



# The Fuzzy Front End of Experience Design

Workshop Proceedings

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## Preface

To start an experience design process, the designers should determine what experience they intend to aim for. How should this decision be made? In the fuzzy front end of the experience design process, there are often several alternative sources for gaining insight and inspiration. There may be different, even conflicting viewpoints and opinions. In addition to user studies, insight and inspiration for experience, goals can be sought from brand promises, technology and societal trends, as well as from just a vision of renewal.

In these proceedings, we present the results of the “Fuzzy Front End of Experience Design” workshop held in NordiCHI 2014 in Helsinki. The workshop brought together practitioners and academics to share knowledge and lessons learned on and explore how to get from the fuzzy front end to a shared vision of the experience to aim for.

We accepted to the workshop eight excellent position papers that presented experience goal setting on different fields. Prior to the workshop, we collected with an online questionnaire participants' views related to experience design. These results were analysed and presented in the workshop. During the workshop, we shared experiences and discussed where insight and inspiration to experience goals setting can be sought, what the characteristics of good experience goals are, and how experience goals should be communicated. Our goal is that this report will provide inspiration and guidance to defining experience goals, thus shedding light on the fuzzy front end of experience design.

These proceedings include the following: an introduction and description of the workshop as well as related phases and activities, an overview of the survey results, results of the workshop activities, and the position papers presented at the workshop. The description of the workshop has been published earlier in NordiCHI 2014 conference proceedings. The papers have been published on the workshop website.

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# 1. Introduction

These proceedings gather together the results of the workshop **The Fuzzy Front End of Experience Design**. The whole-day workshop was organised as a part of NordiCHI 2014 conference in Helsinki, Finland on Sunday 26<sup>th</sup> of October 2014.

The workshop was a continuation to the NordiCHI 2012 workshop entitled "How to Utilize User Experience Goals in Design?" (Väättäjä et al., 2012). In the 2014 workshop, we moved the focus towards the early phases of design, the fuzzy front end. The fuzzy front end refers to the early stages of the development process, in which the targeted system or service has not yet been decided (Khurana and Rosenthal, 1998). We have found in our own studies that experience goals should be defined early in the design process but finding the right kinds of experience goals is not easy. Therefore, in this workshop we discussed the process of defining the goals in order to find ways to ease this important and challenging task.

Today, experience design is often understood as only the cover - graphics, visual appearance and user interface. These can create delightful aesthetic experiences and resolve usability problems. To create great experiences that engage users in the long-run, requires experience design that is not "add-on," but rather "built-in." Experience design is about defining the right functionality and the right concept (Buxton, 2010). Experience design takes the intended experience as the starting point, and defines the product only after defining the experience to design for (Hassenzahl, 2010). As Desmet and Schifferstein (2011) state, the two important challenges in experience design are:

1. to determine what experience to aim for, and
2. to design something that is expected to evoke that experience.

In this workshop, we focused on the first challenge. In the fuzzy front end of experience design process, we have several alternative sources for gaining insight into determining what experience to aim for. We may also have different, even conflicting viewpoints. With a long tradition of user-centred design, we tend to think that we can find out the wanted experiences by studying users and gaining empathic understanding of the users' world. However, there are also other sources for gaining insight into defining goals for user experience. Hassenzahl et al. (2013) have chosen six psychological needs as the starting point for experience design. Roto

and Rautava (2008) describe how brand promise can guide defining experience goals for all of the company's products. Hekkert and van Dijk (2011) introduced the Vision in Product Design approach (ViP), in which first presuppositions of the product are abandoned and then a vision for desirable possibilities is sought, often taking inspiration from other disciplines. Also advances in technologies and new interaction concepts can provide possibilities for novel kinds of user experiences but they may also introduce threats to user experience. Thinking about these possibilities and threats can trigger new types of experiences (Karvonen, Koskinen and Haggren, 2012). Finally, Norman and Verganti (2014) recommend socio-cultural studies to identify a breakthrough experience that may lead to radical innovation.

The different sources of insight provide several alternatives for experience goals. In the fuzzy front end of the experience design process we should be able to define what experience to aim for and to indicate this as concrete, focused experience goals. The experience goals should indicate how we desire the user to feel in usage situations and beyond. The goals should communicate the targeted feelings to the entire design team so that they can commit to the goals.

To start an experience design process, the designers should determine what experience they intend to aim for. How should this decision be made? In the fuzzy front end of experience design process, there are often several alternative sources for gaining insight and inspiration. There may be different, even conflicting viewpoints and opinions. In addition to user studies, insight and inspiration for experience goals can be sought from brand promise, technology and societal trends as well as mere vision of renewal.

The full-day workshop aimed to bring together practitioners and academics to share knowledge and lessons learned on and explore:

- How to get from the fuzzy front end to a shared vision of the experience to aim for?

The questions driving the workshop included:

- Where can you get insight and inspiration to define what experience to aim for?
- How can the information from various sources be utilised to define the targeted experience?
- In which form should the targeted experience be presented so that it can guide the design process?

## 2. The workshop

### 2.1 Workshop organisers

The workshop was organised by a group of researchers from the User Experience and Usability of Complex Systems (**FIMECC UXUS**) programme by Finnish Metals and Engineering Competence Cluster (FIMECC) ([www.uxus.fimecc.com](http://www.uxus.fimecc.com)). The organising committee consisted of five researchers:

- Dr.Tech **Eija Kaasinen**, Principal Scientist at VTT Technical Research Centre of Finland
- D.Sc (Tech) **Heli Väättäjä**, researcher at Tampere University of Technology (Department of Pervasive Computing)
- M.Sc. **Hannu Karvonen**, a Research Scientist at VTT Technical Research Centre of Finland
- M.Sc. **Yichen Lu**, a doctoral candidate at Aalto University (Department of Design)
- M.Sc. **Jari Varsaluoma**, a doctoral candidate at Tampere University of Technology (Department of Pervasive Computing)

In addition to the workshop organisers the Program Committee members included Virpi Roto (Aalto University), Hannu Nousu (KONE), Jaakko Haggrén (Konecranes), Kati Kuusinen (Tampere University of Technology), and Paula Savioja (VTT Technical Research Centre of Finland).

### 2.2 Workshop activities

The workshop comprised of three phases.

1. **Position paper:** people interested in the workshop were asked to submit a 2–6 page position paper that describes their contribution. The papers were anonymised in order to be blind reviewed by the workshop organisers and external reviewers (at least 2 per paper). The objective was to achieve a balance of different types of design cases with varying types of goal setting. We received 12 submissions, from which 8 best papers were selected to be presented at the workshop.



2. **A pre-workshop task:** The participants selected based on their position papers were instructed to complete an online questionnaire prior to the workshop. The questionnaire focused on the question of how the design goals emerged. The organisers of the workshop analysed the results prior to the workshop, and created a summary of them to be presented in the workshop.
3. **Activity at the workshop:**

The participants of the workshop included (in alphabetical order):

Maiju Aikala, VTT Technical Research Centre of Finland  
Mattias Arvola, Linköping University, Sweden  
Jan Derboven, University of Leuven, Belgium  
Sabina Ghellal, Stuttgart Media University, Germany  
Laura Hokkanen, Tampere University of Technology, Finland  
Markus Joutsela, Aalto University, Finland  
Eija Kaasinen, VTT Technical Research Centre of Finland  
Hannu Karvonen, VTT Technical Research Centre of Finland  
Yichen Lu, Aalto University, Finland  
Jari Varsaluoma, Tampere University of Technology, Finland  
Mikael Wahlström, VTT Technical Research Centre of Finland  
Gemma Wheeler, The Glasgow School of Art, Scotland, UK

Based on the position papers by the participants, we aimed to collect examples and experiences of the fuzzy front end of various kinds of experience design processes. We aimed to discuss what kinds of approaches have been used to determine the starting point for the experience design process, i.e., what experience to aim for. The targeted outcome of the workshop was a map describing how various sources of insight and inspiration in the fuzzy front end can be utilised in setting experience goals.

By discussing the contributions of the participants, our intention was to find answers to the following questions:

1. From which sources of insight and inspiration did the experience goals emerge?
2. What kinds of experience goals were set in the cases described?

In the workshop, the position papers were presented in two groups. The first four-paper presentation focused on the theme: “*In which form should the targeted experience be presented, so that it can guide the design process?*” Based on the presentations, the theme was then worked on and further developed in groups. The goal was to *identify characteristics of good experience goals*.

After the lunch break, the results from the pre-workshop task were presented and discussed. The remaining four position papers were then presented, and the presentations focused on the theme “*Where can you get insight and inspiration to define what experience to aim for?*” Based on these presentations, the participants then divided up in groups to discuss different approaches to defining experience goals. They commented the graphical process model that the organisers had prepared before the workshop.



**Figure 1.** Workshop participants.

### **2.3 Position papers**

We invited researchers, designers, and practitioners interested in the workshop theme to share their experiences from the early phases of experience design

processes. Potential participants were asked to submit a 2-6 page position paper describing a relevant case study or a detailed analysis of previous work that would contribute to the workshop questions:

- Where can you get insight and inspiration to define what experience to aim for?
- How can the information from various sources be utilised to define the targeted experience?
- In which form should the targeted experience be presented so that it can guide the design process?

The following papers were chosen to be presented at the workshop (in alphabetical order):

1. Maiju Aikala and Petri Mannonen. Defining user experience goals for a paper quality control system.
2. Mattias Arvola and Stefan Holmlid. User Experience Qualities and the Use-Quality Prism.
3. Mattias Arvola and Andreas Walfridsson. The Mediated Action Sheets: Structuring the Fuzzy Front-End of UX.
4. Sabiha Ghellal. The Fuzzy Front End of Experience Design – Considering Ambiguous and Prescribed Qualities.
5. Markus Joutsela. Collecting User Experiences Online.
6. Maarten Van Mechelen and Jan Derboven. Multimodal Analysis of Participatory Design Results.
7. Mikael Wahlström, Hannu Karvonen and Eija Kaasinen. InnoLeap – Creating Radical Concept Designs for Industrial Work Activity.
8. Gemma Wheeler, Alastair Macdonald and Mariel Purcell. Defining and using experience goals to enhance patient agency in spinal cord injury rehabilitation.

The workshop position papers can be found in Appendix A.

### 3. Results of the pre-workshop survey

Prior to the workshop, workshop participants and all the authors of the papers were requested to complete a web-questionnaire dealing with the main themes of the workshop. The intention of this task was to prompt a reflection process about defined experience goals in the light of the research questions of the workshop. Another purpose was for the organisers to see to what extent there were commonalities in the opinions of the authors of the papers. In the questionnaire, the authors were asked to reflect on their personal experiences and conceptions concerning the topic, specifically on the definition of the experience goals.

#### 3.1 Questions

The questionnaire consisted of six main questions, as presented below.

**Based on the case described in your paper, or thinking about some other case, please answer the following questions.**

1. Describe the topic of the case briefly.
2. Where did you get insight and inspiration to define what experience to aim for? (Choose all that apply.)
  - a. Company or brand image (Brand)
  - b. Scientific understanding of human beings (Theory)
  - c. Empathic understanding of the users' world (Empathy)
  - d. Possibilities and challenges of a new technology (Technology)
  - e. Reasons for product existence and envisioning renewal (Vision)
  - f. Something else, what?
3. Who participated in defining the targeted experiences (experience goals)?
4. What were the targeted experiences (experience goals) in your case?
  - Experience goal 1: \_\_\_\_\_
  - Experience goal 2: \_\_\_\_\_
  - Experience goal 3: \_\_\_\_\_
  - Experience goal 4: \_\_\_\_\_
  - Experience goal 5: \_\_\_\_\_
5. How (in what form) did you communicate the targeted experiences?

6. Based on your own experience, please complete the following sentences:
  - a. In my opinion, a good experience goal is...
  - b. The main opportunities in utilizing experience goals in product design are...
  - c. The main challenges in defining experience goals are...
  - d. The main challenges in communicating experience goals are...
  - e. In the early phases of the design process, the experience goals setting is successful when...
  - f. During the design process, the best ways to confirm that experience goals are reached are...
  - g. After product launch, the best ways to confirm that experience goals are reached are...

The link to the web-questionnaire was sent to the workshop participants and all the authors of each accepted position paper. Thus the number of possible respondents was 16 (in addition to the organisers we had one participant without position paper). Altogether 11 responses were received which yields in a response rate of 69%. Three of the responses were identical from the same study, and therefore two of these were removed from the data set. Results from 9 respondents were used in further analysis.

The organisers of the workshop analysed the answers to the questions prior to the workshop. A summary of the results was presented to the participants between the two group works in the workshop.

### 3.2 Summary of the results

The cases that the respondent chose were from varied domains and most of them were from the position papers. The domains were categorised by the workshop organisers in the following way:

- **Industrial:** tool to manage customer information and prioritisation in product development; paper machine quality control system; concept design approach InnoLeap
- **Marketing:** Packaging design with online research community method
- **Informatics:** Enhancing archival UIs with common UX techniques
- **Entertainment:** Consider quality of experiences in horror game design
- **Entertainment / Education:** something for families with children at the author Astrid Lindgren's childhood home (mobile augmented reality & outdoor education)
- **Education / Well-being:** technology to combat (cyber)bullying in the classroom
- **Health care / Well-being:** enhance patient agency in spinal cord injury (SCI) rehabilitation

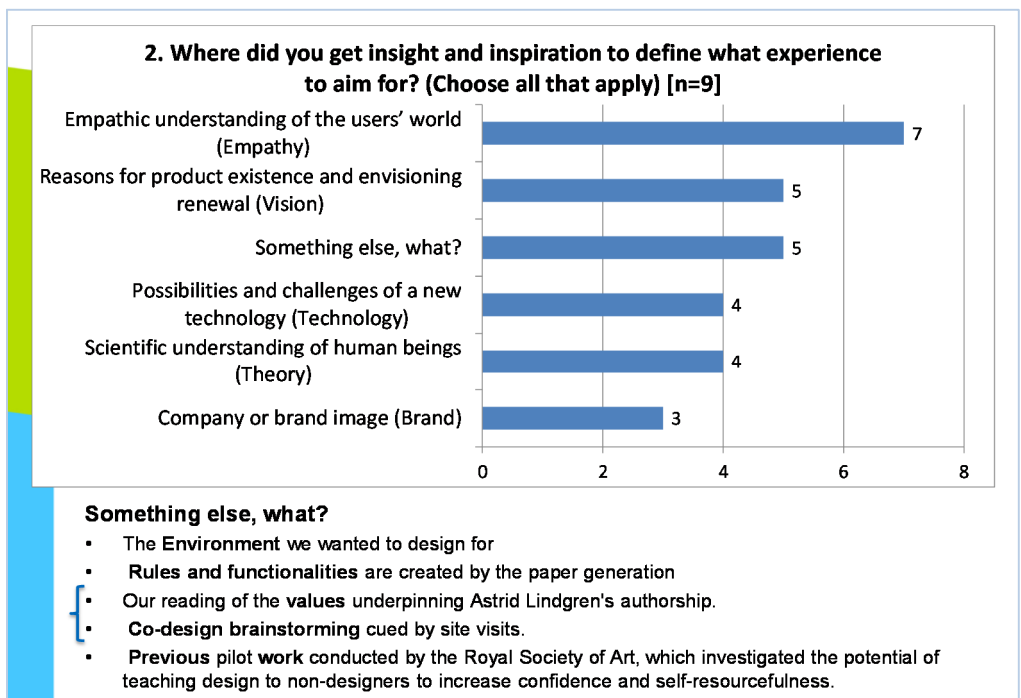
Insight and inspiration to define the targeted experiences came mostly from 1) the empathic understanding of the user's world and 2) reasons for product existence and envisioning renewal. Figure 2 illustrates all the different sources for inspiration.

**Who participated in defining the targeted experiences (experience goals)?**

In the most cases (n=9), researchers (5 mentions) participated in the definition process. Others participants included: Topic experts / Specialists (3), Developers (3), Designers (3), Management / Employees / Client (3), Users / Target users (3), and Students (1).

**What were the targeted experiences (experience goals) in your case? (n=9, NA:2).**

The targeted experiences varied greatly between the described design cases. Two of the respondents did not report any targeted experiences as their papers proba-



**Figure 2.** Where did you get insight and inspiration to define what experience to aim for?

bly did not address this issue. The targeted experiences for each case were the following:

### **Entertainment**

- Overall experience of curiosity, tension and “black-humour” horror
- Feeling of presence
- Speculative play
- Support trajectories as journeys through hybrid spaces

### **Entertainment / Education**

- Arouse curiosity
- Focus on natural and cultural landscape
- Communicate Astrid’s life and authorship
- Support outdoors education
- Sustainable experience over time

### **Industrial (2 cases)**

- Learnability
  - Awareness
  - Feel of control
  - Success
- 
- Being one with the ship and the sea
  - Feeling of community
  - Feeling of efficiency
  - Feeling of trust towards peers
  - Sense of control

### **Informatics**

- Bring user experience of archives closer to modern day web

### **Education / Well-being**

- No-blame strategy: not blaming bullies
- Positivity
- Kind authority, not strict or punishing
- Dialogue

### **Health care / Well-being**

- **Patient-centredness:** any proposed intervention must support a patient-centred approach to rehabilitation.
- **Ease of Use:** any proposed intervention must have a minimal impact on the workload of staff, and not create unnecessary stress during implementation.
- **Ownership:** a patient feels they have the appropriate level of access to the review of their rehabilitation progress.

