

User Experience Quality: A Conceptual Framework for Goal Setting and Measurement

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Abstract. Although the term ‘user experience’ has become ubiquitous, variations in its conceptualization can make design objectives unclear. This paper proposes a simple framework for conceptualizing the components of user experience in order to communicate with UX stakeholders and advance goal setting and measurement in applied settings. A deeper understanding of the components of experience provide a greater ability to set strategic direction for the user experience, guide design goals, and assess user experience outcomes. In educating stakeholders on a more complete view of user experience, UCD practitioners have the opportunity to play a key role in planning the level of user experience quality for the product user experience and influencing where user experience studies will have the most impact on products.

Keywords: UX, user experience assessment, experience quality, consumer experience, perceptual quality, customer emotions.

1 Introduction

Over the past decade, the term ‘user experience’ has become a buzzword within industry and in the HCI community (Jordan, 2002; Khalid & Helander, 2006; Hassenzahl & Tractinsky, 2006). From a professional practice perspective, user experience (UX) is often used to represent a wider approach than usability by going beyond usability to include aesthetics, hedonics, contextual, and temporal variables (Forlizzi & Battarbee, 2004). From a business perspective, having a UX strategy is increasingly being recognized as a means of controlling an aspect of the product or service value proposition. Delivering a better quality UX may be part of the differentiation strategy or potentially required to keep up with the UX offered by competitors. In competitive markets, differentiating on UX has potential to win new customers, increase market share over competition, or be used to relieve pricing pressures associated with technology commoditization.

2 Theory

Recent theoretical models of UX show that it is a complex construct which is why it is difficult to define succinctly (Swallow, Blythe, & Wright, 2005). Difficulty to

define UX may be partially due to artificial dichotomies being drawn between usability constructs (such as simplicity and task effectiveness) and aspects of UX design (such as fun, joy, aesthetics, emotions...etc). These are sometimes framed as incompatible. Take for example game development. Enjoyable games must have challenge and even complexity in order to maintain interest (see Hassenzahl, Beu, and Burmerster, 2001) while a traditional usability approach is more concerned with making tasks easier or more efficient for users. This notion is supported by traditional definitions such as usability defined by ISO 9241-11, "the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use." Usability defined this way lacks the kind of psychological constructs that are typically highlighted in discussions of UX. Differences in perspective among product designers and/or other product decision makers may lead to conflicts in their approach to design and/or less clear design goals and strategies.

In an attempt to help reconcile views between the roles of usability and UX, Jordan (2002) proposed a needs abstraction model useful for high level conceptualization of UX. Jordan suggested that products should engage people at three separate levels: functionality; usability, and UX. At the lowest level in the hierarchy is functionality which is basically what the product can do. To meet functionality needs, the product must reliably do what it claims to do at a basic level. Next, usability is how easily the target user segment interacts with the product to complete their activities in a give context. Users should find it intuitive and easy to accomplish intended their objectives using the product. At the top of the hierarchy is UX. UX is defined in terms by how the user relates to the product and higher level aspirations associated with use over time. Since each of these areas are conceptually distinct it is natural that each area of investigation requires its own set of methodologies that may be highly distinct from each other (McNamara & Kirakowski, 2005). Research questions and methodologies appropriate for usability, therefore may not be the same methods appropriate for UX.

In the HCI and emerging UX literature base, there are still few conceptual models that support practical UX goal setting. Given the restricted scope of usability approaches, these are not typically sufficient for larger UX concerns. Although usability goal setting and assessment methods are often critically important, they do not typically address higher level concerns that have become widely recognized as part of the UX literature. Since UX has been an umbrella term for many constructs, part of the challenge is to define and model UX in an intuitive way that supports goal setting and measurement.

