

Setting the Stage for Design as Action

- artifacts for participatory design in theory and practice

by Pelle Ehn



Pelle Ehn
Lund University, Lund

In this article the author presents a participatory perspective on design and suggests a new role for the designer. The perspective is based on the idea of understanding design as a new language game shared by users and designers. He emphasizes the importance conditions for communication, practical skill and creativity in the design process. A dialectic between tradition and transcendence is seen as fundamental to design.

IN SCANDINAVIA we have for two decades in research been concerned with *participation and skill* in design and use of computer artifacts. This paper is a theoretical reflection of that practice of participatory design. Is there a kind of family resemblance between design theory and practice of architecture, and the art and science of designing computer artifacts? From the point of view of designing computer artifacts the mature art and science of architecture has no doubt been most influential. The aim of this paper is, based on experience from designing computer artifacts, to explore the possibilities of a research and design dialogue between the different design cultures. In summary I have come to take the following position:¹

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

- By understanding design as a process of creating new design practices that have family resemblance with the daily practices of both users and designers we have an orientation for really doing 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 practices is a new role for the designer. Hence, the creative designer is concerned with the practice of the users in organizing the design process, understanding that every new design practice is a unique situated design experience. There is, however, paradoxically as it may sound, no requirements that the design practice make the same sense to users and designers, only that the designer sets the stage for a design practice so that participation make sense to all participants.

- Practical understanding is a type of skill that should be taken seriously in a design practice, 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 behavior, 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.

- Traditional “systems descriptions” are not sufficient in a skill based participatory design approach. Design artifacts should not primarily be seen as means for creating true ‘pictures of reality’, but as means to help users and the designers to discuss and experience current situations and envision future ones.

- No matter how much influence participation in principle may give, our design practices must transcend the boredom of traditional design meetings if the design work is to be a meaningful and involving activity for all participants. Hence, formal democratic and participatory procedures for designing computer artifacts for democracy at work are not sufficient. Our design practices must also be organized 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.

- A concerned approach for setting the stage for shared design practices using involving design artifacts make it possible for ordinary users to express their practical competence when participating in the design process. With “design-by-playing” approaches like the use of organizational games we as designers can make useful interventions into the social interaction and social construction of an organizational reality. With “design-by-doing” approaches like the use of mock-ups and other prototyping design artifacts we can make it possible for users to get practical “hands-on” experiences of the technology under development.

Background:

Rethinking systems descriptions

A few years ago I was struck by something I had not “seen” before. Focusing on how perspectives

make us select certain aspects of “reality” as important in a description, I had completely overseen my own presumption that descriptions in one way or another are “mirror-images” of “reality”. On the ground of differences in interests in participatory design I questioned the objectivity in understanding design as a process of rational decision-making. Hence, I argued the importance of making descriptions from different perspectives to get a more “true” picture. But I did not question the Cartesian epistemology and ontology of an inner-world of experiences (mind) and, an outer-world of objects, and language as our way of mirroring this outer-world of real objects. Focusing on which objects and which relations that should be represented in a systems description I took for granted the Cartesian mind body dualism which Wittgenstein so convincingly had rejected in *Philosophical Investigations*.² Hence, though my purpose was the opposite, the subjectivity of craft, artistry, passion, love and care were rendered invisible in the “descriptions” by my perspective.³

I guess the reason that I now was stuck by my philosophical assumptions of rationalistic reasoning as epistemology and dualism as ontology had to do with our experiences from the UTOPIA project. The UTOPIA project was based on the idea of designing *tools and environments for skilled work and good use quality products and services*. To try out the ideas in practice, the project was, in 1981, started in cooperation between the Nordic Graphic Workers’ Union and researchers in Sweden and Denmark with experiences of participatory design projects. It was a research project on user oriented design of, and training in, computer technology and work organization, especially page make-up and image processing in the newspaper industries. (In the Scandinavian languages UTOPIA is an acronym for Training, Technology, and Products from a Quality of Work Perspective).⁴

The strategy we had chosen meant cooperation with the ultimate users of the design, i. e. graphic workers. To begin with, requirement specifications and systems descriptions were based on

traditional methods like interviews, and based on them graphical systems descriptions of existing and future systems. This was not very successful. However, the situation improved among other circumstances with the following:

- we started to understand traditional tools as a design ideal for computer artifacts – the design of tools for skilled work;
- we made joint visits (designers and graphic workers together) to interesting plants (and discussed with users there), trade shows, vendors, etc.;
- we dedicated considerable time for learning from each other: designers about graphic work, and graphic workers about design;
- we started to use design-by-doing-and-playing artifacts related to the language of graphic work, i. e. mock-ups, work organization games etc.