- **Network Navigation:** a patient feels informed enough to recognise their particular needs and confident enough to access and navigate the available network of SIU staff and resources to address these needs accordingly.
- **Projection:** patient and staff projection (i.e. ability to anticipate the steps needed to be taken and progress made before discharge from the SIU) is synthesised.

**How (in what form) did you communicate the targeted experiences? (n=9, NA:1).**

The most often repeated methods for communication were Brainstorming / Workshops / Meetings (3 responses), Reports / Documentation (2) and Scenarios (2). Other methods that were mentioned included: Bodystorming, Moodboards, Personas, Sketched design concepts, Ad-hoc interactions, Journey timeline, Publications and Audiovisual material.

The rest of the questions included seven sentence completion tasks.

**a) In my opinion, a good experience goal is... (n=9)**

Most important aspect for good experience goal seems to be that it is Clear / Precise / Understandable (4 responses), Achievable (3), and it Involves emotion / User's feelings / Pragmatic and hedonic elements (3). Other characteristics for a good experience goal were that the goal is Possible to evaluate, Grounded in research, Context related, Driving creativity and that it Comes from end user.

**b) The main opportunities in utilising experience goals in product design are... (n=9)**

Considering the main opportunities in utilising experience goals in product design, the most often repeated answers were Design drivers / Vision / Guidance (3), Focus in user (2), Improved design (2) and Innovativeness (2). Other opportunities mentioned included Evaluation criteria, Differentiating from competitors and the importance of Early iteration in order to fail fast and often.

**c) The main challenges in defining experience goals are... (n=9)**

The main challenges seem to be related to Interpretation (3), Specifications (2), Communications (2), Priorisation (2) and User centredness.

**d) The main challenges in communicating experience goals are... (n=9)**

Communicating experience goals can be challenging, especially because of the Subjectiveness of experience (2). Also, finding the Balance between specific and open goals (2), Clarity (2) and Concretising the goals for practical use (2) are seen as challenges for communication. Other challenges mentioned: Communicativeness of experience, Continuous communication, Stakeholder buy-in, Drawing



design implications, and Rationale e.g. "making the translation from user research to experience goals explicit."

The three last sentence completions related to different phases of design process, considering the successful setting of experience goals and confirming how they are reached.

**e) In the early phases of the design process, the experience goals setting is successful when... (n=9, NA: 1)**

The experience goals setting is considered successful by the respondents when the goals are Easy to understand and relate to (4) and Communicative/Informational (2). In addition, the goals should be Inspirational, User initiated, and Tested and iterated.

**f) During the design process, the best ways to confirm that experience goals are reached are... (n=9, NA: 1)**

Based on the responses, during the design process the best ways to confirm that experience goals are reached are User testing (5), Reviews / Checking match of goals and design solutions (4), Prototyping (3), and Using design implications drawn from the goals.

**g) After product launch, the best ways to confirm that experience goals are reached are... (n=9, NA: 1)**

After product launch, the best ways to confirm that experience goals are reached are considered to be User feedback / Interviews (5), Evaluations / Field testing (3), and collecting user data, such as User log data.

## 4. Results of the work in the groups

### 4.1 The essence of experience goals

In the first group work, the participants were divided into three groups, which were guided to engage in a discussion concerning 1) the characteristics of good experience goals, 2) how to concretise the goals, and 3) how to communicate the goals. Each group started by discussing the experience goal-setting process.

#### Experience goal setting

Group 1 started with an example: designing a knife as a gift that can evoke a feeling of craftsmanship. First, they imagined themselves as the designers of a knife manufacturer and created a persona: a girl who admires Japanese culture. The high-level experience goal 'trust' was embodied by "the feeling of craftsmanship," which was oriented from the brand story: the knife manufacturer Atau Tanaka had learned handicraft from his grandfather. The targeted experience was permeated into six aspects of product-service system: technique, practice, communication, organisation, aesthetics and ethics (Arvola, 2010). For example, the visual design of a brand and package can offer the feeling of trust and manifest it via the different touch points of the system.

Group 1 saw that experience goal setting and concretising follows a top-down approach. The goal setting is done before the decisions on functionalities and usability. Group 2 had a bit of a different view: they thought that through an iterative specifying and prioritising process, a consensus will be achieved about an integrated design goal. This integrated goal will then be analysed deeper into 'distilled attributes' or detailed actionable user experience (UX) goals, which will work as design drivers in the actual design work. Group 2 emphasised specifying, prioritising and consensus – a "UX goal distillery" – in defining integrated and focused experience goals.

Group 3 also saw experience goal setting as an iterative process. They suggested that experience goals include both the high level (experience vision) and the lower level (actual user feelings). The vision reflects the design intention, whereas the UX goals reflect context-dependent user/stakeholder articulation of what is and what should be. Experience vision can be e.g., "beautifully simple" and

the targeted feelings can be “relaxing, easy, fun.” Experience vision is important as it can be shared within the design team. Experience vision can be based on a slogan, simplification or key words. In the goal setting, the phases of analysis, synthesis and appropriate transformation are iteratively repeated between the vision and the actual feelings, i.e., top-down approach based on design intention and bottom up based on articulation of actual feelings.

### **Characteristics of good experience goals**

The groups identified several characteristics of good experience goals. The identified qualities can be grouped into three themes:

#### **A good experience goal mediates empathy**

- Can be easily utilised to empathise with users
- Worthwhile, context specific, emotional and human-centred
- Describes a feeling or an emotion that the user achieves with the product
- Includes both high and low level: Experience vision and actual user feelings

#### **A good experience goal guides design work**

- Guides design for meaning making
- Is precise enough to guide the design from the beginning
- Provides inspiration and guidance but does not restrict creativity
- Is correct in the sense that it does not mislead design

#### **A good experience goal is traceable through the design process**

- Can be evaluated and is traceable in the design process
- Convenient for designers to communicate experience goals through product service design system
- At a suitable level of concreteness, which can flexibly serve for both concept divergence and convergence

### **Concretising and communicating experience goals**

Only two groups had time to discuss concretising and communicating experience goals.

Group 2 emphasised that the design team should share and commit to the defined experience goals. That is why the experience goals should be clear enough so that everyone involved understands their meaning and further commits to the goals. Detailed, “distilled” experience goals can be concretised, for example, as sketches, scenarios, personas, and mood boards. These aim to act as references to the experience goals. Goals can be illustrated even more concretely as 3-D prints, samples, prototypes, or physical mock-ups that give concrete examples of how to proceed in the design.

Group 3 identified the following ways to concretise experience goals:

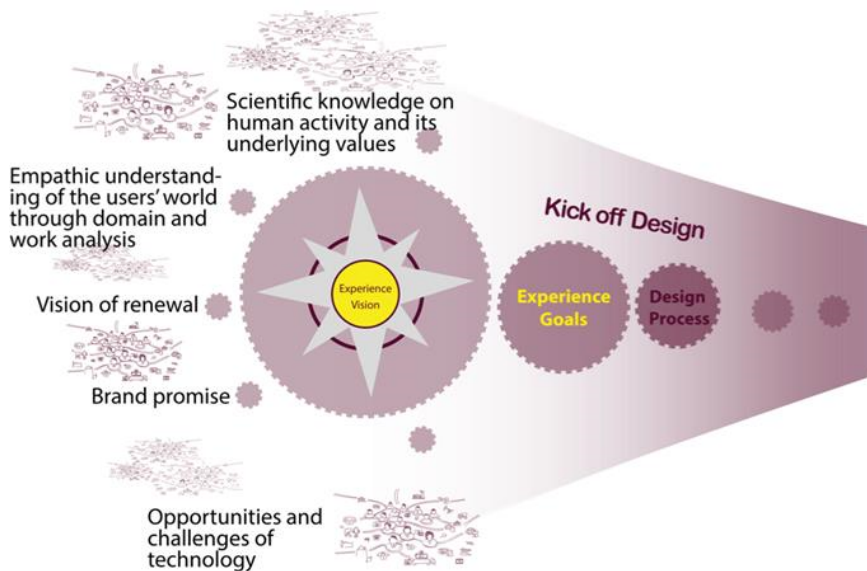
- Multimodality, for vivid memory
- Co-construction (reciprocal discussion with context), to ensure that the goals reflect users' world
- Story-telling (including interesting personas)
- Repetition, in order to keep the goals at the top of one's mind

When discussing who to communicate the experience goals, Group 3 concluded: *experience goals should be communicated to everyone who participates in creating the experience.*

## **4.2 Approaches to defining experience goals**

In the second group work, the participants were again divided into three groups (different to the morning groups) and they were asked to comment the presented fuzzy front end process model (Figure 3). They were also encouraged to share their own experiences and to discuss how to get from the fuzzy front end to the actual design.

The process model illustrated in Figure 3 is based on the workshop organisers' previous work. As illustrated in the model, insight and inspiration for an experience vision and further for experience goals can be sought from five sources: scientific knowledge on human activity and underlying values, empathic understanding of the users' world, vision of renewal, brand promise and technology. Towards the end of the process the amount of alternative solutions is reducing, which shows in the shape of the "design tube."



**Figure 3.** The Fuzzy Front end goal setting process that was commented by the groups.

### Possible enhancements to the model

The groups basically agreed with the presented model. As extensions to the model, Group 1 proposed that user's role should be reconsidered. They considered co-design and co-creation, i.e., active participation of users as an essential aspect missing from the graph. They also emphasised usage practises and personalisation as actions with which the users continue design during actual use, and create new experiences for themselves accordingly. The active role of the user should show in the model better.

Group 2 missed creativity from the model: Where is the actual design work conducted? The group also wondered how design background as a culture would show in the model.

Group 3 proposed, as additional sources of insight in forming the experience goals, for example, the designers' experience and inspiration, ethics, ideals, norms, the organisation's business development strategy and design strategy (both short- and long-term), current consumer behaviour as well as the given design brief.

Group 1 proposed that user studies and scientific knowledge of users may not be totally separate as scientific theories can reinforce observations and users can influence the theory.

Group 3 pointed out that expectations form the ground for experiences. Expectations can be based for instance on:

- Previous versions

- Marketing
- Social influence (F2F or online)
- Brand
- Ambassadors (influential individuals)

Expectations should also be taken into account in experience goal setting. This is a theme that definitely requires further studies.

Regarding the role of technology, Group 2 pointed out that technology as such can be a message. They also suggested that vision of renewal could be seen wider as “vision of future.”

### **Applicability of the model**

Group 1 pointed out that to put the experience goals into the actual design process, a separate activity is required in order to make the goals actionable. The model was seen rather as a checklist than a recipe. In practice, design may be outsourced or the design may involve ecosystems of different companies. It was questioned how the goal setting would then work. Group 3 emphasised the design perspective: ‘what is the objective of the design?’ They suggested that the model may be better suitable for designing “green field” opportunities than for incremental improvements. The role of expectations is strong in the latter, requiring that they should be somehow taken into account as discussed in connection to possible enhancements to the model.

Group 2 pointed out that in the goal setting, the different viewpoints can also show as value conflicts that need to be settled. Organisational culture affects who are involved in experience goal setting and who are making the decisions. The approaches to getting insight and inspiration into experience goal setting require time, so time to be spent in each phase should be considered. Group 1 also discussed the time aspect: gaining insight takes time and how should this show in the model.

Group 2 identified a need to include iteration to the model: the goals may need to be gradually refined, also during the design phase. They thought that some kind of a reality check would be needed for the information sources. Group 3 also suggested that the model should be made more iterative to consider for example the task-artefact cycle by Carroll & Rosson (1992). More iterativeness could be achieved by adding a feedback loop from user evaluations to the model. In addition, usually in design work once the brief is received, a counter brief is sent back. The whole iterative process of specifying and prioritising during the fuzzy front end should show somehow more clearly in the model. Now the shape of the model does not mediate the idea of iteration. Moreover, in one of the groups, the participants expected that the size of the “wheels” in the model aim to reflect time spent in each phase. It was not evident that they reflect the amount of design alternatives as intended.

In the final discussion in the workshop, we discussed what if user and brand values are in conflict. Brand alone may not represent all the relevant business aspects needed in experience goal setting. The participants agreed that a process model for the fuzzy front end of experience design is needed and the proposed model is an interesting starting point. Even if in the workshop the focus in the discussions was on concrete products as design objects, the model could fit also to the design of systems and services.

## Acknowledgements

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# References

- Arvola, M. 2010. Interaction design qualities: theory and practice. In: Proceedings of the 6th Nordic conference on human-computer interaction: extending boundaries (pp. 595–598). ACM.
- Buxton, B. 2010. Sketching User Experiences. Getting the Design Right and the Right Design. Morgan Kaufmann, 2010.
- Carroll, J.M., and Rosson, M.B. 1992. Getting around the task-artifact cycle: how to make claims and design by scenario. *ACM Transactions on Information Systems (TOIS)*, 10, 2 (1992), 181–212.
- Desmet, P.M.A., and Schifferstein, H.N.J. (eds.). 2011. From Floating Wheelchairs to Mobile Car Parks: a Collection of 35 Experience-Driven Design Projects. Eleven Publishers, Den Haag, NL.
- Hassenzahl, M. 2010. Experience Design – Technology for All the Right Reasons. Morgan & Claypool.
- Hassenzahl, M., Eckoldt, K., Diefenbach, S., Laschke, M., Lenz, E., and Kim, J. 2013. Designing moments of meaning and pleasure. *Experience design and happiness. International Journal of Design*, 7, 3 (2013), 21–31.
- Hekkert, P., and van Dijk, M. 2011. Vision in Product Design: handbook for innovators. BIS Publishers.
- Karvonen, H., Koskinen, H., and Haggrén, J. 2012. Defining User Experience Goals for Future Concepts. A Case Study. In: Väätäjä, H., Olsson, T., Roto, V., and Savioja, P. (Eds.), *NordiCHI2012 UX Goals 2012 Workshop proceedings*, TUT Publication series (2012), 14–19. <http://URN.fi/URN:ISBN:978-952-15-2955-9>. ISBN 978-952-15-2955-9.
- Khurana, A., and Rosenthal, S.R. 1998. Towards holistic 'front-end' in new product development. *J. Prod. Innovat. Manag.* 15 (1), 57–74.
- Norman, D. A., and Verganti, R. 2014. Incremental and Radical Innovation: Design Research vs. Technology and Meaning Change. *Design Issues*, 30, 1 (2014), 78–96.
- Roto, V., and Rautava, M. 2008. User experience elements and brand promise. In *Proc. International Engagability & Design Conference*, in conjunction with NordiCHI (2008).

Väätäjä, H., Olsson, T., Roto, V., and Savioja, P. 2012. UX Goals 2012 Workshop – How to Utilise User Experience Goals in Design. TUT Publication series (2012). Tampere University of Technology <http://URN.fi/URN:ISBN:978-952-15-2955-9>. ISBN 978-952-15-2955-9.

## **Appendix A: Workshop papers**

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# Defining user experience goals for paper quality control system

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## **Abstract**

Defining and deciding user experience (UX) goals is a core part of any user experience oriented design project. UX goals can be based on different information sources and reasoning. In user-centered design, emphasis is naturally given to users and their needs. However, in work context also content of the work, organizational cultures and even business models effect on what are meaningful user experience goals for a product or service.

This paper describes a study of UX goal defining in concept development of a paper quality control system for paper mills. UX goals were defined during the concept development by combining 1) existing knowledge of ergonomics, usability and UX in control rooms, 2) opinions and viewpoints of users-to-be of the quality control system, and 3) knowledge and viewpoints of the product development organization. The resulted UX goals were: 1) learnability, 2) awareness, 3) control, and 4) success. The goals reflect user needs, company strategies, and technical opportunities. The paper presents also examples of design guidelines and evaluation heuristics and instruments derived from the UX goals. Design guidelines and ways to evaluate the UX of designs are an important way to ensure that UX thinking extends through the whole design project.

### **Author Keywords**

User Experience; User Experience goals; Complex systems; Quality control; Concept Development

### **ACM Classification Keywords**

H.5.2. Information interfaces and presentation (e.g., HCI): User Interfaces.

### **Introduction**

Concept development is an early phase of product development during which the idea of the product or service is created [10]. In user-centered concept development, the focus is usually on finding the users' needs and wishes in order to create products that fulfill them [4].

Specifications and requirements are the usual way to guide design and engineering projects towards agreed on goals. In case of UX, UX goals are one way to formulize UX ideas into measurable units.

While usability aspects and requirements can be almost solely based on users' characteristics and needs, user experience demands more comprehensive understanding about the usage situation and users' internal state [1]. Thus defining UX goals requires combining knowledge from different information resources and stakeholders.

