Using Narration to Recall and Analyse User Experiences and Emotions Evoked by Today's Technology

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Type of Paper
Design & Emotion – Full Paper

Conference Theme
Design and Emotion

Abstract
We conducted semi-focused interviews with the goal of starting narrations by the users about their encounters and interactions with technology and artefacts. The results provide insights on how participants organize their experiences and which factors are relevant for evoking positive or negative experiences.

The study aimed to gain more insight in the content, generation and progression of everyday experiences of users with all kinds of today's technology such as computer software, mobile devices, consumer products and even hardware tools. These insights allow us understand user experience better and to detect relevant phenomena.

Author Keywords
User Experience, Interaction Design, User-System Relationship, Qualitative Study

Introduction

User experience as a relatively new concept has attracted a lot of attention in the field of Human Computer Interaction (HCI). The main relevant factor for the vivid interest in user experience is the increasing introduction of technological devices into application areas besides the office domain that brings along new priorities. A common assumption is that "technology as a tool" becomes "technology to play with", as well as the increasing intelligence and autonomy of advanced systems that can interpret and react to users' needs.

Several helpful models and frameworks on user experience have been developed recently with the goal to better understand the user's experience and to identify and systemize the factors influencing it (Arhippainen & Tähti, 2003; Forlizzi & Ford, 2000; Jääskö & Mattelmäki, 2003). Besides these theoretical approaches several empirically based studies with the aim to better understand and/or evaluate user experience have been conducted (Kidd, 2002; Steen, et al., 2003).

Central to these models is the term of experience, which, according to Dewey (1980), embraces the totality of the whole lived experience but also can be broken up into a variety of separate "experiences" or situations. These situations are set off as self-contained wholes by virtue of an immediate "quality" that pervades each situation. These qualities are not mere feelings, but they are characteristics of situations themselves, which include natural events, human affairs, feelings, etc. Examples of such qualities are satisfying, problematic, exciting, surprising, etc.

A central question when studying these experiences and qualities with regard to HCI is whether emotions are constitutional parts in the users' interactions with technology and if so which are of central relevance. Emotions can basically be classified as either positive or negative emotions (Cacioppo & Gardner, 1999). Ortony, et al. (1988) provide a structured approach to elaborate on different emotions such as (among others) hope, fear, desire, distress, admiration, reproach, satisfaction, and disappointment. The inclusion of certain emotions and the omission of others are however subject to heavy debate. Many researchers have proposed models of basic and peripheral emotions, but no theory has been widely agreed on (Ortony & Turner, 1990). These experience-related emotions can provide useful insights in designing-for-experience.

The goal of our study is to better understand today's experiences that take place in a real context when interacting with technology. Our aim is to identify characteristics of current experiences, to identify the involved emotions and compare these with existing conceptualizations of user experience, to better understand the content, generation and progression of these experiences and to derive implications and recommendations for designers based on these findings.

Method

User experience research has triggered the development of several new methodological approaches such as cultural probes (Gaver, et al., 1999) and perspective sorting (Forlizzi, et al., 2003). The development of such new methods reflects the difficulties in making the user's experience accessible to the researcher. Due to our focus on widespread and real-life experiences with technology we were also limited in the choice of applicable methods. Our answer was found in narrative interviews. The focus on eliciting narrations allowed us to make use of the structural peculiarities story-telling follows e.g. the need to make meaningful selections, the need to provide sufficient details for the listener or the need to close a once started narrative figure (Kallmeyer & Schütze, 1976). The emotional content of the story is re-enacted during the narration therefore stories provide a more direct access to the experience than evaluative questions (Schütze, 1976). Moreover, with stories as base material, the analysis can also consider structural elements of the narrations and characteristics of the used language.

Procedure

The interviews started with a short briefing of the interviewees. They were informed about the general goal of the study: to better understand the experiences of the interaction with systems of all kinds, e.g. mobile devices, robots, personal computers, personal digital assistants (PDAs) and consumer electronics.

