

EXTENDING THE PRODUCT SPECIFICATION WITH EMOTIONAL ASPECTS: INTRODUCING USER EXPERIENCE STORIES

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ABSTRACT

Emotional aspects of products play a vital role for the purchasing decision but are often neglected in conventional product development processes. In the task clarification design phase, in particular, many challenges need to be faced: task clarification is an interdisciplinary and user-centered process, where a communication platform for the non-tangible, affective characteristics is essential. Additionally, the product specification as output of this phase does not capture important aspects for User Experience (UX): contextual and temporal aspects, user motives and goals and interrelations among product attributes or other system components affecting the holistic experience. UX stories are introduced as a tool to face these challenges and overcome the weaknesses of existing approaches. A definition of UX stories, descriptions of the elements composing them as well as their possible integration in the engineering design process are proposed. The paper highlights how the use of UX stories can enrich product specification regarding UX and reinforce creating consistent product experiences that go beyond the product itself.

Keywords: emotional design, experience design, human behaviour in design, storytelling, design tools

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1 INTRODUCTION

Increased production capacity, resultant competition and increased use of new technologies during the past decades have led the global market to new, complex challenges. On the one hand the focus lies on shorter life cycles and cost reduction, on the other hand the demand for higher quality seems to be more important than ever. Furthermore, supertrends such as hedonism and individuality show the importance of “softer issues” in product development. Emotions and impressions of a product are crucial for the purchasing decision. Consequently, it is the customer’s emotional needs which primarily must be taken care of (Schütte, 2005). Designing attractive products that evoke positive emotions requires knowledge about the feelings the products arouse as well as knowledge about users and their needs. For integrating the voice of the customer different methods exist for industrial use, but when it comes to capturing of emotions, impressions and pleasure, methods are very rare. New research directions such as ‘Emotional Design’ (Norman, 2004), ‘Affective Design’, ‘Pleasure with products’ (Jordan, 2000) have appeared, with common scope to enable the integration of affective, non-technical values into product design. The research fields of User Experience (UX) and User Experience Design (UXD) also focus on analyzing the users’ personal impression and on making the emotional impact of products describable or even measurable. Still there is the need for a systematic approach supporting the design of emotional products holistically, which requires the introduction of suitable methods and tools into companies’ design processes.

Aim of this paper is to support design of emotional products in interdisciplinary teams. A special focus on the task clarification design phase (cp. Pahl & Beitz, 2007) has been selected as decisive for further development phases. We suggest overcoming the disadvantages of existing approaches by applying UX stories, i.e. narratives which involve emotional, temporal and contextual aspects formulated as story elements. In parallel, this work systemizes the storytelling approach, adapts it to product development context and creates a communication platform for the interdisciplinary design team.

2 BACKGROUND AND RELATED WORK

2.1 Psychological needs – driven experience design approach (J. Kim et al., 2011)

According to Hassenzahl (2010), one of the basic claims of UXD is to consider the experience before the products. Before the functionality of a product ("what level") or action ("how level") are described in detail, an emergent story of product use, summarizing feelings, thoughts and actions, should be defined. In his model (Figure 1) the activity of interacting with the product is described in three levels combining the individual and the environment. Do-goals are the effects the actor wants to achieve and are not entirely dependent on technology, while Motor-goals are to be reached by motor activities. This model also introduces another level, whose objectives are crucial for UX and relate most closely to the individual ego: Be-goals, serving as motivation for the action and giving it ultimate sense.

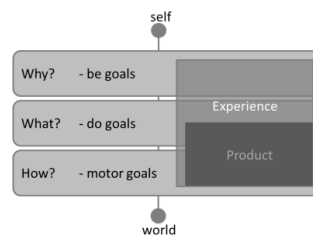


Figure 1. Activity model (Hassenzahl, 2010)

J. Kim et al. (2011) describe the importance of the fulfillment of users’ psychological needs for UXD. They suggest providing satisfaction and enjoyment through the interaction with a product by the fulfillment of basic psychological needs. Evolving the work of Sheldon (2001), they select six main and four sub psychological needs and suggest a five-step design concept generative method, in which experience patterns are used to bridge the gap between a need and an activity or product to lead to novel ideas for enjoyable products. Experience patterns face the challenge of compressing the complexity of positive experiences and thus provide a minimum set of key findings explaining why people enjoy this type of experience. The suggested method consists of the following steps: After determining the activity or product to enhance with experience and the users it aims at, a related need and an applicable experience pattern have to be chosen. A Status-Quo-Analysis, i.e. a comparison

between current and suggested experience should then provide designers with ideas for improvement of the selected product.

