

A Case Study on Participatory Approach to Support Shift to Experience Design of Work Tools in B2B Context

Completed Research Paper

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Abstract

To support the shift from technology-driven to experience-driven design in a company developing work tools (materials handling equipment), we developed and applied a participatory approach to increase awareness and buy-in of experience design and related methods at the company. We 1) present user experience (UX) design guidelines developed for both designers and managers based on the participatory process, 2) report evaluation of the guidelines with designers, developers, and selected internal and external stakeholders, and 3) present a participatory approach to create personas and experience journey maps covering the product life-cycle. SWOT analysis of the guidelines revealed that guidelines need to be understandable without expert UX knowledge, managerial support is needed that was aimed to be supported by the guidelines developed for managers, and representative user participation is needed. Participants experienced positively the applied participatory approach, and the mindset change is proceeding in the case company.

Keywords: User experience, experience design, participatory approach, guideline, work tool, mindset, organizational change

Introduction

In a competitive business landscape, an organization's ability to enable pleasant user experiences during the whole product life-cycle is important. It is no longer enough to provide a technically well-functioning system, but the products also need to be usable and pleasurable from users' point of view (Jordan, 2000, Miaskiewicz et al. 2011). While technological advancements are important in the metals and engineering industry context, which is the context of our study, technology is not the goal in itself, but a means to create good customer and user experiences, and profitable business. User experience refers to "a person's perceptions and responses that result from the use or anticipated use of a product, system, or service" (ISO 9241-210, 2010). In the context of this study, we approach user experience (UX) in the work context and work tools, i.e., as "the way a person feels about using a product, service, or system in a work context, and how this shapes the image of oneself as a professional" (Roto et al. 2012). Our work adds to the work on integrating UX work into organization (Rohn, 2007), focusing on work tool design by developing practical

approaches to supporting the change happen. The need to get all employees involved is especially relevant in product development teams, who make daily decisions affecting the experiential aspects of the product.

Little research exists on studying deployment of UX thinking in business-to-business (B2B) industry manufacturing physical products with interactive features, in comparison to studying deployment in software industry (Jones, 2008; Kuusinen, 2014). In B2B context, in our case in metals and engineering industry, the end-users have a smaller role in product purchase decisions than in consumer markets. UX has not been as elementary in B2B context as a competitive factor as in business-to-customer market, or as customer experience focus manifested in shift to service oriented culture in B2B context (Nuutinen et al. 2012). However, the importance of user experience as a success factor has been increasing (Norman, 2004; Steen 2008), recently also in B2B industry (Nuutinen et al. 2013, Sundberg 2015, Väättäjä et al. 2014). There is a growing demand of introducing UX to B2B organizations and changing the mindset towards user-centric and experience-centric through design activities. It helps to have UX experts to foster this change, but without the commitment of the whole organization and each member of the chain from R&D to production and maintenance it is difficult to reach a competitive edge.

This paper focuses on describing a developed and applied participatory approach to support 1) the organizational and mindset change from technology-driven to experience-driven design in a company developing materials-handling equipment for warehouses, 2) familiarizing the R&D personnel with the concept of UX, and how to implement experience-driven design in practice in product development activities, and 3) the product development team to gain ideas and practical experience of some of the methods applicable in experience design. The paper describes the participatory design process phases and the developed six UX design guidelines and their SWOT (strengths, weaknesses, opportunities, and threats) (Houben et al. 1999) analysis. Then, a participatory approach is presented that was used to develop personas and corresponding UX scenarios with the product development team and internal and external stakeholder representatives aiming to support the design activities. The outcomes of the workshop are presented as well as the evaluation of the whole participatory process by participant feedback.

Background

User Experience Design

The field of user experience (UX) focuses on studying, designing for and evaluating the experiences that people have through the use of a system. In Experience Design, the user experience is driving the design process. According to Hassenzahl (2010), the nature of experience design is to consider the experience before the product. Similarly, Schifferstein et al. (2013) describe the two main characteristics of Experience-driven design: first, the experiences aimed for must be determined, and second, the design should evoke those experiences. Hassenzahl et al. (2010) show that positive experiences can be mapped to psychological needs, and those needs can be used as starting points when designing for experiences. Defining specific experience goals for design has been found to work well in industry cases (Kaasinen et al. 2014, Lu & Roto, 2015, Varsaluoma et al. 2015, Väättäjä et al. 2015), so we adopted experience goal –driven approach also in the present case.

To demonstrate experience goal -driven design approach, Lu & Roto (2015) describe three examples of designed concepts in metals and engineering industry context with experience goal approach driving the design ideation process. One of the examples is an e-learning tool that was targeted for beginner forklift truck drivers to reduce workload of the senior drivers who traditionally have been the ones teaching the new drivers. Based on interviews with warehouse workers as well as their own experience of learning to drive a truck, students chose three psychological needs as experience goals for e-learning tool design: 1) Security – feeling of being guided even without a human teacher present; 2) Competence – balancing the feeling of incompetence and over-confidence; 3) Stimulation – enjoyment of learning. Respectively, these were addressed by a virtual eye that followed the driver and provided feedback in natural language, self-assessment of the success of the exercise to support reflection, and by gamified elements for feedback. This example illustrates how experience goals can indeed drive the design process.

In B2B market end-users rarely participate in the company's investment decisions of new technologies (Sundberg 2015). Yet, many B2B companies are interested in investing to UX due to the following reasons. First, companies constantly have to be looking for ways to differentiate their offerings from their

competitors in order to maintain and develop their business (Sundberg et al. 2014, Vääätäjä et al. 2014). This is crucial especially in industries where supplier companies provide similar products with basic functions and features, such as in our case. In order to maintain their competitiveness, companies must excel in developing offerings based on the customer's requirements - it is vital to understand the in-depth needs and values for current and potential customers. Second, by focusing on the UX design actions, companies can design products that improve the experience of the users (Sundberg 2015; Vääätäjä et al. 2014). Designing for good UX can increase safety and reduce errors (ibid.). Good user experience with work tools enhances job satisfaction and can help users perform better in their work (ibid.). This leads to increased productivity and savings for the company. Thus, by distinguishing itself from its competitors with better UX, a company may gain benefits such as increased customer satisfaction, which has an effect on the company's brand image and reputation, as well as on the sales (Sundberg 2015).

Empowering change by participation

Importing externally developed processes to established organizations is likely to fail (Jones 2008). On the contrary, participatory approach (socialization) promotes internal demand and is more likely to engender a sustainable change (ibid.). A bottom-up approach and participative, co-creative decision-making are expected to have better results in making organizational change to happen.

In our research, we selected to approach the goal of moving from technology-centric design to experience-driven design with a participatory, 'bottom-up' approach, and by applying the idea of a learning organization presented by Senge (1990, 2014). Senge (1990) characterizes a learning organization by team learning, shared vision, openness, and high degree of participation. The five learning disciplines together with lifelong program of study and practice are the core of a learning organization (Senge 1990). The five disciplines are the following. *Personal Mastery* encourages the employees to develop themselves towards chosen goals. *Mental Models* support reflecting upon and constantly improving the internal picture of the world. *Shared Vision* engages the employees and guiding practices to achieve the goals are developed for support. *Team Learning* aims to develop individuals to make teams greater than the sum of its parts. Finally, *Systems Thinking* helps people to see, think and do things in a broader context. In our participatory approach we aimed to support these learning disciplines in order to give employees an opportunity to learn and develop themselves, empower them in their daily work with jointly developing UX design guidelines and by introducing them to some experience design methods. Furthermore, the goal was to start creating a sustainable mindset change, and a shared understanding and vision of UX as the key driver in design and development activities and to see their work and its effects in a broader context.