In work context, the pragmatic aspects of UX are underlined. The technology and tools should both feel and be effective and efficient from the work task performance point of view. The positive UX can be even considered as a measure of general appropriateness of different functions of a tool. In industrial context, the safety of the system is an important part of the general

appropriateness of the tool; thus, most probably safety is a factor affecting the UX [9]. Also the capability of the technology to increase the support in problematic situations has been identified to affect positively UX [6].

In paper mills, the process control systems are highly automated. Quality control is typically an integral part of the process control system; thus, the operators don't make a difference between quality control and process control tasks. The correlations in paper machine quality control are rather complex: one parameter controls several variables.

In the review of trends in process automation by Jämsä-Jounela [3] she referred to a study of use of operation support systems at paper mills in Finland. In the study was found that only 30-40 % of installed operator-support systems were used due to the lack of usability and operator's poor knowledge of the systems. Although there have been renewals of automation systems since the publishing of the article, it doesn't take away the fact that usability and user experience play important roles also in industrial use contexts.

This article describes UX goal development in the very early phase of a paper mill quality control system development project. In addition to the UX goal development process and resulted UX goals also plans for utilizing goals during later phases of product development are described.

### **Setting the User Experience Goals**

The UX goal development was conducted through a three-step process. First, the main stakeholders and information resources regarding paper quality control

systems were identified. Second step was the gathering of understanding about identified stakeholder groups and available knowledge from identified information resources. Lastly, understanding and knowledge from different stakeholders and information resources were combined into four main UX goals.

The main stakeholders relating to the quality control system were quite naturally paper mill workers, their customers, and product development team of the company. Quality in paper production means mainly product's minimal deviation from the agreed on specification. In addition, the specifications are not usually customer specific. As a result customers' role in quality control is somewhat passive. If the product differs from the specification or otherwise causes problems e.g. in printing, the customer gives notice of defects. For these reasons the UX goal development focused on paper mill workers duties and opinions as well as product development company's perspective and the customers of the paper mill were left out in user research. Paper mill workers were studied with semi-structured interviews focusing on process control work in general and quality control work and user experiences in quality control work in particular. The product development company's viewpoint was gathered through user requirement workshops during which initial user requirements as well as potential technology trends were discussed.

The main information resources relating to the quality control system were: technology trends, company strategies, the available studies of control room ergonomics and usability, and the available studies of process control work user experience. Technology trends were gathered from popular technology magazines, Internet based services as well as from the product development company personnel. Because of the nature of the product development project (the renewal of an existing product), the technology trend analysis focused on short-term trends and mainly on user interface technologies. Information about company strategies was gathered mainly from companies' press releases and product brochures. A book about control room design [2] was used as the main information resource about usability and ergonomics issues in control rooms. In addition some individual articles such as [7] were used to gather understanding of control room user experience.

The final UX goals were formed in iterative manner. Initial UX goal candidates were formed based on the understanding about the user needs, requirements and characteristics of quality control work. Other information resources and knowledge domains were then used to further develop the candidates. In the end, the UX goals were reduced to four main goals which seemed to fit together and were accepted by the whole product development team.

### Identified UX Goals in Quality Control Work

The four selected UX goals for the quality control system were: Learning, Awareness, Control, and Success (Figure 1).

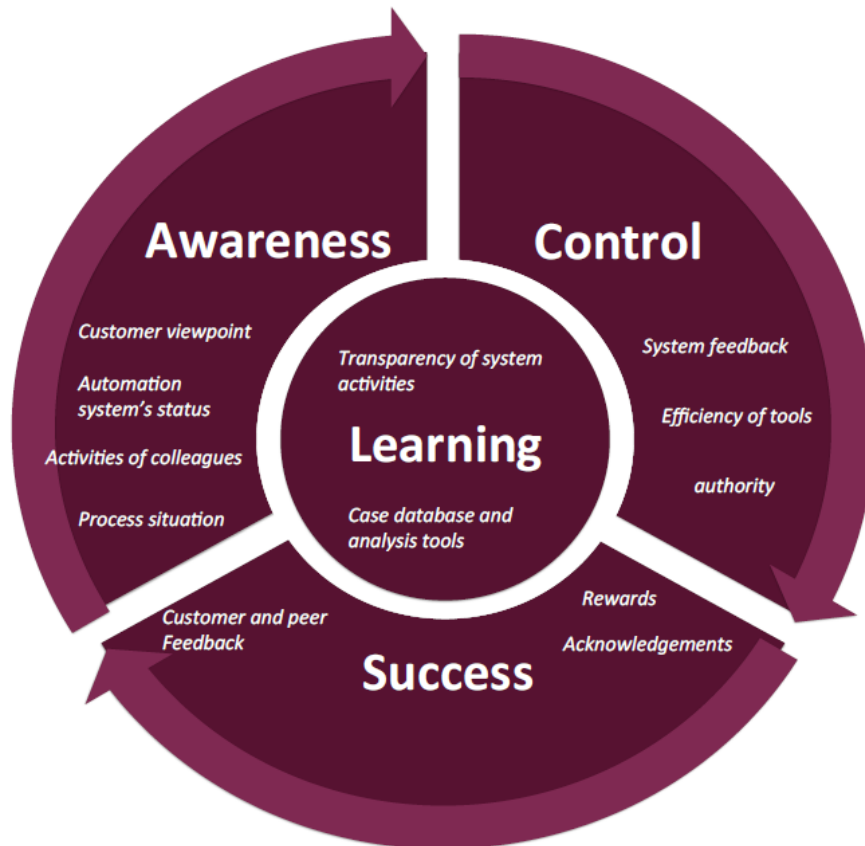


Figure 1. UX Goals for Quality Control work in paper mill.

In **Learning** it is important to allow operators to feel that they are becoming better in both running the paper machine and using the automation system. Learning can be supported with tools that help finding and reusing information from previously occurred incidents. In paper quality control, the most important learning themes are quality parameters and factors, and how good quality is built in production processes. Learnability was not emphasized by the current operators but the characteristics of work (e.g. long periods of routine work followed by events requiring special tools and knowledge, the high level of automation in tools, and complex processes to be controlled) suggested the importance of intuitive designs and high learnability. In addition the product development team's experiences of previous customer deliveries supported the notion of learnability.

**Awareness of quality** is created from quality information that automation system provides and bases on operator's trust in information's accuracy and truthfulness. The operator needs to understand the quality from customer's perspective and to understand relationships between the quality, production efficiency, and business premises of the paper mill. Since work in paper mills is group work, it is also important to be aware of colleagues' activities. Awareness and trust are identified in literature as a central aspect of automation systems [e.g. 2]. In addition, being aware of current quality situation was emphasized by the operators in interviews.

**Quality control** builds on good awareness of quality. In order to feel like being in control, the operator needs to be able to make quality decisions and to see her decisions affecting on product's quality. In addition the

operator needs to trust on the automation system's capabilities to affect efficiently the paper production process. Similar to awareness, also control is identified in literature as a central aspect of automation systems. In addition the feeling of control about quality situation was mentioned by operators as a key factor of providing the feeling of control and possibilities of relax during work. The feeling of control was also mentioned in product development company's marketing materials and listed as a central way to gain competitive advantage by the product development team.

**Success** is based on the feeling of quality control. The feeling of success can be emphasized by positive feedback from colleagues and supervisors as well as from customers. It is important that the feedback reaches the right workers and teams. With quality success also pride towards the products of the paper mill will grow. Also other success-experiences such as optimizing energy and raw material usage can be approached in a similar way as quality success. The feeling of success was not mentioned in control room work literature or in operator interviews. However, UX literature recognizes and emphasizes the need to provide positive experiences [e.g. 8]. Since success fits also well into work context, it was taken as one main UX goal for the quality control system.

### **Utilizing the UX Goals in Design Process**

Setting the UX goals is an important milestone in a design process; however, in order to become memorized the expressions of the goals need to be

compact and, thus, rather general. The goals need to be further developed into more practical form, for example to design principles, before they can be fully utilized. Also tools for evaluating the congruence between UX goals and design solutions are required.

Design tasks can be supported quite easily by reformulating UX goals to design guidelines. In addition, the UX goals themselves can be used as the starting points of ideation activities such as brainstorming.

In order to evaluate the success of designs, the UX goals need to be turned into evaluation criteria. Since the access to users and usage context was not straightforward in the design project, a decision was made to provide both expert based and user-involving evaluation methods and criteria for the product development project. There is a long tradition of heuristic evaluation in user-centered design [e.g. 4]. Thus, UX heuristics were developed to support product development team in fast and informal UX evaluation. UX heuristics included also meta-level UX requirements, such as the need for consistency and comprehensiveness in the quality control system's UX clues, which were not included as separate UX goals. Table 1 shows a few examples of developed UX heuristics as well as corresponding UX goals.



Table 1. Examples of UX heuristics and their linkage to UX goals.

<b>UX review heuristics</b>
<p><i>Easily observable</i>                      The system shows clearly and proactively quality situation and changes in it.                      UX goals: Awareness of quality, Quality Control</p>
<p><i>Information accuracy and trustfulness</i>                      The system shows the measuring/creation time for all information.                      UX goals: Awareness of quality</p>
<p><i>Feedback</i>                      The system informs user about her actions impacts on product quality.                      UX goals: Quality Control, Learnability</p>

### Future Work

The research as well as the studied product development project are still underway. We hope to follow the product development project through and to 1) understand how the UX goals evolve during the design, 2) learn how the UX viewpoint spreads inside product development organization, and 3) see how well the UX goals are in the end met in actual product usage.

### Acknowledgements

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### References

- [1] Hassenzahl, M., and Tractinsky, N. User experience - a research agenda. *Behaviour and Information Technology*, 25, 2 (2006), 91-97
- [2] Heimbürger, H., Markkanen, P., Norros, L., Paunonen, H., Savioja, P., Sundquist, M. and Tommila, T. *Valvomo – Suunnittelun periaatteet ja käytännöt*. Suomen Automaatioseura ry, Helsinki, Finland, 2010.
- [3] Jämsä-Jounela, S.-L. Future trends in process automation. *Annual Reviews in Control* 31 (2007), 211-220.
- [4] Kankainen, A. UCPCD: User-centered Product Concept Design. Proceedings of DUX'03. 2003.
- [5] Nielsen, J. *Usability Engineering*. AP Professional, San Diego, CA, USA, 1993.
- [6] Palviainen, J, Väänänen-Vainio-Mattila, K. User experience in machinery automation: from concepts and context to design implications. In M. Kurosu (Ed), *Human centered design*. Springer, Berlin, Heidelberg, 2009, pp. 1042–1051.
- [7] Paunonen, H. and Oksanen, J. Usability and user experience of process control systems and the feeling of control. In Proc. of 10th International Technical Conference on Pulp, Paper and allied Industry. (Pragati Maidan, New Delhi, India, ), 2011, 299-305.
- [8] Runonen, M., Tamminen, S., Mannonen, P.: Reflections on how service experiences arise. *Re-public: re-imaging democracy*. 2009.
- [9] Savioja, P., Liinasuo, M., Koskinen, H. User experience: does it matter in complex systems? *Cogn Tech Work*, Published online: 05 October (2013).
- [10] Ulrich, K.T., Eppinger, S.D. *Product Design and Development*. McGraw-Hill Education. Boston. 2000 (2<sup>nd</sup> ed.)

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# User Experience Qualities and the Use-Quality Prism

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**Abstract**

Deciding the desirable user experience qualities, i.e. UX goals, for a future product or service is important but difficult. This case study explores how a set of qualities is articulated in the concept design process. The case is a project aimed at exploring the use of smartphones to augment the childhood home of Astrid Lindgren—the children's book author—with stories about her life and authorship. The results showed that articulated UX qualities focused the design work. It was also observed that one set of desirable qualities does not fit all phases in a project, and design consequences propagate between aspects of UX quality.

**Author Keywords**

Quality in use, user experience, use qualities, experiential qualities, interaction design qualities, quality-centered design.

**ACM Classification Keywords**

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

**Introduction**

Early in an experience design project it is important to set up desirable qualities defining the user experience (UX). We aim to find viable approaches to setting desirable qualities, i.e. UX goals. Articulating design

### **Practical Aspects**

*Usefulness:* Do the users have use for the product or the service, its functions and content (relevance or usability in the broad sense)?

*Usability:* To which degree is it comprehensible, clear, maneuverable, and easy to navigate?

### **Communicational Aspects**

*Symbolism & Identity:* Does the product or the service presents the actors in a desirable way, and is appropriate symbolism used?

*Cooperation & Coordination:* Does the product or the service support cooperation and coordination between actors?

### **Organizational Aspects**

*Operations & Admin:* Is the division of labor for administrating the product or service thought through?

*Business:* Is it adapted to the business? Does it contribute to the business value?

objectives regarding UX facilitates the development of a sense of direction in the fuzzy front end of design and innovation [11]. The research question for this case study is how a set of desirable qualities was articulated in the concept design of a platform for mobile augmented reality (AR) applications, and an example application based on that platform. The platform was named Minnesmark, and the example application was called Astrid's Footsteps (Swe. 'Astrids spår'). The overarching purpose of the project was to explore how mobile augmented reality (mobile AR) could be used to communicate the life and authorship of the children's book author Astrid Lindgren in the landscape around Vimmerby, Sweden, where she grew up. The project also aimed at building on principles behind outdoors education such as physical outdoors group interaction. The idea behind AR is to enhance the physical world in real-time with computer-based graphics and sound. However, this paper does not focus on our specific application of augmented reality, which is a topic covered in an earlier paper [10]. This paper aims instead to describe how the desirable experiential qualities were articulated in the concept design process leading up to that end result.

### **Aspects of UX Quality**

We share the aim of Lim, Lee and Kim [8] to develop a quality-centered design approach, not primarily based on rationalistic methods, but rather based on a sense of quality from a designer's perspective. There are however different perspectives that designers may impose on the design situation, and those perspectives will affect what aspects they will pay attention to [7]. Being able to change perspective on what design quality is, can give a richer picture of a product or service under design. Changing perspective will reveal

new aspects and dimensions of the design. The following set of aspects of design qualities in interaction design have been described before in slightly different terms [4, 5, 6, 9]. They are described here using a terminology from activity theory, and the model has been referred to as the Use-Quality Prism [2, 3].

*The practical aspects* of UX quality are what we normally think about when we consider a subject doing something by means of an artifact directed towards some kind of object [4, 5, 6, 9]. It is the hammer made for driving down a nail, or the image editor made for editing images. The artifact is in this perspective seen as a tool for mediating instrumental action and attention directed at a material object. The tool itself remains in the background of attention. The practical aspects can be divided into the issues described in the sidebar.

*The communicational aspects* of UX quality involve the role of the product or service in relation to its use towards other people [4, 6]. These aspects appear when the artifact is seen as a sign or a medium, mediating social or communicative action and attention directed at other people. This includes both direct mediation of a message, and the more indirect symbolism of what the artifact means to us and signals to others. The artifact itself remains in the background of attention, while the message or symbolism is in focus. An example could be how a subject in relation to his or her family and friends uses an image editor. The communicational aspects can be divided into the following issues described in the sidebar.

*The organizational aspects* of UX quality concern the division of labour and rules in a community—issues

### **Aesthetic Aspects**

*Form & Material:* Is the visual and physical design, behavior, material and media format appropriately selected?

*Character & Innovation:* Does the product or the service has a unique and novel character and feel?

*Experience of activity:* Is the experience of the interaction and activity appropriate, enchanting and natural?

### **Ethical Aspects**

*Habits:* What habits and patterns of behavior does the product or service contribute to, and what are the long-term consequences?

*Power:* What power structures does it support or overthrow—between individuals, between individuals and organizations, or between individuals and society?

*Norms and ideals:* Does it reinforce or tear down norms and ideals in society?

touched upon in earlier models [5, 6, 9]. It could, for instance, be if a person has been given the role of photographer at a wedding, and the image editor is then used as part of the organizational workflow aiming at creating and documenting this event. In this perspective, the artifact is like a business component mediating social or societal action directed at a community of people and its division of labor and its rules. The community of people that action is directed at can be either internal or external to the organization. This aspect of UX quality includes issues like organizational change and business models. The organizational aspects can be divided into the issues in the sidebar.

*The aesthetic aspects* appears when a product or service is used with the user's own experiences in focus [4, 5, 6, 9]. A person could for example have an aesthetic use of an image editor when just sitting around playing with images. The activity has then no practical purpose. In some sense the use of the application is directed towards the image, but even though the focus is on the image as an object, the end object is the user himself or herself, since it is his or her experience of the activity that is the important thing. This becomes even clearer in such cases where it does not matter which image the user is playing around with. In this perspective the artifact is hence seen as an objectified form, mediating action and attention directed at the user's own experience of the artifact. The aesthetic aspects can be divided into the aspects in the sidebar.