2.2 Context-based activity modeling (Y. S. Kim et al., 2011)

Most products nowadays are complex and additionally used in a complex, dynamic environment (Anggreeni, 2010; Norman, 2011). Roto et al. (2011) suggest “system” and “context” being two key factors regarding UX. A user’s perception of the system’s properties naturally influences UX. Important for UX are the properties designed into the system, the properties that have been added or changed, as well as the brand image. Additionally, UX may change when the context changes, even if the system does not change. Relevant for UX can be *social*, *physical*, *task* and *technical and information* context. Moreover, products are parts/ components of larger systems. The interrelations with the other system components, sub- and super systems are important for the holistic experience. Consider also that many products are nowadays hybrids of product-service-systems (PSS).

Y.S. Kim et al. (2011) highlight the grown importance of value creation trough PSS in comparison to only product-driven value creation. The PSS Design Method concentrates on the needs and values of the various stakeholders and the creation of experience value is highlighted as central for successful design. The Context-Based Activity Model (Figure 2) is a measure to describe a PSS with all its relevant elements. The *Activity* described by an “action verb” is in the center and all relevant elements that influence the activity and its use experience are arranged around it: Persons involved in the Activity (*Active*, *Passive*, and/or *Third Party Actor*), the *Object* of activity, the *Tool* to execute the activity, *Events* and the *Environment*. The most important element is the *Context* in which the PSS is going to be situated, which is divided into four sub-elements: *Goal Context*, as general motivation for the activity, *Relevant Structure* involving all relevant entities that have to be managed by and influence the UX, *Physical Context* containing information on time, location, weather, lighting, sound etc. and *Psychological Context*, containing information to the affective and social context such as emotion and mood. Changes to the different elements can be made to reinforce PSS innovation.

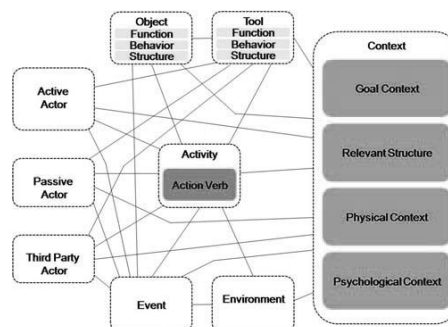


Figure 2. Context-based activity modeling (Y.S. Kim et al.2011)

2.3 Narrative methods

Narratives are a tool used in many disciplines, from knowledge management and sociology to software engineering, with the goal to support communicating, collecting and compiling qualitative information, by giving it a human face. In the areas of *management science* (Their, 2010) and *knowledge management* (Roth and Kleiner, 1998) storytelling is introduced as an appropriate method to communicate activities, to inspire and motivate employees, to visualize qualitative evaluations and to pass on knowledge in a memorable way. In *software development* (Carroll, 1995) scenarios are used to communicate important information like goals and behaviors of users. In *interaction design* (Erickson, 1995) stories are introduced as a communication tool supporting the implementation of user information into prototypes. The use of narratives in the *product design* world has recently increased as a helpful tool to deal with challenges like multi-user and dynamic contexts and interdisciplinarity. Narrative methods can often be found as personas, storyboards and customer journeys, used in different phases of the design process but mostly for user research (Tassi, 2009). In ethnography, where human behavior and context play a vital role, stories are used as a user research method. Communicating user characteristics, tasks, equipment, physical and social environment (Lloyd, 2000) is valuable for the elicitation of requirements. Lloyd (2000) highlights another advantage of storytelling: explaining design procedures and creating a common understanding of situations with

economy of language through “story indexes”. Relevant for this research is the work of I. Anggreeni (2010). She defines scenario accordingly to previous scientific work in software system development as “explicit descriptions of the hypothetical use of a product” with three points: Scenarios describe a process or sequence of acts, are formulated from the view point of an actor, which corresponds to a stakeholder and its scope and can range from “narrow” (describing what the product does) to “rich” (describing a larger context of use). Different scenario types can be applied in different design stages, influencing each other and building on each other, as they consist of common elements (Figure 3).