Each interview started with open questions about “emotional encounters with technology” which introduce the interviewee to the focus of the interview and creates the right mindset for follow-up questions. Users were asked to remember any situation with technology in which they experienced emotions. They were asked to recount these memories in detail and to induce stories as complete as possible.

After these relatively unfocused questions, we asked participants for negative and positive experiences, and then focused on specific experiences mentioned by the interviews.

Then, the interview focused on special emotional and user experience factors that were selected based on the user experience work mentioned in the introduction. Questions on these factors include (1) *general experiences*, both positive (fun, pleasure) and negative (frustration, anger), as well as of (2) *social experiences*, connectedness to other people and sharing experiences with others, and (3) *personal experiences*, feeling intimate with a system, trust in a system and flow, the latter can be described as the positive experience of being totally immerged in something (Csikszentmihalyi, 1990). For each factor, participants were asked to narrate stories about situations in which they experienced it and elaborate on the precise circumstances under which the situation occurred.

Each interview took between 90 and 120 minutes and was audio taped. The audio data then was transcribed in detail. Analysis was based on the transcriptions, but the audio files were used during analysis as an additional source in the case where text based interpretation was not unambiguous. The interviews were conducted in German. Samples used below are translated into English by the authors.

Participants
Due to the time-consuming character of in-depth qualitative analysis and the explorative character of the study the number of interviews was limited to eight interviews. The eight participants were recruited from our database, which contains about 2000 persons who are interested in participating in usability tests and studies. The criteria for invitation were that users can be characterized as heavy users of new technologies and have wide experience with different kind of systems such as office computers, games, internet chats, mobile devices, etc. The average age of the participants was 24.1, with the youngest being 19 and the oldest being 30 (5 males, 3 females). All users use the internet at least 10-20 hours per week, and all use a mobile phone extensively. Additionally, all but one participant used a PDA. The target was to find people that have had a chance to encounter different situations with advanced interfaces that are used for everyday purposes. The drawback of inviting these specific users is that it introduces a certain early-adopter bias in the study. This drawback is compensated by the effect that more experiences with various new technologies can be addressed.

Analysis
The first step in the analysis of the interviews was to summarize the content of the narrations, classify them and see what type of experiences are actually mentioned and to which devices and situations they relate. The further analysis of the results was performed on two levels to cover different viewpoints and research interests:

At the first level, the emotions contained in the experiences were analyzed based on a bottom-up approach that applies an ex post interpretation of users' experiences. After this initial processing, the findings of this analysis were compared with emotions in existing theoretical frameworks to find out whether all theoretical emotions are useful to analyze technology-related user experiences or if relevant subsets of emotions can be identified that are of particular importance in user experience research.

The second level of analysis concerned the common structural aspects of the different experiences and their implications for design. For analysing this aspect we followed the classical "grounded theory" approach as suggested by Glaser and Strauss (1967). We first approached the data without specific hypotheses in mind and developed analytical conceptualisations based on the data (so-called codes), searched for contrasting occurrences and cases for the identified codes and then integrated the results. Additionally knowledge from the field of structural analysis of oral narrations was used to enhance this approach (Schütze, 1976; Kallmayer & Schütze, 1976). Two researchers worked independently on the texts to ensure inter-subjectivity of the interpretations.

Results
Users were first asked to narrate stories containing (1) *general experiences* with technology. The experiences they mentioned were grouped together into experiences with positive and negative emotions and attributed a label by both interpreters. The following two parts of the interview focused on primary aspects of user experience: (2) *social experiences*, connectedness and sharing experiences and (3) *personal experiences,* feeling intimate, trust and flow. These bottom-up narrated experiences were summarized, grouped and labelled by the two interpreters and are reflected in the figure below.