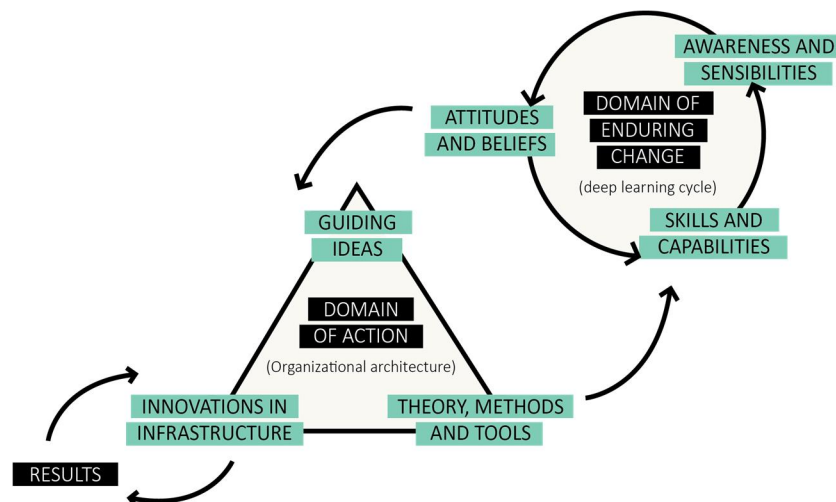


Figure 1. Domains of Action and Enduring Change (Adapted from Senge 2014, p. 45).

The five learning disciplines activate a process called a deep learning cycle (Senge 2014). The aim is to develop not only new capabilities, but to create fundamental changes in the thinking of individuals as well

as collectively (Senge 2014, p.18). Significant changes can be achieved by allowing the cycle of Awareness and sensibilities, Attitudes and beliefs, and Skills and capabilities to operate (see Figure 1). To launch the deep learning cycle, Senge (2014) proposes a triangle of organizational architecture to provide a starting point (see Figure 1). Domain of action consists of Guiding ideas, Innovations in infrastructure, and Theory, methods and tools that enable the deep learning cycle to root in the organizational culture. In our research, the participatory approach is the method that supports the learning cycle and the UX design guidelines is among one of the first “tools” to support the mindset change in the Domain of enduring change.

Figure 1 illustrates the combination of the Domain of action and Domain of enduring change (Senge 2014). Balancing the attention between the circle (Domain of enduring change) and the triangle (Domain of action) is essential. Where the actions of the triangle (Domain of action) can be seen more tangible and providing enablers, and thus easier to approach and take into practice, the Domain of enduring change (circle) is needed for the change. The actions can be easily replaced and modified, while the effects of the learning cycle are more permanent. Once an organization adopts the new way of behaving, thinking, and doing, the change is fundamental and often irreversible. Our aim in this work is to stimulate the learning cycle and in long-term feed back to the organizational architecture.

To stimulate the learning cycle, we arranged two participatory workshops for the product development team members to support the change process and learning. In the first workshop the focus was on end-user's experience, i.e., on logistics workers who drive forklifts, e.g., in warehouses. In the second workshop the focus was on a wider perspective of experience design related to several stakeholder groups that come into contact and have experiences with the product throughout its life-cycle from R&D to actual use in the customer companies. The aim of the workshops was to help steer the mindset and work of designers and developers towards experience-driven design of the products in business-to-business context. The participatory design process with the workshops is described in more detail in the next section.

Description of the developed participatory approach

To stimulate the learning cycle and mindset change from technology-driven to experience-driven design we created a participatory approach for first developing UX design guidelines, and then reviewing and supporting implementation of the guidelines in practice (Figure 2). The phases are described next. This paper focuses primarily on the last two phases, but we describe briefly the earlier phases as well.

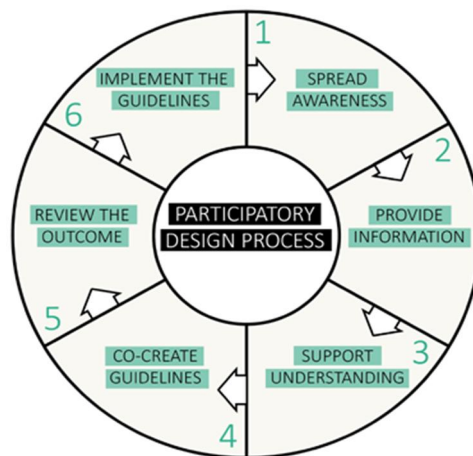


Figure 2. Visualization of the participatory approach developed and used in this study.

Phase 1 - Spreading awareness of experience design and user experience was initially done in connection to a research programme that usually two company representatives participated. However, as only some employees were in contact with the research programme and its results, the rest of the R&D personnel had lower awareness and needed to be included in the change process to engage and empower them, as well as to support feeling ownership of experience-driven design and user experience. In this phase, one of the researchers observed the work at the R&D department for two weeks and carried out 14 semi-structured

interviews with the personnel, simultaneously increasing awareness and reflection on the topic (Hildén et al. 2016). The findings revealed the following status of the practices and current situation:

First, understanding of end-users' work was integrated into the current design process mainly in the forms of user data and video material collected from the field studies at the customer companies' premises (ibid.). The user related material was gathered by the Concept team who presented it to the Design team. The focus was still mostly on the usability aspects, which indeed have great importance, but are only one part of the whole that forms the user experience. There was potential for bringing up the emotional side of UX.

Second, the interviews revealed a shared concern among the R&D employees (ibid.): when conducting user studies in the field it is often challenging to picture what kind of information is needed, what to ask and what to document. Also, some designers found it hard to use the information based on viewed videos when they had not been present in the situation at the site. This indicated a lack of tools and methods that would support the UX design process and aid the designers in their work.

Based on the findings, in order to start the process of change, a two-step process was introduced. First, familiarize everyone with the UX and developing common rules aka guidelines (phases 2-4). Second, providing supportive tools and methods and learning to use them, and defining the UX goals for the whole company and for each new project utilizing experience-driven design approach (phases 5-6).

In Phases 2-4 – Provide information, Support understanding, and Co-creating guidelines - the following activities were carried out. First, related to providing information (phase 2), the findings of the field study with observations and interviews from phase 1 were categorized to six main categories (Industry, Company, R&D department, Process, Team, Individual) and 44 sub-themes based on data-driven analysis (ibid.). To share the findings, create discussion on the topic among the employees, and prepare for the next phases of the process, a poster was created with the main categories and sub-themes with 100 example quotes from the field study. The poster was hung in the office space wall of the R&D department to be viewed and commented (ibid.). Next, a user experience workshop was carried out, facilitated by one of the researchers. Since our aim was to support the UX understanding among the R&D personnel and empower them, we chose to co-create the guidelines with employees (ibid.). The six co-created guidelines focus on the mindset level aspects of UX design process, starting from defining the UX goals to taking responsibility, understanding the context, justifying decisions, testing and prototyping, and ending up to design simple and intuitive. The content of the guidelines was drafted based on the insights from the field study with the goal of supporting the product development team in their practical work.