The conceptual framework proposed in the next section of this paper highlights the importance of several key psychological constructs applicable to a wide range of products. This was designed to be easy to communicate and simple enough for use to educate high level decision makers within organizations and at the same time draw the appropriate attention to relevant constructs for the purpose of design goal setting and validation of a products UX quality. This has been successfully used to provide a basis for UX goal setting and assessment exercises (Beauregard, Younkin, Corriveau, Doherty, and Salskov, 2007).

3 Interaction Based Framework of UX

UX is defined here simply as the emotions, attitudes, thoughts, behaviors, and perceptions of users across the usage lifecycle. Figure 1 shows the components of UX and suggests a conceptual relationship between these constructs. UX arises from an interaction between a user and product within a context. This framework shows the psychological nature of UX by highlighting that many of the key categories of UX constructs are cognitive in nature. As such, UX is mainly accessible through self report, behavioral observation, and other proxies (e.g., physiological proxies) of cognitive processes. The construct categories (see detailed definitions of perceptions, emotions, thoughts, and attitudes below) are suggestive of useful distinctions for both design and potential tools for assessment.

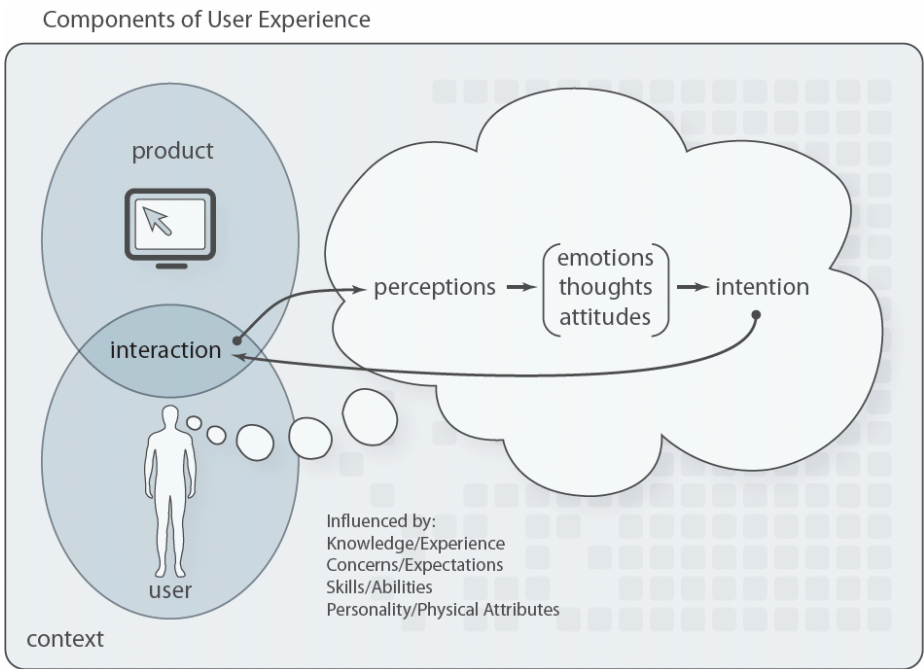


Fig. 1. Conceptual Framework

Essentially, this framework suggests that an interaction with a product or concept (perceived or noticed through one or more of the five senses) gives rise to emotions, thoughts, and attitudes. These, in turn, influence intentions and interactions (including observable behavior) with the product across time. How the interaction unfolds and each component of the UX itself is influenced by a larger set of individual differences including knowledge/experience, concerns/expectations, skills/abilities, personality and physical attributes. This cycle all occurs within a

larger context, the surrounding backdrop that is made up of other cultural, social, and technological influences on experience.

Defining UX in terms of key psychological constructs provides a way to talk about the different components, set design goals, and create a strategy regarding measurement. The supporting descriptions below, based on the psychology and HCI literatures, are for the purposes of drawing useful distinctions between these terms as they relate to UX.

