

Putting the Users Center Stage: Role Playing and Low-fi Prototyping Enable End Users to Design Mobile Systems

Dag Svanæs, Gry Seland

Department of Computer and Information Science,
Norwegian University of Science and Technology.
7491 NTNU - Trondheim, Norway
{dag.svanes, gry.seland}@idi.ntnu.no

ABSTRACT

This paper sums up lessons learned from a sequence of cooperative design workshops where end users were enabled to design mobile systems through scenario building, role playing, and low-fidelity prototyping. We present a resulting fixed workshop structure with well-chosen constraints that allows for end users to explore and design new technology and work practices. In these workshops, the systems developers get input to design from observing how users stage and act out current and future use scenarios and improvise new technology to fit their needs. A theoretical framework is presented to explain the creative processes involved and the workshop as a user-centered design method. Our findings encourage us to recommend the presented workshop structure for design projects involving mobility and computer-mediated communication, in particular project where the future use of the resulting products and services also needs to be designed.

Categories & Subject Descriptors: H.5.2 [Information Interfaces and Presentation] User Interfaces – Prototyping, User-centered design, Evaluation/Methodology; D.2.1 [Software Engineering] Requirements/Specifications – Elicitation methods

General Terms: Design, Experimentation, Human Factors.

Keywords: Participatory Design, Mobile Computing, Role Playing.

INTRODUCTION

As computers leave the desktop and become part of our everyday work and life, there is a need to supplement existing design methods with approaches that embrace the physical, social and bodily nature of interaction. Newcomb et al.'s work on PDAs for shopping [11] is a good illustration of how an existing method (i.e. desktop-based usability testing) had to be changed to take into account aspects of everyday computing such as user mobility, the

physical context, social interaction, ergonomics of the devices, integration with other activities, and changes to practice. In addition, an increased focus on time-to-market and development costs puts pressure on making the design methods both time and resource efficient.

Of special relevance for the user-centered design of mobile computing are role playing and low-fidelity (low-fi) prototyping. Role playing takes users and developers “out of the chair” and into the physical, social, and embodied reality of mobile computing. Combined with low-fidelity prototypes, role playing makes it possible to explore design concepts with users at a very early stage in a project.

Role Playing in Design

The earliest recorded use of role playing and low-fi prototyping in the design of computer systems dates back to the UTOPIA project in the 1980s [1]. More recently, Binder [2] reports on the use of in-situ role playing with low-fi prototypes as a way of involving workers in the design of a PDA-based computer system in an industrial setting. In [3], Brandt and Grunnet describe the use of role playing as a way for designer and users to have a dialogue about design ideas. In [8], Kuutti et al. describe the use of low-fi prototypes and role playing in concept generation. They followed users who brought imaginary products with them into their everyday life. In [4] Buchenau and Fulton Suri describe “Experience Prototyping” as the use of role playing and low-fi prototypes for exploring design concepts. Their work was inspired by the research of Burns et al. [5] on “Informance” and “Bodystorming” as ways of physically acting out design ideas. Howard et al. [7] use professional actors to act out scenarios of mobile computing. Salvador and Sato [13] developed “Focus Troupe” as a way of using drama to get feedback from potential customers on new product ideas. Simsarian [14] describes how role playing with low-fi prototypes is currently being used at IDEO.

Despite this relatively rich research literature on the use of role playing in user-centered and participatory design, we have not found any detailed guideline on how to apply such methods to the everyday reality of software design. Kuutti et al. summarize it [8]: “As now, engaging in theatre performances for design has not been developed as a proper *design methodology*” (their italic).

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.

CHI 2004, April 24–29, 2004, Vienna, Austria.

Copyright 2004 ACM 1-58113-702-8/04/0004...\$5.00.

SIX WORKSHOPS: LESSONS LEARNED

Through a series of design workshops over the last three years we have searched for a workshop structure that can fit many different projects, purposes, user groups, and technologies. We present six of the workshops here to document our learning process and to show how role playing, scenario building and mockup prototyping can be used for different purposes and with different user groups. The most important lessons learned from the workshops have been framed and bulleted in the text.