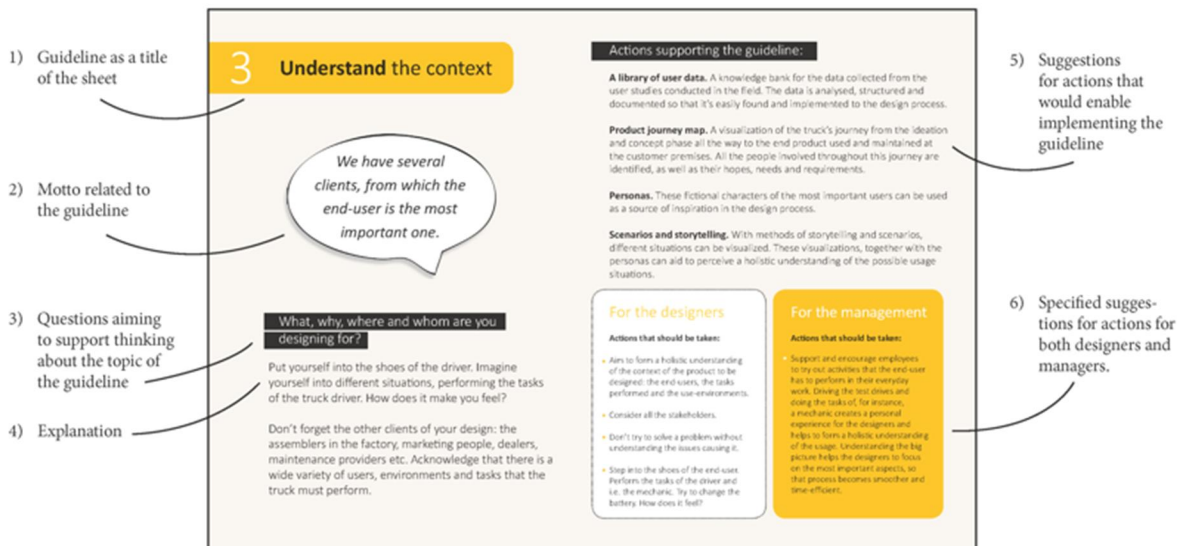


Figure 3. The layout and sections of the six UX design guidelines.

The layout and sections of the guidelines are illustrated in Figures 3. Each sheet consisted of the following sections: 1) Guideline as the title of the sheet, 2) Quote (motto) from employee interviews related to the guideline, 3) A question aiming to support thinking of the guideline theme, 4) Explanation of the guideline, 5) Suggestions for actions, methods, and/or tools that would enable implementing the guideline, and 6)

Specified suggestions for actions for designers as well as for managers to support the change and implementing the experience-driven approach in practice. The content of each guideline is presented in more detail in the next section.

Phases 5 and 6 that are in the focus of this paper – Reviewing the outcome, i.e., the six UX design guidelines, and Implementing the guidelines in practice – were supported by the second workshop as a tool in the participatory process. A 6-hour implementation workshop was organized at the company's R&D department 6 months after finalizing the guidelines. The primary goal of the workshop was to familiarize the participants with the UX design guidelines and to create deeper understanding of the topic of UX, as well as to introduce some tools and methods that they could utilize in their work. The aim was to engage the participants to the design culture change, create a shared understanding, and empower them through knowledge and tools, to support implementation of the UX design guidelines in their work. Secondary goals were to get feedback of the UX design guidelines and to create material in form of personas and scenarios that designers and developers could utilize in their own work at the R&D department.

Participants of the second participatory workshop - In total, 33 participants were present, including two researchers: one facilitating and the other one taking notes. 25 participants from the R&D department employees were selected based on their impact on the experiential part of the design. Employees from different product development teams, such as Concept Team, Design Team, Testing and Prototyping Team and Ramp-up Team, as well as all the phases of the product development process were participating. The participants included both designers (e.g. Technology Engineer, Testing Engineer, Industrial Designer, Mechanical Engineer) and representatives from the management level (e.g. Project Manager, Development Manager, Technology Manager). Marketing and Communications Manager was also participating to the workshop from the Marketing department.

Representatives from six selected stakeholder groups (production, dealer, sales, customer, driver, and service) were participating to the workshop. Two of them were from a customer company that specializes in the procurement, marketing and logistics of grocery goods. These stakeholder groups were selected based on a product journey map created to identify all the different stakeholders throughout the product life-cycle that come into contact with the product and experience it in some phase of the life-cycle "from cradle to grave". One of the customer representatives was responsible for the customer's buying decisions and organizing of the practical daily work logistics using the forklifts (Logistics Development Manager), and the other was a representative for drivers from maintenance viewpoint (Maintenance Planner). The rest (four) of the stakeholders were employees of the host company. Development Engineer represented the production viewpoint, Managing Director the dealer viewpoint, Key Account Manager the sales viewpoint, and Technical Support Specialist the service viewpoint.

Facilitation of the second participatory workshop - One researcher acted as a facilitator for the event. To help facilitate the group discussion and the group assignments as well as to enable the participatory approach, six group leaders were selected from the participants before the workshop together with the company's Design Manager. This group, consisting of R&D Team Leaders and the Marketing and Communications Manager, was guided to basic facilitation skills in 15 minutes before the workshop started.

The participants were divided into six groups. Each group had a leader and a guest participant from the field representing the team's target stakeholder group. The company's Design Manager placed the other team members into the teams in order to ensure a heterogeneous representation of the R&D department so that people from different teams and phases of the product development process were in each team. The aim was to broaden every participating R&D employee's understanding of different stakeholder groups. Thus the groups were rearranged to the second exercise so that the target stakeholder changed and hence each team got to experience two different stakeholder perspectives.

Activities of the second participatory workshop - The workshop consisted of the following activities:

- Icebreaker and introduction round of participants – to share participants' relationship and thoughts towards UX and expectations for the day, and to create a relaxed atmosphere;
- Presentation by the company's Design Manager to give background and motivation for the workshop and future goals;
- Short presentation of the UX design guidelines - to prepare for the later assignments and SWOT-analysis of guidelines;

- SWOT-analysis of the six UX design guidelines - to analyze and present the guidelines to participants, aiming to facilitate understanding and taking the guidelines into use, as well as providing feedback on how to improve the guidelines;
- Persona creation for the group's target stakeholder - to introduce participants to creating and using personas in experience-driven design, and to enable the participants to feel empathy towards the targeted stakeholder group in their daily design and development activities, as well as supporting creation of the experience scenario;
- Creation of experience scenarios - to show how to use the persona-based scenario method in one's own work practice, and to increase understanding how different stakeholders' experiences can be designed for and what contributes to them.

The activities and examples of workshop outcomes are illustrated in Figure 4.



Figure 4. Workshop activities and outcomes of the second workshop.

The groups were divided so that each group had one of the six guidelines to be analyzed with SWOT and the persona and scenarios corresponding the stakeholder that was their group member (see Table 1).

Stakeholder in the group	Guideline	Persona & Scenario for
Truck driver	#1 Set UX goals	Truck driver
Customer	#2 Take responsibility	Customer
Serviceman	#3 Understand the context	Serviceman
Dealer	#4 Justify decisions	Dealer
Salesman	#5 Test and evaluate	Salesman
Mechanic	#6 Design simple and intuitive	Mechanic

Table 1. Groups for Guideline evaluation and persona & scenario creation based on the stakeholder in the group.

