippers, and if you did a service package, how would that change things? So the tangible business model is a way of getting people in the organisation, the design team, and even users, to talk about the business of innovation too.

Conclusion

In conclusion, design anthropology is anthropology *for* design, but it's also the anthropology *of* design. It's concerned with the role of the design team between the field and the organisation. Ethnographic provocation is a way of talking about what happens when findings from the field don't go down well with the organisation. Now that we have a name for it, we can start locating it and thinking about what we do with it.
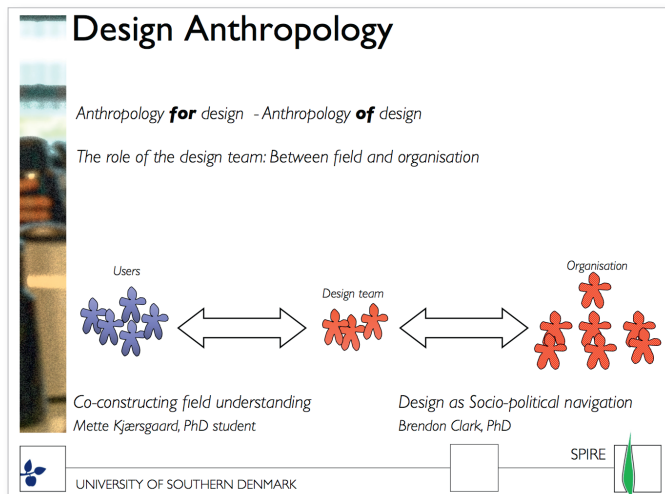
How can ethnography provoke?

1   Forget about bullet points. Rational arguments in textual form hardly provoke anything.

2   Provoke now, don't wait until the theory is done, because theory building cannot progress without understanding the beliefs in the organisation.

3   In Danish we say, "cut it out in cardboard": meaning you have to somehow make it tangible and physical, so people can engage with it.

Q & A with the audience

Q How do we select users so that we don't fall into the trap of people defending their job, so that we can't talk technology that would make them obsolete?

A The more information the better. It's not a question of picking certain people and selecting information from them. It's more that users are a wonderful resource to learn what you're designing for, so of course you need to hear all the stakeholders in a game like that.

Q Isn't participatory design always about politics?

A Yes, it is. We simply try to understand the mechanisms better, and try to provide ways to engage diffferent stakeholders in this discussion. Another of the research strings is dynamic particiaption, and it's about what happens when you don't just think about users and designers, but about the whole value network in a company. Which people do you need to bring together when?

Q Do business people think a foam version of a business model is valuable?

A You have to quickly say that this is not a simulation. Or they'll quickly back off, saying it's not precise. You have to tell them this is a way of talking about things with us naïve ones who don't understand business, then it works.

Q Do you try to steer away from consensus in the process on purpose?

A There's a dilemma here, between being a good participatory designer wanting to embrace everyone and agree on everything, and ensuring that these tensions actually surface, because if people just bury them then you don't have the spark that really gets innovation on the table. I can't say we do it yet, but we're aware that we need to get the tensions out.

Q How do you ensure that every decision is not a compromise?

A That's what designers are for. This is not a democratic design process. It's a way of ensuring that all the stakeholders are heard, but the final word is the designer's, if they can convince the business people.