Workshop 1: Exploring our Mobile Future

The aim of the first workshop was to explore potentials for new mobile devices and services for teenagers, looking 5-10 years ahead. The project was funded by the R&D division of a Telco. We wanted to explore the design space both concerning form and function. For this purpose we planned a two-day cooperative design workshop with teenagers. The reasons for choosing a workshop as format were quite pragmatic: We did not have time or resources to do long field studies, and our partners in R&D wanted to be actively involved and needed to fit it into their busy schedules.

Participants

The workshop was lead by one of the authors with the support a drama teacher and a professional designer. Eight high school students (age 16-17) were recruited from two local schools, four from an art class and four from a drama class. In addition there was one observer from the Telco R&D and one person responsible for recording everything on video.

The Workshop Structure

The workshop consisted of three sessions: (1) scenario development through drama, (2) technology exploration through low-tech prototyping, (3) integration of the prototypes into the scenarios.

The drama session was run by an experienced drama teacher and lasted 4 ½ hours including short breaks. The first hour of the session was spent on practical drama exercises. The participants were then split into a boys group and a girls group and were asked to brainstorm on situations from their lives where they met other teenagers. Each group had to pick a setting, and was asked to create and rehearse a scenario for that setting. Both groups then presented their scenarios. The participants were then split in mixed gender and mixed background groups, and the procedure with creating a scenario was repeated. The result from the drama session was four scenarios on tape showing examples of settings where teenagers meet.

The drama session was followed by a design session run by a professional product designer lasting 3 hours including short breaks. In the first 30 min. the participants did “designing by accident” individually by modeling clay blindfolded. This was done to get a wide variety of physical

forms. Next, the drama teacher did an exercise on form and function: The participants were placed in a circle around a pile of unusual household objects and were asked to pick an object they did not know and make up a story about what it could be. The purpose of this exercise was to show that a form can be given many functions. The participants were then given time to add to their clay models using art materials and simple electronics parts such as LEDs, wires, and switches for form factor. They were further asked to give their creation a name, and to come up with three possible uses. We told them that their devices could communicate with other devices, and have input/output. Each participant gave a short presentation of their device and how they worked. The result of this session was eight fantasy objects, each with at least three behaviors.

In the last session the participants were asked to integrate their fantasy objects in the scenarios. This session lasted 2 ½ hours including breaks. The video recordings of the scenarios were shown to refresh memory. The resulting four new scenarios were staged and acted out in the same manner as in the drama session. The workshop ended with a 30 min. discussion and round-up.

Lessons Learned

The teenagers were all able to use drama as a technique to stage scenarios from their own lives. We had feared that art students with no stage experience would have problems working creatively with drama, but after the initial warm-up we saw little difference between the art and the drama students.

The “design-by-accident” exercise worked well in producing a number of esthetically interesting objects. The students showed a remarkable creativity in coming up with behaviors for the objects. Of special interest was the way they used electronics parts for their fantasy objects. The electronics also sparked the creativity concerning behavior. Unfortunately, a lot of their wishes were not technologically feasible.

- We conclude from this that the prototyping materials provided have a strong impact both on the resulting form factor and on its imagined functionality.

The integration of the fantasy objects in the scenarios was far more difficult. The participants struggled with finding ways to use their objects in the scenarios, and this was reflected in their presentations. The resulting future scenarios included their fantasy objects, but it was evident that the objects did not “fit in”. Their use was “made up”, some times in a very entertaining way, but it was in most cases obvious that we were not watching a future product in use. We learned from this workshop that we needed a closer integration of the scenario building and the design activities, but it was not evident from the workshop how this could be achieved.