*The ethical aspects* of UX quality are about considerations in design and use concerning rules, norms and ideals [4, 5, 6, 9]. What kind of world is it

that a designer wants to create? What kind of world do users and designers want to contribute to? What is OK to do, and what is not OK to do? What behaviors do we want to encourage and what behaviors do we want to avoid? For example, do we want to encourage a healthy way of life where you eat a varied diet, or do we want to encourage eating junk food? Do we want people to get up and move around more, or do we want to encourage a life as a couch potato? What kind of ideals lie behind the desirable use? In this perspective the artifact is seen as an objectified concept, mediating action and attention directed at ethical concerns. The ethical aspects can be divided into the issues presented in the sidebar.

*The technical aspects* of UX quality appear as a subject aims the attention towards the interactive product or service and sees it as a structure or material [5, 6, 9]. Let us say that a person edits an image and changes the saturation in the image editor, which suddenly does something unexpected. In such a situation the application becomes objectified as the person tries to understand its construction. This technical aspect is crucial during the development process, but not desirable during operational use, except in some learning situations where a user needs to learn how to use a product or service. In this perspective the artifact is accordingly seen as an objectified structure, mediating action and attention directed at the construction or material of the artifact. The technical aspects can be divided into the issues in the sidebar.

### *Working with the Multiple Aspects of UX Quality*

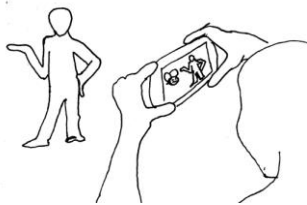
It is important to put the question why for each and every issue described above. The why-questions force a designer to provide motivations for the design. The

## Technical Aspects

*Construction:* Is the product or service technically thought through in terms of robustness, performance, skilled craftsmanship and engineering?

*Technical constraints:* Can the product or service be realized with reasonable cost, time and performance?

*Technical opportunities:* Does it take advantage of the possibilities of technology?



**Figure 1.** From the concept "Guide with virtual sidekick".

aspects are a basis for discussing thinking things through.

Design decisions based in one aspect of UX quality can propagate consequences for other aspects of the design. For example, if a designer of an image editor makes a decision, for practical reasons, to include a function for retouching a human body, it may have the consequence that all models in advertisements are made based on a skinny ideal (ethical aspects). It may also have the consequence that the function is difficult to program (technical aspects).

The idea of thinking in terms of different quality aspects has been tested in an action research project [2]. It was then used to analyze what has been overlooked in the design process, and it was observed that the different quality dimensions, as well as specific design qualities (i.e. correctness, simplicity, and sociability) needs to be defined in close cooperation with users and other stakeholders. It is in their situation the qualities get their meaning. Regular thematic qualitative analysis of users' and stakeholders' accounts and field notes from ethnographic work can be used to obtain a set of desirable qualities in a design project. This set can then be hierarchically ordered in a means-ends hierarchy to get a clearer picture of the objectives for the design project [1, 3].

## The Case of Astrid Lindgren's Näs

The case presented here studies the concept iteration of the design of an augmented reality application with the aim at communicating the life and authorship of the children's book author Astrid Lindgren in the landscape where she grew up. The design team particularly focused on the area around her childhood home: Astrid

Lindgren's Näs in Vimmerby, Sweden. The prototype developed for Astrid Lindgren's Näs became in the end a mobile AR treasure hunt.

The concept iteration consisted of three phases: conceive, construct and consider. Initial concepts were conceived in participatory design workshops. Contextual inquiries were made at places that could have something to tell using AR. The technical work also started by investigating feasibility on different platforms. Concept sketches were made based on the documentation from the workshops. In total, forty concept sketches were made. High-level storyboards were in addition made for the most promising concepts. An early coded implementation prototype was also constructed. The concept design iteration was concluded by considering the concepts in a concept selection matrix (a.k.a. Pugh charts). The basic idea of such a matrix is to compare all concepts in relation to a set of criteria and then decide which concept or concepts to continue working on.

The work in the contextual inquiries and design workshops was, together with the original purpose of the project, translated into the thematic design objectives in the sidebar.

Most of the design objectives in the list above are connected to practical aspects. They have primarily to do with the usefulness and utility of the future outcome of the project. Some communicative and technical issues are also present.

The early work also conceived objectives for how the prototype should be experienced by the users. The following qualities were extracted from workshop

### Thematic Design Objectives

*Augmented Reality:* The project aimed at exploring how augmented reality could be used in tourism and outdoors education.

*Physical Interaction:* A basic principle in outdoors education.

*Group Activity:* Another principal of outdoors education that the design team wanted to support.

*Astrid's Life & Authorship:* What the design team wanted to communicate.

*Folklore & Cultural History:* The design solutions should be able to be used to communicate the lore and history of a place.

*Biology & Nature:* The solutions should be able to be used to communicate knowledge about the biology and the nature of a place.

participants' experiences of Astrid Lindgren's authorship: *Respect for the child; Empathy; Equality; Questioning of authority; Respect for the culture; Respect for nature; Curiosity; Breaking the norms.*

These desirable UX qualities are primarily of an aesthetic nature, but also ethical in their critical stance. The qualities were subsequently used in brainstorming sessions. One of them was taken up in the session and ideas around that specific objective were generated. For example, the quality of 'breaking the norms' was taken up and ideas were developed about what could be built that broke the norms and at the same time fulfilled the thematic design objectives and the purpose of the project. In this way about 40 concepts were generated. The presentation of the concepts also included which interaction design qualities they did build on. Figure 1 shows an example of a concept sketch.

Every concept was then assessed using the thematic design objectives and the five most promising concepts were detailed further in the construction of high-level storyboards (Figure 2).



**Figure 2.** From the concept "Show and tell".

The concept design iteration ended with considerations and concept selection. The criteria for selecting concept were also based in the original thematic design objectives and desirable user experience qualities. They were however, at this stage revised and some new criteria were added since the design team had a better understanding of the design situation. The criteria at this stage are described in a sidebar. The role of these criteria was not to drive creativity and support a divergent process as the original objectives. They rather had the role of saying "no" to particular design solutions, and hence support a convergent process.

The desired focus on the natural and cultural landscape made the design team decide that navigation in the information space should be made by walking around (place-based navigation) and by pointing the phone in different directions (device-direction-based and movement-based navigation). The design team did accordingly not want to employ too much interaction with the touchscreen, simply to decrease the focus on the screen.

Apple iPhone 4 and iOS were chosen as platform since the project team already had knowledge of the platform (an organizational issue), and it provided all the sensors needed (a technical issue). ARToolKit was used for the augmentation because of availability and cost (technical and organizational issues).

### Conclusions

The research question was how a set of qualities was articulated in the concept phase of this case. The results show that qualities in the form of design objectives and desirable user experiences were explicitly articulated and re-articulated. Re-articulation

### Criteria for Concept Selection

*Arouse Curiosity:* A new aesthetic quality.

*Focus on Natural & Cultural Landscape:* A combination of several of original qualities, both practical and communicational.

*Communicate Astrid's Life & Authorship:* The same communicational quality as before.

*Support Outdoors Education:* A combination of several original practical and communicational qualities.

*Good Long-term UX:* A new aesthetic quality.

*Cost:* A new technical and organizational quality.

*Feasibility:* A new technical quality

*Viability for Recreational Business:* A new organizational quality.

of design qualities was crucial in order to find objectives on the level of abstraction appropriate for every phase of the design process. The early interaction design qualities had the role of supporting a divergent creative work in concept generation, and focusing on the experience of doing things. In concept selection their role was instead to support convergent evaluation work with the goal of limiting the number of alternatives and a step back towards the motives was taken.

The UX qualities in the Astrid Lindgren's Näs case were sometimes broad and connected to the motives that drove the activity, and at other times they were more narrowly tied to goals of the users involved. When they were at their most detailed level they almost directly pointed towards the properties of a specific design element and users' operations.

The conclusion of this case study is that the work with UX qualities is present through the entire design process. Design decisions made in based on for example aesthetic grounds propagate consequences for technical or practical aspects. Articulations of design qualities are used differently depending on where in the process the design team is. One set of desirable design qualities does not fit all design situations in a project.

### Acknowledgements

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### References

- [1] Arvola, M. A Use-qualities approach: Judgements in interactive media design. In P. Hernwall (Ed.), *The virtual: designing digital experience: a conference 2006*. School of Communication, Technology and Design, Södertörn University, 2007, 102-118.
- [2] Arvola, M. Interaction Design Qualities: Theory and Practice. In *Proc. NordiCHI 2010*, ACM Press (2010), 595-598.
- [3] Arvola, M. *Interaktionsdesign och UX*. Studentlitteratur, Lund, in press.
- [4] Dahlbom, B., & Mathiassen, L. *Computers in Context: The Philosophy and Practice of Systems Design*. Blackwell, Oxford, 1995.
- [5] Ehn, P., & Löwgren, J. (1997). Design for quality-in-use: Human-computer interaction meets informations systems development. In M. Helander, T. Landauer, & P. Prabhu (Eds.), *Handbook of Human-Computer Interaction. Second, Completely Revised Edition*. Elsevier, Amsterdam, 1997, 299-313.
- [6] Holmlid, S. *Adapting Users: Towards a Theory of Use Quality*. Linköping University, Linköping, 2002.
- [7] Hult, L., Irestig, M., & Lundberg, J. (2006). Design perspectives. *Human-Computer Interaction, 21*, 1 (2006), 5-48.
- [8] Lim, Y., Lee, S., & Kim, D. Interactivity attributes for expression-oriented interaction design. *International Journal of Design, 5*, 3 (2011), 113-128.
- [9] Löwgren, J., & Stolterman, E. *Thoughtful Interaction Design: A Design Perspective on Information Technology*. MIT Press, Cambridge, 2005.
- [10] Nilsson, S., Arvola, M., Szczepanski, A, & Bång, M. Exploring Place and Direction: Mobile Augmented Reality in the Astrid Lindgren Landscape. In *Proc. OzCHI 2012*, ACM Press (2012), 411-419.
- [11] Sanders, E. B.-N. & Stappers, P. J. Co-creation and the new landscapes of design. *CoDesign, 4*, 1 (2008), 5-18.

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# The Mediated Action Sheets: Structuring the Fuzzy Front-End of UX

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**Abstract**

Decisions about what to design, for whom, and why to design it, are made during the fuzzy front of user experience (UX) design. Our approach to structure this process is to use a theoretical and methodological framework based on mediated action. This position paper describes how we put the framework, called the Mediated Action Sheets, to test in UX design practice. The test consisted of two workshops with professional designers. Transcripts of video recordings and results were qualitatively analyzed. The results are used to improve the framework.

**Author Keywords**

Mediated action; activity theory; interaction design; service design; user experience; concept design; fuzzy front-end

**ACM Classification Keywords**

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

**Introduction**

Decisions about what to design, for whom, and why to design a particular object with a certain set of user experience goals are made in the early phases of a design project. These stages are perceived as fuzzy since the directions for the project are not yet set and



qualitative data are usually gathered for both information and inspiration (Sanders, 2005). It is during this phase a vision of what to do, for whom and why is established and embodied in design concepts to facilitate innovation and choice of actions. Design concepts should be visionary and break new ground, well-grounded, easy to grasp, and focus on its unique selling points in terms of UX, looks, interaction, form factors and target users (Keinonen & Takala, 2006).

This paper focuses particularly on the interaction and service design aspects of user experience (UX) design. Interaction and service design can be conceived as the shaping of conditions for human activity (Arvola, in press). The Activity Checklist (Kaptelinin & Nardi, 2006) can be used as a support for the fuzzy front-end of interaction and service design, but it requires basic understanding in cultural-historical psychology and Activity Theory concepts (Arvola, 2013). We have, also based on concepts related to activity theory, instead developed the Mediated Action Sheets. They are used to structure the fuzzy front-end while also striking a balance between information and inspiration (Arvola, 2013). They are used to structure user research, develop personas, and generate design concepts.

The sheets have earlier only been informally tested, and the purpose of this case study is to evaluate and improve them with design practitioners.

### Theory

An earlier approach to making Activity Theory useful in design work is the Activity Checklist (Kaptelinin & Nardi, 2006). It is developed to guide a researcher or designer to the critical contextual factors in a situation of use (Kaptelinin & Nardi, 2006). It covers all the

major aspects outlined in Activity Theory (i.e. means ends; social and physical aspects of the environment; learning, cognition and articulation; development; and mediation). For someone who is just entering the field it is however a daunting task to even get started. The checklist work quite well for the information part of the fuzzy frontend, but it does not work well for the inspiration part.

In an attempt to make Activity Theory a more hands on tool for design, Bødker and Klokmoose (2012) devised the Human-Artifact Model, with the purpose of getting students to act skeptically and systematically supported by theory. It builds on a model they call the human-artifact model, depicted in Table 1. The human side consists of learned routines and action possibilities of the user; while the artifact side consists of assumptions and constraints of use that artifact builds on. The three levels of why, what and how represent the three levels of activity, action and operation in Activity Theory. Bødker and Klokmoose describe how students have used the Human-Artifact Model to address the motivation, goals and operational orientation of personas, and their various technological background competencies. The model was also used in explorations of existing scenarios as well as future scenarios, which were juxtaposed based on the three levels. The model was furthermore used in reviews of prototypes.

The Mediated Action Sheets, which we have developed (Arvola, 2013), build on a related model called Burke's Pentad (Burke, 1945), and Wertsch's (1998 a) use of it in a framework for Mediated Action. The first step of using Burke's Pentad is to identify the performed act, inquiring what the scene of the act is (the context or the situation in which it occurs and its history), and

<b>Why?</b>	Motivational aspects	Motivational orientation
<b>What?</b>	Instrumental aspects	Goal orientation
<b>How?</b>	Operational aspects - Handling aspects	Operational orientation - Learned Handling
	- Adaptive aspects	- Adaptation
	<b>Artifact</b>	<b>Human</b>

**Table 1.** The Human-Artifact Model (Bødker & Klokmoose, 2012)

### The Five Questions of Burke's Pentad

**Act:** What was done?

**Agent:** Who did it?

**Scene:** Where and when was it done?

**Agency:** How was it done?

**Purpose:** Why was it done?

finding the person or role performing the action: who the agent is. After that, one is asking how and by what means the action is performed: what its agency is. Finally, one is putting the question of why the action is performed: what its purpose is. It is the standard questions you learn in school for writing a good story (see sidebar). This set of questions is sometimes referred to as the 5WH or just the Five Ws, and has been used in rhetoric for centuries. They also reflect the five constituents of the Human-Artifact Model.

In Burke's original pentad, the label Agency refers both to "by what means" or steps by which an act is performed (Latin *quibus auxiliis*), and "the attitude" with which, or the manner in which, an act is performed (Latin *quo modo*) (Burke, 1978). It is important to capture both these aspects in design in order to produce an artifact with desirable UX qualities. *Quo modo* is especially connected to user experience qualities.

Another important aspect of the pentad is the ratios between its constituents, also highlighted in the Human-Artifact Model. For example, if we know of a person called Dan (agent) who is taking a drink (act), slowly in a glass (agency), in the evening at a bar (scene), together with friends (co-agents), we reach one meaning or purpose of the act. If we however put Dan in another scene where he takes a drink in the morning before going to work, the act takes on a completely different meaning. This means that the pentad should be viewed as a whole, even though different people can put different emphasis on the various constituents.

### The Mediated Action Sheets

There are two parts of the Mediated Action Sheets: the Persona Sheet and the Design Concept Sheet. The Persona Sheet can be used as support for creating user personas (Cooper, Reimann & Cronin, 2007; Pruitt & Adlin, 2005), hypotheses about who the user is, or observation/interview protocols for user research. The contents of the Persona Sheet are grounded in Burke's Pentad and Wertsch framework for Mediated Action. It consists of a number of fields where the design team can write down the user's goals and motivations, attitudes, skills and knowledge, things that work well and things that do not work well, as well an ordinary day in the life of the persona. There are also fields to describe the activities performed by the persona—in terms of act (what), agent (who), scene (when/where), agency (how) and purpose (why). There are finally fields for ideas to take note of and fields for remaining questions. The Design Concept Sheet is intended to facilitate generation of design concepts that are unique from each other, as well as well thought through. One part has fields based on Burke's Pentad, with the addition of a field for how the design affects people, society and environment (intended to make designers think of wider ethical and moral concerns of their design). The next part is an area for a sketch of the design. The final part of the Design Concept Sheet is storyboard template for sketching a scenario of use.

The latest version of the sheets are available at <http://www.ida.liu.se/~matar/tools.en.shtml>. Small versions of them are included at the end of this paper. An earlier version of the were tested in this study.

### **The Design Brief**

There are sluice rooms between corridors and operating rooms at the burn intensive care unit (BICU) at the hospital. There is surgical equipment there and a sluice guard shall always be present during surgery. The guard is responsible for the patient before and after surgery, gets equipment that is needed during surgery. The guard also makes sure that the doors are shut to minimize the risk of infection. However, a guard is only present during 70 – 80% of the surgeries. A physician or a nurse then opens the door to ask the guard for things. It then seems simpler enter the sluice room and just get the things. It furthermore seems like the sluice guards don't feel that they are taking part in the work.

Create a design that makes the sluice guards feel that they take part in the work, and also that facilitates communication between sluice guard and surgical staff.

