Summary

Interaction, a world of differences
A vision on informatics from the perspective of gender studies

The contents of the research project is presented in six parts.

part 1 Inspiration and Doubt in a Search for the 'Female' in Informatics
part 2 An Interaction Framework
part 3 The Interaction between Use and Design
part 4 Genderstudies, from Object to Subject to Actor
part 5 An Orientation from Objects to Subjects to Actors
part 6 Interaction, a World of Differences; Summary, Conclusions and Recommendations

part 1: Inspiration and Doubt in a Search for the 'Female' in Informatics domain and discipline

In this research project I have discovered how an interaction between the disciplines Informatics and Genderstudies can result in a changed view on the activities: use and design of IT-representations.

The Informatics domain is a world of actors in which IT-representations are designed and used, presented and interpreted. IT-representations are present in this world not only in the form of hardware or software. Methods and theories which are used for designing and making IT-products are representations within this world, too. The Informatics discipline is a part of and an actor in this world of interaction.

research question

My central research question was: "What are the minimal conditions for explicating and making visible the gendering of the Informatics domain and how can femininity be present, visible and changeable in this domain?" This question was actuated by the observation that the number of women who are using IT-representations is growing, though women still do not participate (quantitatively and qualitatively) in the same way as men in Informatics. Women are underrepresented as designers of IT-representations in the Informatics discipline.

genderneutrality and stereotyping

In the Informatics discipline there is little attention for gender aspects. The dominant attitude in Informatics is that its products and its acting are or should be genderneutral. An enriching dialogue between the feminine and the masculine cannot take place because gender is seen as 'outside' the Informatics discipline. Gender itself is recognised just as sets of fixed characteristics of two generalised types of human beings. Female qualities are seen as only useful for the interaction between professionals and users.

the meaning of gender

In my research project gender was conceptualised as a process of meaning construction situated at symbolic, individual and institutional levels of a domain. The meaning of gender is thus embedded in social and cultural constructions and is always dynamically linked to the meaning of many concepts such as technology. Gender is a process in which the meaning of masculinity and femininity are mutually constructed. The performances of gender are the symbols for power relations in a domain. All social activities, practices and structures are influenced by gender. The premise of this research was that gender is not absent from Informatics.

gender research in Informatics is difficult

Answering the research question in the Informatics domain, as well as trying to find conditions and constructions in which the dynamic of gender can be present on all levels of meaning construction processes, is difficult. Because

asking directly for the meaning of the relation between masculinity and femininity in the Informatics domain, is risking a fixation and a re-enforcement of stereotypes and hierarchies. The phenomenon of underrepresentation of women is not simply a question of deficits of women, of removing barriers or of making products more attractive to women. My standpoint was that the underrepresentation of women in the Informatics discipline must have a link with the dominant epistemological and ontological acting and structures within the Informatics discipline. The performance of gender in Informatics might become visible through answers to questions such as: What has been overvalued, what has been undervalued and what has been ignored?

transformation of the research question

Therefore, I took the underrepresentation of women in the Informatics discipline as a symptom for deeper lying phenomena of power which are visible in existing hierarchical binary oppositions in Informatics and I reformulated the central research question into: "What is missing in Informatics if femininity is not present in all possible processes in which meaning is constructed?" "Why did the hard core of methods and theories of the Informatics discipline become a symbol for masculinity and why is femininity constructed as situated only in the discipline's soft border of the interaction with the users of IT-products?"

research strategy deconstruction of hierarchical binary oppositions

Through this transformation my research strategy could be a deconstruction of implicit and explicit binary oppositions linked to gender in the discourse of Informatics. Analysing these kinds of power oppositions could prevent the risk within this research of reducing masculinity and femininity to sexual and biological fixed attributes. Basically I have chosen the oppositions 'use-design' and 'subject-object' as my deconstruction targets.

interdisciplinary research

I have taken Genderstudies to be an interaction partner for this deconstruction assuming the closed core of Informatics might be opened in a confrontation with the epistemological and ontological assumptions of another discipline. Interdisciplinary research is helpful for breaking through the obvious acting within a discipline and can cause change by re-valuing 'the other'. The goal of the interaction between Genderstudies and Informatics was to cause doubts in Informatics and to give doubting a positive meaning as a necessary moment in an interaction for changing the concept of interaction in the Informatics domain.

