**Participation in Interaction Design –**
**actors and artefacts in interaction**

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## 1 INTRODUCTION

*'Real artefacts are always part of institutions,*
*trembling in their mixed status as mediators,*
*mobilizing faraway lands and people,*
*ready to become people or things,*
*not knowing if they are composed of one or many,*
*of a black box counting for one*
*or of a labyrinth concealing multitudes'.*
(Bruno Latour in *Pandora's* Hope,1999)

Interaction design is not computer science, not even human-computer interaction (HCI), even if it deals with humans, computers and interaction. Interaction design is not graphic design, even if it is both visual and communicative. Neither is interaction design other computer studies like computer supported collaborative work (CSCW) or participatory design (PD), nor other design disciplines like product design, architecture or media studies, even if all of these disciplines and practices and many others in the background are giving shape to interaction design.

Interaction design is neither art nor technology in isolation, but maybe a social and aesthetic synthesis. Interaction design is not statements about facts, not even propositions of what ought to be, but may be it could be design as an anxious act of political love, as a rethinking of the Aristotelian intellectual virtues of techne and phronesis, and the reunion of art, technology and politics in the era of ubiquitous computing.

*We are designing interaction design!*

### 1.1 Interaction design – positioning the field

To me the idea of bringing design to software and information technology to design represents the birth of a new and challenging design discipline – interaction design. This discipline has a design-oriented focus on human interaction and communication mediated by artefacts. The identity and actuality of this emerging design discipline is emphasised by the convergence of digital artefacts with physical space and the objects surrounding us (ubiquitous computing) as well as the convergence between different media (multimedia, new media). This discipline represents social, technical and aesthetical challenges to the interaction designer.

Another way to position interaction design would be with reference to *embodied interaction*. The term was coined by Paul Dourish for the creation, manipulation and sharing of meaning through engaged

interaction with artefacts (Dorish 2001). Embodied interaction starts from the observation that computing is getting both more tangible and more social. Design of information technology is becoming more tangible in the sense that emerging radically new kinds of digital artefacts, beyond the desktop computer, deliberately amalgamate interaction qualities of physical objects with computational qualities, augmenting papers, pens, toys and all kinds of everyday objects. Computers are more and more becoming embodied as embedded aspects in our experience of our everyday environment. There is also more embodied interaction in the sense of the embeddedness of artefacts in social practice, community, place and situatedness, beyond the disembodied human-computer interface. The embodiment of our experiences in the world is coming more and more into focus.

Interaction design has grown out of a merge between the traditional design fields (especially product design and graphic design) and socially oriented computer studies (especially human-computer interaction, but also computer supported cooperative work and participatory design). Other important initial contributions come from architecture, art, sociology and media studies. *Bringing Design to Software* edited by Terry Winograd and with contribution from many design fields as well as from computer science was an early manifestation of this trend. Design of computer artefacts is here understood as an activity that is conscious, is a conversation with the material, is creative, is communication, and is a social activity that keep human concerns in the centre and has social consequences (Winograd 1996).

However, a question that may be raised about interaction design in practice is how new the design that is brought in really is. What we meet is in many ways closely related the modern design tradition from the Bauhaus. As Lev Manovich observes in *The Language of New Media* (2001) we clearly see the traces of 'new vision' (Moholy-Nagy), 'new typography' (Tischold) and 'new architecture' (le Courbusier).

The real challenge in interaction design is maybe the other way around. The really new is bringing computational technology to design and to deal with ubiquitous computing (Weiser 1991). The design materials for ubiquitous computing and the appearances of computational artefacts are both spatial and temporal (Redström 2001). With computational technology we can build temporal structures and behavior. However, to design these temporal structures into interactive artefacts almost any material can be of use in the spatial configuration. Interaction design deals with a new kind of combined interactive narrative and architecture, a kind of mixed object (De Michelis 2003).