The research question for this study is how the Mediated Action Sheets can be used by practicing user experience and interaction designers.

### **Method**

To answer the research question we followed a case study methodology with data collection from two workshops at two different companies working with IT in healthcare. The Mediated Action Sheets and a fictive interaction and concept design brief, were introduced to all participants before the design workshops started. In total, five interaction designers from two companies, one master student on internship, and one UX-oriented programmer participated. The brief is described in a sidebar. They were then handed a Persona Sheet each and they were grouped in groups of three and instructed to talk during their design work. The interaction between participants was video recorded. One observer also took field notes. The groups worked for 25 minutes before the Design Concept Sheet was introduced, after which the design work continued in the same groups.

The video recordings were subsequently reviewed and notes were taken. The notes were analyzed thematically bottom-up. Notes and design material produced during the workshops were analyzed in the same way. The analyses of the different data sources were then compared to find recurring themes. Interesting passages of the recordings were transcribed for more detailed analysis. Finally, a top-down analysis was made using the Activity Checklist, and relations to earlier research were identified.

### **Results**

How were the Mediated Action Sheets used in these workshops? Some groups made several personas since they had several Persona Sheets. The different parts of the sheets invited to different approaches depending on what the group focused on. For example, one group started with describing the user characteristics, while another group started with describing the activities around the sluice room. Groups that started with the activities gained more insights while working with Burke's Pentad. By thinking through activities, insights regarding who the user was also emerged and could be filled in in the user part of sheet. It was therefore more rewarding to start with the activity part of the Persona Sheet than to start with the user part. The groups that started with the user part had fewer ideas to work with, since they experienced a lack of information regarding things like user goals, attitudes, knowledge and skills (things prompted for in the Persona Sheet). Starting with activities seemed accordingly to make it easier to also imagine a hypothetical user.

There was an empty space on the Design Concept Sheet for sketching. Sketches provided a shared external representation for the group. They could point at it, explain and discuss. Produced concept tended to be quite similar due to a lack of divergent ideation. Key features like disk counter-windows, glass doors, microphones and speakers were often repeated. We could observe that the generated concepts covered all constituents of Burke's Pentad

### **Conclusions**

The results of this study points toward a conceptualization of UX and interaction design as activity-centered (or use-centered) rather than user-

centered. Artifacts always mediate human activities and starting by describing the constituents of Burke's Pentad facilitates the formation of a holistic view. By understanding the action context you also open a door to understanding the people who act. Developing persona hypotheses of several user groups seems also more beneficial since it also promotes a more holistic view, which supports the creation of well-grounded design concepts. It would therefore seem like the Mediated Action Sheets facilitate an activity-centered, or use-centered, rather than user-centered approach to UX and interaction design.

In those groups where joint sketching occurred, one participant could easily fill in the blanks missed by others in the group. The shared representation facilitated in creating the concept. Finding workshop set-ups that facilitate joint sketching or modeling while also make use of the Mediated Action Sheets is an important step for further development of this approach. We also observed a lack of divergent ideation in the workshops. This is partly due to time constraints, but not only. We could, and should, develop workshop set-ups where the participants brainstorm around different acts, different agents, different agency, different scenes, and different purposes. This will allow for creating a morphological chart, and radical concepts can be typified based on such a chart. Exactly how to set up such a workshop remains a question for further research.

The final question for this paper is how the sheets can be improved. First of all, the sheets themselves, or instructions for using them, should afford designers to start with activities rather than details regarding user characteristics. Creating several personas (or persona

hypotheses) rather than a single one should also be promoted.

## References

- [1] Arvola, M. (2013). The Mediated Action Sheets: A Framework for the Fuzzy Front-End of Interaction and Service Design. In *The 10th International European Academy of Design Conference*. Gothenburg, Sweden, April 17 - 19, 2013.
- [2] Arvola, M. *Interaktionsdesign och UX*. Studentlitteratur, Lund, in press.
- [3] Burke, K. *A Grammar of Motives*. Berkeley and University of California Press, Los Angeles, 1945.
- [4] Burke, K. Questions and answers about the pentad. *College Composition and Communication*, 19, December (1978), 330-335.
- [5] Bødker, S., & Klokmoose, C. N. Preparing Students for (Inter-)Action with Activity Theory. *International Journal of Design*, 6, 3 (2012), 99-111.
- [6] Cooper, A., Reimann, R., & Cronin, D. *About Face 3: The Essentials of Interaction Design*. Wiley, Indianapolis, 2007.
- [7] Kaptelinin, V., & Nardi, B. A. *Acting with Technology: Activity Theory and Interaction Design*. The MIT Press, Cambridge, 2006.
- [8] Keinonen, T., & Takala, R. *Product Concept Design*. Springer, Berlin, 2006.
- [9] Pruitt, J., & Adlin, T. *The Persona Lifecycle: Keeping People in Mind Throughout Product Design*. Morgan Kaufmann, San Francisco, 2005.
- [10] Sanders, E. B.-N. (2005). Information, inspiration and co-creation. In *The 6th International Conference of the European Academy of Design*. University of the Arts, Bremen, Germany.
- [11] Wertsch, J. V. *Mind as Action*. Oxford University Press, Oxford, 1998.

## Appendix: The Mediated Action Sheets

**Figure 1.** The Mediated Action Sheets in their latest version. The Design Concept Sheet to the right and the Persona Sheet with its three pages below. Download from <http://www.ida.liu.se/~matar/tools.en.shtml>

Design Concept No.

WHAT the name of the concept is:	WHO the user is:	
WHAT the concept is:	WHEN and WHERE it will be used:	
WHAT it does (main function and content):	WHY the user wants to have it and use it:	
HOW it is used (draw a storyboard):		
The user's experience before	Interaction step 1	Interaction step 2
Interaction step 3	Interaction step 4	The user's experience afterwards
HOW it should be: Principles and qualities	Consequences: For people, environment, or society	Project: Date: Researcher:

Design Concept Sheet, Mattias Arvola 2014.

Foundation for personas

Goals and driving forces	Skills and knowledge
Quote	Experiences
Portrait	Family and contacts
	Likes
	Dislikes
	Habits
Name: Description: Age: Role: Sex: Income: Hometown:	Project: Date: Researcher:
Background	

Persona and scenario sheet, Mattias Arvola 2014.

An ordinary day for the persona

An ordinary day starts with...

Project:  
Date:  
Researcher:

Persona and scenario sheet, Mattias Arvola 2014.

Foundation for scenarios

OBSERVATIONS AND FACTS	INTERPRETATIONS
WHAT is done?	Weaknesses to address
WHY is it done? (participants' motivation and researchers' interpretation)	Strengths to emphasize
HOW is it done?	Constraints to deal with
WHO does it and who are involved?	Project: Date: Researcher:
WHEN and WHERE is it done?	

Persona and scenario sheet, Mattias Arvola 2014.

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# The Fuzzy Front End of Experience Design – Considering Ambiguous and Prescribed Qualities

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## **Abstract**

Little literature exists that deals with the quality of experiences, yet it is an important factor for determining what experience to aim for as an experience designer. In this paper I present *The Remediation of Nosferatu*, a location-based augmented reality horror adventure presented at Dis2014. Focusing on the phenomenological world of 21 participants, we analyse triangulated data by distinguishing between a range of more 'ambiguous' and 'prescribed' qualities of experiences. This case study contributes an example of how considering ambiguous and prescribed qualities of experience materials can improve design understandings when aiming to invent and implement fulfilling, meaningful and engaging experiences.

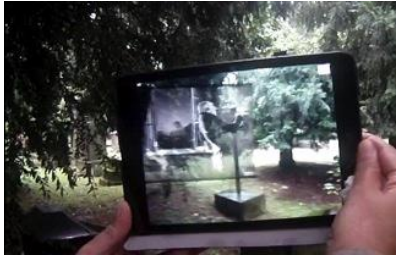
## **Author Keywords**

Ambiguous, Prescribed Experiences, Installation, Speculative Play, Transmedia, Fictional Universe

## **ACM Classification Keywords**

H.5.m. Information interfaces and presentation

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**Figure 1.** *The Remediation of Nosferatu*



**Figure 2.** *Nosferatu Rises and Attacks*



**Figure 3.** *Nosferatu Dissolves into Ether*

## Introduction

While much research deals with processes or methods for generating meaningful experiences through technology in general [4],[7], [19] and [10], only few studies address the quality of experiences. With *The Remediation of Nosferatu* [10], an experimental location-based augmented reality horror adventure, we were primarily interested in how designed experiences unfold and are maintained for the experienter. We applied a phenomenological approach [17], focusing on participants' lived experiences. We further linked emerging experiences to the material configurations (i.e. the design) we provided [3]. The goal of our research is to deepen knowledge of how to design fulfilling, meaningful and engaging experiences. This paper presents an interdisciplinary design approach that merges the theories of Transmedia [14] and [15], Fictional Universe, Interaction Trajectories [1] and [5], Speculative Play [16] and Experience Design by focusing on the quality of experiences [2]. While the theory of Transmedia Storytelling was used to create content, Speculative Play [16] and Interactional Trajectories [1] helped us to design the interactive elements of the fictional universe. Focusing on the phenomenological world [17] of 21 participants, we analyse triangulated data by distinguishing between a range of more ambiguous [7] and prescribed [13] meanings of interactions. Within the HCI community, ambiguity is described as a resource to build one's own narratives and meaning [7]. Here, experience is understood as an act of appropriation made possible by artefacts, but not designed in and of itself. One example of a more prescribed approach [13] regards experience designers foremost as authors of experience. In this view, experiences are deliberately designed and inscribed into artefacts as an act of

design. However, while prescribed or ambiguous qualities within an interactive system may prove fundamental for how a system is experienced or played, we also acknowledge the need to appreciate the agency of the human beings interacting within a system, as such; all experiences might be ambiguous to degrees of interpretation, [8] and [9].

## The Remediation of Nosferatu

With *The Remediation of Nosferatu* [10], see video (<http://vimeo.com/99461471>) and figure 1, we introduce a location-based augmented reality horror adventure. Using the theory of fictional universe elements, we work with diverse material from Nosferatu's horror genre and vampire themes as a case study. In this interdisciplinary research we intertwined traditional storytelling and scriptwriting skills with interaction design methods. For the game setting, we created hybrid spaces [1] merging the fictional universe and the physical environment into one pervasive experience, centering around a variety of augmented reality activities played out at sunset. Focusing on the phenomenological world of 21 participants, we analysed triangulated data by distinguishing between a range of more ambiguous and prescribed styles of interactions. Overall, we designed and evaluated 12 single, location-based *sub-experiences*. Each featuring a unique hybrid [1] sub-experience e.g. Nosferatu rising from a physical gravestone (figure 2) or Nosferatu dissolving into ether after a player attack, figure 3. Speculative play [16] allowed each participant to shape their own holistic experience by choosing not only the sequence of the sub-experiences made available on an in-game map (figure 4) but also which sub-experience to visit and which to omit. For the design of the *sub-experiences* we cut the original movie into fragments, found suitable





case, prescribed experiences helped to increase suspense, instil a certain urgency requiring a speedier style of interaction.

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### REFERENCES

- [1] Benford, S., Giannachi, G., Koleva, B. and Rodden, T. From interaction to trajectories: designing coherent journeys through user experiences. *In Proc. CHI'09*, ACM Press, 709-718.
- [2] Braun, V. and Clarke V Using thematic analysis in psychology. *Qualitative research in psychology* 3.2, 2006: p. 77-101.
- [3] Corbin, J., & Strauss, A. Basics of qualitative research: techniques and procedures for developing grounded theory (3rd ed.). *Sage, Los Angeles, CA*, 2008.
- [4] Forlizzi, J. and Battarbee, K. Understanding experience in interactive systems. *In Proc. DIS'04*, ACM Press, 2004, p. 261-268.
- [5] Fosh, Benford et al. 'See Me, Feel Me, Touch Me, Hear Me': Trajectories and Interpretation in a Sculpture Garden. *Proc. CHI'13* ACM Press, 149-158.
- [6] Freytag, G. Die Technik des Dramas [1863]. Gustav Freytag. Dramatische Werke. Technik des Dramas. *H. Fikentscher, oJ*, 2003
- [7] Gaver, W. W., Beaver, J., & Benford, S. Ambiguity as a resource for design. *In Proceedings of the SIGCHI'03* ACM Press, 2003, p. 233-240
- [8] Gaver, W., Boucher, A., Law, A., et al. Threshold devices. *In Proc. CHI '08*, 2008, p. 1429-1438.
- [9] Gaver, W. et al. The prayer companion: openness and specificity, materiality and spirituality. *In Proceedings of the SIGCHI'10* ACM Publication, 2010, p. 2055-2064.
- [10] Ghellal, S., Morrison, A., Hassenzahl, M., & Schauffler, B. The Remediation of Nosferatu: Exploring Transmedia Experiences. *In Proc. DIS'14*, ACM Press, 617-626.
- [11] Hassenzahl, M. and Tractinsky, N. User experience- a research agenda. *Behaviour & Information Technology*, 2006, 25. Jg., Nr. 2, p. 91-97.
- [12] Hassenzahl, M. Experience design: Technology for all the right reasons. *Synthesis Lectures on Human-Centered Informatics*, 3, 1 (2010), 1-95.
- [13] Hassenzahl, M. et al. Designing moments of meaning and pleasure. Experience design and happiness. *International Journal of Design*, 2013, 7. Jg., Nr. 3, p. 21-31.
- [14] Jenkins, H. Convergence culture: Where old and new media collide. *NYU press*, 2006.
- [15] Jenkins, H. Transmedia 202: Further Reflections, on Confessions of an Aca-Fan: *The Official Weblog of Henry Jenkins*, 2011 Retrieved 18.01.2014 from: [http://henryjenkins.org/2011/08/defining\\_transmedia\\_further\\_re.html](http://henryjenkins.org/2011/08/defining_transmedia_further_re.html).
- [16] Morrison, A., Viller, S. and Mitchell, P. Building sensitising terms to understand free-play in open-ended interactive art environments. *In Proceedings of the SIGCHI'11*, ACM Press, 2011, p. 2335-2344.
- [17] Smith, J. A., Flowers, P., and Larkin, M. Interpretative phenomenological analysis: Theory, method and research. *SAGE Publications Ltd*, 2009
- [18] Vyas, D., and Van Der Veer, G. C. Experience as meaning: some underlying concepts and implications for design. *Proceedings of the 13th European*

*conference on Cognitive ergonomics: trust and control in complex socio-technical systems.* ACM Press, 2006.

[19] Wright, P. and McCarthy, J. Experience-centered design: designers, users, and communities in dialogue.

*Synthesis Lectures on Human-Centered Informatics,* 3.1 2010, p. 1-123

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# Collecting User Experiences Online

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**Abstract**

Designers need convenient solutions to connect with users in order to collect genuine user experiences from the case-relevant user group. Online Research Community is a method offering this possibility. It is a curated online environment based on Web 2.0 technology and social networking and it can be used to collect user data and self-reported experiences. It can be used to test concepts and collect feedback or to generate new ideas with users. The online platform offers opportunities to create different types of research designs and collect both qualitative and quantitative data from its participants. This paper describes briefly how the Online Research Community method was used to collect user experiences in a case study of Lohaspack research project in 2012.

**Author Keywords**

User experience; packaging design; Online Research Community; insight

**Introduction**

Related concepts user experience, product experience, customer experience and brand experience have become increasingly common both in academic and popular press. In this paper, for the sake of clarity, user experience is used as a general umbrella term for the phenomenon.

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Position paper in workshop "The Fuzzy Front End of Experience Design", organized in conjunction with NordiCHI'14, Oct 26-30 2014, Helsinki, Finland.

In principal, the designer can take various routes to arrive at the intended experience or so called experience goal. This experience goal is one of the design drivers influencing the outcome of the creative process. However, the experience goal might not be based on any actual user data, but in the most naïve form be merely a product of designers imagination, a vague idea of a possible experience resulting from the interaction with a product, service or system. The author would like to argue for a more informed approach to design for user experience by including the intended user to the design process as an informant.

Designers need an understanding of the emotions and experiences related to designs. The starting point for new designs should be an understanding of user's relationship and experience with the existing solution in the current situation, comprehension of how the needs and wishes of users (and possibly other stakeholders) are being met now. Past and current user experiences can be a starting point for the intended future experiences.

Social networking and so called Web 2.0 technology offer researchers new and interesting opportunities to connect and engage with actual users to gain understanding and insights. An online community can be used as a research platform to interact with users for idea generation, collecting user experiences and insights about packaging concepts. Online communities or "crowds" have previously been used to actively contribute to knowledge, work or value of different kinds [1]. Also a number of companies are interested in connecting with users as they are seen as a potent source of new ideas for innovation [2].