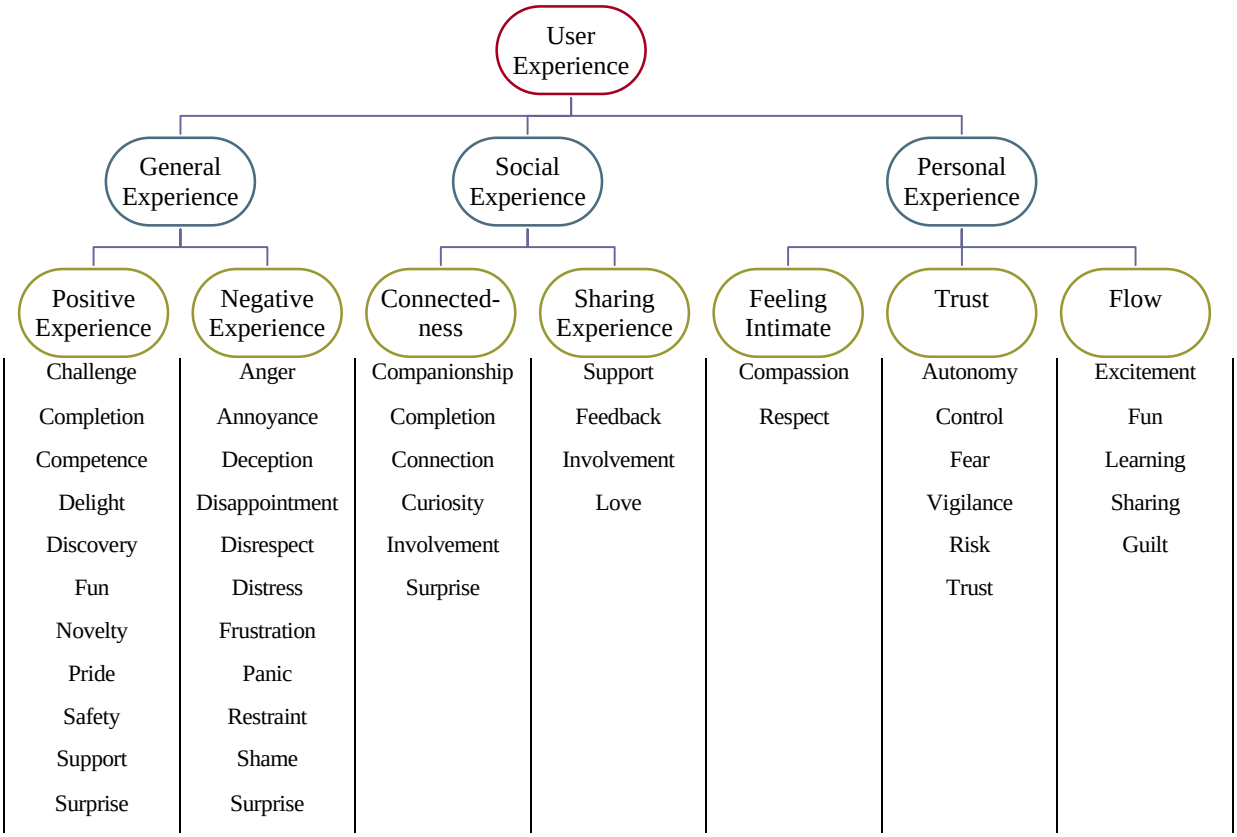

Figure 1: Labeled experiences described in the interviews.

The kind of system the stories are about can be summarized as follows: the majority of narrations dealt with experiences with personal computers (67%). Typically these were stories about interactions with software programs or a system crash. The next frequent categories were stories containing cell phones and consumer electronics (both 10%). Only rarely users told stories related to cars/bikes (4%), games (3%) or other things (3%).