Workshop 2: Participatory Design as Market Research

The next workshop was done as part of a research project with the same Telco R&D on peer-to-peer (P2P) computing. One of the aims of the project was to evaluate the market potentials for direct terminal-to-terminal radio communication and ad-hoc wireless networks for teenagers. Encouraged by the results from the previous workshop, we let teenagers come up with ideas for applications through a design workshop.

Participants

The workshop was lead by one of the authors and a professional product designer. A group of nine 14 and 15 years old were invited to participate. They had no special background in drama or art. In addition, one person was responsible for filming.

Prototyping Materials

The main difference from the first workshop was concerning technology focus. The first workshop was very open concerning technology, while we here had a relatively well-defined technology for which we wanted to explore potentials for use. We had learned from the first workshop that the materials provided have a strong impact on the resulting ideas and mockups. To constrain the design space, we built a set of foam models that the workshop participants could use as starting points in their design activity. We built foam models in different sizes: watch size, mobile phone size, PDA size, laptop size, and tablet PC size. We glued a piece of white cardboard on one of the faces of each foam block in order to indicate a front. The cardboard allowed the participants to use Post-it notes and paper with "Post-it" glue for paper prototyping (Post-it notes do not stick to prototyping foam). All foam models had a nail "antenna" to signal that they were "connected". As in the first workshop, clay and some simple electronic parts like LEDs, wires, and buttons were provided.

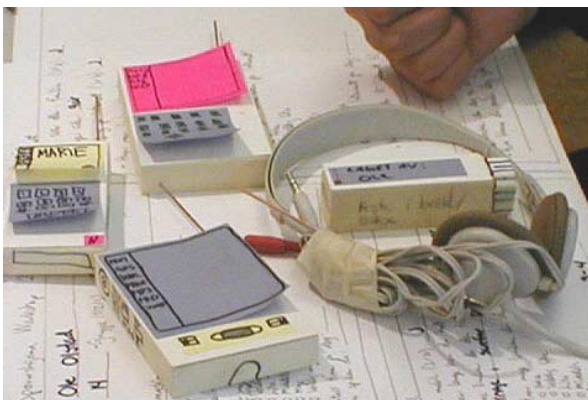


Figure 1. Low-fidelity prototypes of wireless P2P

Workshop Structure

In the first workshop we had not succeeded in integrating the role playing with the design activities, and for this workshop we therefore decided to omit role playing

altogether and focus on scenario building with storyboards and low-fidelity prototyping.

The session started with an introduction to the idea of wireless P2P. The participants were split into three groups of three. They were asked to brainstorm on everyday situations from their own lives where wireless P2P could be relevant, and choose one or two of the situations as a basis for their scenarios. Then they developed ideas for functions and properties to support the needs for their specific situations. They were further presented with the design materials and asked to choose foam models that best suited their needs.

Lessons Learned

The groups developed relevant scenarios and several devices, ranging in size and functionality from small MP3-player size to PDA and CD player size. Figure 1 shows some examples of mockups made by the participants. To the left three PDA/mobile phones, to the right a wireless control for a headset.

- The first lesson learned from this workshop is that scenario building and mockup prototyping do not require special competencies such as a background in drama or visual art.
- Next, we learned that stronger constraints on the technology made it easier for the participants to fit the design solutions to the scenarios. The foam models worked very well for this purpose.
- We learned that some constraints on candidate situations are necessary to focus the brainstorming on scenarios.

Workshop 3: Mobile Computing in Hospitals

As part of a research project on mobile ICT for health workers, we wanted a deeper insight into typical use situations for PDAs in hospitals. For this purpose we initiated a half-day drama workshop to explore different scenarios. A professional drama teacher was invited as facilitator. She had not been part of any of the previous workshops, and had no prior experience with using drama for this purpose. We explained to her what we wanted, and she suggested a half-day program that we approved.

Participants

In addition to the invited facilitator and one of the authors, there were six participants. They were all researchers and Ph.D. students from Computer Science and the Social Sciences working with the introduction of technology to hospitals. None had any real work experience from hospitals.