Another challenge of particular significance to interaction design, being physical, digital and social, is the paradox of *demassification*. This expression was used by John S. Brown and Paul Dugid in a paper in already in 1994 (Brown and Dugid 1994). What they pointed at is how information technology and new media introduces new material and social conditions for the design of artefacts. Demassification concerns the *physical* or material change - artefacts literary lose mass and can be distributed and accessed globally. Think of a digital

book or a library. But there is also a *social* or contextual demassification. This concerns the possibility to customize and make individual copies of digital artefacts - a loss of mass in the meaning of a mass medium. Again think of a personalized version of the book or the digital library. Why is this a design problem? Is it not just great with totally mobile and individualized artefacts? As Brown and Dugid suggest with their paradox of demassification this is achieved at the prize of lost intertwined physical and social *experiences* of the artefacts. The physical demassification deprives the artefact of material 'border resources' for shared interpretation. The cover of the book may not be decisive for the content, but its shape, texture, weight etc may still be an important aspect of its 'bookness' and how we experience it as a book. It is these 'border resources' that are lost when every digital copy gets its own form, and hence a relatively 'immutable' source for interpretation dissolves. Entangled with this, and adding to the problem of lost physical mass, is the social demassification. The individualized versions of a digital artefacts, reaching only a few persons, underline the loss of shared 'border resources' by jeopardizing 'border resources' as relatively 'immutable' contextual sources for shared interpretations within a community.

**1.2 A case of interaction design**

Erling Bjarki Björgvinsson and Per-Anders Hillgren are interaction designers as well as PhD students in Interaction design at the School of Arts and Communication at Malmö University. They do both have an art college background before they joined our school as master students and later in the doctorate program. As researchers and interaction designers they have now spent a couple of years together with staff and patients at the University hospital in Malmö, focusing on everyday learning (Björvinsson and Hillgren 2002).

The starting point for their project was an inquiry into the use of video and digital devices to support everyday learning by an ethnographically inspired design and change process in close cooperation and dialogue with the staff at the wards. Early on it became obvious that oral tradition is a major resource and that this could be supported by short video films made by the staff concerning different learning situations, e.g. operation of different equipment at the intensive care unit. The films are edited in the camera by the persons recording them. Afterwards they examine the films together with their colleges. Approved films are linked to barcodes that are attached to the actual equipment at the ward. When someone wants to be reminded about how to operate that specific equipment he or she reads the barcode with a small handheld computer on which the film is then being played via the local area network. On the film they see a college showing how to operate that specific medical equipment and at the same time sharing practical advises from her experience.

This application is now being taken up by other hospitals in a network where experiences can be shared. This application and the staff at the intensive care unit were given a national award for most innovative IT application in the care sector in 2002.

At the same time the interaction designers have moved on to work with another ward at the hospital. The research and design methods

are still the same: an open, design oriented, ethnographically inspired inquiry in open dialogue and close contact with staff and patients. However, now the focus is also on how the patient can learn with support of mobile IT at the hospital, at home or at work.

To me this case is a good example of interaction design and interaction designers in practice, and in this paper it will serve as a background for more theoretical reflections on the foundations of interaction design. The case highlights the participative and collaborative character of the design process, it addresses dilemmas in the meeting of art and technology and the aesthetics of interaction, and it contributes to reflections about the interplay between and co-construction of artefacts and actors.

## 2 TOWARDS INTERACTION DESIGN – PARTICIPATION

In this paper I will relate the emerging field of interaction design to my own trajectory in this direction with a focus on participation and community and my own background and participation in work-oriented design and participatory design. On this journey I will make three stops: The first will be by *work-oriented design of computer artefacts* where questions of community and participation were centred around users, democracy and the design process. The second stop will be at *design-oriented studies of information technology in context* and the attempt to form a framework for uniting the technical, functional and subjective knowledge interests in design of computational artefacts. The final stop will be by the *manifesto for a digital Bauhaus* and the attempt to create an arena, a meeting place, a school, and a research centre for creative and socially useful meetings between 'art' and 'technology'. Finally I will return to interaction design at the hospital case in the introduction.

### 2.1 Work-oriented design of computer artefacts

A 'movement' towards *participation and skill* in design and use of computer artefacts evolved at Scandinavian workplaces and in academia in the 1970s and the 1980s. This 'movement' was based on two design ideals:

- *industrial democracy* and the attempt to extend political democracy by also democratizing the workplace, and
- *quality of work and product* and the attempt to design skill-enhancing tools for skilled workers to produce highly useful quality products and services.