This can be understood by two Wittgensteinian lessons that not had struck us before.

Earlier we oversaw the Wittgensteinian lesson that, as Peter Winch has put it, “a cook is not a man who first has a vision of a pie and then tries to make it, he is a man skilled in cookery, and both his projects and his achievements spring from that skill.”⁵ The fundamental question of skill in design was confused.

We had in practice also overseen the fundamental Wittgensteinian lesson that what a picture describes is determined by its use. The role of descriptions as design artifacts was confused.

Below I will illustrate how our “new” UTOPIAN design approach may be understood from a Wittgensteinian position, i. e. why design-by-doing-and-playing and a skill based participatory design process works. More generally, I will argue that the role of “design artifacts” (models, prototypes, mock-ups, descriptions, representations, etc.) in the design process is as *reminders* and as *paradigm cases* for our reflections of future computer artifacts and their use. The use of *design artifacts* brings earlier experiences to our mind. It is in this meaning we should understand them as *representations*.

But first a few words on *practice*, the alternative point of departure as compared with the “picture theory of reality”.

Practice is reality

To replace the picture theory of reality, *practice as the social construction of reality* is a strong candidate. In short this is what I understand as practice: Practice is our everyday practical activity. Practice is ontological. It is the human form of life. It is more fundamental than subject-object relations. In practice we produce the world, both the world of objects and our knowledge about this world. Practice is both action and reflection. But practice is also a social activity. As such it is being produced co-operatively with others. To share practice is also to share understanding of the world with others. However, this production of the world and our understanding of it takes place in an already existing world. It is the product of former practice. Hence, as part of practice, knowledge has to be understood socially – as producing or reproducing social processes and structures as well as being the product of them.⁶

With this background we can understand design of computer applications as a concerned social and historical activity in which artifacts and their use are envisioned, an activity and form of knowledge that is both planned and creative, and that deals with the contradiction between tradition and transcendence.

Once struck by the “naive” Cartesian presumptions of a picture theory, what can be gained in design by shifting focus from *correctness of descriptions* to *intervention into practice*? What does it mean to take the position that what a picture describes is determined by its use? Most importantly there seems to be an opening for understanding the crucial role of skill and participation in design, and in practical design to transcend some of the limits of formalization by the use of more action oriented design artifacts.

Language-games

To use language is to participate in *language-games*, the Wittgensteinian notion of practice. In

discussing how we in practice follow (and sometimes break) rules as a social activity Wittgenstein asks us to think of games, how they are made up and played. Why games?

We often think of games in terms of a playful, pleasurable engagement. I do not think that this aspect should be totally denied, but a more important aspect of the games children play is that they are most concerned activities, as are most of the common language-games we play in our ordinary language. Even professional language-games of e. g. systems designers, architects or typographers, complicated as they may be, are grounded in our everyday ordinary language.

We do not understand what counts as a game because we have an explicit definition, but because we are already familiar with other games. There is a kind of *family resemblance* between games. Similarly, professional language-games can be learned and understood because of their family resemblance with other language-games which we know how to play.

Language-games, like the games we play as children, are social activities. To be able to play these games we have to learn to follow rules, rules that are socially created, but far from always explicitly existing. The rule-following behavior of being able to play *together with others* is more fundamental to a game than explicit regulative rules. Playing is interaction and cooperation. It is inter-subjective practice. To follow the rules in practice means to be able to act in a way that others in the game can understand. These rules are “embedded” in a given practice from which they cannot be distinguished. They are this practice. To know them is to “embody” them, to be able to practically apply them to a principally open class of cases.