Workshop Structure

The first hour of the workshop was used on drama theory and on simple status exercises. The next hour was used on improvisation techniques for drama, and on the creative use of props. The participants were asked to improvise scenes from the hospital, and act these out playing different roles.

As the focus of the workshop was on scenario building, time did not allow for any design activities.

Lessons Learned

The workshop only partly gave the intended results. The researchers did not learn very much new, and some of the participant experienced the drama exercises as too difficult and a bit intimidating.

- **As in the first workshop, we learned that it is important to ensure that the drama facilitator understands the purpose of the workshop; otherwise they simply do what they are good at, i.e. teaching people drama techniques and creating performances.**
- **Next, we learned that it is crucial that real users are included as workshop participants. Without real users the workshop runs the danger of “spinning in the air” and simply iterate existing assumptions and prejudices about the context of use.**

Workshop 4: Working with Real Health Workers

As part of an ongoing research project on mobile ICT for hospitals, we got funding to explore different design methodologies. We had access to a full-scale model of a ward that was built by the architects of a new regional hospital. Learning from our previous mistakes concerning the role of the facilitator, we looked for a drama teacher who had time to spend beforehand on understanding our goals and on planning the workshop. From our previous experience we found that a one-day workshop was a good compromise.

Participants

In addition to the facilitator and both authors, six health workers (nurses) were recruited at the local hospital. During half the workshop we also had one additional researcher and the head of the hospital’s IT department present as observers.

Workshop Structure

For this workshop we made a detailed plan, down to every 15 minutes of the seven hours it lasted. The day was split in two, with three hours before lunch on staging realistic scenarios from current work practice, and three hours after lunch on designing mockups and integrating them in the scenarios to show their use.

The day started with a short introduction. As in the first workshop, some time was spent on teaching basic drama skills, but not more than what was necessary to enable them to improvise scenes from the hospital. We stressed to the drama teacher the main differences between the workshop and theatre: that the participants mainly stage stories from their own life, and that there is no “fourth wall”.

After the warm up exercises, the health workers were split in two teams and asked to brainstorm on communication and information rich situations from the hospital. The brainstorming was done by placing Post-it notes on a wall and clustering similar situations.

Before lunch, the teams presented their scenarios. Each scenario was presented twice, first as the team had rehearsed it and next with interruptions from the other team. During the first presentation, the members of the other team were asked to write down on Post-it notes possible external events that could influence the scenario. The notes were put in a bowl, and during the second presentation the scenarios were frozen and the notes were drawn and read. The actors then had to react adequately to these external events and change the flow of events accordingly.

After lunch the participants were introduced to the technology that we wanted them to explore. We used the foam models from workshop 2. We explained that the devices would all be connected through wireless internet, that they had a color screen, pen or button input, a microphone, a speaker, and that they could have a built-in camera. We also informed the participants that the devices could detect each other by holding them close. We did not describe the technology needed to do this.

The participants then picked a number of foam models and discussed what they would need for their scenario. They used Post-it notes to simulate screens, and developed proposals for new technology. The mockups were then integrated into the scenarios to show their functionality. When the teams were satisfied with their new scenarios, there was a short break, and after the break the teams presented for each other with and without interrupts as before lunch.

The last 30 minutes were spent on an evaluation of the scenarios, the designs, and the workshop as such.

Lessons Learned

The new structure worked well, both concerning scenario building and mockup creation.

As in previous workshops, the transition from scenarios to design, and the integration of mockups into the scenarios was experienced as difficult. During the future scenario session we consequently had to give much support. At one point an interesting thing happened.

Designing-in-action

During the work with integrating a mockup into a scenario and making its functionality fit the scenario, the team had played through the beginning of the scenario. One of the participants was holding a “blank” foam model in her hand trying to figure out what should happen next. We asked her “what happens next?”. She started tapping on the model with a pen and said that she was getting access to blood test results for the patient in the bed. She was inventing functionality at the spot, while mentally being in the situation and imagining content and interactive behavior on the “screen”. We followed up on this and asked her to draw on a Post-it note what she had “seen” on the model. She drew a screen with buttons and menus, and brought it into the future scenario.