Level 1: Analysis of emotions contained in the experiences

The narrations were further analysed in detail to gain an overview of the emotions central in the experiences. In the interviews, we noticed that some experiences were dominated by certain emotions to such a degree that the experience was labelled after the dominant emotion (e.g. fun, pride, anger, excitement). Other experiences that were described by our participants were more abstract from their emotional content, and could not be directly related to emotions. These include challenge, completion, discovery, feedback, novelty, safety and support. Other positive experiences that were mentioned are curiosity, autonomy, control, vigilance, and trust, most of which were mentioned in describing “trust”-experiences. These abstract experiences could not be directly related to emotions, as they describe other appraisal processes and are not as emotion-rich as the above-mentioned experiences.

When we compare the above mentioned experience-related emotions to emotions from theoretical approaches such as those from Ortony, et al. (1988) and from Ekman (1999), this leads to interesting results. In their structured approach, Ortony, et al. (1988) mention a number of emotions: prospect-based emotions for the self (confirmed and disconfirmed hope and fear) and for others (gloating, happy for, pity, resentment), well-being (joy, distress), attraction (love, hate) and attribution (pride, shame, admiration, reproach, relief), as well as compound emotions related to well-being and attribution (gratification, gratitude, remorse and anger). Ekman mentions a total of fifteen groups of emotions as basic emotions, partly similar to the ones from Ortony, et al., but also including contempt, disgust, embarrassment, and sadness, as well as amusement, contentment, excitement, and sensory pleasure. A comparison shows that many existing emotions mentioned by Ortony, et al. and those mentioned by Ekman are found in the list of experiences from our interviewees: *joy, fun, pride, anger, disappointment, distress, panic, shame, love, fear, excitement, fun, and guilt*. In addition, some compound emotions might identify the additional factors *hope* (from discovery and novelty), *satisfaction* (from challenge and completion) and *gratitude* (from safety, support and feedback). Although many emotions mentioned in emotion theory also were described in the interviews, a number of emotions are not reflected in the interviews: *desirable and undesirable emotions regarding others* (happy-for, resentment, gloating and pity from Ortony, et al.) were not mentioned at all, nor were *remorse*, *admiration*, *reproach* or *hate* mentioned in any form.

One experience, *surprise*, occurred in a positive setting where the system is doing something unexpectedly good, as well as in a negative setting, where the system is doing something unexpectedly in a negative way. Surprise is a difficult experience to relate to specific emotions. Some researchers have categorised surprise itself to be an emotion, but this approach is not undisputed (e.g. Derbaix & Vanhamme, 2003; Ekman, 1999). All emotions are valenced, that is, are either positive or negative, whereas surprise can be both. The findings from the interviews underline this non-valence of surprise on a theoretical level, implications of the presence of surprise in both positive and negative experiences can be seen on a practical level regardless of the theoretical discussion.

Level 2: Interesting characteristics from a design-for-user-experience point of view
The detailed analysis of the structure and the content of the narrations based on suggestions from the "grounded theory" as well as the work of Schütze give us an overview of striking characteristics that recur in multiple situations. These observations are described in detail below.

1) Positive Experiences
The first important observation based on the interviews is that we can identify three important key factors for positive experiences, *exploration, challenge* and *autonomy*. Almost all of the narrated positive experiences are strongly related to one or more of these three aspects.

Exploration – Narrations about positive experiences contained as key element the exploration of "new territories" with the potential to discover novel and interesting possibilities. An interesting structural aspect of these exploration activities was that the outcome - i.e. if the user actually discovered something helpful - was only of secondary nature. Exploration was experienced as a satisfying activity in its own right. The perceived possibilities of a device are powerful determinants for the exploration possibilities and the resulting positive or negative experiences. Users report negative surprises when advertisements introduced unrealistic expectations and positive surprises when they discover more possibilities than expected.

Challenge – Another frequent starting point for positive experiences is a challenge that matches the ability of the user. Participants mentioned difficult situations that they could solve with the help of a system as example. An interesting aspect here is that the difficulty typically was not introduced by the system but by factors outside the user-system-interaction, e.g. a deadline is coming up and a lot of work still has to be performed, in this challenging setting a computer program has to be used. Computer-games are an exception to this outside influence, here the challenge comes from the game itself.