Language-games are performed both as speech acts and as other activities, as practice with “embodied” meaning within societal and cultural institutional frameworks. To be able to participate in the practice of a specific language-game one has to share the *form of life* within which that practice is possible. This form of life includes

our natural history as well as the social institutions and traditions we are born into. This is prior to agreed social conventions and rational reasoning. Hence inter-subjective consensus is more a question of shared background and language than of stated opinions. Language as a means of communication requires agreement not only in definitions, but also in judgements.⁷

This seems to make us prisoners of language and tradition, which is not really the case. Being socially created, the rules of language-games, as those of other games, can also be altered.

There are, according to Wittgenstein, even games in which we make up and alter the rules according to which we play, as we go along.⁸ Think of design and future use as language-games. The very idea with the interventionistic design language-game is to change the rules of the language-game of use in a proper way. We change the rules as we go along.

The idea of language-games entails and emphasis how we linguistically discover and construct our world. However, language is understood as our use of it, as our social, historic, and inter-subjective application of linguistic artifacts. As I see it, this is not a neglect of how we also come to understand the world by use of other artifacts.

Artifacts and objects also play a fundamental role in a given language-game. A hammer is in itself a sign of what you can do with it in a certain language-game. And so is a computer artifact. These signs remind you of what you can do with it. In this light, an important aspect in the design of computer artifacts is that its signs remind the users of what they can do with the computer artifact in the language-games of use. Just as a hammer does.⁹ The success of “what-you-see-is-what-you-get” and “direct manipulation” user interfaces has not to do with that they mirror reality in a more natural way, but that they provide better reminders of, and have a family resemblance with, the users earlier experiences.¹⁰ This is also, as will be discussed below, the case with artifacts that we use in the design process.

Knowledge and design artifacts

As designers we are involved in reforming practice, in our case typically computer artifacts and the way people use them. Hence, the language-games of design changes the rules for other language-games – those of use of the artifacts. What are the conditions for this interplay and change?

A common assumption behind most design approaches seems to be that the users must be able to give complete explicit descriptions of their demands. Hence, the emphasis is on methods to support this elucidation by means of requirement specifications, system descriptions etc.¹¹

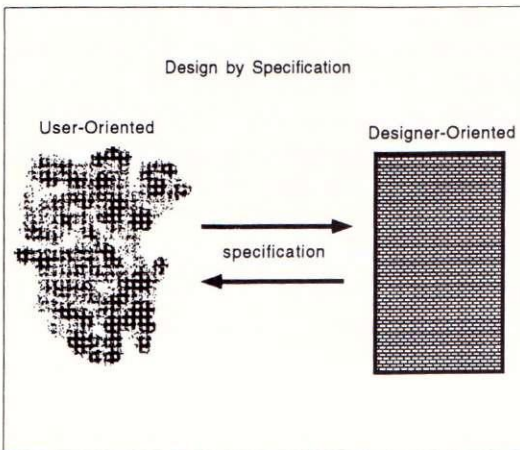
In a Wittgensteinian approach, focus is not on the “correctness” of systems descriptions in design, on how well they mirror the desires in the mind of the users, or on how “correctly” they describe existing and future artifacts and their use. Systems descriptions are *design artifacts*, typically linguistic artifacts. The crucial question is how we use them, what role they play in the design process.

The rejection of emphasis on “correctness” of descriptions is especially noteworthy: In this we are advised by the author of the perhaps once

strongest arguments for a picture theory and the Cartesian approach to design – the young Wittgenstein in *Tractatus Logico-Philosophicus*.¹² A reason for this rejection is the fundamental role of practical knowledge and creative rule following in language-games.

Nevertheless, we know that systems descriptions are useful in the the language-game of design. The new orientation suggested in a Wittgensteinian approach is that we, as mentioned, see these linguistic artifacts as a special kind of artifacts that we refer to as “typical examples” or “paradigm cases” when we describe something, or when we “inform” each other. That does not, however, make them models in the meaning of Cartesian mirror-images of reality.¹³ In the language-game of design we use these artifacts as reminders and as paradigm cases for our reflections on future computer artifacts and their use. The use of design artifacts brings earlier experiences to our mind and it “bends” our way of thinking of the past and the future. I think that this is how we should understand them as *re-presentations*. And this is how they “inform” our practice. If they are good design artifacts, they support good moves within a specific design language-game. The meaning of a design artifact is its use in a design language-game, not how it “mirrors reality”. Important aspects are what kind of experience they represent, e. g. by having a family resemblance with artifacts that the participants use in their everyday work activity. Here is a hint to why the breakthrough in the UTOPIA project was related to the use of design artifacts like prototypes and mock-ups. The point is that, since design artifacts understood as reminders or paradigm cases do not linguistically mirror a given or future practice, they can even be *experienced* beyond language, e.g. as practical use of a prototype or mock-up, an experience that can be further reflected upon in the language-games of design in ordinary language or in an artificial one.