It struck us that this was the way to overcome the missing link between scenario building and design, by not doing designing as a separate activity but by letting the mockups simply evolve “on the stage” as the future scenarios were being created.

- The *designing-in-action* technique is simple: play the scenario until somebody sees a need or potential for new technology. Freeze the scene and pick a device to fit the need. Continue while imagining its functionality for that specific “time frame”. Stop to externalize (draw) the imagined screens, and continue the scenario until the next freeze with the new technology integrated. At the end of the improvisation the team has designed both a future scenario and a low-fi prototype for that scenario.

Workshop 5: Finding a Role for the Developers

To explore the role of drama workshops in user-centered design processes, we planned a repetition of workshop 4 with developers present as workshop participants.

Participants

In addition to the authors, six health workers (four nurses and two doctors) were recruited from the local hospital, and two graduate computer science students with systems development experience were recruited to fill the role of developers. For this workshop we did not invite any external facilitator, as we now felt experienced enough to take that role.



Figure 2. Improvising technology and its future use.

Workshop Structure

We repeated the structure from the previous workshop, with the exception that we planned to give the developers two 15 minutes sessions during the day to ask the health workers questions and discuss the resulting scenarios and design solutions. During the workshop the developers were not allowed to suggest design solutions or influence the scenario building in any way. The health workers were allowed to use the developers as extras (supporting artists), but all the time instructed by the health workers.

In the session after lunch, we applied our newfound techniques of designing-in-action instead of doing design

and scenario building as separate activities. Figure 2 shows three health workers improvising new technology and work practice. The nurse is holding a foam models of a “Tablet”.

Lessons Learned

In interviews after the workshop, the developers were asked how such workshops could fit into a development process. They concluded that it gave them a unique insight into the users’ world, and that it was very valuable to see the users themselves suggest solutions to their information needs. They also stressed the value of such workshops in the confidence building between developers and users. They commented that for real projects a one-day workshop would not be enough to create a full requirement, and that workshops had to be supplemented with other methods.

The role of the developer was different from that of both facilitator and user. The developers often felt that they did not understand what was going on in the scenarios, and wanted more explanations from the health workers. The developers did not need the 2 x 15 minutes allocated to them because they had been allowed to ask questions during the improvisations. There is a delicate tradeoff between giving the developers the role of passive observers and allowing them to actively freeze scenarios and ask questions.

- When the developer wants to interrupt, the facilitator has to decide to what extent this will disrupt the creative process. On the other hand, not allowing the developer to interrupt might let pass a unique learning opportunity.

Workshop 6: Using Field Data as Input

One of the results from the previous workshop was that it is necessary to integrate with other design methods. To learn more about this we decided to concentrate on one specific activity at the ward. We got access to a ward, and filmed one morning meeting.

Workshop Structure

We repeated the structure from the previous workshop, with the exception that 10 minutes were spent during the introduction on showing the video from the ward, and that we saw no need to allocate separate sessions for the developers to ask questions.

Participants

In addition to the authors, six health workers and two developers were invited, none of which had participated in any previous workshops.

Lessons Learned

We had originally thought of the video material from the ward as providing scenes for the participants to act out, but this did not happen. Instead, the participants found the video valuable as a common point of reference, from which to start building scenarios based on their own experience.

- We conclude from this that the use of field data is valuable, but not essential for the success of a workshop. It should consequently be seen as optional.

THE RESULTING WORKSHOP STRUCTURE

Through our process of trial and error we have ended up with a fixed structure for a one-day workshop. As little literature is available on how to conduct role playing workshops, we present it here in detail.

Participant Roles

We have identified three major roles: Facilitator, User, and Developer. Additional roles are Support person and Observer.