Personally, I was heavily involved in this 'movement' both as action researcher and as reflective academic. In the book *Work-Oriented Design of Computer Artifacts* (Ehn 1988) I tried to give a comprehensive view of theory and practice of this 'movement'. What was suggested was an approach that from an emancipatory perspective both deals with the inner everyday life of skill based participatory design and the societal and cultural conditions regulating this activity.

This kind of locally anchored, trade union based, politically significant, interdisciplinary and action oriented research on resources and control in the processes of design and use of computational artefacts, has

contributed to what abroad often has been seen as a specific Scandinavian approach to computer systems design.

*2.1.1 Participation as a fundamental epistemological category*

There was, however, also a complementary focus to this labour process approach to skill and participation. The focus on the role of skill and participation in design as an everyday practical activity, and participation as a fundamental epistemological category. This concern grow out of a dissatisfaction with traditional theories and methods for systems design, not only with how systems design had been politically applied to de-skill workers, but more fundamentally with the theoretical reduction of skills to what can be formally described. Hence, one can say that the proactive critique of the political rationality of the design process pointed at a transcending critique of the scientific rationality of methods for design of computational artefacts. An alternative foundation for the practice of a skill based participatory design approach was outlined, based in the tradition of the language-game philosophy of Ludwig Wittgenstein (Wittgenstein 1953). This more epistemological foundation for participatory design reflecting on the design process, design skills, and design artefacts like mock-ups and games, was described as a number of lessons learned:

*General lessons on the language-games of work-oriented design*

- By understanding design as a process of creating new language-games that have family resemblance with the language-games of both users and designers we have an orientation for really doing work-oriented design as skill based participation, a way of doing design that may help us to transcend some of the limits of formalization. To set up these design language-games is a new role for the designer.

- Traditional 'systems descriptions' are not sufficient in a skill based participatory design approach. Design artefacts should not pri-marily be seen as means for creating true 'pictures of reality', but as means to help users and the design-ers to discuss and experience current situations and envision future ones.

- 'Design-by-Doing' design approaches like the use of mock-ups and other prototyping design artefacts make it possible for ordinary users to use their practical skill when participating in the design process.

*Lessons on skill in design of computer artefacts*

- Participatory design is a learning process where designers and users learn from each other.

- Beside propositional knowledge, practical understanding is a type of skill that should be taken seriously in a design language-game, since the most important rules we follow in skilful performance are embedded in that practice and defies formalization.

- Creativity depends on the open-textured character of rule-following behaviour, hence focus on traditional skill is not at the cost of creative transcendence, but a necessary condition. To support the dialectics between tradition and transcendence is at the heart of design.

*Lessons on participation in design of computer artefacts*

- Really participatory design requires a shared form of life - a shared social and cultural background and a shared language. Hence, participatory design is not only a question of users participating in design, but also a question of designers participating in use. The professional designer will try to share practice with the users.

- To make real user participation possible, a design language-game must be set up in such a way that it has a family resemblance with language-games the users have participated in before. Hence, the creative designer is concerned with the practice of the users in organizing the design process, understanding that every new design language-game is a unique situated design experience. There is, however, paradoxically as it may sound, no requirements that the design language-game make the same sense to users and designers, only that the designer sets the stage for a design language-game so that participation make sense to all participants.
- (See figure 1).

*... and a final lesson on the boredom of design*

- formal democratic and participatory procedures for designing computational artefacts for democracy at work are not sufficient. The design process must also be or-ganized in a way that make it possible for ordinary users not only to utilize their practical skill in the design work, but also having fun doing this.