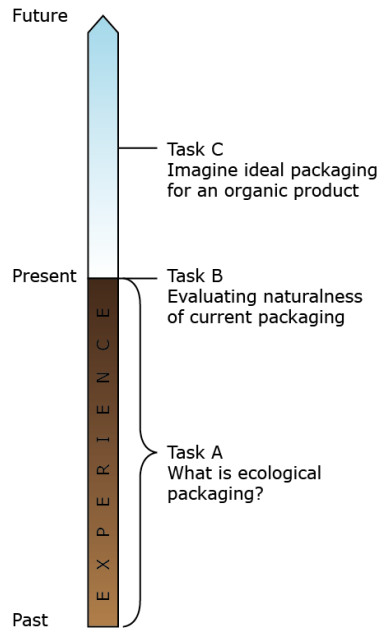
### **Online Research Community as Method**

A study was carried out as part of the Lohaspack<sup>1</sup> project to test how user insights could be collected from a curated online crowd. [3] An Online Research Community (ORC) [4] was used in a case study as a method to collect topical user data for packaging research and design. Comley (2008) describes an ORC as "*a group of people who have been provided with an online environment in which to interact with each other (and the client and researcher) about topics related to a research interest.*" The motivation for our study was to test a collaborative and crowd-based approach as a means to collect information, user experiences and ideas from a community of typical packaging users in Finland. The method was used with a small crowd of 137 participants for 13 days. The online platform was made accessible any time of the day to the participants during the research period. A moderator was present every day in order to ensure that participants had understood the tasks correctly. As the technical solution we used IdeaBlog [6] as the platform for our online research community.

In our study, we used a number of different research topics and tested different task types with the method. We were also interested in the actual data and user-generated content that participants produced during the study. Each research topic was operationalized into a range of sub-tasks. Researchers prepared a number of tasks, such as various assignments, discussion topics and related stimulus materials in advance. Each day a different theme and research topic was introduced with

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<sup>1</sup> LOHASPACk- *Packaging experiences for Lohas consumers* 2011-2014 is a Finnish research project funded by the Finnish Agency of for Technology and Innovation (TEKES) and fourteen companies representing various business sectors.



**Figure 1.** Tasks related to past experiences, present experiences and imagined future experiences.

related sub-tasks. Altogether 25 different packaging related tasks were carried out during the study period. More detailed description of the tasks can be found in Joutsela & Korhonen 2014 [3].

### **Experience & time**

Experiences are usually context and time-specific [5] but they also accumulate over time. Figure 1 presents how three user experience inquiries task A, B and C varied in their temporal dimension in our ORC study. Each task relates differently to time.

In task A the research interest was in finding out what users describe as ecological packaging. What are the distinct characteristics of ecological packaging? Users shared their opinions based on personal experience. In relation to time, task A is looking back to the past, to what is experienced and learned about the topic. It is focusing on accumulated personal experiences, beliefs and subjective knowledge developed over a longer period of time.

An example answer from the task A:

*"Ecological packages are usually made from recycled materials, they are either brown paper or cardboard, and perceiving this immediately connects to ecology in my eyes. On the other hand, non-ecological packages are usually colourful, they contain plastic, and are not easily re-used. Unpacked products are not necessarily on the same level ecologically or logistically as packaged products, and they might not be hygienic. I am not willing to pay more for a product because it is packaged ecologically."*

In task B users were asked to evaluate the appearance of current package designs of a product category in terms of perceived naturalness and perceived pleasantness of the visual design. Pictures of 16 commercial organic muesli packages were to be placed in a coordinate (Figure 2.) in appropriate places, when Y-axis represented perceived naturalness and X-axis perceived pleasantness of the package. Task B is positioned in the present experience, how users experience something in a given context and time.



**Figure 2.** A screenshot illustrating how a single participant sorted organic muesli packages according to perceived naturalness and pleasantness.

After completing the task participants were asked to reflect on the task and give some reasons for their decisions. This provided researchers information about why some of the packages might have been considered more natural than others.

Organic muesli packages were chosen as the material to be evaluated, because there is a lot of variation in how naturalness is visually communicated within this product category in Finland.

An example answer from the reflection part of task B:

*"A paper bag evokes a more natural image than a box, even though my own package evaluations were a bit inconsistent with this assertion. Green colour on the box creates a more natural impression than other colours, and also the word "bio" on one package. I placed the Super Fruity at the bottom (rated lowest), because I could not find anything related to the naturalness in it."*

In task C the users were asked to ideate an ideal package for organic muesli by describing the characteristics and sensory experience of it. What would the package look like? How would it feel? How would it smell? Users were imagining what an ideal product-specific packaging experience would be like and what features or elements might contribute to this experience. The answers provided insights about the multisensory nature of a pleasant product experience. Temporally this task is positioned in the imagined future.

(In our study, task C was completed before task B, in order to minimize the bias that the visual materials in task B might have on the imagined packaging solutions in task C.)

An example answer from the task C:

*"It would be a wonderfully rustling bag made from unbleached paper. It has subtle low-key illustration (calm arable landscape and / or ears of corn / fruits / berries / whatever the product contains), the colours of the text and images should be down to earth, but distinctive. Country of origin and other product information should be clearly visible. Package does not have to be that big. If it was possible also to smell the scent of the product through the packaging (cereal or fruit), I would certainly leave that store with that product with me."*

### **Reflecting on Method**

We included a large number of different tasks to our study ranging from thematic discussions to collective ideation. Also different evaluation, sorting and voting assignments were part of the study. The ORC method provided rich qualitative data, for instance, about perception, interpretations, expectations, images, memories, and feelings attached to packages. One task utilized self-reporting of significant user experiences with packaging. Participants shared in a blog-like format, written memories and pictures of packages that had become special for them. Data collected with this approach highlighted the hard-to-access factors of user experience providing insights about the temporal, situational, personal and contextual sides of user experience.

The ORC method enables collecting either qualitative or quantitative data or both depending on the research design. In our study, most of the tasks were of qualitative nature and such data can be analyzed for instance with content analysis. Some tasks, e.g., sorting or rating assignments, enable also quantitative approach with related statistical analysis.

Packaging, in general, turned out to be an inspiring and discussion-fueling meta-topic, as it is something that everybody has some experience of, and quite often, strong opinions about.

In our experience participants provided straightforward and seemingly “honest” answers. The blog-like online format allowed users to participate on their own terms and time, integrating the research nicely into the daily routines and minimizing situational distractions and bias. Based on the feedback, participants experienced this approach as unobtrusive and motivating and clearly preferred it to other, more traditional forms of online research, such as surveys. From the data gathering perspective, one of the biggest benefits of the method is that the qualitative data doesn’t need transcribing.

The biggest challenge is related to data density in individual answers. The participant’s interest varies depending on the task. In our experience, the answers were typically only a few sentences long, so the answers remain clearly less detailed than what could be achieved through other means of qualitative inquiry, such as, focus groups or interviews. However, ORC makes it possible to involve a much larger crowd into the study. Another challenge is related to research design. The order of research topics and tasks requires careful consideration and planning in order to make the research interesting for participants in longer studies and managing consistent and optimal workload throughout the study.

Participants can be selected to ORC according to a specific criteria or interest. For studying user experience of a particular product, the researcher might

want to include, for instance, special-needs users, lead users or desired users for a specific target market. Demographic or geographic segmentation can also be used to discriminate potential participants.

### **Conclusion**

In our experience ORC is a potent method to engage with the users in a time-efficient way, collecting information, evaluating and rating concepts and snowballing new ideas for design. For UX studies, it can be used for discussing past experiences, emotions and significant memories related to product use or it can be used to explore reactions to future concepts and designs.

Further studies are recommended for finding the best practices of using ORC for co-designing packages with users. Also collecting real time data with ORC on long-term user experience is yet to be explored.

### **Acknowledgements**

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## References

- [1] Aitamurto, T., Leiponen, A., & Tee, R. The Promise of Idea Crowdsourcing—Benefits, Contexts, Limitations. *White Paper for Nokia Ideas Project*, 2011.
- [2] Chayutahakij, P., & Poggenpohl, S. User-Centered Innovation: The Interplay between User-Research and Design Innovation. In *User-Centered Innovation: The Interplay between User-Research and Design Innovation*, 2002.
- [3] Joutsela, M. & Korhonen V. Capturing the User Mindset – Using the Online Research Community Method in Packaging Research *Journal of Packaging Technology and Science* (2014). DOI:10.1002/pts.2106
- [4] Comley, P. Online research communities. *International Journal of Market Research* 50, 5 (2008), 679–694.
- [5] Dewey J. *Art as Experience*. The Berkeley Publishing Group, 1934.
- [6] IdeaBlog by Firefly Millward Brown. <http://www.fireflymb.com/en/default/whatwedo/signaturemethodsandtools/Ideablog.aspx>



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# Multimodal Analysis of Participatory Design Results

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## **Abstract**

We describe a multimodal method for the analysis of participatory design (PD) results. The multimodal approach we take allows researchers to treat both verbal (notes, writings) and tangible material outcomes as equal ways of communicating design ideas. We argue that an integrated approach in which both PD outcomes are compared and contrasted can result in a richer analysis, in which underlying values can be identified more clearly. To illustrate the method, we describe a PD process with primary school children.

## **Author Keywords**

Participatory Design; Fuzzy Front-End; Multimodality.

## **ACM Classification Keywords**

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

## **Introduction**

Participatory Design (PD) is a well-known methodology that can be useful in the fuzzy front end of design, to determine the specific experiences to aim for when designing technology. Future users are at the core of the methodology: in PD, these users are considered co-designers of their technology, and of the practices that may be reified in that technology. In an attempt to determine the specific experiences to design for, recent work by Iversen et al. [2] has attempted to rekindle

values in a more 'authentic' approach towards PD. This work focuses on the values that emerge and develop over the course of the design process. Instead of taking values for granted, Iversen et al. start from the emergent values as 'the engine that drives the design process' [2]. In this paper, we describe a case study of a PD session analysis, focusing on these underlying values: the things that a person or group of people consider(s) important in life [5]. We used an integrated multi-modal analysis [3] of session transcripts, written ideas on Post-Its (verbal material), and the designed artefacts (visual/tangible material). We argue that underlying values can be identified more clearly using an in-depth, integrated approach in which both the verbal and visual/tangible PD outcomes are analyzed.

Specifically, we focus on a case in which 49 primary school children aged 9 to 10 were involved in PD sessions on designing a tangible, digital toolkit to facilitate class groups of primary school children to become more self-regulatory in combating traditional bullying as well as cyberbullying. Bullying, both online and offline, is a complex problem often related to existing social contexts such as the classroom. Tangible interaction offers interesting opportunities to bridge the gap between children's online and offline worlds, and to stimulate pro-social behaviour on both levels. Furthermore, tangible digital tools can easily be embedded in a classroom for structural use.

This specific case of co-designing digital tools for the prevention of bullying is used to illustrate the integrated, multi-modal analysis of PD results. This approach allowed us to analyze the children's ideas and underlying values: these values, in turn, provide designers with a solid starting point for design.

## **Related Work**

### *Participatory Design with Children*

Scaife & Rogers [4] acknowledge the difficulty of involving children in more open-ended, future directed work. "On the one hand, the kids come up with many wonderful suggestions [...], on the other hand, many of their ideas are unworkable in computing terms". This quote is exemplary for a tendency to analyse co-design artefacts solely in 'computing terms', that is, on a functional or attribute level (e.g. [11][9]). However, the values that are implicitly expressed in PD outcomes are often more interesting than the design ideas as products per se. Focusing on the underlying motives behind design choices can reveal why specific design attributes are important and how they serve children's values. Climbing up the 'value ladder' enables researchers to reach out into the 'opportunity spaces', rather than being limited to problem solving right from the onset. Moreover, making values explicit opens up possibilities for a re-alignment of values between adults and children, as well as across groups of children working together [6]. Since values are dynamic in nature, we cannot simply identify them, and design for them. PD, in its authentic sense, aims at reformulating values and transcending possible value conflicts [2].

### *Multi-Modal Analysis*

Multimodality, an approach based on social semiotics, views communication and representation 'as more than language and attends systematically to the social interpretation of a range of forms of making meaning' [3]. As such, it provides a framework for the analysis of various ways of communicating, including spoken and written language, but also visual, gestural and other modes. This type of analysis has been used in various analyses of e.g. educational games and social network-



Figure 1: Elements in the PD process: descriptions of how a superhero would solve problems (top), and the materials used to create the artifacts (bottom).

ing [3]. We argue this approach is also useful in PD, as researchers often limit themselves to a descriptive analysis of co-design artifacts or rely exclusively on what participants say or write about their creations (e.g. [8][9]). Buckingham refers to this approach as 'naïve empiricism' [7], arguing that data from creative research cannot be taken at face value: these data need to be analyzed with special attention for its visual dimensions. A multimodal approach is suitable for this analysis, as it allows for an integration of both the textual transcripts and the artifacts. Speech (verbal explanation) and artifacts can be treated as different *modes* used to communicate the same ideas.

## Method

### *Participatory Design*

We used a blend of two different approaches to PD: cooperative inquiry [9] and contextmapping [8] (see [10] for an in-depth description of the method used). The PD sessions took place in two schools with 49 children and resulted in 11 co-design artifacts created by an equal number of groups of 4 to 5 children. One researcher was involved in each PD session facilitating two to three groups of children at the same time. The material used for analysis consists of various elements from the PD process (see figure 1). For each group, we analyzed:

1. a short description of two problematic class situations defined by the children (e.g. children excluding each other from playing games, not listening to each other,...);
2. verbal descriptions on post-its of how a superhero would solve these problems (e.g. Batman sending 'bad' children to jail). From these

solutions, the children picked two for further elaboration;

3. a co-designed artifact that embodies the solutions chosen in 2;
4. a verbal presentation of the artifact.

Based on these elements, we analyze the PD process starting from the children's original ideas (1 and 2), and evolving towards the eventual results (3 and 4). Through a comparative analysis between the original ideas and the results, we can determine how values emerge and evolve throughout the PD process.

### *Multimodal Analysis*

Verbal communication and tangible artifacts, as different modes, have different affordances: each has specific characteristics that make it more suitable for communicating specific information. For instance, while speech is more suitable for narratives, material or visual objects can be easier to communicate moods, emotion, style, etc. (figure 2). Integrating both modes in an analysis of PD outcomes can therefore offer a comprehensive analysis of different information types.

Visual and material objects can, however, be interpreted in different ways, and it can be difficult to make interpretations that are meaningful and valid in the context of the PD process. We engage in a 'close reading' [1], identifying recurring themes, and arriving at interpretations through detailed analyses of both the artefact and the transcripts. In a data interpretation phase, two researchers independently conducted their close readings in order to identify relevant values and themes in the data. Afterwards, the researchers collaborated to refine the themes they identified, arriving at a common understanding of the data.

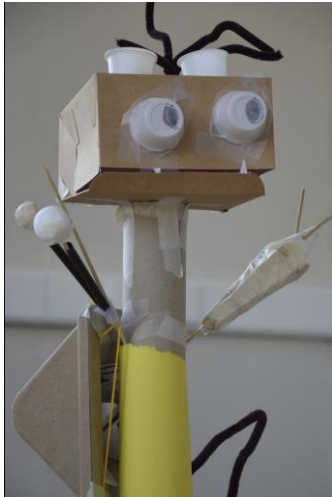


Figure 2: A goofy-looking (top) and a severe-looking robot figure (bottom).

Group	1		2		3		4		5		6	
	positive	negative	positive	negative	positive	negative	positive	negative	positive	negative	positive	negative
Number of ideas	10	11	8	3	6	8	9	4	7	2	10	7
Selected ideas	1	1	2	0	1	1	2	0	2	0	1	1

Figure 3: Number of initial ideas identified as positive / preventive and negative / disciplinary per group.

### Results

In this section, we describe the results and the analysis of the PD sessions. Although a full analysis of the results is beyond the scope of this paper, we use the preliminary analysis of six PD groups to illustrate the multimodal method used in order to arrive at a well-founded analysis of the ideas and underlying values.

#### *Preventive Activities and Disciplinary Punishment*

Before the creation of the artifacts, all groups had various initial ideas to solve the problematic class situations they had selected. Groups 1, 3 and 6 started out with a balanced number of preventive, positive (e.g. stimulate inclusion) and disciplinary, negative ideas (e.g. punishments). In groups 2, 4 and 5, the positive ideas clearly outnumbered the negative ones – see also figure 3. From the pool of initial ideas, the groups collaboratively selected two ideas for further elaboration. The groups with the balance between positive and negative ideas all selected one positive and one negative idea, while the groups with primarily positive ideas selected two positive ones.

In the evolution from initial ideas to artifacts, it was telling that the negative ideas all but disappeared, even in the groups that had initially selected a negative idea. In the artifact of group 3, the punishing component

disappeared entirely. In the artifact of group 1, the punishing component was reduced to 1 out of a collection of 14 artifacts (figure 3), and in group 6, the punishing component was only mentioned in the children's presentation of the artifact, but not present in the material artifact – whereas the positive component was clearly elaborated on in the form of games. This evolution of initial ideas to their material and verbal elaboration points towards a significant shift from negative, disciplinary ideas towards positive ideas.