chosen oppositions

The chosen oppositions, 'use-design' and 'subject-object', function as sources for doubts on the discourse and the acting, methods and theories in Informatics. The meaning of the terms of these oppositions, constructed as a weave of differences and distances, can be traced throughout the discourse of the Informatics discipline and domain. By examining the seams, gaps and contradictions it is possible to disclose a hidden meaning or agenda. Deconstruction uncovers the obvious acting in the past and how it has been established. Identifying the positive valued term, reversing and displacing the dependent term from its negative position will reveal the gendering of this opposition and create a dialogue between the terms in which the difference within the term and the differences between the terms are valued. Thus opening the obvious established discourse can give room for negotiations on possible changes in future acting.

part 2: An Interaction Framework

To facilitate an interdisciplinary interaction between Genderstudies and Informatics I have developed an epistemological and ontological framework for the concept interaction. This framework has functioned as a language in this interdisciplinary research and was necessary because many words have obtained different meanings in the respective traditions of each discipline.

interaction

In this framework the concept 'interaction' is seen as an exchange of representations between actors. Each acting of an actor is a representation of the actor and through acting the world of the actor changes. This exchange of representations is not a simple transmission process from a sender to a receiver. Interaction is a process of constructing meaning through repeated interpretation and representation which is always situated in the interaction itself and depends on the horizons and the backgrounds of the actors and representations involved.

horizon of acting

Any world of interaction has a horizon which can be seen as the potential of all meaning construction processes which can emerge and which will depend on the horizons of the participating actors and the backgrounds of the exchanged representations. A horizon process is a fusion of experiences and expectations of every actor. Through this fusion actors give meaning to the actual exchange of representations.

thrownness and design

A horizon process can be seen as designing a future out of the thrownness of the actor in the world of the actual interaction. Thrownness is the necessity of acting in situations without the time or ability to grasp the full consequences of actions or plans in advance.

experience and learning

Experiences of actors are seen as representations of interactions in the past. Making use of experiences is giving a situated and actual meaning to these representations in the actual interaction. The capacity to do this can be called learning.

obvious acting, habit, routine, doubt, presence, changed acting

Through learning actors develop habits and routines. A habit is acting out of acquaintance with the representations and actors. A routine can be seen as repeated and established acting. Routines are frozen habits which are executed without thinking.
The perception of the actors is always situated in an interaction world. Therefore, the meanings given to actors and representations by an actor rely on the existing meaning constructions. Not all activities or interactions of the actor are present in interaction worlds. If the changes caused by these actings are comparable and compatible with previous changes then they will be perceived as obvious. This kind of interaction will not cause any doubt. Doubt is in this research project perceived as a meaning given to a situation in the interaction which is necessary for the change of meaning and changed acting. The act of doubting is seen as a bridge between the obvious acting and a possible change of habitual acting. Doubt is situated in the interaction. Doubt cannot only occur by the visible in the interaction but also by the invisible. Actors and representations are present in an interaction if they have a potential of creating doubt in the other actors and if they can create a disrupting moment in the interaction.

worlds of open and closed interaction

In open interaction worlds doubts on representations are possible and can be effective in a change of the acting itself and in a change of the results of this acting: the interpretations and representations. In open interaction worlds representations and actors can have such a presence. The 'preferred reading' of representations can be negotiated. There is room between interpretation and representation. Differences and different meaning construction processes are respected. However, changing routine acting is always very difficult because routine does not have much presence in each world of interaction. In closed worlds differences from the dominant meaning and acting are seen as errors, failures and dissidents. Doubt is only seen as a feeling of insecurity and not as necessary prerequisite for change. Domination and ignorance cause the hierarchical opposition between doubt and security.

part 3: The Interaction between Use and Design

The deconstruction has revealed that the binary hierarchical opposition between use and design in Informatics is based on the following:

different worlds

– Use and design are treated as activities in different worlds; a world of senders and a world of receivers, while the IT-products are seen as the exclusive links between these worlds.

design is product oriented

– IT-representations are perceived as the products of a design process if the product is new and innovative in the receiver world whether or not that the process of making is a routine process of applying obvious methods and routines.

use-design and passive-active

The symbolic meaning of use and design is constructed as an opposition in which design is active and virtuous and use is passive and not creative. Designers see themselves and are seen as makers of a better future and working in a straightforward line of progress.