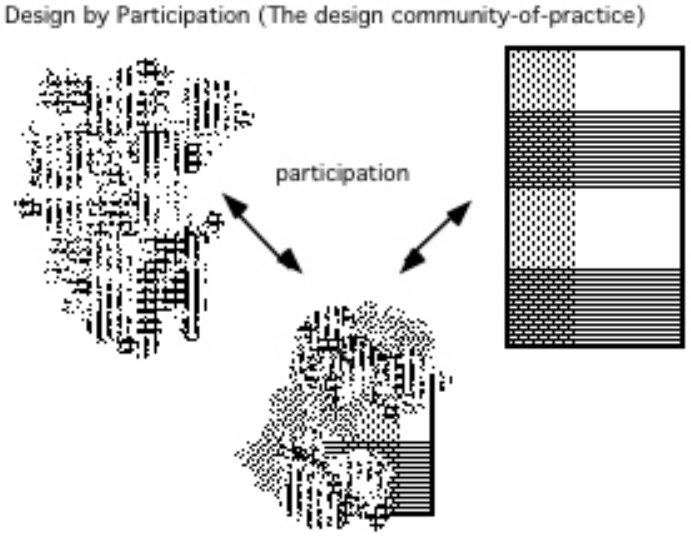

***Figure 1. The participatory design approach.*** *A communicative and participative language-game view on the design process. Two or more language-games fundamentally related via shared experiences in a common design language game (the design community-of-practice) which has a resemblance with the ordinary language-games of both users and professional designers. A fundamental competence of the designer is the ability to set the stage for a shared design language game that makes sense to all participants.*

I would like to claim the relevance of this kind of understanding design of computer artefacts also when laying the theoretical foundations for the field of interaction design, especially concerning the design process and the use of design artefacts in that process. However, Interaction design is in no way constrained to work, and given other settings participation can take very different shapes. Furthermore participatory design is very week on understanding the computer as an interactive design material that has to be formed not only technically and functionally, but also aesthetically. A material that, as was suggested in the introduction, is both spatial and temporal, a kind of mixed object. With computational technology we can build temporal structures and behaviour. However, to design these temporal structures into interactive artefacts almost any material can be of use in the spatial configuration. This is a challenge for interaction design that goes far beyond work-oriented design of computer artefacts, also with regard to the design process.

In the epilogue to *Work-oriented design of computer artifacts* the future of participatory design was outlined as "back to Bauhaus and beyond postmodernism". This also became my way towards interaction design.

### 2.2 Design oriented studies of information technology in context

The next stop on this way was, however, when I in 1991 was appointed to the chair in Informatics (Information and Computer Science) at Lund University in Sweden with a program to push the discipline in direction of *design-oriented studies of information technology in context*. It was from the outset clear that such a design orientation would go beyond the 'technical' and focus on the 'social and functional', on participation and usability. But as a design discipline it would also have to deal with "experience and aesthetics", and the general design orientation was towards 'quality-in-use' (Ehn 1995).

A general framework for such contextual design inquiries in the use of computational artefacts was outlined with reference to the social philosopher Jürgen Habermas and the concepts of 'communicative actions' and 'knowledge interests' (Habermas 1968, 1985). As designers we can be said to have relations to three 'worlds': the objective, the social and the subjective. The languages of these worlds are very different. The objective world has to do with rationalistic design. Quality is a question of prediction and control. The social world concerns understanding, interpretation and communication. Quality becomes ultimately a question of ethics. In the subjective world we deal with emotional experiences and creativity. Quality is a question of aesthetics. We relate to these

worlds and their language both in design as product (*artefact-in-use*) and process (*design process*).

*2.2.1 Artefacts-in-use*

Looking at artefacts-in-use what was needed was a way to address significant aspects of the control, ethics, and aesthetics of computational artefacts. This was by the way the approach to 'design' taken by the architect Vitruvius about two thousand years ago, and when architects assess buildings in terms of their *structure*, *function*, and *form*, this goes back to the de Architectura in which he divided the study of buildings into *firmitas, utilitas and venustas* (firmness, commodity, and delight). These are exactly ways to assess the objective, social, and subjective quality of artefacts. However, the ability in Informatics and other computer science oriented disciplines, to judge the quality of artefacts has historically been focused on the 'objective' structural or technical aspects. Taken alone, no matter how well they are understood, these aspects say very little about quality-in-use. To understand the quality-in-use of computational artefact, we also have to be concerned with the contextual aspects of function and form. To that end we now have well-elaborated design perspectives with which to judge the 'social' functional aspects of an artefact. Finally, when it comes to the 'subjective' experience of computational artefacts, we were just beginning to form an aesthetic perspective. Without such a perspective, the ability to judge the quality of a computational artefact was severely hampered (Ehn and Löwgren 1997). (See figure 2).