A good example from the UTOPIA project is an empty cardboard box with “desktop laser printer” written on the top. There is no functio-



Design by specification.

The traditional approach to design. Two or more language-games or communities-of-practice fundamentally related via requirement specifications. A fundamental competence of the designer is supposed to be the ability to formulate complete and correct systems descriptions.

nality in this mock-up. Still it works very well in the design game of envisioning the future work of make-up staff. It reminded the participating typographers of the old “proof-machine” they used to work with in led technology. At the same time it suggested that with the help of new technology the old proof-machine could be re-invented and enhanced.

This design language-game was played in 1982. At that time desktop laser printers only existed in the advanced research laboratories, and certainly typographers had never heard of them. To them the idea of a cheap laser printer was “unreal”. It was our responsibility as professional designers to be aware of such future possibilities, and to suggest them to the users. It was also our role to suggest this technical and organizational solution in such a way that the users could experience and envision what it would mean in their practical work, before too much time, money and development work were invested. Hence, the design game with the mock-up laser printer. The mock-up made sense to all participants – users *and* designers.¹⁴

This focus on non-linguistic design artifacts is not a rejection of the importance of linguistic ones. Understood as triggers for our imagination rather than as mirror-images of reality, they may well be our most wonderful human inventions. The narrative aspect of design artifacts is a challenge to tell stories that make sense to all participants.

Rule following and tradition

Now to the paradox of rule following behavior. As mentioned, many rules that we follow in practice are scarcely to be distinguished from the behavior in which we perform them. We do not know that we have followed a rule until we have done it. The most important rules we follow in skilful performance defies formalization, but we still understand them. As Michael Polanyi, the philosopher of tacit knowledge, has put it: “It is pathetic to watch the endless efforts – equipped with microscopy and chemistry, with mathematics and electronics – to reproduce a single

violin of the kind the half-literate Stradivarius turned out as a matter of routine more than 200 years ago.”¹⁵ *This is the traditional aspect of human rule following behavior.* Polanyi points out that our perhaps most widely recognized explicit rule based system – the practice of Common Law – also uses earlier examples as paradigm cases. “This procedure recognizes the principle of all traditionalism that practical wisdom is more truly embodied in action than expressed in the rules of action.”¹⁶ According to Polanyi this is also true for science, no matter how rationalistic and explicit it claims to be, the point being that, “while *the articulate contents of science* are successfully taught all over the world in hundreds of new universities, *the unspecified art of scientific research* has not yet penetrated to many of these.”¹⁷ The art of scientific research defies complete formalization; it must partly be learned by examples from a master whose behavior one trusts.

The suggestion to actively include skilled users in the design of new computer artifacts, when their old tools and working habits are redesigned, can hardly be given better illustrations. After all, few social activities have been under such pressure of formalization as Law and Science, and still they are heavily dependent on practical experience and paradigm cases. Why should we expect other social institutions that have been under less pressure of formalization to be less based on practical experience, paradigm cases and tacit knowledge?

Rule following and transcendence

In rule following behavior there is also the aspect of *creative transcendence of traditional behavior.* Again, this is what is typical of skilful human behavior, and exactly what defies precise formalization. By mastery of the rules comes the freedom to extend them. This *creativity* depends on the Wittgensteinian emphasis on the open-textured character of rule-following behavior. To begin with, we learn to follow a rule as a kind of dressage, but in the end we do it as creative activity.¹⁸ To be able to follow a rule is to have

learned how to in practice continue an example we have been given. Mastery of the rules puts us in a position to invent new ways of carrying on. As the Wittgenstein expert Alan Janik has put it: "there is always and ineliminably the possibility that we can follow the rule in a wholly unforeseen way. This could not happen if we had to have an explicit rule to go on from the start"¹⁹, and he goes on arguing that "the possibility of radical innovation is, however, the logical limit of description. This is what tacit knowledge is all about."²⁰ An this is epistemologically why there should be strong focus on skill both in design and in use of computer artifacts. We focus on traditional skill, not at the cost of creative transcendence, but as a necessary condition for it.