Autonomy – Positive experiences included the increase of the perceived autonomy of the person. The system allowed the users to do things they weren't able to do before e.g. they could chat to friends far away at low cost. But this relationship can be inverted dramatically if the system doesn't function well - the autonomy switches into dependence.

An example for a positive experience containing all three aspects is to learn to use a system auto-didactically - a situation mentioned strikingly frequent as example for positive experiences. To learn a new system you have to explore it. This is not always easy, it's a challenge. But when you succeed it increases your autonomy.

2) Negative Experiences

A general trend within the interviews was that *negative experiences dominated* both in terms of frequency and in terms of intensity. Negative experiences, e.g. frustration, anger or annoyance, were mentioned far more often than positive ones. Negative experiences were told using more emotionally loaded terms and the structural organization of the narrations showed stronger patterns indicating emotional activation. Typically for positive experiences were terms like "quite good", "nice". For negative experiences similar terms were used, like "bad" but also much more expressive phrases like "hit rock bottom" or “I would have liked it the most to throw the cell phone against the wall”.

3) Social Experiences

With respect to the social experiences participants mainly mentioned experiences where technology helped them stay in contact with distant friends and relatives via chat, e-mail and telephone conversations and share not only information with each other, but also ‘connect’ and share experiences with each other. This corresponds with Battarbee’s (2005) “co-experience”, which mentions that social interaction is very important to many kinds of experience and technology needs to be designed to support this social interaction.

4) Personal Experiences
Regarding personal experiences with technology and relationships with technology itself, we found a number of interesting results. The personal experiences mainly revolve around four aspects: reliability, frustration, intelligence and goals which are described below.

I Can Count on You – Regarding the perceived and expressed (implicitly or explicitly) relationship between the user and the system the most outstanding result is that reliability is the core value users appreciate in their relationship to technology. This we think is not only related to the above mentioned importance of functionality but also has to be understood in comparison to human-human relationships. It's especially what is different in technology that makes it appealing. Typical statements by our interviewees expressing this were e.g. "it doesn't disappoint me" or "I can count on it". This also can explain the importance of functionality as problems with it interfere with this model of relationship. This aspect is especially relevant for advanced systems, as with the emerging new interaction styles this model of relationship might be challenged.

Person-system relationships are coloured by usage goals – What people use the devices for seems to be much more relevant for users' attitudes towards the device than what it is capable of. For example, if they use a system to communicate with friends the mobile phone becomes also kind of a friend, if the system is always running it becomes a companion, if the device is used in work it becomes a tool. The emotional characteristics of the usage situation - independent of the devices capabilities - are coloring the overall impression of and relationship with the device. There is no intrinsic property of the device that defines the relationships; there are just potentials and possibilities which are ignited by the way the device is used to reach other goals.

"It frustrates me" and "I frustrate me" – Users report two ways in which they deal with frustration and anger in relation to technology. When a system reacts unexpectedly and leads to errors or data loss, the terms describing these experiences for all interviewees are either frustration or anger, or both. Interestingly, these are either a) targeted at the technology or the developers of the technology for some users, or b) targeted at themselves. These differences in blame attribution provide an interesting dichotomy in which both styles of blame attribution have different design implications.

Immergence leads to wasted time, not flow – Although all interviewees reported that it occurred at least occasionally to them that they were so occupied with technology that they completely forgot everything around them and lost track of time (attributes of flow), the experiences reported by the participants were associated with wasted time and feelings of guilt or shame for not doing something productive. These negative emotions are quite different from the positive experience of flow. Interestingly, not one experience mentioned by any of the participants could be considered to be a real flow experience, even though they were directly asked to recall an experience in which they felt completely immerged in an activity including technology.