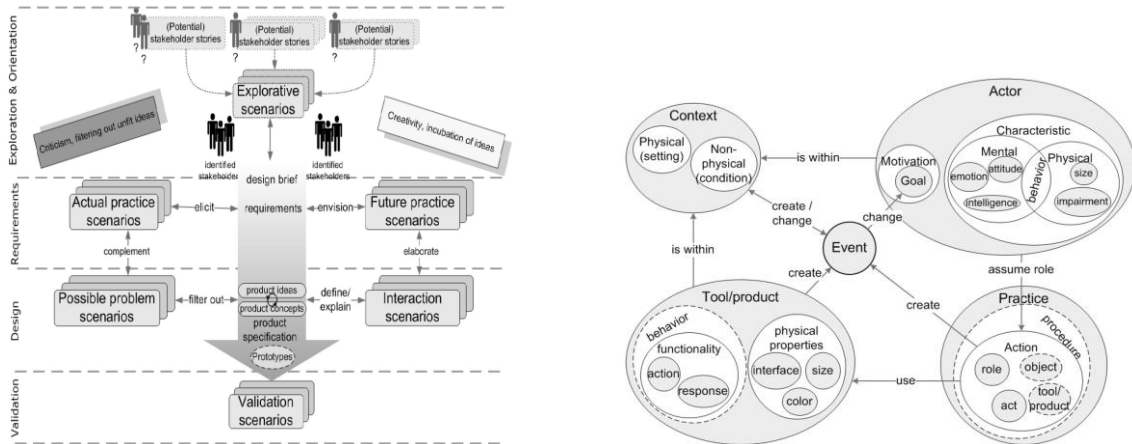


Figure 3. Scenario types (left) and scenario elements (right). (Anggreeni, 2010)

In UXD, as suggested by Quesenbery and Brooks (2010), a storytelling approach applied during the whole design process would improve the quality of the developed concepts regarding UX. Among different story types introduced for possible audiences and design phases, the *technical specification story* type is particularly interesting for this work. In this type useful information is summarized in a structure including *presumptions* on which the story experiences base, *user experiences* described in two sentences, *goals* of the new experience, *references* and *takeaways* as a short summary.

2.4 Deficits

To sum-up, approaches emphasizing contextual information and, more importantly, user needs and emotions are needed for successful UXD. J. Kim et al. (2011) provide a strong theoretical basis with the matching of needs fulfillment with UX, yet the link to the product and the design practice is still weak. Context-based activity modeling (Y. S. Kim et al., 2011) and scenario building (Anggreeni, 2010) capture important contextual aspects but miss emotional elements concerning usage over time. The dynamic nature of experiences and temporal aspects of product usage are very important for UXD (Roto et al., 2011). UX is dynamic, as the person experiencing the system with its motivation, mood, its current mental and physical resources and expectations, is dynamic. Furthermore, the actual experience of usage does not cover all relevant UX concerns (Figure 4): indirect experiences can appear before use, for instance through expectations formed from existing experience or advertisements, as well as extends after usage, e.g. through reflection on previous usage.

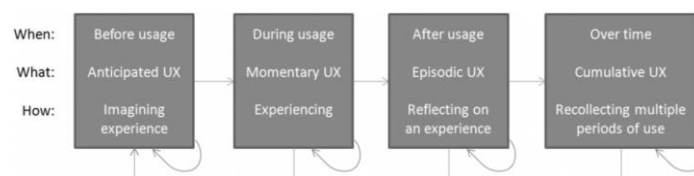


Figure 4. Time spans of UX, kinds of UX and internal process. (Roto et al., 2011)

Literature on storytelling shows potential for its use in development process to improve communication of emotional and contextual factors and add a temporal aspect. Still, definitions and concrete guidelines about how to create a story with special focus on UX factors and scope to support the development team are not to be found.

