

Designing Experimental Design – Moving In, Moving Out

The paper describes an intensive course in experimental design, bringing up the difficulties of keeping the creative process open and the need to converge in some direction. This paper reflects upon the design processes in the course, observing a phenomenon that happened by chance, where a participant moved in and out of the design group. Upon this observation we suggest moving in and moving out as a tool that stimulates ambiguity and creates heterogeneity by changing the composition of the design group.

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INTRODUCTION

We will start by discussing what is experimental design and some of the trends in this area. We will then describe an intensive course in experimental design that had a practical design session as a significant component. Using that session we will describe a phenomenon we observed that we have called 'moving in, moving out'. We will discuss how this phenomenon could be used in other contexts as a tool in experimental design.

We begin by exploring the scientific or the etymological roots of the words 'experimental design'. Experiment and the experimental form of life has its scientific roots in Robert Boyles' demonstrations of the air pump during the 17th century. Experiments were not used at that time in the production of natural philosophical knowledge. Boyle used three technologies; material, literal and social, in order to convince the scientific community of the experimental program as a right way to conduct natural philosophy [15, 8]. Boyles work led to the Gas Law but it was not only based on experiments and the evidence produced by these but also with class and gender [13]. The subject and the object were separated in the process. Objectivity as well as facts was also constituted during these experiments. Since Boyles days experiment has transferred from the laboratories to a variety of contexts and practices both inside and outside academia. But the concepts still has the connotation to laboratories. In this paper we understand and use experiments as a verb or the definition "to carry out experiments: try out a new procedure, idea, or activity"¹.

In a dictionary design is defined: "to create, fashion, execute, or construct according to plan"². Design has its root in Latin and the meaning is to be outlined (av-teckna) and signify (be-teckna). The verb design is said to be used for the opening of the seal. In languages such as Spanish and French two different words exist. The Spanish word diseño has travelled from Latin via the Italian and is similar to the English word design. Designio, on the other hand, means purpose (avsikt), aim (syfte), intent (uppsåt) [14]. The English meaning of design has been incorporated/imported in the Norwegian as well as the Swedish language. Thus, design has the meaning to shape something or to give form to something. The concept design is ambiguous since it has both the meaning of the form in itself and the activities to convey ideas to a final artefact. The latter meaning is used in this paper, thus, we use design for the description of peoples design activities (social, cultural and cognitive) aiming for the creation of an artefact.

¹ See Merrian-Webster On-Line

² Ibid.

Conceptually from Prof. Wagner, (who conducts research in experimental design and will be presented below), experimental design is a combination of circling between concepts and producing as well as evaluating concrete ideas on the one hand. And on the other approaching problems which are not well defined and re-definable

The trends in the design of experimental design processes have included participatory design, probes, scenarios and ambiguity as a resource. We will briefly discuss each of these.

Participatory design brings 'user and usage information into the early stages of concept development' [19]. The concept of participatory design however brings forth a dilemma in terms of how the process can be described. The more specifically it is described the more unusable it becomes as each participatory design process needs to be just that, participatory, making any pre-defined roadmap counterproductive. The individual and group relations and dynamics need to evolve and as such no two participatory design projects will be the same. An attempt to theorize one for the benefit of the next will result in a rationalization of the relations and dynamics which in itself would not be a true understanding of the events that unfolded. It would also lead to a construction of events to give the impression of predictable actions and outcomes which did not exist, known as the hind-sight bias [3]. Imposing all this as a roadmap for a new group of people in a different context should warrant some serious misgivings. This brings an additional dilemma in the design of a design process - the often dichotomous relationship between keeping an open creative process and wanting some rules, methods and structures. Apart from taking that participation is useful, how that process has unfolded in case studies should be cautioned as a prescription to follow. Another note on participation would be to ask who should participate. Most innovation happens at the boundaries between disciplines or specializations [11]. This is supported in one study where 'subjects with similar backgrounds tended to become creatively impaired because they agreed on most things. Subjects with different backgrounds seemed to relate to each other by juxtaposing their views, thereby extrapolating a wide range of different information' [19]. What extents and combinations in the boundaries of knowledge should be sought or desired is debatable but having 'common' knowledge among the participants should also be strived for [4]. As a final note, participatory design offers enormous *potential* in considering aspects of design that otherwise go unexamined [6].

A probe is used as a tool to invoke the participation of a particular group in the design strategy and process. One example is a technology probe from Hutchinson et al [9], which involves 'installing a technology into a real use context, watching how it is used over a period of time, and then reflecting on this use to gather information about the users and inspire ideas for new technologies'. They contend that technology probes are promising new design tools which in their field cases helped reveal 'playful needs and playful desires', 'provided real-life use scenarios to motivate discussion in interviews and workshops' and introduced new kind of interface technologies that encouraged the subjects to be more creative in their use of technology.