| 'world' | objective | social | subjective |
|---|---|---|---|
| artefact aspect | **structure**<br>• hardware and software<br>• other materials<br>• material or medium | **function**<br>• practical use<br>• symbolic use | **form**<br>• experience of use |
| quality perspective/ language | **control**<br>• software metrics<br>• quality standards | **ethics**<br>• usefulness<br>• utility<br>• power<br>• interests<br>• values | **aesthetics**<br>• appropriate-ness<br>• style<br>• balance<br>• resemblance |
| Vetruvius | *firmitas* (firmness) | *utilitas* (commodity) | *venustas* (delight) |
| 'usability' style? | **appropriateness**: A 'proper balance' between structure, function and form | | |

***Figure 2. Artefacts-in-use.*** *Structure, function and form assessed from the quality perspectives control, ethics and aesthetics. The relation to the Vetruvian categories. Usability (and style?) as the appropriateness in the balance between these aspects.*

*2.2.2 Design process*

Shifting from product to process it is interesting to notice that not until the sixteenth century 'design' emerged in European languages as a term. The emergence of the word coincided with the need to describe the process of design and the profession of designing. Especially the term indicated that designing was separated from doing (Cooley 1988). In modern times the design process has been studied as an academic field since the early 1960s. The field has been dominated by architectural and industrial design.

The development of design approaches can be described in three generations corresponding to each of the three design worlds (Cross

1984, Ehn 1995). The 'first generation' design approach focused on *engineering*. It addressed the 'objective world' and the answer had to do with control - with the correct representation and manipulation of objects, facts and data. The second one focused on participation. It addressed our 'social world' and the answer had to do with ethics - with democracy and appropriate social interaction. The third one focused on design *ability*. It addressed our 'subjective world' and may be described as having to do with aesthetics - with the expressive and creative competence of designers and users. In retrospective the design approaches seem complementary rather than mutually exclusive (See figure 3).

| 'world' | objective | social | subjective |
|---|---|---|---|
| design process aspect | **engineering**<br>• manipulation of objects<br>• formalisation<br>• refinement of specifications<br>• logic | **participation**<br>• communication<br>• learning<br>• politics | **design ability**<br>• creativity of environments<br>• emotional expressions<br>• artistic expressions |
| quality perspective/ language | **control**<br>• correctness of descriptions<br>• predictability | **ethics**<br>• democracy<br>• appropriate social inter-action | **aesthetics**<br>• creativity<br>• innovation |
| "usability" design style? | **appropriateness**: A "proper balance" between engineering, participation and design ability | | |

***Figure 3. Design process.*** *Engineering, participation and design ability assessed from the quality perspectives control, ethics and aesthetics. Usability (and style?) as the appropriateness of the balance between these aspects.*

### *2.2.3 Three 'worlds' of design and seven questions*

This left us with six related questions about how to design computational and a seventh holistic question that has to do with our ability to relate these questions to each other in a proper way in the practice of designing computational artefacts for quality-in-use (See figure 4).

| 'world'<br>Aspect | objective | social | subjective |
|---|---|---|---|
| artefact-in-use | **structure**<br>How do we make sure that an artefact is made of the right materials? | **function**<br>How do we make sure that an artefact is useful in its context? | **form**<br>How do we make sure that an artefact supports appropriate experiences? |
| design process | **engineering**<br>How do we control the technical development of an artefact? | **participation**<br>How do we support appropriate interaction in the design process? | **design ability**<br>How do we support creativity in the design process? |
| Quality-in-use | **appropriateness**<br>How do we find a proper balance among our responses to the questions above in our design practice? | | |

***Figure 4.*** *Three 'worlds' of design and seven questions.*

Struggling to come up with useful practices to address these questions in education and research Informatics as a discipline has gotten a stronger design orientation, but it has not become a design culture and aesthetic practices are still poorly developed and integrated. Informatics has a design philosophy and has also integrated human-computer interaction with participatory design, but

it has not become a real design discipline and a proper home for interaction design even if it offers a framework for developing such a discipline. Especially, it is interesting to notice that there seems to be a direct connection, worth investigating, between the focus on user experience and artefacts-in-use (as opposed to objects in isolation), and the current interest in embodied interaction and interaction design in socially inhabited places (as opposed to abstract spaces). However, Informatics as a computer oriented design discipline has not become an arena for really productive meetings between art and technology (e.g. Duorish 2001).