3 OBJECTIVES

3.1 Support design of emotional products by extending the product specification

Main objective of this work is to reinforce the integration of emotional aspects and UX-related factors in product development processes. The task clarification design phase, being the first in design process, offers the potential to include affective factors that would accompany the rest phases.

The first phases of product development focus on creating a situational understanding of the market and its opportunities and defining the problem to be solved through the new design (Gausemeier et al., 2006; Hales and Gooch, 2004; Lindemann, 2009; Pahl and Beitz, 2007). In this work we refer to the definition of Pahl and Beitz (2007), according to which, the first of four main phases of product development process is “product planning and clarifying the task”, composed of following steps: *Situation analysis and field search*, where market and company situation are analyzed to identify future developments; *selection of product ideas* with the formulation of a product proposal; *task clarification*, where product goals, such as functionality and performance, and goals concerning deadlines and cost targets are formulated; *elaboration of a requirements list*, where the product development department identifies, formulates and documents the requirements that determine the solution and embodiment quantitatively. Input of the task clarification phase is a task defined by the company, the market or environment influences, while output is the “product specification” summarized in a requirements list, a document representing the specification against which the success of the product development project can be judged. Product specification accompanies the whole development process as a key document. Therefore, it is important *to reinforce the integration of non-technical requirements regarding mostly three issues: “be-goals”, temporal aspects and complexity*. Technical requirements and product specifications usually describe what should be designed and how, and not the “why” behind the design or “be-goals” (Hassenzahl, 2010). The dynamic nature of experiences and temporal aspects of product usage are very important for UXD, yet neglected in a requirements list. Most products nowadays are complex and additionally used in a complex environment (Norman, 2011). The relations among the system components and their effect on the holistic UX are difficult to visualize in a requirements list.

3.2 Create a communication platform

UXD is interdisciplinary and user-centered, which makes UX aspects necessary, yet difficult to communicate. With experts from different disciplines working in different departments, managers, and potential users as participants in the UXD process, as well as with aspects non-tangible and dependent on holistic and personal emotional responses, difficulties in communication can occur in all stages of the UXD process. The challenge is *to create a common communication platform for all stakeholders and eliminate the need for continuous “translation” and subsequent information loss*. The relations among the system components and, more importantly, their effect on the holistic UX have to be clear to the design teams working on different subsystems. They should have a common vision about the holistic experience to be designed, as shown in Figure 5.

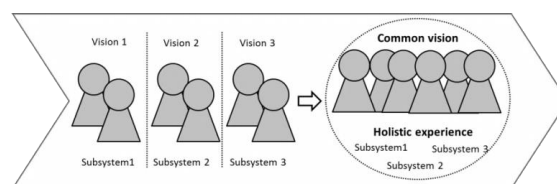


Figure 5. Need for common vision of holistic UX, adapted from Björndal et al. (2011)

3.3 Adapt and systemize the storytelling approach

Storytelling approaches suggested in literature, either do not aim at developers or do not focus particularly on UX, so are not applicable to the scope presented in this work. Narrative methods like the persona approach is abstract and do not provide the developers with guidelines about how the story content can be implemented into designs, while scenarios do not focus on user needs and emotions. Storytelling is mostly applied by experts; we address developers without background in UXD or storytelling. Goals of this work are *to introduce a story type building on the advantages of*

existing approaches, define it with a special focus on UX elements and adapt it to product development context.

4 PROPOSED STORYTELLING APPROACH

So far we have recognized the need for a tool to support emotionality in engineering design, being *easily adaptable* to existing design processes, *simple to understand and use* by developers without experience in UXD as well as the whole design team and *process accompanying*. In this work we suggest creating narratives with UX relevant elements or “UX stories” to extend the design artifacts and accompany them in different stages of product development. The particular focus lies on the narratives extending the product specification, i.e. serve as output of the task clarification process as well as input for the following phases of the product development process to support decision making and evaluation of design concepts, analog to a requirements list.

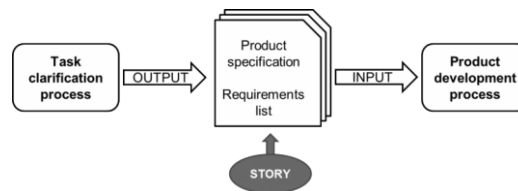


Figure 6. Proposed application of UX stories in the design process

The following section presents a definition of UX stories, followed by a description of the elements composing them and a proposed integration in development processes. The use of the elements in the story creation process is proposed in a ten-step-methodology described in Michailidou et al. (2013).