UX Design Guidelines and the Results of the SWOT Analysis

Each co-created UX design guideline was presented on one page with clarifying explanations and implementation action suggestions (see Figure 3). The guideline page consisted of a chosen quote (motto) explaining the essence of the guideline, a text explaining the content of the guideline, and the suggested implementation actions in more detail. The guidelines were analyzed in the second workshop by SWOT (strengths, weaknesses, opportunities, and threats) analysis (Houben et al. 1999) in order to introduce participants to the guidelines. The use of SWOT analysis aimed to activate participants to think about what parts of the guidelines and the implementation suggestions could be utilized in the organization and what

aspects could be improved. Each group analyzed one guideline. After the exercise all the groups presented the results of their SWOT analysis. Working on the guidelines provoked an active conversation in the groups, and when presented to other groups, a lively plenary discussion around the guidelines and their implementation. Next, each guideline is presented separately in their numbered order. The results of the SWOT analysis are presented after each guideline.

SWOT Analysis of Guideline 1 – Set the UX goals

1 Set the UX goals

Communicate with experiences!

What is the core of each project?
What are the desired UX goals?

The starting point for new projects is a set of UX goals defined based on the user studies conducted in the field. These UX goals are guiding the design process and opening up opportunities for new innovations.

User experience should be a central design driver in the product development process, not one of the many that are competing against each other.

Actions supporting the guideline:

Defining and evaluating the UX goals
 Design tools based on pictures or animations resembling emotions, like AttrakDiff and PrEmo, can be altered according to Roclas's needs. These tools can be used also in helping to define the UX goals. With the same tools and methods one can also evaluate the realization of UX goals among the design team or together with the users and customers.

Communicating the UX goals
 Based on the UX goals one can build moodboards that showcase the desired user experiences. Each UX goal can also be presented on a separate poster, with pictures and words. These posters and moodboards can be exhibited somewhere in the office where they can be seen by the whole design team. Making the goals visible helps designers to keep them in mind while designing. Thus UX stays as an essential part throughout the design process.

For the designers

Actions that should be taken:

- UX goals should be put to the basis of the design - they should be guiding the design.
- The defined UX goals should be kept in mind when making decisions. There are many design drivers and things to consider. The UX goals should be a filter through which decisions are being made. The product as a whole creates the user experience.

For the management

Actions that should be taken:

- Company-wide and R&D department wide UX goals should be defined.
- In the beginning of each project, project-wide UX goals are defined based on the information gathered from the field together with the company wide goals.
- The role of UX in the design strategy should be emphasized and supported. It should be lifted above the other design drivers.

Figure 5. Guideline 1 – Set the UX goals.

The SWOT analysis of guideline on setting UX goals (Figure 5) concentrated on two overarching themes: Content and structure of the guideline, and understanding the meaning and used terminology.

Strengths: The guideline was described to be well structured, having a clear slogan, compact, and targeting both designers and management with suggested actions.

Weaknesses: Group members found the guideline somewhat difficult to internalize mainly due to two reasons. First, the guideline used unfamiliar terms and abbreviations - such as PrEmo, AttrakDiff and moodboard. Second, even though the compactness was mentioned as a strength, the amount of content in a tight package was mentioned as a weakness as well.

Opportunities: As an opportunity, the group proposed that there could be links to additional information sources or to a more extensive guidebook. In addition, presenting some examples could make the guideline more easily understood.

Threats: The simplicity of the guideline was feared to enable the misunderstanding of its message. The text of the guideline can be understood in many ways (e.g. the perspective of one or several users).

While presenting the results the group also gave some further guidance on designing the guidelines, especially focusing on the language and the taking the viewpoint of a naïve non-UX expert viewpoint. For

example, it was mentioned that the guideline should be so simple that “even a mechanical engineer can understand it”. The language should be altered to basics, so that everyone could understand it. This clearly raised the need for improvement for editing the guideline without the UX expert terminology.

SWOT Analysis of Guideline 2 – Take Responsibility

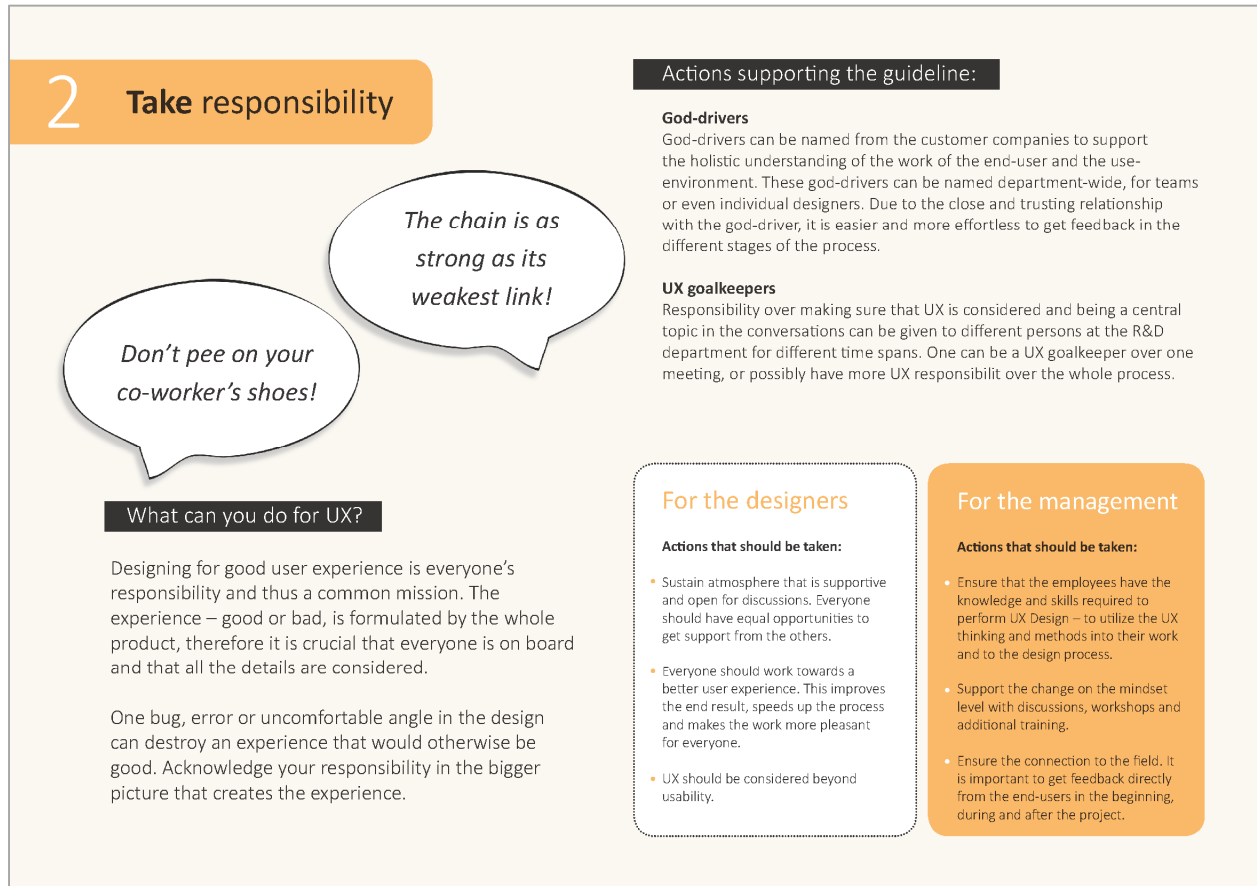


Figure 6. Guideline 2 – Take responsibility.

The feedback on guideline “Take responsibility” (Figure 6) concentrated on clarity and suggestions of the guideline, guidance towards mindset and behavior change, and impacts related to applying the guideline.