We have found that for a one-day workshop it is optimal to have two teams of users, each with 3-4 members. The users are the domain experts and the aim of the workshop is to activate their knowledge and creativity. In all workshops we have either paid the users to participate or their employers have agreed they could do it in their ordinary working hours. This is important to create the shared feeling of being there on equal terms.

In our workshops we have restricted the number of developers to one per team. Having more than two per team will probably block the users' creativity. The developers are there to learn from the users, and they must under no circumstances give direct input to the scenario building or prototype design. During the creative processes they can take the roles of extras and ask simple questions.

As two teams work separately, it is necessary to have two facilitators. The facilitators should not give direct input to the scenario building or prototype design. Their role is to guide the teams in their creative processes. Especially for facilitators with a background as developers this requires a high degree of self control. As such it has strong similarities to the role of the experiment leader in usability tests.

Before the Workshop

As with usability testing, it is important to pick representative participants. The users should have direct experience from the kind of work (or leisure) that is being dealt with in the workshop.

Care should also be taken in the selection of developers. Ideally, they should be influential enough in the project to be able to make use of the results from the workshop, but still at a level where they do actual design and development.

The most difficult role in the workshop is that of the facilitator. As with usability tests, it takes time to become a good facilitator. The basic skills can be learned relatively fast, but we recommend inviting a professional drama person as facilitator for the first two or three workshops to get comfortable with the techniques.

Every design project is unique concerning aim, history, staffing, funding, business model, timing, customer, user group et cetera. To get the most out of a workshop it is

necessary to state clearly beforehand the goals for that specific workshop.

The Workshop in Detail

The workshops consist of four major parts: (A) Introduction and warm up, (B) creating "current practice" scenarios, (C) creating mockups and future scenarios, and (D) evaluation and discussion. A typical one-day workshop has the following structure:

1. Introduction of goals and methods (30 min.)
2. Warm-up and drama exercises (30 min.)
3. Optional: Presentation of video from the field (10 min.)
4. Brainstorming on situations for scenarios (30 min.)
5. Improvisation of "current practice" scenarios. (1 hr.)
6. Presentation of scenarios. (30 min.)
7. Lunch (30-45 min.)
8. Introduction to prototyping and technology. (15 min.)
9. Improvisation of future scenarios and development of low-fi prototypes. (1 ½ hr.)
10. Presentations of future scenarios (30 min.)
11. Discussion and evaluation. (30 min.)

After the Workshop

Time should be allocated to allow facilitators and developers to sum up and document the workshop. The use of video is crucial for this purpose. The focus of the analysis will depend on the aim of the workshop. A good starting point for an analysis is to look through the eight scenario presentation and the final discussion. In most cases an edited 15 minute video summary will be of great value for other members of the design project.

STEPS TO A THEORY

The resulting workshop format can be analyzed from many different perspectives. The purpose of our current analysis is twofold: (1) to understand the creative processes when end users create scenarios and build mockups, and (2) to understand the role of such workshops in user-centered design projects.

The Creative Process

This part of the analysis deals with the scenario building and the prototyping sessions.

Role Playing

In the scenario building session, the team members use their own experience to create and stage an imagined situation from their own lives. One might suspect that such activities would require extensive drama training as it resembles the acting we see in theatres and on film. Experience from the use of role playing in teaching [15] show that little training is needed to be able to do this. The simplest explanation is that it resembles play, and taking roles in play is a basic social skill that we all learn as kids. One might even argue as Erving Goffman did in "The Presentation of Self in Everyday Life" [6] that drama is the best metaphor for everyday social life, and that we all play roles most of the

time. Central to role playing and play, as to drama and performing arts, is the “as-if”. This is what Laurel [9], referring to Coleridge, calls “the willing suspension of disbelief”. By letting people and objects represent something else, we create an imagined world within the real world.

Storytelling

In addition to playing roles, scenario building requires the ability to invent and tell stories. As with role playing, kids spontaneously tell and invent stories, both from their own lives and from the lives of their imaginary heroes. Over the last two decades there has been a growing focus on narrative in psychology and in the social sciences. From the narrative perspective we are all storytellers, and we constantly create and maintain our identity by constructing and telling the stories of our lives.