'user friendliness' is 'doubtless'

Designers follow the ideal of making IT-products which cause no disturbances for and fit completely within the expectations of the users. The concept of 'user friendliness' is based on this notion of non-problematic interaction and security of interaction. Good design is defined as making a product for users which should not create disharmony or doubt in the life of the users.

objectivity of values

There is a dominant belief in the objectivity of values. Qualities as 'good', 'innovative', 'friendly', 'secure' and 'reliable' can be measured objectively and their achievement can be planned in advance. The design of IT-products is characterised as decision making, problem solving, optimising, controlling, prescribing and predicting, and therefore have become an activity of displaying power. Through the use of expert languages and methods within the closed interaction world of Informatics the dominance of design over use is established.

the concealing and prevention of design in usage

The dominance of design discloses and mostly prevents the act of discovery of the users by the designer and acts of discovery on the part of the users. Design is focused on generalised and classified users. Users are turned into resources which can be used by makers in the process of making IT-products. Users do not have room for starting their own designing processes. Those who do not fit in pregiven classes are seen as dissidents.

'distant' models of interaction

Design in Informatics is seen as making a product for a remote world, which interaction can be modelled from a distance and without being experienced.

cause of the hierarchy between 'use-design': models of interaction communication

One of the main causes of the hierarchical opposition between use and design is that oversimplified models for interaction and communication are used in Informatics. In models such as the transmission-model and the impulse-response-model there is no room for processes of meaning construction. 'Communication' is defined as the transmission of representations between a sender and a receiver through a neutral channel. Transmissive models of communication do not have 'a message to the message'. The meanings of a message, the role of sender and receiver are fixed and separated. The sender has the active role and the receiver has the passive role. The channel of communication is conceived as neutral. It cannot influence the interaction between sender and receiver. There is no room in the models for negotiation or doubt. Interaction and communication are only defined on a technical and syntactical level but are used on a semantical and pragmatical level to construct planned and closed interaction. The semantical and pragmatical ambiguities which

occur in 'being-in-interaction' are ignored. Ambiguity is seen as troublesome and inconvenient and thus is to be prevented and solved on the technical and syntactical level.

opening to a process oriented view on use and design

The product oriented view is based on the hierarchy and distance between use and design. Deconstruction of the 'use-design' opposition reveals a process oriented view on use and design. In this process oriented view designing can be conceptualised as changing and changed acting, as a projection to future acting. Doubting the obvious use of IT-representations can uncover this projective acting into the future. 'Being-in-interaction' with open IT-representations means that the activities use and design are always intertwined.

mutual actability

Open IT-representations are 'actable' for an actor. Actability is not a condition of the IT-presentation. Mutual actability is a process between an actor and a representation and depends on the presence of an IT-representation for an actor. Mutual actability is the process in which the intertwining process of use and design can be based on doubting the obvious way of interacting and the ready to hand routines of the IT-representation. The intertwining of use and design needs the presence-at-hand of the IT-representations. Their readiness-to-hand should not be fixed.

leavability is the presence between despair and routine

The doubt in acting should be possible but should not lead to desperation or to a forced routine acting. IT-representations can only be present in a world of actors if they cause doubts and if the representation is at the same time 'leavable' and reliable. The use of IT-representations means designing and redesigning a flexible network of interactions between human and non-human actors in which the connections can always be disconnected by the actors involved in the network.
The making of IT-representations, based on theories and methods, is using IT-representations. Using an IT-product is negotiating not only on the content of the product but also on what kinds of actions of the IT-product are suitable for the situation of the actor. This process of intertwining is always individual and situated in the interaction. It depends on the affective disposition and the state of mind of the actor. The acting and interacting of people will be influenced by the acting of the IT-representations which are made ready. Processes of negotiation and constructing are necessary not only with the contents of the representations but also with the behaviour and memory of IT-representations to make the range between desperation and obvious acting, leavable, useful and reliable. IT-representations have a presence of leavability if representations allow the user to use the IT-representations as a routine but also give the users the opportunity of learning in which kind of situations the IT-representations are adequate and in which situations the IT-representations should be abandoned. Therefore, the ways of interaction of IT-representations should be as diverse as possible and the presentation of the behaviour of the IT-representations should not be to determine the acting of the users.

closed readiness is an unreachable ideal

Translations and replacements of IT-representations do not need to fit smoothly without conflict into the world in which they are made ready for. A closed readiness is an ideal which is not feasible because in the interaction situation the acting itself is ad-hoc and, therefore, cannot be predictable. The ready-made behaviour and the content of IT-representations should be differentiated and changeable to enable users to make IT-representations ready and reliable for their own use. Users should design their own future by repeatedly giving meaning to IT-representations.

the gendering of 'use-design'

The hierarchical opposition 'use-design' is gendered on the symbolic level and is linked to other oppositions such as technical-human, hard-soft, secure-doubtful. These symbolic links are established and re-enforced through the military, mathematical and technological traditions of the Informatics discipline and through concepts of female Informatics based on essentialist and deterministic views on femininity and technology.