#### *The Nature of Authority*

Groups 3 created an artifact with a human-shaped figure, and groups 4, 5 and 6 all created robots. These groups associated all kinds of functionality to their figures, ranging from ringing a bell when things threaten to go wrong (group 3), to a DJ robot for a class party (group 4 – figure 2, top). Beyond these specific functionalities, these anthropomorphic figures all represent some type of authority – the way the children described their figures verbally and represented them materially is significant for analyzing the specific type of authority. Generally, the robots did not look sterile, but had some kind of personality that was implicitly described in the participants' presentations, and more explicitly visualized in the artifacts.



Figure 2: The 'Rox Box' (bottom) containing 14 artefacts (top) but only one punishing component: the 'Wiggle Machine' on the right.

With the exception of group 6, all robots looked friendly or funny in some way. Group 3 made a kind-looking figure with a big red heart. The figure had an authoritative function: it signalled potential problematic class situations by ringing a bell, and calming the participants highlighted the importance of the figure's appearance, and explained that children feeling sad would feel better by looking at the figure. Group 4 created a goofy DJ robot, who would always create a fun atmosphere, and who would eat all 'bad' ideas. Group 5 created a kind-looking robot that would mediate between bullies and their victims. Only group 6 created a rather severe-looking robot (figure 2, bottom), with a clear regulating, authoritative function (the red-orange-green traffic light on his body). However, the severe, authoritative component was present in the visual appearance of the robot, and mentioned in the children's presentation of the artifact (with a reference to punishment), but not present in the further elaboration – whereas the robot did contain a number of games, the punishing aspect was not elaborated in the artifact. This absence of the disciplinary aspect in the artifact is significant, and suggests that disciplinary punishment is not central to the children's understanding of an ideal tool to prevent and combat (cyber)bullying in a class context.

This analysis shows that where the participants created authoritative figures, most of them were kind or fun. Where a more strict-looking figure was created, the emphasis in the material elaboration was still on the fun (games), rather than on punishment. Therefore, positivity, fun, and kindness.

## Discussion

The multimodal analysis allowed the researchers to create rich analyses, and tease out higher-order ideas

and values implicitly present in the PD outcomes. For instance, the analysis of several anthropomorphic figures focused not on the specific functionalities of the individual figures, but on their 'personality', as represented implicitly in the children's explanation of their artifact, and more explicitly in the visual appearance of the artifacts themselves. The figures' personalities, then, are linked to underlying values surrounding the prevention and reconciliation of conflict situations. By incorporating verbal data as well as visual characteristics of artifacts, it became easier to move from functional and attribute-focused analyses to more holistic analyses. Consequently, we were able to identify underlying motives behind certain design choices, within and across teams, and how these relate to children's values. This way, designers can go beyond the surface level of cherry-picking participants' ideas, and start from a well-founded analysis of values to define experience goals, and create designs.

The analysis of the making process as a whole traces the emergent and evolving values in the design process, from the invention and selection of verbal ideas to a final, tangible artifact. The multimodal approach allows for an integrated analysis of both verbal information and tangible materials, and assigns the appropriate significance to the artifact. In the analysis of the entire making process, the initial ideas serve a double purpose. First, the initial ideas help grounding the analysis of the artifacts. They clarify the origin and the meaning of the artifact, providing essential, additional information to arrive at a valid interpretation. Second, they provide essential information about the making process: they make it possible to trace the evolution of ideas and underlying values throughout the design process. For instance, the analysis above showed a

clear evolution from both preventive and disciplinary ideas to artifacts centered on the preventive, the positive, and the fun.

### **Conclusion and Future Work**

While the multimodal method for analyzing participatory design outcomes is still under development, we believe that an integrated analysis of verbal and visual/tangible material potentially leads to richer, more in-depth analyses. In our opinion, the current literature on PD analyses offers little guidance on how to approach the analysis of co-designed materials. As such, we aim to contribute to PD research by developing a structured analysis method.

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### **References**

- [1] Bardzell, J. (2011). Interaction criticism: An introduction to the practice. *Interact. Comput.* 23(6), 604-621.
- [2] Iversen, O.S., Halskov, K., & Leong, T.W. (2010). Rekindling values in participatory design. In *Proc. PDC '10*, p. 92-100. New York, USA: ACM Press.
- [3] Jewitt, C. (2013) Multimodal Methods for Researching Digital Technologies. In: Price, S., Jewitt, C.,

Brown, B. (Eds.) *The SAGE Handbook of Digital Technology Research*, pp. 250-265. London: Sage.

[4] Scaife, M. and Rogers, Y. (1999). Kids as informants: Telling us what we didn't know or confirming what we knew already, in A. Druin (Ed.), *The design of children's technology*, pp.29-50. San Francisco, CA: Morgan Kaufmann.

[5] Rokeach, M. (1973). *The Nature of Human Values*. Free Press, NY.

[6] Halloran, J., Hornecker, E., & Stringer, M. (2009). The value of values: Resourcing co-design of ubiquitous computing. *Co-Design*, 4(5), 245-273.

[7] Buckingham, D. (2009). 'Creative' visual methods in media research: possibilities, problems and proposals. *Media, Culture and Society*, 31, 633-652.

[8] Sleeswijk Visser, F., Stappers, P.J., van der Lugt, R., Sanders, E.B.N. (2005). Contextmapping: Experiences from practice. *CoDesign: International Journal of CoCreation in Design and Arts*, 1(2), 119-149.

[9] Guha, M.L., Druin, A. & Fails, J.A., 2013. Cooperative Inquiry revisited: Reflections of the past and guidelines for the future of intergenerational co-design. *International Journal of Child-Computer Interaction*, 1(1), 14-23.

[10] Van Mechelen, M., Gielen, M., Vanden Abeele, V., Laenen, A. and Zaman, B. (2014). Exploring challenging group dynamics in participatory design with children. In *Proceedings of IDC '14*. ACM, NY, 269-272.

[11] Walsh, G., Druin, A., Guha, M.L., Foss, E., Golub, E., Hatley, L., Bonsignore, E. and Franckel, S. (2010) Layered elaboration: a new technique for co-design with children. In *Proc. CHI 2010*. ACM, NY, 1237-1240

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# InnoLeap – Creating Radical Concept Designs for Industrial Work Activity

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**Abstract**

This paper presents the premises of the InnoLeap concept design approach. InnoLeap is a collection of design principles that facilitate the creation of radical concept design ideas for industrial work activity. The approach is based on already existing methods applied in design, including user studies, trend analyses, and co-design, but with some deviations for the purpose of creating radical instead of incremental design ideas.

**Author Keywords**

Concept design; radical design; experience design; design methods

**ACM Classification Keywords**

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

**Introduction**

When designing for an industrial work context, the produced design solutions should support the broad and relatively pre-fixed aims of the work activity, such as maintenance, logistics, or production. This implies that user-centred design (UCD) [1], in which the needs, wants, and capabilities of the users are closely considered, seems an appropriate approach.

However, user-centeredness in design has been criticised for not providing radical design solutions that, by definition, offer people with entirely new kinds of activities [2]. Examples of truly radical innovations include the mobile phone, which made possible activities such as text messaging, or the airplane, which allowed people to travel by flying. UCD offers users what they know they wanted, because the design solutions correspond with the issues already recognized by the users [3]. Studying the activities and needs of the users does not necessarily provide novel or radical ideas, as the proposed solutions can be too close to the existing models of activity or user paradigms.

When creating innovations for work activity, the users do not know all the technical possibilities or trends that the future might have to offer. Furthermore, the users may be too closely fixed to their current systems and practices to intuitively propose radical solutions. Therefore, traditional user studies provide incremental or evolutionary design solutions, i.e., only slight modifications to the current designs. Yet, entirely novel designs would be the ones that have the potential in providing more drastic environmental, social, or business advantages. Thus, the following problem needs to be solved: how to generate design solutions that both support the existing work activities *and* surprise the workers and other stakeholders positively with their radical nature? A design approach answering to this question would provide a unique possibility to provide substantially new kinds of product concepts.

InnoLeap is a new design service created by VTT Technical Research Centre of Finland, which strives to overcome this above-mentioned problem. It has its roots in UCD, but entails certain techniques and ideas,

which arguably promote radical design. The basic procedures and ideas of InnoLeap are the following:

- 1) Creating design basis by modelling and studying user activity. This entails
  - a. identifying and dissecting the 'main instrumental elements' (i.e., what is done and why) in the work activity; and
  - b. envisioning the future user experience (UX), that is, UX goals to be achieved.
- 2) Future studies, including
  - a. societal trend analysis;
  - b. an overview to new and forthcoming technologies; and
  - c. a combination of review of future technologies with user study findings.
- 3) Co-design and co-evaluation after the initial design concepts for selecting the best designs and for the further development and improvement of the selected concepts.
- 4) Not focusing on the existing requirements, that is, designing with the attitude that legislation can be changed and that robustness of technology will develop.

### **User Studies**

As implied earlier, radical design ideas for industrial purposes should both reflect and serve the existing



activity of the industry's workers and yet a reasonable distance to user study findings would be needed for radical design ideas. We should strive to avoid the phenomenon recently discussed by Norman and Verganti [2]: designers can be 'trapped' within the current user paradigms, not being able to create design ideas that create new kinds of activities for the users. For these reasons, we assume that the design implications drawn from the observations and interviews of the professional users should be sufficiently broad. Users' ideas should not dictate the design process. Instead, user activity should be modelled and understood on a more general level. As has been argued elsewhere [4], relatively abstract modelling of user activity and the reformulation of findings into non-direct indications for design can provide guidelines that are both broad and meaningful.

It has been stated [5] that a product or service includes both instrumental and non-instrumental qualities. Instrumental qualities refer to the utilitarian aspects of usage, such as usefulness or ease of use. Non-instrumental qualities refer to emotional and experiential aspects of usage. In InnoLeap, both instrumental and non-instrumental elements in industrial work are identified. For identifying broad instrumental features of work activity, InnoLeap typically applies Core-Task Analysis (CTA) [6, 7]. The approach has been used to study several work domains and is an efficient method for identifying domain-specific interconnected elements influencing the way in which aims of certain work activity are and could be achieved. The identified issues in CTA include the constraints and demands of work as well as means of managing these demands in a certain work environment [6]. In the InnoLeap approach, we

assume that CTA is useful for identifying pertinent instrumental issues during a design process.

The specifics of applying CTA in design have been discussed elsewhere [4, 6, 7, 8], but what can be mentioned – and is applicable for other methods of analyzing as well – is that the user study findings should be applied to identify and formulate various kinds of stimuli that can be useful in design. These include scenarios, personas [9], themes, models as well as specific design goals addressing practical problems of the observed and interviewed professional users. These indications represent different levels of abstraction and particularity. A design theme is vague and broad while a design goal can be very specific. We assume that operating in these various levels fosters creativity beneficially.

The UX side of InnoLeap draws from the experience design tradition, which proposes that instead of products themselves, UX should be the focus of design [10]. UX goal driven design [11, 12] on the other hand is a more specific approach in suggesting that UX goals should be defined in the beginning of the design process to guide the design: the designers should first choose what kind of activity or emotion should be supported with the produced design and based on this insight, concepts can be designed. This approach promotes thinking outside the box, as the design process is not tied up to the existing product solutions. In this sense, experience design serves the purpose that users' ideas on the existing products do not dictate the creation of the new product ideas.

Overall, the InnoLeap approach of applying user studies differs somewhat from the typical UCD [13] process. In

InnoLeap, we do not use findings on users' wants and needs as the primary inputs for the design ideas, but instead, strive to identify the main elements taking place in the actual work activity. Then, we try to find a technological solution that would correspond with these findings – as will be discussed in the following.

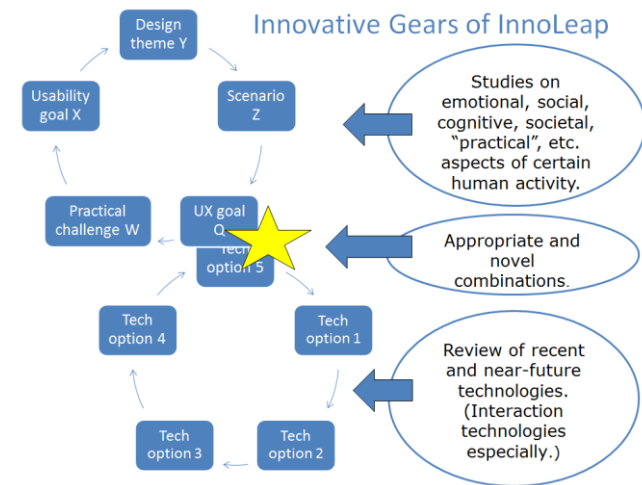
### Future Studies

In addition to user studies, InnoLeap includes the study of technological, business, and societal trends. New user interaction tools are especially of interest as, assumedly, they might change the work processes by providing new possibilities for future work activity. The business and societal trends provide general design guidance and broad design goals. Typically, the InnoLeap service is applied so that the customer provides an overview of the domain's business trends.

The true additional value of InnoLeap, however, lies in coupling the reformulated user study findings with the overview of new and forthcoming technologies. The idea is that, first, user studies are applied to explore certain relevant aspects in the users' actual work activity. Second, these findings are transformed into design themes, scenarios, usability goals, practical issues, UX goals, and such (the list is not exhaustive as the designers' imagination can be applied freely).

Third, it is considered how these reformulated findings could be enhanced or solved with emerging technological solutions. After these steps, some practical design related questions can be formulated, such as the following examples: How would a certain scenario be achieved with new technology (e.g., with a novel virtual reality interaction method)? Could a certain practical challenge be resolved with new kind of

technology (such as wearable devices, heads-up displays, or gaze tracking)? Could certain UX be achieved with new user interfaces (e.g., brain-computer interaction or body-implemented user interfaces)? As presented in Figure 1, the combination of reformulated user study findings with future studies on recent and upcoming technologies allows so-called 'Innovative Gears' of the InnoLeap approach.



**Figure 1.** Innovative Gears of InnoLeap – combining reformulated user study findings with technology reviews allows new design ideas

Overall, contrasting the future technology study findings against the reformulated user data findings is the main means of creating design ideas in InnoLeap. This combination is crucial: the approach is not just about making an overview to new technologies and then selecting those technological options that seem interesting or fresh for the designers. Instead, the options also have to make sense in view of the actual

work activities.

### **Co-design**

Co-design has been a recent trend in design studies and in actual design work [13]. In InnoLeap, some parts of the design are conducted together with the users and other stakeholders. However, a specific feature of co-design in InnoLeap is the preference for involving the users into the design work only after the fuzzy front end of the design process where initial design ideas have been created. This principle is applied because the purpose of InnoLeap is to create radical design ideas, that is, solutions that have not yet been imagined by the users. Indeed, one cannot assume that users, who are on a daily basis closely involved in the existing ways of doing, could imagine entirely novel radical solutions [2].

As we have deduced previously [8], applying co-design and expert user evaluation in the end of the concept design process is beneficial for promoting radical design. The utilization of expert end-users in the early phase evaluation of the produced concept designs liberates the designers to freely imagine many kinds of solutions, even potentially absurd designs. The expert users will reduce the non-functional or inappropriate concepts from the overall repertoire. The diminished self-criticism of the designer allows generating design ideas more efficiently and, eventually, there will also be solutions appreciated by the expert users. Another way in which expert users support the design in the concept evaluation phase is by providing feedback on the produced designs. Additionally, they may even generate new design ideas based on some seemingly unlikely concepts.

### **Considering Requirements**

It is quite typical that design solutions are made to meet some exact technical or legal requirements. InnoLeap is a concept design approach that deviates from the traditional requirements-based design methods. The aim is to create futuristic design concepts, which are to influence legislation and the technological development of a particular industry. In other words, the idea of InnoLeap is to develop and change the overall thinking in certain domains rather than to adapt to the existing realities.

The main incentive for creating the InnoLeap service was a successful design case [8] on ship command bridges. Instead of physical product solutions, which could be immediately taken into use, the project involved creating inspirational concept videos [14]. The concepts were created irrespective of maritime legislation and when the videos were shown to the Finnish maritime authorities, the response was positive: they stated that legislation will never be changed without the creation and presentation of entirely new ideas. Industry and product development lead is therefore needed. The videos also present technological solutions, which would require increased robustness from the existing technologies (such as virtual reality goggles worn by deckhands). In other words, it is imaginable that the product solutions would not easily meet the current practical technological requirements. However, this type of concepts can provide an incentive for the proposed technological developments in the future.

### **Conclusion**

This paper has presented the ideas featured in the new design approach by VTT Technical Research Centre of

Finland. It is a combination of existing approaches applied in design, including user studies, future studies, and co-design, with some modifications for the purpose of creating radical design solutions. The development of InnoLeap, however, is an ongoing process and this paper presents only the main ideas. The service includes also certain steps not elaborated here, such as media buzz generation for the created concepts. Additionally, future work is needed for further exploring the creation of radical concept designs for industrial work.

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### References

- [1] Gould, J. and Lewis, C. Designing for usability: key principles and what designers think. *Communications of the ACM* 28, 3 (1985), 300-311.
- [2] Norman, D.A. and Verganti, R. Incremental and radical innovation: Design research versus technology and meaning change. *Design Issues* 30, 1 (2014), 78-96.
- [3] Keinonen, T. Immediate and remote design of complex environments. *Design Issues* 25, 2 (2009), 62-74.