Strengths: The group mentioned the clear goals and areas of development within the guideline as strengths, raising the fact that everyone is responsible for good UX in their own work and that the guideline steers strongly the mindset.

Weaknesses: The only mentioned weakness was related to the possible negative aspects of responsibility sharing: “shared responsibility is no-one's responsibility”.

Opportunities: Group members saw that when people take more responsibility over the UX, it is more likely that the UX goals are achieved. This was mentioned to guide the designers to take the project towards the real UX design. Suggestions made also give the customer a real opportunity to participate to the process and even to have influence on the final product. It was also seen as an opportunity that a project could be divided into smaller bits, which individuals could be responsible of.

Threats: The threats raised by the group included a description of “Chinese whispers” meaning that the message or feedback can change along the way if the feedback comes through several different persons. In addition, if wrong persons are selected as godparent drivers, this can steer the focus of design and development to a wrong direction. The focus might in this sense be too narrow. Therefore, attention should

be paid on selecting the drivers in order to ensure that the products will fit to many different environments and use situations.

The guideline as such was acceptable. The focus of implementation should be making everyone commit to the experience design as part of their daily work. In addition, being able to communicate the user and customer feedback unaltered was felt to be important as well as choosing a wide enough range of participants to the design activities.

SWOT Analysis of Guideline 3 – Understand the context

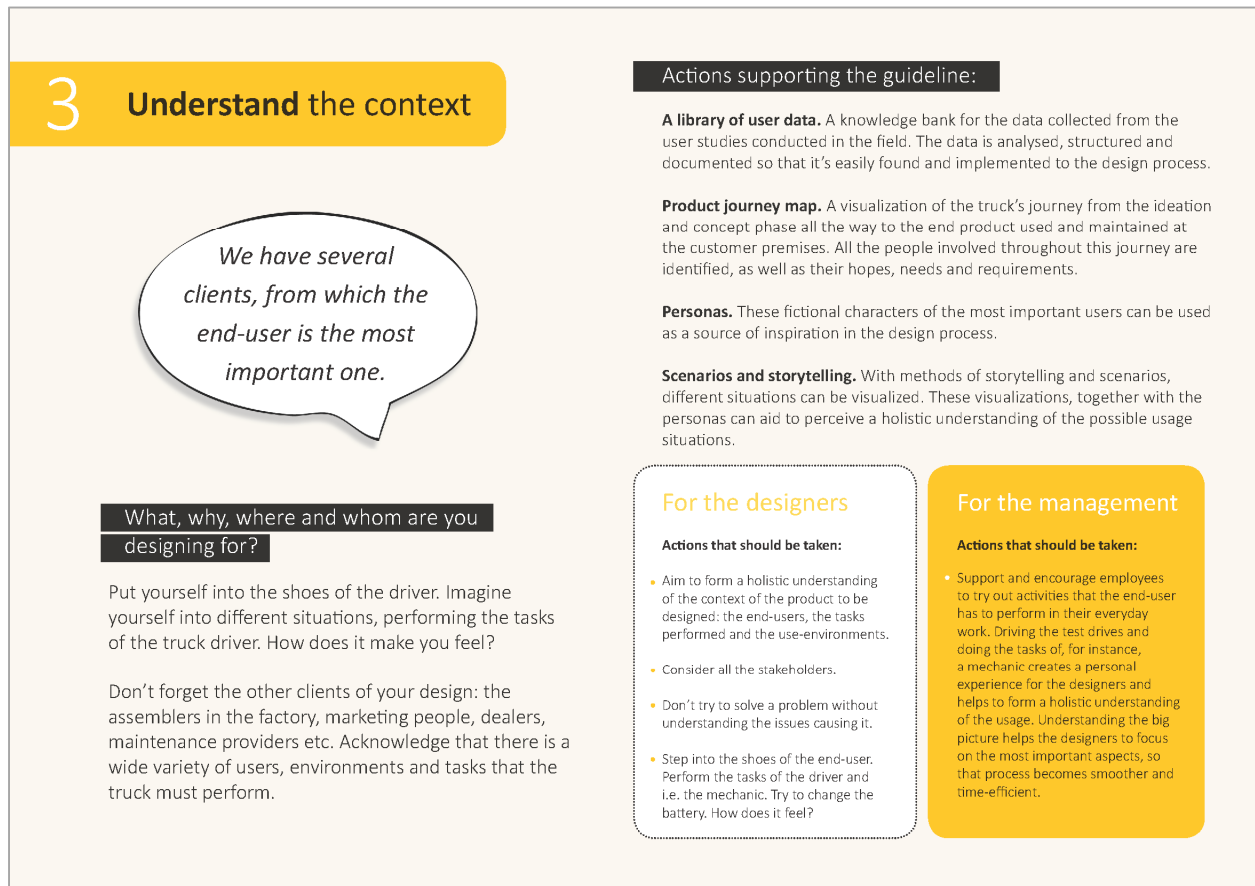


Figure 7. Guideline 3 – Understand the context.

Feedback on guideline "Understand the context" (Figure 7) based on the SWOT analysis focused on four main themes: stepping into user's shoes, issues related to data collection and sampling of users and contexts, first reactions to design, and implementing the guidelines.

Strengths: The first paragraph of the explanation was found to capture and suggest a useful, central, and important aspect of UX design. Furthermore, guideline was seen as guiding to focus on the things that bring added value.

Weaknesses: It was mentioned that even though stepping into the shoes of the user is recommendable and useful for UX design purposes, it still is hard. What kind of compromises can this lead to? Another weakness mentioned was related to the limited filtering and sampling of the users and user data, which was also discussed in threats. Furthermore, the group pointed out that the instructions to set up a library for user data are lacking - how the documentation is created and what data needs to be collected? How to prioritize the data and findings based on it?

Opportunities: Simplicity and essential aspects for the use can be identified by applying the guideline in practice, and guideline also directs to recognizing the intuitiveness when designing.

Threats: As mentioned in weaknesses, sufficient sampling is needed to gain a wide enough understanding of the context and users. There might be a temptation to focus too much on a “basic truck” and it may be difficult to find a “median driver”. The group also mentioned that design innovations might cause a negative first experience in the early stages - one must keep trying to push forward. Another threat is that when you focus on one context of use or user/stakeholder group such as a factory, you may forget other groups, such as services (maintenance) and sales. Finally, the group pondered whether all the options can be found in the early stages of the design process.

The discussion revealed a need to further develop supportive processes and tools to support experience design activities. Furthermore, the importance of seeing the bigger picture and understanding the viewpoints of also other stakeholder groups than the end-users by involving them in the design activities was brought up. Also, as change can cause resistance in stakeholders, not giving up by the first feedback is important to push the design further and testing for further feedback.