4.1 Story definition

A story is used in this context as a technique for modeling applications and is therefore compared with other such techniques. Note that the persona technique is excluded, because, despite emphasizing on user goals and motives and contextual information in a narration format, it does not include information about the product or product usage. The results of literature review (Erickson, 1995; Anggreeni, 2010; Quesenbery and Brooks, 2010; Björndal, 2011) are summarized in Figure 7.

Technique for modelling applications	Characteristics							Format	
	Events		Human/ Actor			Context		diagram	narration
	sequence	network	user	goals	motives	environment	Physical, emotional, sensory, historical, memory context		
Flowchart		x						x	
Use case	x		x					x	(x)
Use Scenario	x		x	x		x		x	(x)
Story	x		x	x	x	x	x		x

Figure 7. Comparison of the characteristics and format of stories with other techniques

Figure 7 highlights the special characteristics of stories, which are:

- the *narration-format*, emphasizing the natural and memorable communication scope
- the *specific nature*, as it describes a specific person in a specific situation
- the focus on a *well-drawn character with known motives and needs* rather than an “actor”
- the focus on *untypical* –rather than typical or prototypical- situations
- the *personal nature*, since the character as well as the receiver are interested in the result.

A definition formulated for the scope of this work is: “A story is a narration about a specific, aimed interaction of a character with a system in physical and emotional context. The story focuses on the characters’ needs, motives and goals. Therefore, the story enables a personal identification of the receiver with the story character”. The special focus on user needs and motives implies that the stories defined here portray UX. Moreover we define a set of elements which further emphasize this attribute.

4.2 Story elements

The generic phases of storytelling process (Roth and Kleiner, 1998) are: plan, interview, extract, write, validate, and spread. Collecting the story elements supports the phase “extract”. With the proposed collection of story elements as basis, the team responsible for the task clarification process can systemize its findings with focus on experience-relevant aspects and compose a UX story which captures them even in this early phase. The UX story will then be passed on to the development team as part of the product specification, so that they achieve continuity in the rest of the design process until the concept implementation, without forgetting UX aspects.

Motive and Psychological need

The approach of UX aims at developing experiences via the product usage, which has to meet psychological needs and motives of the user and fulfill or even exceed his expectations (Sheldon, 2011). To support this need-oriented approach from the beginning of the design process we suggest users’ motives and needs addressed by the new concept to be defined as first story elements. The user motive or motives are, in this approach, expressed as a simple sentence in the form “I want to ...” or “I can ...”. This motive-sentence represents the design goal in a specific and memorable way and could serve as title of the UX story or “story index” (cp. Lloyd, 2010), making the vision for the new product clear and memorable to everyone involved in the design process. Another reason why this formulation has been chosen is that it reinforces the expression of the design goal in a positive way, as a chance for creating an enjoyable product, instead of a problem to be solved. Methods to derive such motives can be found in the work of Kim et al. (2011) concerning experience sampling, where a similar motive sentences are defined as “experience statements” and in the work of Tomico (2007). To support teams with little background in psychology and to enable story and concept evaluation, we recommend selecting one need from an established set of psychological needs, for instance the set of the 10 needs tested by Sheldon et al. (2001). Taking the car navigation systems as example, motives like “I want to know the quickest way to my destination” and “I want to add points of interest in my route”, describe the purposes of the new system from user perspective and the need addressed would be “competence”.

Character

One of the main characteristics of stories is that they are personal. To give the story a human face we suggest defining a well-drawn character as main protagonist of the UX story. Important data concerning interaction and UX, like user physical and cognitive characteristics, especially previous experiences and expectations are summarized in personas. The study of the story character emphasizes the user-centered character of the design process and creates a link to user research. Data derived from ethnographic methods can be used for the persona creation. Literature on persona (e.g. Cooper, 2007) can provide methodological support at this stage. The authors recommend selecting also untypical users as protagonists to explore extreme use situations.