But what is the role of "new" external ideas and experiences in design? How are tradition and transcendence united in a Wittgensteinian approach. Could it for example mean utilizing something like Berthold Brecht's theatrical *Verfremdungseffekt* to highlight transcendental untried possibilities in everyday practice by presenting a well-known practice in a new light? Yes, similar design artifacts and methods may be applied in a Wittgensteinian approach, since "the aspects of things that are most important to us are hidden because of their simplicity and familiarity". However, as Peter Winch put it, in a Wittgensteinian approach: "the only legitimate use of such a *Verfremdungseffekt* is to draw attention to the familiar and obvious, not to show that it is *dispensable* from our understanding."²¹

Design artifacts, linguistic or not, may in a Wittgensteinian approach certainly be used to break down traditional understanding, but they must make sense in the users' ordinary language-games. If the design artifacts are good, it is because they help users and designers to see new aspects of an already well known practice, not because they convey revolutionary ideas. In fact, this focus on traditional skill in interplay with design skill may be a hindrance to really revolutionary designs. Put another way: Which traditional skill, and hence which potential users, that are to participate in a design language-game is

not a given fact. Few designs, however, are really revolutionary, and for normal everyday reformistic design situations the participation of traditionally skilled users should be most rewarding in terms of quality of the product.

Hence, the contradiction between tradition and transcendence seems to be fundamental to design. There can be focus on tradition or transcendence in the *artifacts* to be used. Should a word processor be designed as a traditional typewriter or as something totally new? Another dimension is *professional competence*. Should the "old" skills of typographers be what is designed for or should new knowledge replace these skills in future use? Along the same dimension we have *division of labour and cooperation*? Should the new design support the traditional organization in a composing room or suggest new ways of cooperation between typographers and journalists? There is also the contradiction between tradition and transcendence in the *goods or services* to be produced. Should the design support the traditional graphical production or completely new services like in desktop publishing? Tradition *and* transcendence, that is the dialectical foundation of design.

Design-by-doing-and-playing - new "rules of the game"

What do we as designers have to do to qualify as participants in the language-games of the users? What do users have to learn to qualify as participants in the language-game of design? And which means can we develop in design to facilitate these learning processes?

If designers and users share the same form of life it should be possible to overcome the gap between the different language-games. It should at least in principle be possible to develop the practice of design so that there is enough family resemblance between a specific language-game of design and the language-games the design of the computer artifact is intervening in. A mediation should be possible.

But what are the conditions for this "if"? To Wittgenstein it makes no sense to ask questions

beyond a given form of life. In a famous quotation he says that "if a lion could talk, we could not understand him."²² In the arguments below, I have assumed that the conditions for a common form of life are possible to create, that the lions and sheep of industrial life can live together. This is more of a normative stand-point of how design ought to be, a democratic hope rather than a reflection over general political conditions for its realization.²³

To possess the competence required to participate in a language-game requires a lot of learning within that practice. But in the beginning all you can understand, is what you have already understood in another language-game. You understand because of the family resemblance between the two language-games.

What kind of design artifacts may be applied to support this interplay between language-games, and to make this mediation from the one to the other possible? I think that what we in the UTOPIA project called a *design-by-doing-and-playing* approach, e. g. the use of prototyping, mock-ups, scenarios etc., are good examples.

The language-games played in design-by-doing-and-playing can be viewed both from the point of view of the users and of the designers. This kind of design becomes a language-game in which the users learn about possibilities and constraints of new computer artifacts that may become part of their ordinary language-games. The designers become the teachers that teach the users how to participate in this particular language-game of design. In order to set up these kind of language-games the designers have to learn from the users.

However, paradoxical as it sounds, users and designers do not really have to understand each other in playing language-games of design-by-doing together. Participation in a language-game of design and the use of design artifacts can make *constructive but different sense*, to users and designers. Wittgenstein notes that "when children play at trains their game is connected with their knowledge of trains. It would nevertheless be possible for the children of a tribe unacquainted

with trains to learn this game from others, and to play it without knowing that it was copied from anything. One might say that the game did not make the same *sense* as to us."²⁴ As long as the language-game of design is not a nonsense activity to any participant, but a shared activity for better understanding and good design, mutual understanding is desired but not really required.