**2.3 Manifesto for a Digital Bauhaus**

*'What is needed in design and use of the most post-modern media and technologies - the information and communication technology - is not a modernism caught in a solidified objectivity in the design of modern objects in steel, glass and concrete, but a comprehensive sensuality in the design of meaningful interactive and virtual stories and environments.*

*What is needed is not the modern praise of new technology, but a critical and creative aesthetic-technical production orientation that unites modern information and communication technology with design, art, culture and society, and at the same time places the development of the new mediating technologies in their real every day context of changes in lifestyle, work and leisure.*

*What is needed in the development of the aesthetics of the information and communication technology society is a Scandinavian design that unites a democratic perspective emphasizing open dialogue and active user participation, with the development of edifying cultural experiences and the production of useful, interesting, functional and maybe even beautiful and amusing every day things for ordinary people.*

*What is needed is humanistic and user-oriented education and research that will develop both a critical stance to information and communication technology, and at the same time competence to design, compose, and tell stories using the new mediating technologies.' (Manifesto for a Digital Bauhaus, Ehn 1998)*

In the history of the modern society several grand projects have been launched in attempts to unite the two sides of Enlightenment: the hard (technology and natural sciences) with the soft (values, democracy, art and ethics). One remarkable such project was the Bauhaus. Today, in a digital age, we can witness new attempts to creative and socially useful meetings between 'art' and 'technology'- an emerging 'third culture' as CP Snow formulated the overcoming of the division of the two cultures of the arts and the sciences in *The two cultures and the scientific revolution* (Snow 1959).

In 1997 I was offered the opportunity to participate in such a 'third culture' Bauhaus project building a new university and a school of design focusing on the meeting between art, media and information technology. As director of research for the School of Arts and communication at Malmö University I was given the possibility to

participate in trying to create a proper environment for the emerging discipline of interaction design.

At that time pioneering schools and institutes in the field of interaction design included computer science at Stanford University, computer related design (now interaction design) at Royal College of Art, Domus Academy and the Interactive Telecommunication program at Tisch School of the Arts.

(Today several universities and institutes also have master programs in interaction design and at least the School of Design at Carnegie Mellon University and at the School of Arts and Communication and Malmö University have doctorate programs in the discipline. MIT Media Lab is one of the major research contributors to the field, but newcomers like the Interactive Institute in Sweden and not least the Interaction Design Institute IVREA illustrates that the field is rapidly growing.)

*2.3.1 Educating the Interaction designer*

The bold quotation above comes from the founding vision document, *Manifesto for a Digital Bauhaus* (Ehn 98), for the K3, the School of Arts and Communication at Malmö University in Sweden. At this neo-modernist 'Digital Bauhaus', bachelor programs in material and virtual design, interaction design, media and communication studies and performing arts technology; master programs in interaction design, imagineering (art and technology) and for creative producers as well as a doctorate program in interaction design are combined with studio-based interdisciplinary and cross art research.

The explicit but ambivalent neo-modernist references to the Bauhaus express fundamental challenges to, and contradictions in, the field of design of interactive computational artefacts and to interaction design as a new discipline.

Can and should interaction design studies be shaped into an academic subject? What is the relation between the professional and the scientific? Is information technology in context a technical or a social or even an artistic field of study? And what about ethics and aesthetics if we try to cross boarders between engineering and social sciences as well as between art and technology?

Let me use our own graduate program in interaction design at K3 in a provisional attempt to deal with this dilemma in practice. The program opens up for an orientation towards a design doctorate rather than a traditional PhD degree. Examples indicating this orientation are that:

- the program in general is oriented towards coaching, learning by doing and reflection-on-action,
- focus is on a design oriented synthesis of constructive action and critical reflection and on synthesis of art and technology,
- students have a commitment to design studies but very varied background e.g. computer science, engineering, architecture, product design, interaction design, set design, music, visual art and literature,
- research work is carried out in a production-oriented studio-based interdisciplinary and cross art environment,

- the thesis may take the form of a portfolio of works and a reflective summary,
- form is allowed to follow content, hence the form of the thesis may be an interactive multimedia production.