SWOT Analysis of Guideline 4 – Justify decisions

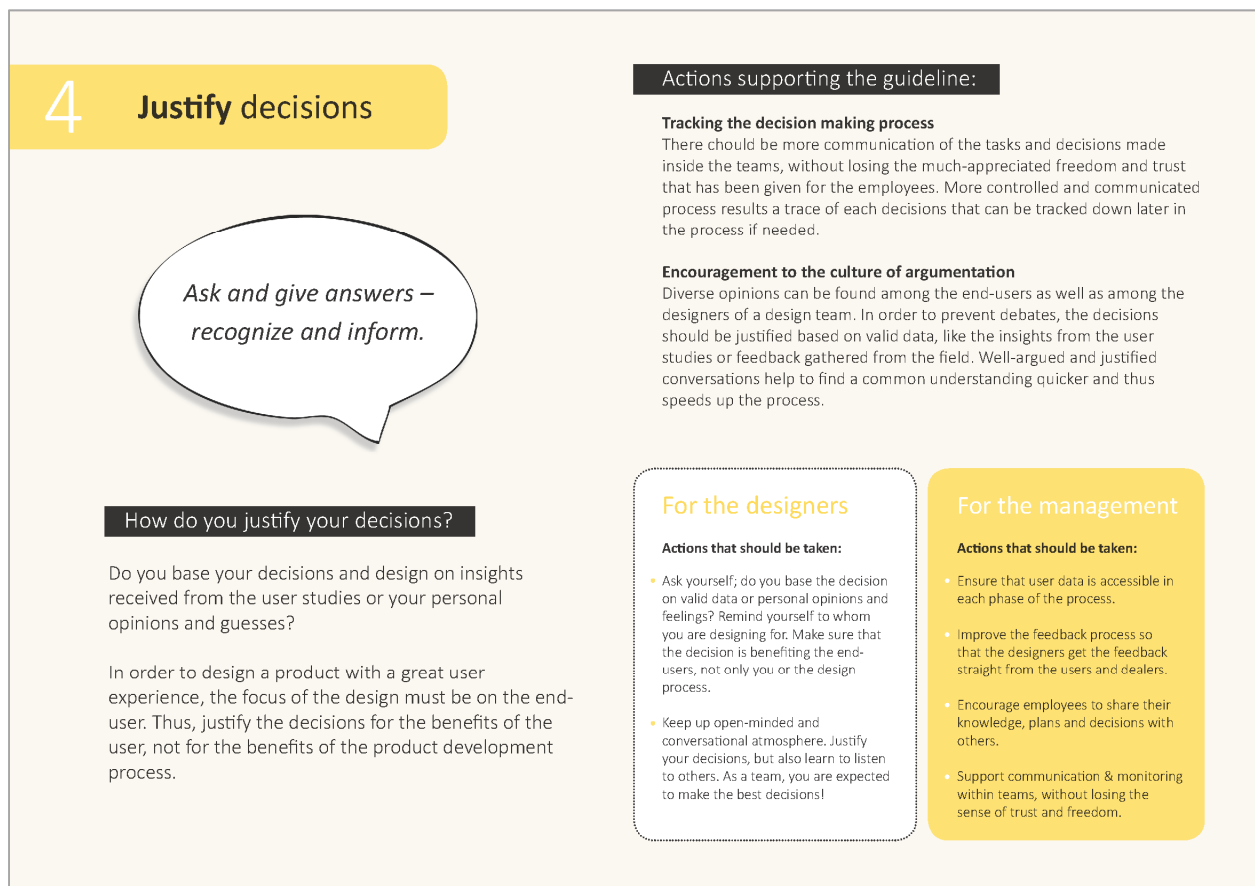


Figure 8. Guideline 4 – Justify decisions.

The analysis results on the “Justify decisions” guideline (Figure 8) focused on communication and collaboration in decision making, and using facts and insights for decision-making.

Strengths: Group reported as a strength the emphasizing traceability of decisions. This was mentioned as highly important. The group also felt that this is a strength within the company already at the point of the study: there is a culture of strong collaboration with customers, field visits are made to customer premises, information is shared with the others, and good results have been achieved with the resources available.

Weaknesses: On one hand it is good to have freedom and trust, but on the other hand this can lead to lack of documentation and going solo when making decisions.

Opportunities: The guideline directs to increased amount of communication, justifying decisions, designing for the customer, and towards the culture of argumentation, thereby creating an opportunity for increased making of things and decisions together. It also encourages to base decisions on data, such as user studies and at the same time to questioning the results and their reliability, e.g., was the data collected based on one customer/user or 100 customers.

Threats: As mentioned in opportunities, whether decisions are made based on solely on users, on one customer or several customers includes a threat. Generally, it was seen that if decisions are made by small groups of people and their gut feeling, this is a clear threat. Also too many meetings for decision-making can obscure the benefit, therefore the meetings need to be focused and efficient. Also the logistic managers, production managers etc. should be considered as “users” in addition to end-users.

One of the customer representatives commented that designers should “think that you are one of us”. All groups that come into contact with the product in some way also experience it, whether it is driving the truck or ordering maintenance. For further refinement of the guideline, other stakeholder groups could be more widely included in addition to emphasizing the end-user (driver).

SWOT Analysis of Guideline 5 – Test to evaluate

5 Test to evaluate

Good user experience can be sensed immediately!

Fail fast, to succeed sooner!

How do you ensure that the UX goals are achieved and the experience is good?

Prototyping during the ideation phase will give you instant feeling of the experience to be. Test your ideas – a good user experience can be sensed.

The more ideas the better! By prototyping, the good ideas stand out from the others. It also makes it easier to ask and receive feedback, since your thoughts and ideas are tangible and therefore easier to be evaluated and communicated.

Actions supporting the guideline:

A prototyping workshop / training day
Prototyping, which supports the design process and ideation, should be increased/added more into the different stages of the process. To get things started, a workshop focusing on prototyping could be organised with hands-on exercises. This would allow the designers to explore their ideas through a physical model and to evaluate the overall looks and feelings via quick prototyping and even 3D printing.

Space for prototyping
Quick prototyping and testing of ideas in the early ideation phase increases the chances for innovations. Handmade foam prototypes, as well as, 3D printed miniature models of trucks and its components help in the creation process on a detail level and forming the big picture of the product. Customers and end-users can be invited to the prototype workshop to comment and even co-design together with the designers.

For the designers

Actions that should be taken:

- Aim to produce as many ideas as you can and evaluate them by quick and dirty prototyping. The more ideas and testing by prototyping, the bigger chances to find the best ideas among the other ones.
- Try not to fall in love with your own ideas. You can prevent this by testing the ideas by prototyping before they are developed further. You'll sense the good experience already when prototyping quick and dirty!

For the management

Actions that should be taken:

- More time for prototyping should be reserved. Prototyping is most crucial in the early ideation phase, when a lot of ideas are created. Testing and evaluating ideas speeds up the process and reveals the most promising ones.
- Ensure access to the prototype workshop, where new dimensions can be found to design process and ideation. The details can be explored better and alterations can be made easily in order to find the best ideas.

Figure 9. Guideline 5 – Test to evaluate.

For the guideline on iterative testing and using prototypes (Figure 9), the results of the SWOT analysis focused on the following main themes: stakeholder participation and feedback, use of prototypes, engaging management, and iterative prototyping and testing.

Strengths: Key strengths of the guideline were the participation of the customer and dealer and the iterative approach in prototyping and its encouragement with quick and dirty approach

Weaknesses: Among the weaknesses it was mentioned that one must ensure that right things are tested and against the set goals. Furthermore, there is a need to synchronize the experience map with the testing map. This would be needed for the practical implementation of the guideline.

Opportunities: iterative testing and prototyping creates an opportunity to use the “fail fast and save money” approach also in physical product design. In long-term the benefits related to the guideline enable in best case positive first impressions that can lead to winning the demo situations organized by the dealers. Guideline also encourages engaging the management level to the UX process, which is needed to support the new experience-driven design approaches. Testing results can also justify design decisions better, and getting more feedback from different stakeholders gives more viewpoints to the design process. Furthermore, documenting the testing results enables creating an experience bank of products and processes that can be useful in design and development activities.