destabilisation of the gender matrix of oppositions

Strategies destabilising this matrix of links are not easily found and executed for female IT-professionals. To say yes to the established horizon of the Informatics discipline means to lose the potential of doubt because socialisation demands a commitment to the practices of the discipline. To say no means to reinforce the link between the technical-social and the male-female oppositions. A forced socialisation of women into the Informatics discipline will not change its methods or assumptions. Giving the responsibility of changing Informatics to women by means of the incorporation of human and ethical aspects or by taking it as a necessary condition for involving more women is based on the stereotyping of the sexes and will only freeze the binary oppositions. Design strategies such as Prototyping or Participatory Design are not sufficient for disconnecting the dominance of design over use, if there is not a displacement of the binary opposition of use and design and of a changed meaning on their relation. The relation of design and use is basically interactive.

living in borderland

To ignore IT-products is impossible. Therefore one should be pragmatic and live on the borders between the binary oppositions, recognising that these borders cannot be found at the border of the discipline but only within the discipline itself. Through living on the borders women can cultivate an erotic relation to IT-representations, feeling attraction and antipathy simultaneously. In that relation women can blow up the separation of use and design, and intertwine use and design through doubting the ready-made interactions. Through the creation of an opening in this cleared room between use and design processes of intertwining use and design and of changing the (inter)acting (re)presentations can be started.

part 4: Genderstudies, from Object to Subject to Actor

To build the interdisciplinary bridge I analysed the discourse in Genderstudies on 'subject-object' relations, 'subjectivity-objectivity', and possible constructions of truth and reality in three main feminist tendencies toward generating new theories of knowledge: feminist empiricism, feminist standpoint theory, and feminist postmodernism. These three tendencies have in common that they reject the claim of universal truths; truths are always particular and situated.

transformative critical room

The concept of a 'transformative critical room' as a place of negotiation between interpretation and representation is found useful for the construction of mutual actability. In rooms in which differences are present, truth can be seen as an ongoing conversation and a process of disclosure and not as correspondence to reality. Truth is then mere a construction of actors being in interaction.

part 5: An Orientation from Objects to Subjects to Actors

I have analysed the 'subject-object' relations in Informatics by applying the critical views developed in Genderstudies on the object oriented approach (OO). OO is used in Informatics as a method for interpretation and representation, especially for analysing worlds of interaction, representing design models and the realisation of hard- and software.

colonisation of the analysis process

One of the most dominant ideas in software engineering is the production of unambiguous software with mastered complexity. Based on the same ideas of

controlling complexity and reducing ambiguity within software, software engineers master the complexity and ambiguity of the real world. With the abstraction tools such as classification and division they have colonised real world analysis processes. This colonisation from system realisation into world analysis is dictated by the fear of the analysing subject for meeting the complexity and ambiguity by selecting the most formalised documents, texts, tables, schemes in the domain etc. which are close to the syntax of the object oriented language and by transforming the natural language into a model of elementary propositions. This colonisation causes hierarchical structures and planned behaviour to be enlightened and ad hoc actions and interactions to be darkened.

OO as example of assumptions

This use of OO in Informatics is exemplary for the ontological and epistemological assumptions in the Informatics discipline: not only is it possible to handle the facts but also to handle and therefore control behaviour itself. The users of the object oriented approach suggest very heavily that OO can objectively represent the total dynamics of reality by creating OBJECTs; artificial representations.

critique on 'objectivity'

Feminist theories can give arguments for doubting the assumptions within the OO approach because they are always based on the same illusions of objectivity and neutrality of representation, the negation of power and dominance by its translation into 'natural and obvious' and the existence of truth by its transformation into progress, which has classified women and femininity as unitary and subordinated in opposition to man and masculinity. The object oriented approach is seen as the right language for naming humans, things, the objects of reality, and the OBJECTs with the same words. This naming is supposed to be the objective and unambiguous translation from reality into analysis results and from the design model into realisation. In OO the significant oppositions are: the formal and the informal, the predictable and the unexpected and last but not least the OBJECT and the human.

ontological and epistemological assumptions

The 'subject-object' relation in OO is very typical for the ontological and epistemological assumption in the Informatics discipline:

