IS THERE ANYBODY OUT THERE:
Context awareness in a virtual organization

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Introduction
Recently I have been working in the EU-project: MANICORAL. The project investigated the possibility to enhance the communication and cooperation through technology (a CSCW system) between a group of geo-scientists distributed all over Europe.

MANICORAL (Multimedia And Network In Cooperative Research And Learning) was a user driven research and development project, the aim of which was to develop a CSCW, or rather a DCV (Distributed Collaborative Visualisation system) for a dispersed group of European scientists. The project was supported by the European Union's 4th Frame program: Telematics for Research.

The user group AFRICAR (Altimetry for Research In Climate And Resources) were a group of geo scientists investigating the use and exploitation of Radar Altimetry Data. The scientists are located in Holland, Austria, Italy, Greece and Denmark. The AFRICAR group has collaborated for many years through conventional technology and infrequent face-to-face meetings. The focus of their research was to utilize methods for measuring the distance from satellites to the ocean surface or to the ice surface. Change of the height of the ice cap may indicate climatic change. Studying the changes of currents and eddies of the ocean may contribute to basic understanding of climate change, and the observations are also used for gravitational field calculations. This is important for mapping resources, e.g. oil and understanding e.g. earthquakes (Proceeding of INTERACT, Sydney 1997).

My focus was on tacit knowledge and explicit knowledge, and it led to point out the lack of meta-communicative codes, which we rely on in traditional face-to-face
communication. These are missing from CSCW mediated communication, and thus cause problems with constructing sense of presence. The interest in the concept of tacit knowledge, however, goes beyond this. The scientific cognitive process is founded in tacit knowledge, and it is the enhancement of this process which is the basis for introducing geophysicists in MANICORAL to CSCW, and the question if technology may be designed to enhance the explicitation of tacit knowledge is raised.

Video recording was a major tool in the empirical approach to investigating the interaction with the CSCW-system. Focus in the analysis was on the awareness of others and sense of presence, and the same event was video captured at 3 different sites (host sites and two participant sites). The analysis showed the situatedness of each site experiences, the problems with lack of meta-communicative codes and the needs for development of new communication strategies and new co-operation cultures.

This was just a small introduction to my area of interest. Following some thoughts on your questions.

**What is context? – my focus**

Context is all the “things” which we use (aware or unaware) when we interact with other people. It can be artifacts both physical and social (the more indefinable ones).

The physical things can be divided into concrete things and how they function. It may be things such as furniture’s (Is the chair comfortable, is the light right), also the functioning of the artifacts; how easily it is to get supporting materials during the session, or just be able to get thing you for some reason would need in a second. These observations are important, because often you see an office where the computer just are put into, because that was a room where you could have some privacy for you long distance talks. So I think this an important when you “design” a context.

But also the artifacts which create an atmosphere and the people present (authority, rank, and storage of knowledge ect.) are important factors in the successful dialogue. And I think this is the area “we” are interested in.

Rønby and Sokoler (1997) use the concept: Peripheral awareness – our ability to maintain and constantly update a sense of our social and physical context. They mean that we do so: “…in an apparently effortless manner and without being aware that we do so, -at least until something happens that is out of order and makes us raise out level of consciousness”.

I think that peripheral awareness is a good concept to work with, but still I would like to know, more about this area, because I think there is more to it than that – in what I’m doing anyway. I need to figure out which social and physical signal we use in i.e. discussions, and rely on in a very complex knowledge creating process, to be able to design optimal systems, but also to be able to once and for all to find the limitations for mediated communication/cooperation.

**Whose context is important to whom, or what?**

I would say that it is important for people who are work geographically dispersed. Working with the AFRICAR-group it was very clear that the different context they worked in gave rise to a lot of frustration. I have referred to this kind of awareness as situated awareness. Several examples can be mentioned, but I only give you two.
For once, one setting (A) had problems with the connection. They were on and off all the time. This was very annoying for them. In another setting (B) everything was functioning, and they heard the others on and off. They even made jokes when the others came through. “Yes, we hear you. Can you sing a song?” If setting A had had that I don’t think they would have been laughing, too.