Threats: The group analyzing the guideline mentioned that in case testing follows a specification and if the specification is wrong, it will lead to problems. Also organizing of testing so that the individual opinions do not overrun the groups’ perceptions and experiences is a challenge to solve. Individual customer opinion might not be the opinion of the general market.

In addition, there was discussion on using agile methods to test the experience throughout the product journey. Further, end-user participation to pre-production phase was also raised. Both of these raised topics need support by changing the current practices as well as finding and choosing the participants to the testing. Further, critical analysis of the findings of tests and feedback are needed, so that the design decisions are not based on one individual or one customer.

SWOT Analysis of Guideline 6 – Design simple and intuitive

6

Design simple and intuitive

Less is more!

*Don't play tricks –
focus on the essentials!*

What is essential and needed?

Less is more. Think simple and functional solutions. Do not play tricks or make things more complicated than they need to be. Design simple and intuitive solutions in order to make the truck as natural to use as possible.

Well-thought design enhances the work of the user, whether it is the driver or the mechanic. Good design can ensure fast and effortless learning. Operating the vehicle becomes more efficient and safer and the driver won't get tired during the shift.

Actions supporting the guideline:

A library for UX innovations

UX innovations from other fields could be collected and brought to sight in order to spark new ideas and inspire the designers. This collection could be stored in an internal virtual library and exhibited on posters on the walls of the R&D department. To collect this material, methods like post-its (used in the User Experience workshop) can be used for example to analyse other vehicles. The insights from this exercise can be inspiring when designing trucks.

Internal design guidelines and standards for components

A set of general design guidelines is defined and a training day is organized to go through them. Most commonly used components are internally standardized, in order to keep the design uniform. This will aid both the designers in their decision-making, as well as, the assemblers on the product line.

For the designers

Actions that should be taken:

- Aim to design intuitive and simple solutions without excessive complexity. Natural and logical solutions help the driver do his job, by making it more enjoyable.
- Strive for consistent design by using same parts as in other models if possible. This way the assembly of the products becomes faster and money is saved when there is not too many components lying around in the storage.

For the management

Actions that should be taken:

- Develop and define a set of general design principles for the whole product development process.
- Standardize internally components and tools commonly used in the assembly of the trucks. The designers should be encouraged to use standardized components. If a suitable component doesn't exist yet on the list the new components should be chosen keeping the multipurpose in mind.

Figure 10. Guideline 6 – Design simple and intuitive.

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The group analyzing the sixth guideline “Design simple and intuitive” (Figure 10) focused on the outcomes of using the guideline rather than evaluating it as such. Therefore, the results of the SWOT analysis focus on its outcome and impact.

Strengths: The product developed applying the guideline is easy to use and understand, easy and cheap to manufacture, reliable. The group also mentioned that the product is easier to buy if it is simple.

Weaknesses: The group felt that the result of using the guideline might be too much narrowing, less features would be included, and the product might be more expensive than previously. In addition, the tool expenses could be bigger.

Opportunities: As an opportunity it was seen that there could be lower costs to manufacture. There would be less needed parts, and less steps also in the production line. Selling and buying can also become easier. Furthermore, delivery time could become shorter.

Threats: Mentioned threats of using the guideline included too simplistic design, eliminating too much or wrong features, selection being too narrow and stiff compared to the competitors, on the other hand too many combinations in the options, and lack of differentiating factors. In addition, it was raised as a threat that it is easy to think about individual features, but what about the product portfolio etc.?

Other comments in the discussion of the analysis results included the importance of making the decisions in the right stage of the process and that facts are needed already in the beginning of the design process. Furthermore, more power could be given to the agile team in the beginning to make decisions. Clearly, also the decision making process, the justification for making the decisions, and the result of the decisions were important when considering the impact of using the guideline.

Persona and UX Scenario Creation

The creation of personas was used in the workshop assignment to enable the participants to better understand the targeted stakeholder and to step into their shoes. Personas are fictitious, specific and concrete representations of target users (Pruitt et al. 2010). that can be utilized to communicate the customer needs. The method applies the power of storytelling to enhance attention, memory and user data (ibid.). Personas can help to bring target users to life and to integrate their goals and needs as a central driver of the design process and thus e.g. improve the communication of the users within the design team as well as with other stakeholders (Miaskiewicz et al. 2011). Personas, if used correctly, can be seen as a powerful tool for product development and create a shared understanding of who to design for. The method can be utilized as “a foundation on which to build scenarios and data collection” (Grudin et al. 2002, p. 146). Personas are easy to relate to – they are personal and detailed enough to gain credibility as “people”.


Scenarios are stories with a sequence of actions and events built around a setting and presenting actors (personas) with goals and objectives (Grudin et al. 2002). UX journey maps, on the other hand, focus on providing a graphic visualization or a map of user’s experience with a product or service, and the organization, which produced it (Howard 2014). The UX scenario template created for the workshop was designed to fit between these two approaches – scenarios and UX journey maps – focusing on one situation and the experience that the situation creates. UX scenarios are in our case study stories of user’s, in this case created persona’s, representative experience with the product, service, or system.

Before the assignment a briefing was given using examples of personas and UX scenarios to illustrate them in practice. An example persona of an R&D employee was created in advance, and presented for the participants to provide a starting point for the assignment. By creating the persona before the product experience journey mapping, we aimed that the participants would be able to relate to the persona they were creating the UX scenario for. The personas also gave the guest participants - the expert stakeholders from the field outside R&D department - a chance to become closer to the group, and share their experiences and views with the R&D personnel. This provided also an opportunity to share the expertise of the participating stakeholders so that it could be utilized in the persona and UX scenario sketching.

The second phase of the exercise was UX scenario description. The teams were provided a template and set of supporting questions to build a UX scenario focusing on the created persona in a specific situation. To enable smooth execution of creating the UX scenario, an example of a UX scenario was provided and presented for the groups before the exercise.

The template for the UX scenario creation included the following themes and guidance: 1) Situation: what kind of situations the persona faces in his work? Describe a situation that creates either a positive or negative experience caused by the products or services of the company, 2) Experience: What is the user experience in this situation? 3) Feelings: How does the persona feel in this situation? 4) Cause: What is the cause of the experience? 5) Expectations: What kind of expectations does the person have towards the products and services of the company? 6) Who else is affected by the situation? 7) How could this be developed / improved?

After creating the persona and UX scenario the teams were asked to present their work for others. Each team presented both the persona created in the beginning of the exercise as well as the UX scenarios they had created. An example illustration created based on the participatory workshop materials by one researcher after the workshop for the persona and related UX scenario is presented in Figure 4. The illustrations created by a researcher for each of the six personas and related UX scenarios were provided for the company to be utilized as part of their design activities. The company printed after the workshop the personas and UX scenarios on large posters, and put them up on the open office workspace walls, similarly to the previously created UX design guidelines.



"Everything is easier if you have clear instructions to do things!"

MECHANIC / ARTHUR, 30

NAME	Arthur Smith
AGE	30
OCCUPATION	Mechanic
JOB DESCRIPTION	Assembling warehouse trucks
HOBBIES	Music and cars
FAMILY	Engaged

RELATIONSHIP WITH TECHNOLOGY
Arthur is very interested in cars and technology. He likes to spend money on technology, especially when he has some extra cash.

The best thing about work is... when the day ends and he gets to go home. Work is just work for him.

