

Effects of (frustrated) Expectations on UX Ratings and UX Phases

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Abstract

Temporal aspects of user experience [UX] play an important part in shaping the overall UX of a product. Accordingly, different phases of UX can be identified, covering UX from a pre-use-phase, over a use-phase to a past-use-phase. Expectations about the interaction with a product are an important indicator for overall UX and are already formed before the actual interaction during the pre-use-phase. This paper tries to shed light on differing effects of the fulfilment and the frustration of these expectations depending on UX phases. An experiment was carried out to investigate how expectations from the pre-use-phase can influence the use- as well as the post-use-phase.

1 Introduction

Interacting with technical products has become an important part of our everyday life. Whether this interaction is a positive and enjoyable experience highly depends on the product's usability as well as on the resulting UX. The concept of user UX goes beyond pure usability and takes into account emotional aspects as well as timely aspects of user interaction with a product (ISO 9241-210, 2010). Moreover, not only the interaction itself but expectations about the interaction play an important part in shaping UX (Karapanos, Zimmerman, Forlizzi & Martens, 2009; Pohlmeier, 2011). As these expectations about the interaction process are not always fulfilled, unforeseeable performance of a product can lead to a surprise reaction in the user (Ludden & Schifferstein, 2007). When looking at UX as a long-term process with different phases rather than as a short-term, interaction-dependent construct, expectations form and change during these different phases of the UX eventually eliciting surprise which affects UX ratings. How these processes are interrelated with different phases of UX, and how this can be leveraged when experimentally investigating the phenomenon of surprise and product ratings, will be described in the following paragraphs.

1.1 Temporal Aspects of UX

In their „user experience lifecycle model“ ContinUE from 2011, Pohlmeier proposes the understanding of UX as a continuous process (Pohlmeier, 2011). She identifies different phases of UX and acts on the assumption that UX already begins before the actual interaction (pre-use phase), continues throughout the interaction phase (use phase), leading to an overall UX rating after the actual use of the product (post-use phase).

1.2 The surprise process

The processes elicited by surprising events can be described in terms of a serial model (see figure 1). They follow from a discrepancy between beliefs or expectations about an event and the detected information about the event. As a result, the schematic processing of information is interrupted, and in its place a more effortful, conscious, and deliberate analysis of the unexpected event is initiated. If the newly gathered information about the unexpected event is deemed necessary, a schema update is initiated, resulting in an updated or revised schema (Meyer, Reisenzein & Schützwohl, 1997).

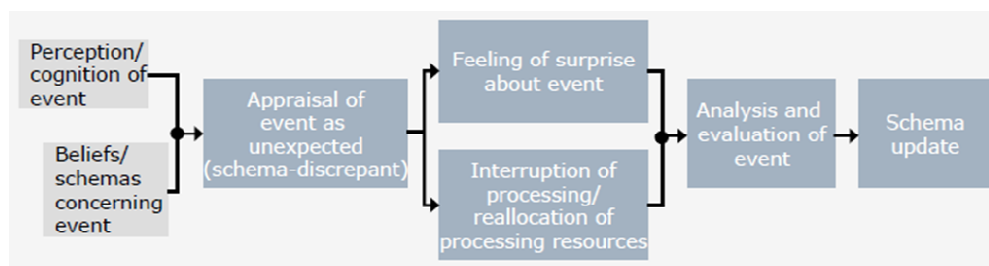


Fig. 1: The surprise process (according to Meyer et al., 1997)

1.3 Expectations and pleasant/unpleasant Surprise

Oliver and Winer (1987) state that expectations are formed by memories of actual events, perception of current stimuli and inferences which are drawn from related experiences. An important part of UX are the expectations users have about the interaction with a product (Karapanos et al., 2009; Pohlmeier, 2011). These expectations develop before the actual interaction and can be either fulfilled or frustrated during the course of interacting with the product. Following Reisenzein's belief-desire theory of emotion (BDTE), emotions are the product of cognitions and desires (Reisenzein, 2008). Accordingly, the result of an unfulfilled cognition (e.g. expectation) is surprise. If this disconfirmation co-occurs with desire fulfilment, it is a pleasant surprise. If it co-occurs with desire frustration it is an unpleasant surprise (see a schematic description of this process in figure 2).