– Everybody has the same preferred way of ordering the world and the world can be seen within one metastructure. Within OO the metastructure is "a world divided in OBJECTs with a stimulus-response co-operation and an encapsulated self". The world can be classified by recognising the similarities between objects and interactions and ignoring for the time being the differences.
– Observing subjects can and should act as persons without body and horizon. Subjects are substitutable.
– Everything and everybody can be represented in terms of OBJECTs. There is no fundamental difference between people or things.
– Change is a logical process of action and reaction.
– There exists a common language in which all people (who are affected by software) can understand each other. OO is presented as a language very close to that ideal.
– Every perceived object has a structure which is independent of the observing subject. OO is but a mirror helping the subject to discern and represent that structure objectively.
– Truth is based on the assumption that the real world is structured orderly and that we can represent the world objectively independent of the observer's appreciation.
– Subjects apply a correspondence view of reality. A model is 'true' if it accurately depicts the underlying reality of the universe of discourse. Different opinions are a reflection of human error and can be eliminated. In the

correspondence view the meaning construction process is reduced to the selection of relevant aspects of an object. The OBJECT has the same meaning as the original object if the structure of the OBJECT and the structure of the object are the same. Assuming that there can be no misunderstanding between subjects which represent and subjects which will perceive those representations.
– It is assumed that if the constructed software has the same structure as reality then this artefact has the potential to equally fit in the world of software engineers as in the world of users. The users likewise will understand each OBJECT in the meaning of mastery and possession and will emphasize its structure as natural.

conclusions:
OO is not suitable for the analysis of social worlds

The conclusion of the confrontation of OO with Genderstudies is that OO is not suitable for analysing human worlds. Diversity can only be constructed by specialisation out of a predetermined similarity. Differences are mostly neglected and are only opposite to equal. An object can only be represented as a member of an OBJECT class. The class concept fails to represent a social process. A group of humans can only be an aggregated class with a harmonious and planned co-ordination structure. A group can only exist if it has planned transitions and a fixed goal. The social processes of grouping cannot be represented.

the 'change of change' is zero

Changes in an interaction process can only be represented as sets of states and sets of transitions between these states. They can only occur when the conditions in the environment comply with prescriptive rules. The 'change of change' is zero. This is consistent with the correspondence view, it closes it of. There is no need for meaning construction processes in OO because they cannot exist within its ontology.

strategies of coping with OO

We, therefore, have to leave OO and use it only for the purpose it was meant for: the realisation of software. Realised OO software which consists of predictable and planned interaction, cannot be the base of the representation of humans because otherwise we would turn humans into an available resource which can be ordered repeatedly.
A total rejection of OO cannot be the answer to the doubts. The presence of OO products enforces the disclosure of what OO has hidden. In OO ambiguity and doubt are only hidden, they are not absent. Human actors have to design the way they want to use OO. In Genderstudies there are a lot of opportunities given to change the 'subject-object' relation.
So OBJECTs are neither (re)presentations of humans nor equal to humans. OBJECTs are ROLEs in a play or OBJECTs are things to use and integrate in acting. People (users and designers) are the authors and directors creating the play.

part 6: Interaction a World of Differences
– the missing

By deconstructing the 'use-design' opposition and the 'subject-object' relation in Informatics I have discovered that the 'subject-position' and design as a changing activity focused on an openness of the future, has vanished in the Informatics discipline. In the process of making IT-representations professionals are not designing, they are using methods and theories. They focus on security, non-ambiguity and are afraid of the complex and the unpredictable. Meaning construction processes have disappeared in processes of doubtless translation. These usage practices of professionals are reflected in the IT-products ready-made for users. Users are not given enough opportunities to intertwine use and design. They are not subjects but mere objects (OBJECTs) in the representation. The room for mutual actability of IT-representations has become very small between forced routine and despair.

– the recommendation

My recommendation for the Informatics discipline is: The enclosure and the repair of a variation of 'transformative critical rooms' which were closed in the past. These 'rooms' should be opened and redecorated with differences.

– the constructions

In my research project I have started this process of opening through examples of constructions of such critical rooms. The examples I have developed are:
– conceptualisation of analysis as an ongoing conversation on vision instead of solving problems,
– rewriting the ontology of the OO-approach to make it possible to look at OO-realisations as plays of artificial actors directed by users,
– integrating doubt on the IT-methods and -theories in the IT-education by an interdisciplinary approach.

– the conditions

Transformative critical rooms are in my opinion the necessary conditions for making the gendering of the Informatics domain visible and present and allowing for a symmetrical dialogue between the female and the male in which differences can continue to exist. My answer to the research question is not a closed solution. It is the designing behaviour of women and men which can vivify the differences in future worlds of interactions.