Accepting scenarios as an established method in design, Iacucci & Kuutti [10] describe SPES (Situated and Participative Enactment of Scenarios) where a designer and user are simultaneously actors and spectators in normal daily activities. Everyday life as a stage provided insights into matters such as the amount of attention a user could give to a particular device and what would be counted as part of the context at a specific instance. The idea is to experience the scenarios with all the constraints of everyday life. The

scenarios evoke reflection and this reflection-in-action where thinking influences the doing which further influences the thinking and the doing. The limitations discussed include the disturbing presence of the designer in the everyday life context.

Another concept from Gaver, Beaver & Benford [5] involves embracing ambiguity as a resource tool. Everyday life is ambiguous with most events having multiple possible meanings. Ambiguity is an attribute of how an object is interpreted by a person. This interpretive relationship is how ambiguity can be used as a resource 'by thwarting easy interpretation, ambiguous situations require people to participate in making meaning' where 'the artefact or situation sets the scene for the meaning, but doesn't prescribe the result'. Creating ambiguity is a powerful design tool raising issues and perspectives without providing solutions.

We chose to examine the experimental design process by giving examples from an intensive course on experimental design which had practical design work as a major component.

PRESENTATION OF THE COURSE

The practical design session in experimental design was focused on designing tangible user interfaces and was based as a five days intensive course ending with a presentation Friday afternoon. Prof. Ina Wagner from Institute for design and assessment of technology, multidisciplinary design group at Vienna Technical University has developed the course – and was managing it for a group of researchers and doctorates from information systems and media studies at the University of Oslo. The course gave a broad introduction of different categories of methods for creative idea production; playful methods, provocation, ambiguity as a resource, use of cultural probes, technology probes, video prototyping, games/theatre and performances, using everyday life in creating scenarios.

The course consisted of one and a half day theoretical introduction and two and a half days workshop in the studio. The course was structured like this;

1st day: theoretical introduction on tangible user interfaces and ubiquitous computing

2nd day: finding a common approach for the experimental design process, finding a probes that can be related to the theme, establishing a collaborative workspace in the studio

3rd day: working in the studio collecting diverging visual and textual illustrations and symbols related to the theme, interviewing people on their associations related to the theme – making a wall paper collage with the results. Discussing the broad possibilities for a tangible character of the product and possibilities for use.

4th day: continuing stretching the association to the theme, keeping the creative process open and not discussing concrete solution.

5th day: creation and presentation for an audience

THE CREATION OF A DESIGN SPACE

In our course at the University of Oslo the topic skiing was given by Prof. Wagner on the first day. The design part of the course started with the creation of a design space in the studio at the Centre of InterMedia, University of Oslo. The tables were placed in one chosen corner of the room, organised in order for all the participants to see each other:



Figure 1:The design space was created so that all participants could see each other

Writing and drawing materials such as coloured paper, scissors, tapes etc. was provided. The participants was asked to bring one probe that was associated to skiing – and one that was not associated to skiing. The participants brought T-shirt from Mexico, beach-balls

Furthermore, we had collected pictures as well as written a story which were used for the creation of the collage (see Fig. 2)



Figure 2: Visual association of the design theme was pasted on the wall

The design space was filled with visual associations and text in relation to skiing pasted to the wall. The illustrations consisted both of experiences of skiing, the feeling of snow, the food and chocolate that are part of a nice skiing tour and the equipment that is needed – or that gives a feeling of luxury on the trip. The illustration stimulated laughter and small-talks among the course participants – getting aware of diversing associations with something that was so Norwegian as cross-country skiing.

MOVING IN AND MOVING OUT

The group continued broadening the collage and suggesting possible directions on the theme. Prof. Wagner noted and made small posters for each direction, see fig.3;

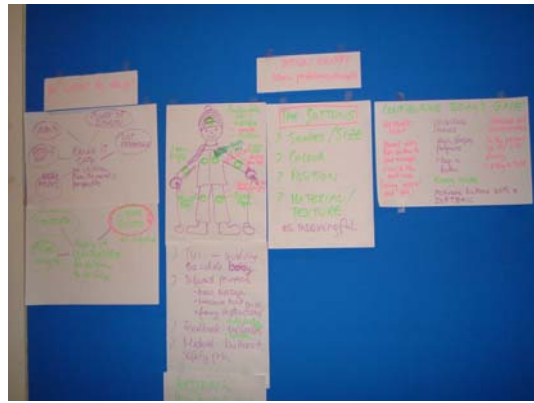


Figure 3: The posters drawn by Prof. Wagner illustrating the output from the brainstorming

On the fourth day, the group was still trying to broaden up the ideas related to the theme, discussing different ways to go for designing tangible user interfaces. One person missed the morning session that day because the kindergarten where her son was happened to be understaffed. This meant that she had to spend some hours at the kindergarten that morning. The group had been struggling to find a common idea to work on. After observing the groups discussions she understood that the was group still was searching for a common idea to work on. The person suggested that the group should decide on what kind of users they wanted to design for; children, youths or adults. The suggestion was taken as a proposal by the members of the group. The moving in of the person who had not been participating in the earlier struggle seemed to bring a new wind to the discussion. The group as a wholes seemed “ripe” to converge in to a clear direction. And the further brainstorming process took one clear direction towards the relationship between parents and children during cross-country skiing. The rather long process of brainstorming, and the role of Prof. Wagner keeping the associations open had come to a point where it was getting more difficult to prevent people from converging on certain ideas. Prof. Wagner did not at this point prevent the group for going further in the direction that the group was now heading on.