Such a design orientation of the discipline challenge the role traditionally expected to be played in academic life by theories as explicit, abstract, universal and context independent carriers of knowledge and draw attention to the practice of knowing, to politics, sensuousness, embodiment and particularity.

The kind of support to expect from 'design theory' is not so much in terms of 'scientific theories' for prediction of results of an activity independent of context and situation, but rather support for reflections about conditions for changed human activity. Such 'design theories' are rather practical instruments to support the designer as a reflective practitioner (Schön 1987) to improve his or her competence or design ability to make ethic and aesthetic judgments that are appropriate in their context.

The epistemological basis for such an orientation of graduate interaction design studies may well be found in rethinking the intellectual virtues Aristotle (Aristotle 1985) named *techne* and *phronesis* (see e.g. Macintyre 1981).

*2.3.2 Techne*

*Techne* may well be a corner stone in building a firm platform for a teachable doctrine of interaction design. In techne art and technology are not yet separated. Techne does not separate methods and theories for science and technology, and creativity and freedom for art, but focus on pragmatic, concrete context dependent means-end knowledge oriented towards production. In practice studies are being carried out as shared projects in the interdisciplinary studio-based research environment focusing on learning by doing, coaching rather than teaching and on dialogue of reciprocal reflection-in–action in what Donald Schön called a 'reflective practicum'. Students learn to reflect on their own theories-in-action in the presence of patterns of phenomena of practice (theories on action) as tools for reflection and build up their own repertoire of paradigmatic exemplars.

For interaction design as a practice in between a scientific technological practice and a design-oriented artistic practice the relation between text and artefact in the thesis work becomes potentially contradictory. Is an artefact new knowledge? Are texts the ultimate form for thesis arguments? That artefacts can illustrate textual arguments is not the question, but which are the demands on artefacts if they should be valuable arguments in their own right? This is an essential question to deal with for higher education in interaction design. (For discussion on this dilemma see e.g. *Doctoral education in design – foundations for the future* (Durling and Friedman 2000).

Another related dilemma has to do with the lack of canonical texts and exemplary artefacts. As discussed in the introduction interaction design is a very young and highly interdisciplinary design field with contributions not only from several traditional design fields and

computer science including human computer interaction, but also media studies, performing arts, etc. Beyond introductory readings like the earlier mentioned *Bringing design to software* it is hard to point to an agreed body of canonical texts that all interaction design students should develop a stance to. In a similar way it is neither, as opposed to in for example architecture, obvious which exemplary artefacts to point at in Interaction design. There sure exist well-known interactive artefacts, but not really a discourse around a repertoire of such exemplars.

The booklet *Searching voices – towards a canon for interaction design* (eds. Ehn and Löwgren 2003) addresses this lack of canonical texts. In our doctorate program we asked the students to write essays about interaction design focusing on texts from their native fields in set design, architecture, engineering, literature, media studies etc. This kind of eclectic exchange with other fields is one small step in finding a theoretical home for the discipline. Texts like *The language of new media* (Manovich 2001), *Herzian tales – electronic products, aesthetic experience and critical design* (Dunne, 1999) and *Where the action is - the foundations of embodied interaction* (Dourish 2001) and more general texts by Bruno Latour and Donna Haraway are becoming central points of reference as well as contested terrain in their interaction design discourse.

*2.3.3 Phronesis*

In the Aristotelian virtue of *phronesis* wisdom and artistry as well as art and politics are one. *Phronesis* concerns the competence to know how to exercise judgement in particular cases. It is oriented towards analysis of values and interests in practice, based on a practical value rationality, which is pragmatic, and context dependant. *Phronesis* is experience-based ethics oriented towards action. Hence, *phronesis* is fundamentally not concerned with statements of fact nor prescriptions of what ought to be, but speculative propositions enacted as anxious acts of political love (an expression I have borrowed from *The Fate of Art* by J.M. Bernstein 1992). Students are encouraged to focus on their own hidden politics-in-practice rather than on espoused design philosophy (e.g. socio-technical methods, human relations theory, participatory design procedures, etc.). No one is seen as a naïve neutral technician, independent free artist or simple manipulator in the service of power, but as designers with a humanistic stance recognising the collective and political character of the design process in real cases facing dilemmas like: How do they 'get things done their way'? What tactics and strategies are enacted? How are interventions legitimised technically, ethically and aesthetically (Ehn and Badham, 2002)?