System components

Subsystems, product components, other systems or services, which address the same need as the development object, are proposed to be listed as elements highly relevant to the holistic experience. The integration of more components into a consistent product experience can be a challenging part of designing for UX. This story element is supposed to encourage designers to integrate the new concept into a larger system of more components that contribute to the fulfillment of the same motive and to reassure the consistence of the experience described in the story. Back to the navigation system example, UX can be affected by other systems of the complex car environment, such as Adaptive Cruise Control systems, the Head Up Display, or the radio.

Use cases

Roto et al. (2011) emphasize the temporal aspect and the dynamic nature of experiences. Environment and context factors have an impact on the motives, as well (J. Kim, 2011). We suggest all use cases relevant to the new concept be listed and selected systematically. In this step, designers are supposed to explore how the experience described in their story and the developing product change over the use in different cases. What does, for example, the experience of using a navigation system while planning the drive, while driving in the city with traffic, or while using the system as co-driver look like? This step should also serve as basis for the definition of the plot. The use cases collection can take place in a workshop session, where the team explores product usage in a cognitive walkthrough.

Coincidence and/or disturbing event (resulting in emotions and activities)

Finally, we recommend the selection of at least one key event for the story, which highlights the need for the new product. This can be a disturbing event, the problem solved by the new solution, or a coincidence, providing the chance for the use of the new concept. It could also refer to expectations before or to memory created after the interaction. Either way, due to this key event, the story character faces critical emotions and the need for activities/actions enabled by the new concept. Key events play an important role for the suspense in the story plot and make the story interesting and memorable. We suggest selecting an actual event derived from user observation.

Note that the product to be designed is not considered an element, because we want to emphasize a need-driven approach. The UX story is not product-specific, but experience-specific, including mostly context factors giving insights into the character's emotions.

4.3 Proposed application of UX stories in design process

The primary steps in the engineering design process (Pahl and Beitz, 2007) are *Situation analysis and field research* and *Selection of product ideas*. Narrative methods are commonly applied during these steps, mostly in form of real user stories during observations and interviews, personas during marketing research, or scenarios describing future trends. The suggested approach encourages the use of such narrative methods: user stories and personas, in particular, will determine the identification of the story elements "motives" and "characters". After having identified the product proposal, the *task clarification* step follows, to define product goals and set a project plan. The proposed approach supports the product goals definition: The story elements can at this point serve as guideline for the interdisciplinary team to structure and summarize findings and to support cooperation. Goal of our approach is thereby that, with the UX story as key document, the development team has a clear vision for the new product within a context of use and that UX aspects are not neglected. Moreover, evaluation with users is already possible, since the UX story enables the communication of the new product idea and needs to be fulfilled. By testing needs fulfillment the product goal formulated can be tested (Sheldon et al., 2001). The story creation also contributes to the preparation for the next step, the *elaboration of the requirements list*, since data of various formats derived from different sources are summarized into one comprehensible, memorable document. By the end of this design phase the team's findings are proposed to be incorporated in two documents to be passed on to the development team implementing the concept: the requirements list and the UX story. To sum-up, the UX story bases on user research data collected in the beginning of product development, but can still evolve during the process analog to a requirements list. Both documents accompany the rest of the process as basis for decision making, evaluation and moreover for marketing and advertising.

5 DISCUSSION

We propose applying UX stories in task clarification design phase, in order to improve process-relevant factors and the process output itself (Table 1). The approach was applied in several trial uses by students in UXD projects and also by an interdisciplinary research team in automotive industrial context. The feedback collected contributed to the story elements improvement and provided helpful insights into advantages and limitations of the suggested approach.

Regarding the first two objectives following use case gives interesting insights: Six students groups have been asked to create a requirements list for a new juice press. The requirements were derived by applying brainstorming, benchmarking, questionnaires and Quality Function Deployment. Two other groups applied the suggested approach to create UX stories in sessions moderated by the researchers. In the first case, the requirements formulated involved following categories: Costs, functionality, materials, quality, laws/ standards, logistics, production, time, personnel, aesthetics, manufacturing, efficiency, safety, ergonomics, geometry, energy. Most requirements, as the discussions during the group sessions, regarded technical rather emotional aspects concerning the product rather than the user, while many "soft issues" discussed have not been documented. The UX stories created, on the contrary, involved many user- and experience- related aspects. The suggested approach also reinforced the integration of the concept ideas into a context of use and helped including interrelations with other relevant systems or services. As a result, the UX story as complementary document to the requirements list can contribute to the *completeness* of the product and increase the potential for leading to emotional products.