User participation and skill

The users can participate in the language-game of design, because the design artifacts applied give their design activities a family resemblance with the language-games that they play in ordinary use situations. An example from the UTOPIA project is a typographer sitting at a mock-up of a future workstation for page make-up, actually doing make-up on the simulated future computer artifact.²⁵

The family resemblance is only one aspect of the methods. The other is what can be expressed. I think that it is reasonable to say that in design-by-doing-and playing the user will be able express both propositional knowledge and practical understanding. Not only could e. g. the typographer working at the mock-up tell that the screen should be bigger because then it would be possible to show a full spread, something which is important in page make-up. He could also show what he meant by "cropping a picture", by actually doing it, as he said it. It was also possible for him to express practical understanding in the sense of sensuous knowledge by familiarity. He could e. g. while working at the mock-up, express the fact that when the artifact is designed one way he can get a good balanced page, but not, when it is designed another way.

Designer participation and skill

For us as designers it was possible to express both propositional knowledge and practical understanding about design and computer artifacts. Not only could we express propositional knowledge like "design-by-doing-and-playing design artifacts have many advantages as compared with traditional systems descriptions" or "bit-

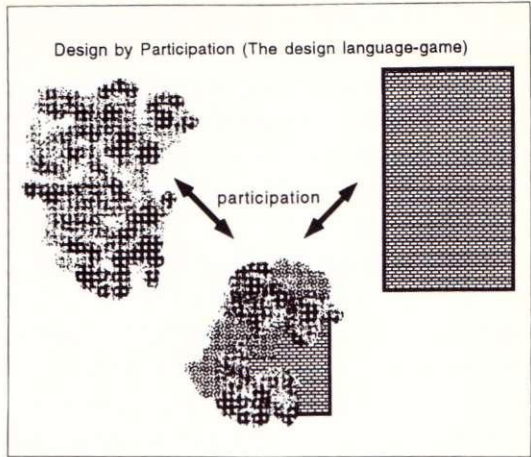
map displays bigger than 22 inch and with a resolution of more than 2 000 * 2 000 pixels are very expensive". In the language-game of design-by-doing-and-playing we could also express practical understanding of technical constraints and possibilities by "implementing" them in the mock-up, prototype, simulation, experimental situation etc. Not least simulations of the user interface, the sign aspect of the future artifacts discussed above, the reminders of what they are for were important in this language-game of design.

However, as designers, our practical understanding will most of all be expressed as *the ability to construct specific language-games of design in such a way that the users can develop their understanding of future use by participating in design processes.*

There is, however, as mentioned above, another important aspect of language-games: We make up the rules as we go along. To assist in such transcendental rule breaking activities should be an important competence of a skilled designer. Perhaps, this is the artistic competence a good designer needs?

I have argued that in design-by-doing-and-playing language-games users can express both propositional knowledge and practical knowledge. From both these kinds of activities there is much that will prove useful in the design process for the designers. But it should be observed that most of the practices that can be learned are examples of correct and incorrect moves in the language-game of use, not formal descriptions of this practice.

However, in language-games of design based on participation and design-by-doing, much can also be learned from the users by the practice that is shared in the design activity. To take some examples from the UTOPIA project, activities such as joint visits to work places, with situations in some aspects similar to the ones being designed for, may be a kind of "design artifact" from which both designers and users can learn and create the language-game of the specific design they both are involved in. To really learn the



Design by participation.

New rules of the design language-game. Two or more language-games or communities-of-practice fundamentally related via shared experiences in a common design language-game which has a family 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.

language-game of the use activity by fully participating in that language-game is of course an even more radical attempt by the designer. Less radical but perhaps more practical would be that we as designers concentrate our design activity to just a few language-games of use, and for them develop a practical understanding of useful specific language-games of design.²⁶ Finally, there seems to be a new and fundamental role for the designer as the one who sets the stage for a shared design language-game that makes sense to all participants – designers *and* users.