Discussion

Many experiences that were described could not be directly related to specific emotions. This could be related to the structure of the interview, as we asked for experiences and asked participants to give as many details as possible, and not asked for specific emotions. This bottom-up processing of experiences led to situations that contain more than only a single emotion, giving also antecedents and results of emotional encounters. This allows a more *integrative approach to emotions in user experience research*, and provides us with interesting findings regarding the relative importance of negative emotions such as anger and its antecedents, and more generally, positive and negative surprises in encounters with technology.

A comparison between the emotions mentioned in the narrations and emotion theory revealed us that *a very large part of general emotion theory is transferable* to emotions in users' experiences with using everyday technology. This makes emotions not only an integral part of user experience, but also one of its important parts. However, *designing for user experience comprises other factors as well*: we also need to take care about issues like trust, control, autonomy, challenge, and discovery to guide user experience, which do not have the same physiological and psychological characteristics as emotions, but are also important in good design.

We can also see that, when we look at the emotions mentioned by Ortony, et al. (1988), that the emotions that are related to the 'self' are all reflected in the interviews, but the ones that are all related to specific parts of emotions that are related to others, to agents and to objects are partly missing. This shows a particular focus on the self in respect to everyday technology. Partly, this can be attributed to the interview style that focused on personal experiences, but some questions were directed at interactions with other users, and users were often asked whether they experienced a situation with other people. This implies that, in dealing with technology, *the most salient emotions are the ones that are related to the self.*

The fact that both the amount and the intensity of negative experiences dominate, can be traced back to the notion of "negativity bias" as reported by Cacioppo & Gardner (1990), who explain this behaviour from an evolutionary point of view: a missed opportunity for exploration is not as dangerous as an overly positive assessment that can end in being eaten by a predator. This evolutionary footprint apparently also determines our experiences in relation to technology: this is the user's reality and interaction designers should consider this.

Our results strengthen the position that designers can not evoke positive experiences directly but the results also show that there are several things designers can do to make positive experiences possible. Based on these considerations we want to provide a number of recommendations for practitioners concerned with designing for experiences:

- Support approaches that invite the user to *explore* the system and provide possibilities for playful interaction without dead ends while not placing excessive demands on him/her.

- Create a realistic image of your product, or even omit certain features in your advertising. Users will be positively *surprised* by your features (of course, be careful not to omit too many features in your advertisements). This also means that negative surprise can be avoided which results in anger and frustration.

- When performance is different than expected by the user and the system is able to recognize such an exception, it should be designed to provide meaningful error messages, try by all means to rescue data: deleting is easy, recovery difficult. Apologize for your imperfection and ask for feedback, show that you care, to reduce possible user frustration and retain trust.

- Unexpected behaviour is very tricky, especially in more or less autonomous systems. When analyzing the sequential organization of experiences it became clear that untimely actions by the system can flip a formerly positive perceived process into an offending experience. In contrast, an unexpected but helpful intervention by the system can trigger positive experiences as for example thankfulness. To enable positive experience actions initiated by the system must match with the users' needs and expectations.

- It is important who the user is blaming for occurring difficulties and errors. Think about proper mechanisms of blame attribution and how to channel this process. Users might blame the software, "take it" and do something with this emotion. Or users might blame themselves, which is a very negative experience for the users. Instead, try to redirect this blame towards the original target: the developers, who can do something against it.

As we could see in the analysis of the interviews, exploration, challenge and autonomy play a crucial role for positive experiences. The above recommendations, based on direct user experiences with everyday technology, can help provide the necessary preconditions for these concepts and to construct a positive user experience.

Conclusions

This paper discussed the everyday experiences and emotions evoked by today's technology. We were able to identify interesting phenomena, e.g. the overlap between emotion theory and technology practise as well as the differences between them, the dominance of negative experiences and the influence of usage on the user-system relationship.

Acknowledgements

This work was supported by the Austrian Science Foundation (FWF, project S9107-N04). We would like to thank Stephanie Deutsch for helping with practical details of the work.

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