However, the virtue of *phronesis* in interaction design studies is not necessary a question about user centred interaction design. In the contemporary hybrid networks of mind and matter the most important purpose might not be to contribute yet another useful modern digital product, but to critical interpretations taking the form of tangible design proposals. This is the approach to Interaction design taken by Anthony Dunne and Fiona Raby in *Design Noir* (2001). For example by investigating the secret life of electronic products they hope to stimulate debate about the dominant perspective in pervasive or

ubiquitous computing where the consumer or the user is the hero that needs to do everything as fast and easy as possible. Instead they want to provoke reflections about 'design noir', where the user or customer is a kind of anti-hero as in film noir where things not always work out or end happily. Hence, with design noir there is no claim to solve human needs, but to suggest dilemmas, conflicts and ambivalence and to provide narratives where these darker feelings are expressed, explored and acted out. Design noir is not glamorous with great utopias and modern heroes as the Bauhaus, but it still has a humanistic stance and a consciousness about political dilemmas that can take us beyond modern design and challenge both the traditional Bauhäusler and the postmodern designer as the interaction designer of tomorrow.

## 3 BACK TO THE INTERACTION DESIGN CASE

In the introduction to this paper I outlined a case of interaction design where the designers in a design oriented, ethnographically inspired inquiry in open dialogue and close contact with staff and patients at a hospital explored new learning practices supported by computational artefacts. This case can now be reviewed in perspective of the three stops outlined in my own trajectory towards Interaction design with a focus on participation and community and my own background in work-oriented design and participatory design.

In relation to work-oriented and a participatory design approach the case clearly shows a design practice centred around users and democratic dialogue. The design process, as well as the use of design artefacts like mock-ups, games and prototypes, are supported by and can be well understood in a theoretical framework of language-games of design and use.

The case also highlights some interesting aspects with reference to design-oriented studies of information technology in context and the attempt to form a framework for uniting technical, functional and subjective knowledge interests in design of computational artefacts and quality perspectives of control, ethics and aesthetics. Not least is it interesting to notice that, even if social and functional aspect are in focus with the support of the everyday learning practice and procedures at the ward, also technical and aesthetic design judgement are important in the design. Issues of technical control like retrieving films over the local are network via barcodes at a specific place and in a specific learning situation are integrated design questions as well as the ability to make aesthetic judgements for example with regard to designing films that express the professional 'tacit knowledge' of operating a specific artefact at the ward.

With regard to a Digital Bauhaus and the attempt to create an arena for creative and socially useful meetings between 'art' and 'technology' the approach taken by the designers (who have an art school background) has similarities with, and can to some extent be said to be inspired by, Marcel Dushamp's 'redymades' and the technical solution are more of 'bricolage' of existing artefacts and practices than a new technical system. It is especially worth noticing that the arena for this meeting between art and technology is not an exhibition at an art centre, but everyday use of medical equipment at

a hospital. Hence, the idea of a Digital Bauhaus, not only as an aesthetic synthesis of art and technology, but also as a social synthesis between research and politics is underlined and the open dialogue with users and the surrounding society becomes fundamental.

In this perspective the design practice that Erling Bjarki Björgvinsson and Per-Anders Hillgren, as PhD students and interaction designers, enact in their work together with staff and patients at the hospital is essential to the theoretical foundation of Interaction: anxious acts of political love as a reunion of art, technology and politics in the era of ubiquitous computing.

This is not opposed to the need for a more thorough theoretical understanding of the artefacts and the material for Interaction design: the mixed objects, the combination of temporal structures and spatial configurations, the combined interactive narrative and architecture. Nor is it a substitute for more fundamental theoretical reflections about the interplay between and co-construction of artefacts and actors in interaction design. However, I suggest that such participatory practice is fundamental to the theoretical foundation of the collectives of humans and nonhumans we are designing in the name of interaction design.

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