Beyond the boredom of design

Given the Scandinavian societal, historical and cultural setting skill based participatory design is associated with the democracy aspect of design. In this paper some ideas inspired by Ludwig Wittgenstein's philosophical investigations was applied to the everyday practice of skill based participatory design in search for a theoretical foundation. Practical understanding and family resemblance between language-games

became fundamental concepts for participatory design.

The concept language-games gives, however, also associations to a playful activity, but which are the practical conditions for such pleasurable engagement in design? Is the right to democratic participation enough?

In fact, the experiences from our participatory design projects indicates that most users find design work *boring*, sometimes so little engaging that they stop participating. This problem is not unique for the Scandinavian participatory design tradition. It has for example been addressed by by Russell Ackoff. He has concluded that for participation in design to be successful it requires that: it makes a difference for the participants; implementation of the results are likely; it is fun to participate.²⁷

The two first points concern the political side of participation in design, the users must have a guarantee that their design efforts are taken

seriously. The last point concerns the design process. No matter how much influence participation may give, it has to transcend the boredom of traditional design meetings to really support design as meaningful and involved action. The design work should be treated as a play. In our own later projects we have tried to take this challenge seriously and integrated the use of future workshops, metaphorical design, role playing and organizational game into work-oriented design.²⁸

Hence, as a last reminder from Scandinavian participatory design of computer artifacts it should be stated that formal democratic and participatory procedures for designing computer artifacts for democracy at work are not sufficient. Our design language-games must also be organized 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.

Footnotes

1. This perspective on participatory design was first outlined and documented in Ehn, P.: *Work-Oriented Design of Computer Artifacts*, Almqvist & Wiksell International, Falköping 1988, and Lawrence Erlbaum 1989. Later on the practical implications have been further developed in the chapters, Ehn, P. & Kyng, M.: "Cardboard Computers – Mocking-it-up or Hands-on the Future" and Ehn, P. & Sjögren, D.: "From Systems Descriptions to Scripts for Action" in Greenbaum, J. & Kyng, K. (eds): *Design at Work*, Lawrence Erlbaum, 1991. This paper is based on these books.
2. Wittgenstein, L.: *Philosophical Investigations*, Basil Blackwell & Mott, Oxford 1953.
3. By the way, it is not by accident that especially female philosophers have focused on the need to rethink Cartesian philosophy. In *Reflections on Gender and Science*, Yale University Press, New Haven 1985, Evelyn Fox Keller argues that the division of the world in the knower (mind) and the knowable (nature), as well as rationalistic or objective reasoning as a relation between the two, is a genderized philosophy of the world.
4. For a description see Ehn 1988, op. cit.
5. Winch, P.: *The Idea of a Social Science and its Relation to Philosophy*, Routledge & Kegan Paul, London 1958, p. 55.
6. This perspective on practice can be found among many Marxist philosophers e. g. Karel Kosik, *Die Dialektik des Konkreten*, Suhrkamp, Frankfurt 1967. In the sociology of knowledge it is represented by e. g. Berger, P. L. & Luckmann, T.: *The Social Construction of Reality – A Treatise in the Sociology of Knowledge*, Doubleday & Copany, New York 1966.
7. Wittgenstein, op. cit., § 241, § 242.
8. Ibid., § 83; see also § 23, § 67, § 75.
9. This "sign" aspect of objects and artifacts in language-games has been pointed out by

- Brock, S.: "Wittgenstein mellem fænomenologi og analytik" in Brock, S. et al.: *Sprog, Moral & Livsform*, Philosophia, Århus 1986.
10. This aspect is, with reference to activity theory, further developed in Bødker, S.: *Through the Interface – A Human Activity Approach to User Interface Design*, Lawrence Erlbaum, 1991.
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 15. Polanyi, M.: *Personal Knowledge*, Routledge and Kegan Paul, London 1973, p. 53.
 16. Ibid. p. 54.
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 19. Janik, A.: *Style, Politics and the Future of Philosophy*, Kluwer Academic Publishers, London 1988, p. 11.
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 26. See Ehn, P. & Kyng K.: "The Collective Resource Approach to Systems Design" in Bjerknes G. et al. (eds): *Computers and Democracy – A Scandinavian Challenge*, Avebury, 1987.
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Pelle Ehn, professor at the Department of Information and Computer Science at the University of Lund, Sweden; since the mid-1970s conducting theoretical and practical research into skill based participatory design.