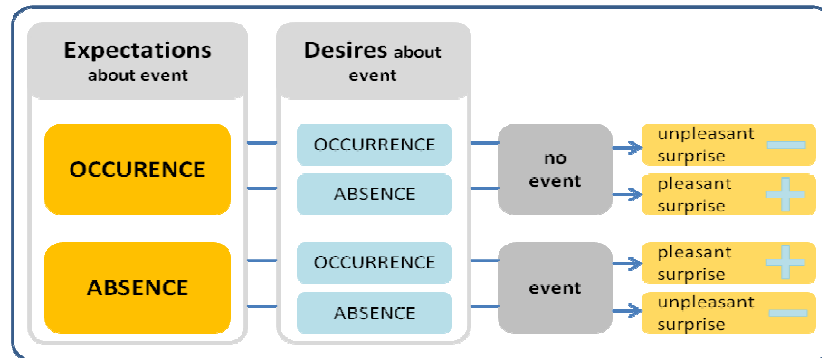


Fig. 2: Schematic development of pleasant/unpleasant surprise (according to Reisenzein, 2008)

1.4 Surprise and UX

The focus in emotional UX research lies on factors which shape a “high-quality experience” (Law & van Schaik, 2010) and thus influence the success of a product. Surprise, as an emotional reaction to sudden, unexpected events has been proven to be beneficial for user interaction, but has been mostly studied in tangible products, so far (Ludden, Hekkert & Schifferstein, 2006; Ludden, Schifferstein & Hekkert, 2008). Ludden, Schifferstein & Hekkert (2009) were able to show that surprising products are more interesting, easier to remember, and elicit increased word-of-mouth than similar, conventional products. These insights raise the question whether similar effects can be attained by furnishing interactive products with surprising aspects “because surprise may arouse interest and intensify UX” (Gross & Thüring, 2013). Put differently, a transfer of the findings of Ludden et al. from touchable to digital products could be beneficial for creating high-quality UX.

2 ContinUE and Surprise

To shed light on the relation between surprise and expectations about the interaction with a technical product, the effects of surprise on UX ratings can be investigated with regard to the different phases of the ContinUE model by Pohlmeier (2011).

2.1 Surprise in the different phases

As it has been mentioned above, expectations about the interaction with a product are already formed *before* an actual interaction, namely in the pre-use-phase. As these expectations are formed pre-interaction, they are not necessarily accurate and thus can be either fulfilled or frustrated during the following phases of the interaction. Former experiences as well as attitudes towards a product serve as a basis for this expectation formation. Even a person that has never interacted with a product can already have expectations about its behaviour when in use (Karapanos et al., 2009). During the actual interaction, these expectations can be ful-

filled or frustrated, depending on the behaviour of the product: If a mismatch is detected between expectations and actual behaviour, a surprise reaction can be the result. Whether this surprise is a pleasant or an unpleasant one, depends on the desires a user has about the product's functionality (see figure 2). As it has been described in the previous section, when encountering a surprising event, the schemas and beliefs about this event are updated and newly acquired knowledge is accommodated in one's mental model about the situation. When interacting with a product, this schema update takes place during the use phase and is maintained throughout the post-use phase. Only when interacting with the product again these models can be updated after encountering of new, maybe surprising information.

3 Surprise and product design

In classical product design, excitement and interest have been created by putting a pleasant surprise aspect into the design of a product (Ludden et al., 2009). By creating products that exhibit features which do not match the expectations of the user, these products were more interesting, easier to remember, and elicited increased word-of-mouth than similar, conventional products (Ludden et al., 2009).

To make use of these findings a possible transfer of surprising product design to digital, interactive products could be beneficial. Not only effects of pleasant surprise should be investigated but also possible effects of unpleasant surprise. If pleasant surprise has an effect on product evaluation and UX scores of digital products, it could become a design asset for product developers. Investigating the negative impact of unpleasant surprise can provide measures of its harmfulness.