Table 1. The variables derived from Section 3 were examined in trial use of the approach.

Objective	Variable	Method
<i>To reinforce the integration of non-technical requirements into product specification regarding three issues: “be-goals”, temporal aspects and complexity</i>	Completeness of product specification (user motivation, use over time, interrelation with other system components)	Review of product specification and comparison of different approaches results
<i>To create a common communication platform for all stakeholders and eliminate the need for continuous “translation”</i>	Communication of soft (vs. technical) issues Information loss	Observation and interviews Observation
<i>To introduce a story type easily adaptable to existing design processes, simple to understand and use by the whole design team and process accompanying</i>	Acceptance, Compatibility with existing processes, Time effort, Comprehensibility, Use in later phases	Interviews with industry partners

Interview and observation results show that *communication* is supported by the use of stories. It was observed that group discussions even involved more emotional than technical aspects. In another use case, the method was applied by a researcher team consisting of one psychologist, one HCI expert, one industrial designer and two engineers. Observations confirmed that contributions of all team members despite the different backgrounds could be structured as story elements; the participants confirmed that the common communication platform eliminated *information loss* and improved cooperation.

Since the approach was applied in moderated sessions, it was difficult to evaluate its comprehensibility and its integration in real working procedures. Still, interviews with industry partners involved in the project where the suggested approach was applied provide useful insights. The application in industrial context identified possible risks regarding *acceptance*; it seems that *compatibility* with existing processes, *responsibility* and *comprehensibility* issues are decisive. It has been observed that a company without previous experience in narrative methods accepts difficult the benefits of such an approach. A UXD team working already with narrative methods would require less time to understand the process and collect the data needed. Besides, the use of narratives through the whole process leads to less information loss. Concerning *time effort* further studies need to be made to explore the effort/benefit relation, since teams need to invest extra time to create a UX story, even if all data needed are already collected in previous phases. Moderated sessions with predefined time slots for the definition of each element would make the process more effective. Because a UX story is the result of team work it is important to identify a “story keeper” responsible for the changes made in the story and for its use in the following design phases; the project manager could take this role.

6 CONCLUSION AND FUTURE WORK

Designing emotional products requires tools supporting communication and reinforcing integration of UX aspects from the beginning of the design process. Design teams need applicable and feasible methods, tools and criteria that can be used to manage the UX factors throughout the design process (Roto et al., 2011). In the task clarification design phase, in particular, many challenges need to be faced: task clarification is an interdisciplinary and user-centered process, where a communication platform for the non-tangible, affective characteristics is essential. Additionally, the conventional product specification, as output of this phase, does not capture important aspects for UX: temporal aspects, user motives and goals and interrelations among product attributes or other system components affecting the holistic experience. UX stories are introduced as a tool to face these challenges and overcome the weaknesses of existing approaches. A definition of UX stories in this context, a description of the UX elements composing them as well as their possible integration into the design process are proposed in this paper.

Future work focuses on the design and completion of controlled experiments to compare the proposed storytelling process and the UX stories as result of the task clarification with existing approaches testing the hypotheses derived from this work. Furthermore, we intend to create guidelines that support bringing together the story elements into a UX story and to explore different story visualization forms.