From this we conclude that the kind of scenario building done in the workshops is a very natural thing, and that whatever learning is necessary for role playing and story telling is more about de-learning cultural conventions than about learning new skills.

Tool Making

In the second creative session of the workshop the team members improvise new technology to solve their information and communication needs. This is a kind of activity that we normally call design, development, innovation, or engineering, and that normally requires professional training. The fact that all workshop participants were able to come up with technological solutions to their needs and were able to represent these as mockups consequently requires some explanation.

The kind of design done by the workshop participants is very different from that done by professional designers and developers. In this respect, the title of the paper should be read more as an invitation to a discussion about the role of the user in design than as a statement about what we have observed in the workshops. The workshop participants design specific solutions to specific needs and do not need to worry about issues such as software architecture, implementation, information structure, interface consistency, and integration with other ICT systems, just to mention a few. It is the role of the “real” designers to make the low-fi prototypes into something that actually works.

Despite these differences, most of the developers in the workshops were surprised to see with what ease ordinary users came up with relevant design solutions. One way to understand this process of “end-user design” is to see information systems as tools, and systems design as tool making. Papert [12] borrows the term bricolage/bricoleur from the French anthropologist Levi-Strauss to describe design processes involving large elements of improvisations based on the materials available. He observed how children were able to construct interesting LOGO programs in a bottom-up fashion. Papert argue that their unstructured and

playful behavior showed important similarities with what Levi-Strauss observed among “primitive” tribesmen. The latter constructed their artifacts through playful improvisation from what was available in their natural environment. Bricolage is not a logical activity. It is what we do all the time to cope with our environment. It is our “practical intelligence”.

As with role playing and storytelling, we are born tool makers and only need to be provided with the right materials to become creative innovators of technology. Tool making is a species-specific faculty of Homo sapiens. As Nardi found in her field studies of end-user programming [10], this kind of end-user design requires that the building blocks are simple and that they do not require an understanding of the underlying technology. This kind of bottom-up tool making only works as long as it is concrete. The materials enable the participants to become creative, and much care should therefore be put into the design of the prototyping materials. This is similar to the Montessorri Method’s focus on toy design for learning.

The Workshop as Design Method

One way of understanding the workshop is to see it as a social science research method where the object of study is the context-of-use being stage and its potentials for new technology. Most of the techniques we use in user-centered design are adaptations of research methods from the social sciences, e.g. usability testing, interviews, field studies, and focus groups. Their quality can therefore be assessed with the same criteria as those used to evaluate social science research. There is an ongoing debate in the social sciences as to how research should be assessed, but most authors agree on basic evaluation criteria such as objectivity, reliability, validity, and transferability.

Applied to the workshop this means:

- **Objectivity:** To what extent do the scenarios and ideas originate from the users, and not from the facilitators or developers?
- **Reliability:** Are the scenarios accurate in their description of the situations being studied?
- **Validity, or what is often called internal validity:** Are the scenarios describing the important aspects of the situations with respect to the purpose of the workshop?
- **Transferability:** Are the scenarios typical for the situations being studied, i.e. can the conclusions drawn from analyzing the scenarios be generalized?

Objectivity

The role of the facilitators and developers is to enable the users to articulate their understanding of the workplace and the potentials for new technology and work practice. The input to the users is restricted to the definition of the “research problem” for the workshop and the input on technology. The latter is the sum of the verbal presentation

and the implicit constraints provided by the prototyping materials.

It is unfortunately impossible to eliminate all unintended influence on the creative processes. Even seemingly neutral questions affect the focus of the users and signals what the “correct” approach to building a scenario is. The use of video enables the facilitators and developers to later analyze the creative process and to calibrate the results for their influence. The use of video does not eliminate the need for facilitators and developers to be constantly watchful of their influence on the creative processes.