3.1 Experimental findings

While pleasant surprise has been studied extensively in classical product design, not many researchers have actively explored it as a design factor for digital, interactive products. Although some studies refer to surprise related concepts, like WOW, delight or appraisal (Desmet, Porcelijn & van Dijk, 2007; Mori & Inoue, 2004; Väänänen-Vainio-Mattila, Palvianen, Pakarinen, Lagerstam & Kangas, 2011), most research was constrained to non-interactive products. In contrast, we investigate how surprising behavior of interactive digital products influences UX. We want to know whether the UX differs between two products which are basically identical but elicit either pleasant or unpleasant surprises. To answer this question, an experiment was carried out in which three groups of participants played three differently surprising Tetris games. During the game a surprising event was encountered in the form of an unexpected and inexplicable addition of points (creation of pleasant surprise) or a reduction of points (unpleasant surprise), depending in which manipulation group users were playing the game (For a detailed description of the experiment, see Gross & Thüring, 2013). An increase of reaction times during trials, in which a surprise occurred, was predicted for these two groups in comparison to a control group. Supporting this hypothesis, there was a main effect for the factor group, showing significant differences between the three

groups: The group that encountered a sudden reduction of points had significantly longer reaction times. No effect was found for the group that encountered an unexpected bonus. Similarly, considering UX ratings of the Tetris games, only the reduction group showed significantly lower UX ratings on the SAM valence scale as well as the AttrakDiff (hedonic quality stimulation scale).

In summary, the manipulation of surprise was only partially successful as trials with unpleasant surprises took longer to process and the ratings of the respective group indicate a less positive UX while we didn't find a positive effect for the bonus group. A possible explanation could be found in the gaming context used for the experiment. An unexpected bonus in a game may not be as surprising as an unexpected deduction of points.

To further investigate the impact of surprise on different phases of UX, especially pleasant surprise, further experiments need to be carried out. A stronger manipulation of the positive surprise should produce deeper insights into its possible beneficial effects. Furthermore, changing the context of the interaction from a gaming environment to a more goal-directed environment (e.g. productivity applications rather than games) can produce insights into how surprise influences UX ratings for productivity applications.

4 Discussion

UX is a complex and dynamic construct. It has been used to capture a user's experience when interacting with a product. Some researchers have tried to come up with models of UX which describe the dynamic components of the construct and shed light on interrelated influences between different parts of UX (Thüring & Mahlke, 2007, Pohlmeier, 2011). One important part of UX that can be identified in those models are the expectations about the interaction with a product a user has in mind when starting the interaction with that product. According to the ContinUE model of Pohlmeier (2011), expectations and their possible consequences impact a user before, during and after the interaction with a product. Surprise as a possible consequence of frustrated expectations could prove to be a useful design element, as it has been shown to elevate product ratings in classical product design (Ludden, 2009). Furthermore, the harmful impact of negative surprise should be investigated, as well. Results from a first gaming environment experiment produced some promising results: Expectations about the game that existed before the actual interaction were frustrated during the game. Concerning UX ratings, results of the study point into two directions: First, unexpected events during human computer interaction which lead to *undesirable* consequences should be prevented under all circumstances. They can lead to negative surprise which can impair a users information processing and can have a negative influence on UX ratings. Second, it is not clear whether unexpected events with *desirable* consequences and thus positive surprise have an influence on UX ratings. This could be attributed to the system under consideration and the interaction context. An unexpected bonus in a game might not have the same impact as an unexpected reduction of points since bonuses are more common in games and thus could be less surprising than unexpected losses. For other systems and in different contexts, such as software in a working environment, an unexpected and beneficial system

response may prove as more surprising. As it has been shown, expectations about interaction and phases of interaction are closely intertwined. When designing digital products, it seems advisable to keep in mind how different phases of interaction bear different potential for pleasant/unpleasant surprise and how these surprises can influence overall UX.

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