The idea of deciding if the interface should be for children or for adults struck a corde by those of the group who had experience with cross-country skiing with children. But also members with no experience saw that making decisions on the user group made it easier for them to adapt to a common idea in the group. One participant came up with many ideas on how the cross country skiing could be a game of treasure hunting. This idea stimulated a new flow of suggestions associated with the theme of cross country skiing with children; related to the communication between the child and its parents.

Still there was interesting diversity in the approach to the idea of communication tools for children and parents skiing; from designing it as a game that motivated the children, heat based and sensor based tangible communication and more traditional mobile communication by speech and sound.

The situation is a good example for reflecting upon how teams work creatively and how thinking teams or groups as places where the participant move in and out to stimulate the design process. The arrival of the late coming person seemed in this case to fuel the group with new wind. The person was not responsible for respecting ideas that had been discussed but not accepted by the group and seemed by her late arrival *uhildet*. (impartial). This phenomenon of bringing a new wind to group processes is partly known also in group work for example in theatre work, where rather big groups are split into smaller

group that works individually improvising on a theme, that in the end will be presented for the full group.

CONCLUDING REMARKS

Lucy Suchman [18] argues for design practices as situated and located somewhere. The design from somewhere is another way of examine design compared to design from *nowhere*. Knowledges are not comprehensive but are situated, partial and context dependent [7] thus, translations that are made in a design process are partial and local [18, 12]. The design from nowhere is a consequence of how disciplines are organized at the universities. With that, the design and use has been separated. But another consequence is that designers are disciplined in a more rational way of thinking, they design artefacts and systems for everyone, ignoring their own interventions in the design process [7, 18].

The design course we have used as a case in this paper was located in a research group with a long tradition of the Scandinavian participatory design tradition [1,2,7]. The participants as well as Prof. Wagner, the course leader, had previous experiences with participatory design as well as experimental design from numerous research and development projects in a variety of settings. The participatory approach was one point of departure, however, never discussed but taken-for-granted. Secondly, when we designed the tangible user interface *somewhere* became obvious for example in the choice of topics, skiing, and also in the collection of pictures. We, Scandinavians, collected pictures and probes related to cross-country skiing, the course leader in relation to alpine skiing. The participant's imagination or vision intertwined already with the collection of pictures, this is, in the introductory part of the design process.

Visions come into view very near the beginning of the design process before the present domain or situation is analysed [16]. Hence, the designers' ideas, values and understandings are intertwined with their visions of the choice of a certain functionality, structure or technology of the future system, service or artefact [2]. This was (became) also obvious in the experiment we were involved in, in the introductory part when we collected pictures, but also how we moved very quickly to suggestions of solutions. The course leader brought us back and did not narrow down too early but to keep the design process alive and open to consider the variety of ideas related to the wall paper collage and stories.

We cannot fix and decide on design processes too early, but we can use methods that stimulate and motivate the creativity. Like probes, wall paper collage and stories, moving in, moving out can be similarly used as a tool in the design process. The moving in, moving out tool is also consistent with using ambiguity as a resource as the person who is moving in with little knowledge of what has taken place in the group is in herself an ambiguous resource.

In our case the moving in and moving out happened by accident. It is unclear how this will change if the participants knew beforehand that such a role or event was going to take place. Would the participants then change behaviour resulting in a different outcome that was experienced here?

Like in theatre though, where the course leader or director intervenes into the creative process by moving in and moving out artefacts, people and dramatic situations. In the same manner the course leader could also intervene with the group participants by moving participant or artefacts in and out. In an attempt to create a new wind. This could be particularly useful at a point where a group is stagnating, or as in our case "ripe" for this intervention.

There are still a lot of questions:

How to transfer the experiences and the course to other settings such as for students at other departments? How is it possible to bring in new winds in a students group when they seem to loose the motivation? How is it possible to be aware of when it is time to move on, not to keep the design process too open anymore, in order to avoid counter productivity? When is the group ripe enough to make a move towards a decision? Should there be more than one person moving in and moving out of the group? Should the timing of the main group becoming stagnant or ripe be coordinated with the participant moving in and out? Can any participant be moved in and out or does it have to be a particular person based on his personality or relations with the other participants?

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