Reliability

The scenario presentations and the final evaluation work as reality checks for the scenarios. In the scenario building process it is the role of the facilitator to make sure that the scenarios are realistic and not parodies or pure fantasy.

Validity

The users are unfortunately of little help in ensuring the validity of the workshop. It is the responsibility of the developers and the facilitators to ensure that the users work with the topic of the workshop, and not with something else. It is therefore important that the aim of the workshop has been stated explicitly beforehand through a dialogue between facilitators and developers. Without a clear shared understanding of the purpose of the workshop one runs the danger of wasting energy on unnecessary activities.

Transferability

At the end of the day, the value of a workshop is in its usefulness for the design process. The results should be applicable also to other places, people and situations. Transferability can to some extent be evaluated by asking the workshop participants, but it is in most cases a result of the choice of users, the choice of workshop focus, and the choice of technology input. This is similar to the considerations for focus groups, usability tests, etc.

CONCLUSIONS AND FUTURE WORK

The most striking difference between our workshop format and most other uses of role playing in user-centered design is that we are dogmatic on not allowing developers or facilitators to influence the creative processes. We put the users center stage, and learn by observing them acting out and designing their present and future life worlds.

We have found role playing and low-fi prototyping to be of particular value in projects involving mobile technology and multiple users. Our workshop format allows for the simultaneous exploration of future use and future technology. That is of great value in the design of mobile products and services where we simultaneously need to design their use.

We plan to develop a facilitator course to teach computer science and design students the skills necessary to run such

workshops. We do not see this as more difficult to learn than paper prototyping and usability testing, and foresee a near future where role playing will be just as common in user-centered design projects.

ACKNOWLEDGMENTS

We would like to thank Trond Are Ørstrand, Christian Sommerfelt, Solveig Engbakk, and Mariane Stensby. This research was supported by Telenor and Allforsk Research.

REFERENCES

1. Ehn, P. *Work oriented design of Computer Artifacts*, Arbetslivscentrum, Stockholm, 1988.
2. Binder, T. Setting the Stage for Improvised Video Scenarios, *Ext. Abstracts CHI'99*, 230-231.
3. Brandt, E. and Grunnet, C. Evoking the Future: Drama and Props in User Centered Design, *Proc. Participatory Design Conference (PDC'00)*, 11-20.
4. Buchenau, M. and Fulton Suri, J., Experience Prototyping, *Proc. DIS2000*, 424-433.
5. Burns, C. et al., Actors, Hairdos & Videotape – Informance Design, *Proc. CHI'94*, 119-120.
6. Goffman, E. *The Presentation of Self in Everyday Life*. Anchor, Doubleday, New York, 1959.
7. Howard, S., Carroll, J., Murphy, J. and Peck, J. Using ‘Endowed Props’ In Scenario-Based Design, *Proc. NordiCHI'2002*.
8. Kuutti, K., Iacucci, G. and Iacucci, C. Acting to Know: Improving Creativity in the Design of Mobile Services by Using Performances, *Proc. Creativity & Cognition 2002*.
9. Laurel, B. *Computers as Theatre*, Addison-Wesley Longman Publishing Co., Inc., Boston, MA, 1993.
10. Nardi, B.A. *A small matter of programming : perspectives on end user programming*, Cambridge, Mass. MIT Press. 1993.
11. Newcomb, E., Pashley, T. and Stasko, J. Mobile Computing in the Retail Arena, *Proc. CHI'2003*, 337-344.
12. Papert, S. *The Children's Machine*. New York: Basic Books, 1992.
13. Salvador, T. and Sato, S. Playacting and Focus Troupe: Theater techniques for creating quick, intense, immersive, and engaging focus group sessions. *Interactions of the ACM*, 6(5) 1999, 35-41.
14. Simsarian, K., T. Take it to the next stage: the roles of role playing in the design process, *Ext. Abstracts CHI'2003*, 1012-1013.
15. van Ments, M. *The effective use of role play: A handbook for teachers & trainers*, Nichols Publ., N.J. 1994.