REFERENCES

- Anggreeni, I. (2010) *Making use of scenarios: Supporting scenario use in product design*, Dissertation, Enschede, University of Twente.
- Björndal, P., Rissanen, M.J., Murphy, S. (2011) 'Lessons Learned from Using Personas and Scenarios for Requirements Specification' *Design, User Experience, and Usability, DUXU 2011*, July 9-14 2011, Orlando, FL, USA, Springer, pp. 378-387.
- Cooper, A., Reinmann, R., Cronoin, D. (2007) 'Personas' In *About face: The essentials of interaction design*, Indianapolis, Indiana, Wiley Publishing Inc., pp.100-110.
- Erickson, T.: 'Notes on design practice: Stories and prototypes as catalysts for communication' In Carroll, J. M. (eds) (1995) *Scenario-based design: Envisioning work and technology in system development*, Amsterdam, The Netherlands, Elsevier Science B.V., pp.37-58.
- Gausemeier, J., Hahn, A., Kespohl, H. D., Seifert, L. (2006) *Der erfolgreiche Weg zum Global Engineering Networking*, München, Carl Hanser Verlag.
- Hales, C., Gooch, S. (2004) *Managing engineering design*, London, Springer.
- Hassenzahl, M. Experience Design: Technology for All the Right Reasons. In Carroll, J.M. (ed.) (2010) *Synthesis Lectures on Human-Centered Informatics Princeton*, NJ, Morgan & Claypool.
- Jordan, P. W. (2000) *Designing pleasurable objects*, London, Taylor and Francis.
- Kim, J., Park, S., Hassenzahl, M., Eckoldt, K. (2011) 'The Essence of Enjoyable Experiences: The Human Needs – A Psychological Needs-Driven Experience Design Approach' *Design, User Experience, and Usability, DUXU 2011*, July 9-14 2011, Orlando, FL, USA, Springer, pp.77-83.
- Kim, Y. S.; Hong, Y.K., Kim J. H., Kim Y.M. (2011) 'Context-Specific Experience Sampling for Experience Design Research' *Proceedings of the 18th International Conference on Engineering Design, ICED 11*, August 15-19 2011, Lyngby/Copenhagen, Denmark, The Design Society.
- Kim, Y. S.; Lee S. W. (2011) 'Service Design for Product-Service-Systems Using Context-Based Activity Modeling' *Proceedings of IASDR2011, 4th World Conference on Design Research*, October 31 - November 4, 2011, TU Delft.
- Lindemann, U. (2009), *Methodische Entwicklung technischer Produkte*, Springer, Berlin.
- Lindemann, U., Maurer, M., Braun, T. (2008) *Structural Complexity Management: An Approach for the Field of Product Design*, Berlin, Springer.
- Lloyd, P. (2000), 'Storytelling and the development of discourse in the engineering design process', *Design Studies* Vol. 21, pp. 357–373.
- Michailidou, I., v. Saucken, C., Lindemann, U. (2013), 'How to Create a User Experience Story' to be published in *Proceedings of Design, User Experience, and Usability Part I - DUXU/HCI 2013*, July 21-26 2013, Las Vegas, NV, USA, Springer.
- Norman, D. (2004) *Emotional Design: why we love (or hate) everyday things*, New York, Basic Books.
- Norman, D. (2011) *Living with complexity*, Gotham, The MIT Press.
- Quesenbery, W.; Brooks, K. (2010) *Storytelling for User Experience*, New York, Rosenfeld Media.
- Pahl, G., Beitz, W., Feldhusen, J., Grote, K.-H. (2007) *Konstruktionslehre*, Heidelberg, Springer.
- Roth, G.L., Kleiner, A. (1998) 'Developing organizational memory through learning histories', *Organizational Dynamics*, vol. 27, no. 2, pp. 43-60.
- Roto, V.; Law, E.; Vermeeren, A.; Hoonhout, J. (eds.) (2011) *User Experience Whitepaper* [online], <http://www.allaboutux.org/files/UX-WhitePaper.pdf> (20.12.2012).
- Schütte, S. (2005) *Engineering emotional values in product design: Kansei Engineering in development*, Dissertation, Linköping, Linköpings Universitet Department of Mechanical Engineering
- Sheldon, K., Elliot, A., Kim, Y., Kasser, T. (2001) 'What is Satisfying about Satisfying Events? ', *Journal of Personality and Social Psychology*, vol. 80, no. 2, pp. 325-339.
- Tassi, R. (2009) *Service design tools* [online], <http://www.servicedesigntools.org> (10.12.2012).
- Thier, K. (2010) *Storytelling: Eine Narrative Managementmethode*, Heidelberg, Springer.
- Tomico, O. (2007) *Subjective experience gathering techniques for interaction design: Subjective psychological exploration techniques based in the constructivism paradigm for informational and inspirational purposes*, Dissertation, Technical University of Catalonia, pp.129-139.