How does the products and services that the company produces affect on him? He curses almost every day the low installability of their products. The most important thing though is safety, so that there would not be work-related injuries while assembling the products. The incidence of errors when installing the products frustrates him and slows down the work speed. The slowness of changes frustrates him.

What are his area of responsibilities at work? The tasks ordered by his supervisor.

What is he responsible for and to whom? He is responsible for the quality of the end product, for example in the final inspection. He is responsible for the customer, and the end-users, but also his own colleagues.

What frustrates him at work? His status at the workplace. Like his colleagues, he is frustrated by the poor communication and the slowness of the changes. The detected design errors that have been reported forward are not being fixed. This affects the installability of the parts and thus the quality of the final product.

What motivates him at work? Because the work itself is not very motivating, the motivation to work can be found in leisure time: weekends, coffee breaks and vacations helps to keep him going. Work is worthwhile when surrounded by a good team, so also the co-workers can be seen as a motivator.

UX SCENARIO

SITUATION

In the production line, the parts that he is trying to install do not fit. The problem is continuous and it has been reported forward already several times.

EXPERIENCE

The experience is negative. Not knowing how to proceed when the reported notifications are not quoted and instructions how to proceed the work are missing.

FEELINGS

Frustration and uncertainty - whether he has done his job correctly? Also he feels depressed, due to the fact that the message is not received.

CAUSE

A design error, which takes a lot of time to be fixed.

EXPECTATIONS

Flawless parts that are easy to install and proper instructions how to assemble the product.

WHO ELSE IS AFFECTED?

The customer when the final inspection and the product delivery is delayed. People in sales have to explain, the dealers are frustrated. Ultimately the customer suffers the most.

HOW COULD BE IMPROVED?

By creating an installation guidelines together with the R&D department, and thus get better instructions to the technical drawings.

Figure 11. A persona and UX scenario originated from the workshop.

According to the feedback from the company, five out of six personas and UX scenarios succeeded and captured the stakeholder viewpoint well. However, it was noticed that one of the personas was not usable as it was highly stereotypical, namely the salesman. In this group, the stakeholder representative (dealer), had to leave before the persona was created. It seems that the viewpoints that the stakeholder representative can bring to the persona and the experience scenario creation is beneficial for creating realistic personas and mapping their experiences.

Feedback on the Participatory Approach and its Impacts

In the end of the second (implementation) workshop, feedback for all the phases of the developed and applied participatory design process was collected from the participants. The feedback form consisted of three parts: 1) the assessment of the development process of defining the UX design guidelines including the field study with observations and interviews as well as the first participatory workshop, 2) the assessment of the UX design guidelines themselves, and 3) the assessment of the second, i.e., review and implementation, workshop where SWOT analysis of the guidelines was done and personas and UX scenarios created. Each part contained nine adjective pairs with a 7-point semantic differential scale. The adjective pairs were the following: Confusing - Clearly Structured; Ordinary - Novel; Dull - Captivating; Isolating - Connective; Discouraging - Motivating; Uninstructive - Instructive; Alienating - Integrating; Technical - Human; Illogical - Logical. In the beginning of the form the participants were asked to mark in which part of the UX design guideline defining process they took part (field study interviews, first workshop and/or second workshop).

Overall, positive feedback for every attribute was received from all 23 company employee participants for all three parts reported as means and standard deviations: Defining UX design guidelines: $M = 5.0-5.9$ ($SD = 0.8-1.3$); Developed UX design guidelines: $M = 5.0-5.5$ ($SD = 0.9-1.2$); Review and Implementation workshop: $M = 5.4-6.2$ ($SD = 0.8-1.2$). The responses from six stakeholder guests were similarly positive in regard to the second workshop they participated with SWOT analysis of guidelines and UX persona and scenario creation.

According to the design manager at the time of writing this article, that is, 18 months after starting the participatory process with observations and interviews, the company has adopted the experience-driven approach and thinking, and related methods and tools in their daily work. The materials created during the participatory process, from guidelines to created personas, are still showcased on the open office workspace walls of the R&D department to support discussion and UX focus. The design manager describes:

"The impacts are heard in how designers justify and even question already made decisions, and are willing to work harder to achieve better user and customer experience. Details are discussed more than before. In some cases even too much from the point of a manager. This process has provoked much discussion on whom we design for. Production is one of our users or customers. This has also influenced how easy and fast it is to assemble and manufacture products. From this, there is a connection to serviceability and maintenance as well as to the customer, who has previously sometimes needed to wait for the equipment too long due to challenges in assembling. Impacts are directly affecting competitiveness. When making decisions, we use the personas to think about the impacts of design choices. Nowadays this is something we do in our everyday work. My job is to see that these things are not forgotten."

According to the design manager's statement, the developed and applied participatory process has been effective in starting the mindset change and resulted in change in the thinking of both individuals and collectively. The management support to the UX related activities and UX thinking seems to support the change to happen in every day work.

Discussion and Conclusions

We developed and applied a participatory design approach to engage and empower employees in a change process from technology-driven to experience-driven design. Our case study was conducted with a company designing, developing, manufacturing, and selling materials handling equipment in metals and engineering industry. If developers build the products for people like themselves, it easily leads to technology-driven design that highlights technology over user experience. Therefore, an important step in the change process is to shift the focus from technology towards the actual users of the products and their experience. The experience-driven approach introduced to the case company builds on understanding the users' world and empathizing with the target users. The aim in the case company was to reach beyond the usability focused human-centered design by incorporating experiential aspects as the guiding light for design throughout the development process and for all involved in the development activities (Kaasinen et al. 2015, Varsaluoma et al. 2015, Väättäjä et al. 2015). The guidelines include advice to *understand the context* and to *set UX goals*,

and experiential aspects are prominent in persona and UX scenario templates as well. Guidelines such as *justify decisions*, *take responsibility*, and *test to evaluate* should also increase the user focus.

Regarding the mindset change, we see the actual UX guidelines less important than the participatory, co-creative process of developing, and discussing and reflecting on them within the company. If guidelines are developed having the focus in the end result, they may become more 'correct' and comprehensive, but the impact may remain marginal. In this study, the means to create the guidelines was integrated to the mindset change goal. Our aim was to find an easy-to-remember set of guidelines that resonate in this organization, especially in the R&D team. Distilling a vast number of requirements from the interviews into 6 best resonating UX guidelines was a laborious task but it was an essential activity to justify the guidelines and get buy-in among the internal stakeholders. The participants were especially pleased with the possibility to influence the guidelines before approval, as can be seen from the second workshop feedback.

The participatory process in this case company seemed to produce useful results – it seemed to catalyze a change in the design process and in the mindsets. The process is ongoing in the case company, and follow-up actions and management support root the changes deep in the process and mindset. Further workshops or other educating events could be organized, and processes and additional tools to support experience design need to be designed, preferably in collaboration with the employees. To support the product development team, a library or database for user related data could be implemented and taken into use as part of the development process. In addition, the management level needs to be supportive of the experience design as an approach, e.g., by including the experience design into the company strategy and by allowing time for the design activities. In addition, including a representative sample of users and other stakeholder groups in design is essential for success as well as providing UX methods and guidance in a non-expert language.

As a conclusion, the participatory design process and the created UX design guidelines were assessed positively. For future work it would be interesting to follow up the adoption and use of the created UX design guidelines, materials (personas and UX scenarios), as well as the experience-driven design tools and methods introduced to the participants. We welcome future works on applying similar type of participatory approach to support the shift to experience design in other B2B companies in traditional industry sectors such as metals and engineering industry.

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