The other example is when they are waiting to get started with a session. One setting is ready at the time the session was announced to begin. Others are late, and others again are late because of problems with the technology. The ones who have been ready from the beginning are getting more and more annoyed; they want to begin. The chair of this session is greeting everyone gradually as they appear on the screen; he does not have the eager to begin. The experiences from this session are that the chair called it a success and the “right in time” for a failure. And there are many more.

**Where can an awareness of context be exploited?**

My whole research is about the “things” that happens when we interact. The unaware things we rely on and which make a dialogue or discussion run more smoothly. If we can names those important “tings” then it is possible for us to design better systems which makes the cooperation more optimal for people physical separated.

**When is context useful? (My focus)**

It is commonly known that body language is used in communication. Kinetics (use of hand and arm) and posture (the way you sit) are two out of, at least, ten non-verbal codes, which we rely on the communication process.

In a session a Ph.D.-student is trying to explain some of his work to the others. He gets questions and replies, but the more the question/reply merges into a dialogue, and he has to explain things he wasn’t prepared fore, he is loosing the touch. He actually ends up with the sentence: “...this is to hard to explain over a video conference”. In the interview afterwards he explains that he needs the gestures (arms and hands) to explain...also to help him self in finding the words. He was definitely to isolated in front of the computer to be able to find the words.

So I think that the context is useful to everyone who needs a deeper understanding in a more complex situation. When there are a need to capture a thought, or when you have to explain a complex problem.

**Why are context-aware applications useful?**

The AFRICAR-group had many problems using the CSCW-system. A question that came up again and again was "Can you hear me". The question was asked 28, 39 og 21 times (Lindgaard, 1997) in the three different sessions. The session duration were aproximatly one hour, which means that it was every second minute they couldn’t hear what was going on! So we (the HCI- teknologi group working with optimizing the user interface) had to make a three-step model to educate them. The three-step model consisted of: 

• the technical learning process - which is supposed to learn the individual to handle the CSCW-system
• the communicative learning process - which is supposed to be able to communicate with others through the CSCW-system
• the scientific learning process - where the individuals actually were capable to exchange ideas and learn form each other

Even though the CSCW-system has audio and video, it couldn’t count for the physical face-to-face situation. While the pictures are too small and the movements are delayed, it gives the participants a lack of sense of presence. Some of the participants even said that they didn’t need the pictures, but in our video analysis again and again the pointed to the pictures when they talked about the others. They even cheered with a cop of coffee to a picture.

Since they gradually had become familiar with the CSCW-system, my task became to develop a guideline and some thumb rules for the communicative learning process. This was important since the context-awareness in using mediated communication were different from the traditional physical face-to-face communication. A new meeting culture developed.

So you may say that here in this case (and maybe others) context awareness applications are useful not only in the scientific learning process (see ‘What is context’ and ‘When is context usefull’), but also when they have to work in a total different setting that they are used to.

**How do we implement a generic supporting infrastructure for context-aware applications?**

I haven’t had a lot to do with actually designing systems. But I’m am very inspired of of Elin Rønby’s and Tomas Sokoler’s work: AROMA: Abstract Representation Of Presence Supporting Mutual Awareness (1997). They are building a series of prototypes to learn if abstract representation of activity data indeed convey a sense of remote presence and does sufficiently subdued manner to allow the user to concentrate on his or her main activity (Rønby and Sokoler). So all I can contribute with in this area is the knowing of their work. The paper can be found at: [http://www.acm.org/sigchi/chi97/proceedings/paper/erp.htm](http://www.acm.org/sigchi/chi97/proceedings/paper/erp.htm)

**Epilog**

I must say that it has been very hard to choose one of the themes. They somehow merge into each other. I would like to choose three of them! Maybe it’s because I didn’t get the questions right. But in any case…if there is any problems please feel free to contact me.