- [4] Wahlström, M., Karvonen, H., Norros, L., Jokinen, J. and Koskinen, H. Radical Innovation by Theoretical Abstraction – a Challenge for Design Anthropologists. Manuscript in peer-review.
- [5] Mahlke, S. Understanding users' experience of interaction. In *Proc. EACE 2005*, University of Athens (2005), 251-254.
- [6] Norros, L. *Acting under uncertainty: The core-task analysis in ecological study of work*. VTT Publications, Espoo, Finland, 2004.
- [7] Norros, L. Developing human factors/ergonomics as a design discipline. *Applied Ergonomics* 45, 1 (2013), 61-71.
- [8] Wahlström, M., Karvonen, H., Kaasinen, E. and Mannonen, P. Designing for Future Professional Activity – Examples from Ship Bridge Concept Design. In *Proc. AHFE 2014*, AHFE International.
- [9] Cooper, A. *The inmates are running the asylum*. Morgan Kaufmann, US, Indianapolis, 1999.
- [10] Hassenzahl, M. Experience design: Technology for all the right reasons. *Synthesis Lectures on Human-Centered Informatics* 3, 1 (2010), 1-95.
- [11] Karvonen, H., Koskinen, H. and Haggrén, J. Defining user experience goals for future concepts. A case study. In *Proc. NordiCHI 2012*. TUT Publication series, Tampere, Finland, 2012.
- [12] Koskinen, H., Karvonen, H. and Tokkonen, H. (2013), User Experience Targets as Design Drivers: A Case Study on the Development of a Remote Crane Operation Station. In *Proc. ECCE 2013*, ECCE, Toulouse, France.
- [13] Sanders, E. and Stappers, P. Co-creation and the new landscapes of design. *CoDesign: International Journal of CoCreation in Design and the Arts* 4, 1 (2008), 5-18.
- [14] Rolls-Royce. Rolls-Royce presents the future of tug bridge controls. Video on YouTube: <https://www.youtube.com/watch?v=27uCL90s20o>

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# Defining And Using Experience Goals To Enhance Patient Agency In Spinal Cord Injury Rehabilitation

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**Abstract**

This paper explores the process of defining and using experience goals as part of a design-led research methodology to enhance patient agency within spinal cord injury (SCI) rehabilitation. It describes the work and findings from the first year of doctoral level research. Information derived from a literature review and an ethnographic study of a host spinal injury unit (SIU) over 10 months was analysed thematically and discussed with a variety of stakeholders and professionals from medicine and design. This analysis led to the development of five experience goals, with the intention of their facilitating a participatory design process to enhance the rehabilitation experience through providing a better shared vision for patients, carers and staff.

**Author Keywords**

Rehabilitation; participative co-development; design-led methodology

**ACM Classification Keywords**

H.5.m. Information interfaces and presentation:  
Miscellaneous.

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## **1. Introduction**

Mapping the network of patients, carers and hospital staff involved in a SIU patient's rehabilitation reveals there are multiple individuals and perspectives from whom and from which to define the rehabilitation experience. These differences have to be reconciled within the existing clinical rehabilitation healthcare culture and environment. The contention in this paper is that experience goal-driven design-led research provides an enhanced approach to understanding the needs of and engaging with a variety of stakeholders in the project, with the intention of improving the rehabilitation experience and, by so doing, potentially improving rehabilitation outcomes.

### *1.1 Spinal cord injury rehabilitation*

A spinal cord injury (SCI) results in partial or complete loss of function and/or sensation below the level of injury; impacting on a person's mobility, ability to perform activities of daily living independently, skin care and bowel, bladder and sexual function. The acute care and rehabilitation of these physical effects can typically take 6-9 months, depending on the level of injury. During this time, patients progress along the rehabilitation pathway, learning techniques to manage their mobility needs and the bodily functions affected by their injury. A network of staff from medical, nursing, therapy, psychological and social departments within the SIU provide input during this journey.

### *1.2 Previous pilot work*

In 2010, the Royal Society of Art (RSA) launched the 'Design and Rehabilitation' initiative [1] which sought to investigate if the confidence, resourcefulness and self-reliance of people with spinal cord injuries could be improved by teaching them 'design thinking' i.e.

aspects of design practice. During this, Macdonald [5] identified 'approximately one year post-discharge [as] being the most problematic period.' Although it is difficult to generalize any aspect of living with a SCI, as the consequences of SCI shape very different individual experiences, post-discharge many patients experience a 'loss of camaraderie,' a 'lack of post-discharge care' and 'other people's [negative] reactions to SCI,' [3]. Results from these pilots [1, 2] were said to show a potential 'relationship between design thinking and having a sense of agency in one's environment and one's life,' [6].

## **2. Approach to the research**

Whilst the findings of the above pilot projects are acknowledged, these were only exploratory in nature and it is as yet unknown how applicable 'design thinking' is to daily life post-discharge. As such, the research reported in this paper reconsidered how the problematic post-discharge period could be better anticipated and addressed during SIU rehabilitation using patient-centred design approaches.

### *2.1 Contextual study*

An ethnographic study of the host SIU was conducted over 10 months to develop an insight into how the many and varied healthcare professionals' roles within the unit work together to support a patient's rehabilitation. This began with a series of 12 informal, semi-structured interviews with senior staff across 9 departments and 1 volunteer organisation. These interviews focused on the participant's contribution to a patient's journey, how they liaise with other departments and how SCI care has changed, as well as facilitating an introduction to the researcher. Opportunities and invitations to observe SIU activities

emerged from these interviews and became more frequent as the SIU community better understood the purpose of the research. A total of 41 events across 17 different SIU activities were observed during the contextual study involving the staff, patient and family communities together and separately. Observations of group activities, such as patient education sessions, allowed introductions to individual patients who often then gave permission for the researcher to observe patient-specific activities, such as goal planning meetings. Regular contact at these meetings and on the ward with 5 different patients created a channel for the patient voice, and developed an understanding of the common challenges patients face within distinctly individual experiences. Particular areas of interest within all observations were shaped by the original aim, to enhance patient agency, but also by the emergent themes (as discussed in 2.3). These areas included information exchange, tracking progress, power dynamics, conflict and communication.

This type of work, where the research question is not clearly defined at the outset, is not often found in a clinical context. Therefore it was vital to explain that just by allowing observation of their normal work activities, the clinical and care staff were contributing to the researcher's understanding and that the observations made were non-judgemental of their individual professional practices.

### *2.2 Thematic analysis*

Regular summaries of the observations were created by the researcher using thematic analysis. These summaries and their emergent themes were discussed during joint supervisory meetings, which typically included the researcher, a design professor, a SCI

consultant and the director of the host SIU. Collecting insight from experienced design and medical practitioners together in this way highlighted the resonances and contrasts between the two fields and their epistemological preoccupations. Combining their collective experience with the researcher's 'objective' perspective of the SIU during these discussions helped to identify potential target experience goals from the emergent themes. These experience goals (discussed more fully in section 3 below) identified opportunities for patient agency to be enhanced, whilst still supporting the work of the staff and unit policy.

### *2.3 Introducing design approaches into the rehabilitation pathway*

Although this paper focuses on the first year of this study, an outline of the remaining research plan helps to give context to the use of the first year's findings. The experience goals will be used as the basis for hypotheses to be tested in remaining work. It is anticipated that a tool or tools that help evoke these experience goals will be co-designed<sup>1</sup> and co-developed through a series of participatory workshops with patients and staff (across disciplines and hierarchies within the unit). In these workshops, participants will use the experience goals as a tangible, shared vision of a desired future model of SCI rehabilitation, and investigate the use of design approaches to achieve them. Working towards clear, shared aims embodied in the experience goals may also aid participant commitment to the design process. The resulting tool(s) will be evaluated in use (alongside existing

<sup>1</sup> Co-design is used here in the manner described by Sanders and Stappers [7] as an area within Participatory Design which refers to 'the creativity of designers and people not trained in design working together in the design development process.'

rehabilitation practices) to test if these increase a patient's sense of agency<sup>2</sup>. Traceability of the effect(s) of the tool(s) to the experience goals may also provide a methodological robustness within this evaluation that is expected in scientific fields such as medicine.

### 3. The Experience Goals

Deriving experience goals from the thematic analysis, and allowing these goals to drive further work, was a natural progression in this project.

#### 3.1 Experience Goal 1: Patient-centredness

During the contextual study it was evident that customised, patient-centred care is inherent within SCI rehabilitation, where the needs of each patient are unique; so any design intervention must support individual, patient-centred experiences.

#### 3.2 Experience Goal 2: Ease of Use

As discussed above, this research aims to introduce an additional tool or tools into the rehabilitation pathway. Part of creating a positive experience for the patients is ensuring that any additional tool has a minimal impact on the workload of staff. With this in mind, the implementation of this should be intuitive and without unnecessary stress.

#### 3.3 Experience Goal 3: Ownership

Patient progress can be seen as being largely owned by the SIU. For example, in the host SIU any progress that a patient makes during a gym session is recorded by

<sup>2</sup> A metric for measuring and evaluating *agency* would need to be derived to measure any increase (or decrease) in the patient's sense of agency whilst they are inpatients, and the level of control they feel during the reportedly problematic post-discharge phase.

the physiotherapist after the patients have returned to the ward. These records are kept in the physiotherapist's office (just as the other departments store their own notes), and are reported back by the physiotherapist during ward rounds or goal planning meetings. The question arises over patient access to these notes. This repeated observation led to the third experience goal; a patient feels that they have an appropriate level of access to the review of their rehabilitation progress.

#### 3.4 Experience Goal 4: Network Navigation

As discussed above, SCI rehabilitation involves the patient learning many skills from a network of professionals. The current model of the patient pathway [fig. 1], explains the responsibilities of each actor in this staff network and shows a generic, linear progression through prescribed stages.

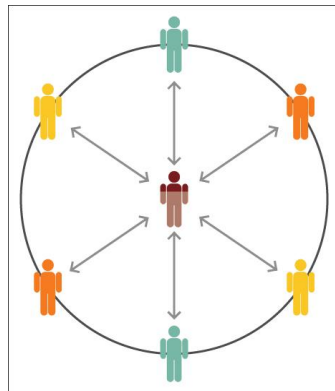


**Figure 1.** A schematic representation of the host SIU's current model of the rehabilitation pathway, showing the input from different members of a patient's care team (here shown with different colours representing staff from nursing, therapy and social departments) over a typical 6-9 month period.

The researcher's attempts to create profiles of each actor in this network, and their interactions with the



rest of the network, mainly served to highlight the dynamic environment in which SIU staff work. Each patient has different needs, so it is difficult to anticipate the informal, experience-based, ad-hoc interactions that occur between the staff daily. A different model is suggested in fig. 2, which illustrates the fourth goal. In this, the aim is for a patient to feel informed enough to recognise their particular needs and confident enough to access and navigate this network to address these needs accordingly.



**Figure 2.** The suggested 'Network Navigation' model, where the patient is equipped with the skills and tools to decide when input from each department is needed; creating a patient-oriented rehabilitation pathway.

### 3.5 Experience Goal 5: Projection

Initial observations suggested a difference between the ways staff and patients are able to 'project', i.e. anticipate the steps needed to be taken and progress made before discharge from the SIU. Discussing this idea graphically (i.e. by using a visual timeline to show what and how far in advance steps and stages are

anticipated differently by patients and staff) in an interview with a senior nurse and senior occupational therapist gave conflicting views – highlighting once again the dynamic nature of the SIU environment. It also prompted the staff to explain that there is a variation in projection competence (or outlook) in the patient population; some patients prefer to think about one day at a time, whereas others focus on their estimated discharge date. With this in mind, the desired reconciliation between patient and staff projection became the fifth experience goal.

## 4. Discussion

### 4.1 Experience goals as a tool for shared understanding

As discussed in 2.3, the experience goals will be used to create a shared understanding of less tangible concepts, such as agency, during future participatory workshops with staff, patients and families. When used in this way, experience goals may help to move a proposed intervention on from the *fuzzy front end of its design*, by making the emergent themes from the initial ethnographic study concrete enough to interrogate without dictating the direction of the co-design process. Experience goals may also encourage different ways of thinking within this participatory process, by anchoring 'what could be' within the context of 'what is' – a concept that is particularly relevant within the traditionalist healthcare culture.

### 4.2 Experience goals as hypotheses

While Goal 1 (Patient-centredness) and Goal 2 (Ease of Use) aim to encourage successful implementation of a co-designed tool or tools into the SIU, could the remaining goals address opportunities where a patient's sense of agency could be enhanced? If a patient feels that they own their progress to a greater extent (Goal

3, Ownership), would they feel more engaged with their rehabilitation and experience a greater sense of agency? If a patient feels more confident to navigate the network of staff supporting them within the SIU (Goal 4, Network Navigation) would they feel more in control of the route they take through the rehabilitation pathway? If a patient feels that they have a better shared vision of their future with the staff (Goal 5, Projection), would they feel that their choices and actions will affect their future - increasing their sense of agency? Beyond this, if the use of a co-designed tool or tools that aimed to test these hypotheses did develop a patient's sense of agency **within** the SIU, would this increased sense of agency remain with the patient **post-discharge**? If so, to what extent (if any) could this make the post-discharge period less problematic as it is reported to be [1, 2, 3, 5]?

#### 4.3 Experience goals assisting agency

Using the patient experience goals naturally gives value to the patient voice, which is 'largely absent from the literature,' [5]. Focusing on what experience is desired, rather than what has been lost, may also encourage asset-based intervention(s) [4] to enhance patient agency within SCI rehabilitation and beyond.

### 5. Conclusion

Information gathered from a literature review and a contextual study of the host SIU was discussed and mediated into a set of experience design goals through regular meetings with design and healthcare professionals. The target experiences cover aspects of patient-centredness, intervention implementation, patient ownership, resource navigation and projection. Moving on with the project, these goals will be used to (i) guide the Participatory Design of a tool or tools to be

incorporated into the existing rehabilitation pathway and (ii) provide a framework to robustly evaluate the increase (or decrease) of patient agency that the use of the tool instigates.

### 6. Acknowledgements

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### 7. References

- [1] Campbell, E. (2011) *Design & Rehabilitation: A three-day workshop in design for people with spinal cord injuries*. [http://www.thersa.org/\\_\\_data/assets/pdf\\_file/0007/562642/Design-and-rehab.pdf](http://www.thersa.org/__data/assets/pdf_file/0007/562642/Design-and-rehab.pdf)
- [2] Campbell, E. (2012) *Report on the RSA's Design & Rehabilitation project at three spinal injury centres*. [http://www.thersa.org/\\_\\_data/assets/pdf\\_file/0006/637215/Design-and-Rehabilitation-Report-at-three-spinal-injury-centres.pdf](http://www.thersa.org/__data/assets/pdf_file/0006/637215/Design-and-Rehabilitation-Report-at-three-spinal-injury-centres.pdf)
- [3] Dickson, A. et al. (2011) Difficulties adjusting to post-discharge life following a spinal cord injury: An interpretative phenomenological analysis. *Psychology, Health and Medicine*, 16 (4), 463–474
- [4] Glasgow Centre for Population Health (2011) *Asset based approaches for health improvement: redressing the balance*. [http://www.gcph.co.uk/assets/0000/2627/GCPH\\_Briefing\\_Paper\\_CS9web.pdf](http://www.gcph.co.uk/assets/0000/2627/GCPH_Briefing_Paper_CS9web.pdf)
- [5] Macdonald, A.S. (2013) The inner resource: enabling the designer within us all - a case study. *The Design Journal*, 16 (2), 175–196
- [6] Montgomery, A. (2011) *RSA initiative tackles issue of Design & Rehabilitation*. <http://www.designweek.co.uk/rsa-initiative-tackles-issueof-design-and-rehabilitation/3024583.article>
- [7] Sanders, E. and Stappers, P. (2008) Co-creation and the new landscapes of design. *CoDesign*, 4 (1), 5-18

Title	<b>The Fuzzy Front End of Experience Design</b> Workshop Proceedings
Author(s)	Eija Kaasinen, Hannu Karvonen, Yichen Lu, Jari Varsaluoma & Heli Väättäjä
Abstract	<p>To start an experience design process, the designers should determine what experience they intend to aim for. How should this decision be made? How can the information from various sources be utilised to define the targeted experience? In which form should the targeted experience be presented so that it can guide the design process?</p> <p>To find answers to the questions above, we organized the workshop "Fuzzy Front End of Experience Design" at the NordiCHI 2014 Conference in Helsinki. The workshop brought together practitioners and academics to share their knowledge and lessons learned, and to explore how to get from the fuzzy front end to a shared vision of the experience to aim for. These proceedings include the workshop position papers that provide examples of experience goal setting from different fields. In addition, we present the results of the workshop activities, where we discussed the characteristics of good experience goals as well as where to find insight and inspiration in the process of experience goal setting.</p>
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