Perceptions: Perception is the process of acquiring and interpreting sensory information. End-user perceptual experience is an often ignored aspect of UX assessment. Focusing on intake and subjective assessment, psycho-visual and psycho-acoustics studies assess human perceptual variables related to product use such as video quality, audio quality, acoustical and thermal performance. Perceptual targets must comprehend that user expectations change over time as technology changes. For example, as consumers shift from standard-definition to high-definition television resolutions, the anticipation of high picture quality increases and this must be reflected in perceptual requirements. See Beauregard et al. (2007) and Corriveau (2006) for examples of applied perceptual validation techniques as an aspect of UX.

Emotions: Emotions are feelings or subjective states of consciousness that are critical to learning, trust, and assessment of what's desirable. Products may evoke positive or negative feelings which affect purchasing behavior, how much the technology is used, and what consumers say about the product to others. Despite the assumption that people make decisions logically, research shows that decisions are highly dependent on the emotional states of end users (Schwartz, 2004). Both quantitative and qualitative assessment techniques exist to understand the potential impact of emotions and factor this into planning and design. From a quantitative approach, Desmet (2003) describes several broad emotion categories and has created measures to assess specific emotions related to products. In applied settings, semantic differentials and likert-type questionnaires are often used for targeted emotions. Examples of commonly targeted emotions include pleasant surprise, desire, fascination, interest, and joy. Degree of negative emotional states such as boredom, disgust, frustration, sadness, fear, and anger are also often studied. In addition to quantitative techniques, case studies provide opportunities for rich qualitative data that can provide a deep and unique understanding of context (Strauss & Corbin, 1990; Hassenzahl, Beu, and Burmester, 2001).

Attitudes: Attitudes are judgments toward a target typically associated with value, good/bad, or helpful/harmful. Attitudes are a function of expectations and past experiences (Hassenzahl & Tractinsky, 2006). Examples of attitudes, showing the importance of these measures for UX, include satisfaction, perceived value, judged comparisons of products or past experiences, judgments of the degree of control over technology. Additional research is needed in this area particularly addressing known problems. For valid assessment, careful design of the study methodology is needed if results are to be generalized. Often interviews geared to assess attitudes have quantitative components (e.g., likert type scales), although the most important information is from deeper contextual interviewing techniques. Attitude

measurements such as commonly used in usability studies or surveys have questionable validity when attributes are not entirely clear (surveys) or when the situation or contexts are not representative (lab studies or context simulations). Assessments of attitudes are also particularly sensitive to distortions in situations where there are non-realistic consequences to user behavior. Given these limitations and the importance the role of attitudes in UX, methodology research is needed in this area. Specifically, using the framework of UX as a guide, use of ethnographic and contextual inquiry methods, such as the “grounded theory technique” (case study described by Swallow, Blythe, & Wright, 2005) may provide useful data to better triangulate attitudes variables measured by more quantitative or hybrid studies.

Thoughts: Thoughts are mental processes that allows humans to model what they experience and to plan behavior. Understanding the mental models held by users before, during, and after interaction with a product can provide clear design opportunities and highlight roadblocks across stages of the use the usage lifecycle. Product goals can explicitly target and assess proper alignment between the user mental models and the mental models afforded by contact with the product.

Overall, each of the high level components of UX can provide useful categories in assessing needs, developing designs, and assessing the UX itself. These are proposed as closely interrelated threads. The UX directly influences behavior including further interaction with the product and context and continually loops back to the interaction to further effect perceptions, emotions, thoughts, attitudes, and behavior. As the “usage lifecycle” part of the UX definition suggests, this feedback process continues throughout the full usage lifecycle starting from initial discovery through purchase, out-of-box, usage, maintenance, upgrades, and disposal (e.g., Vredenburg, 2002). In this way, UX not only extends a temporal thread (anticipated experience through reflected experience over time) but also highlights the necessity to coordinate UX efforts across organizational functions to include everything the user sees, touches, and hears regarding the product, service, and/or brand.

The ability to accurately assess many of these aspects of UX for business purposes has been steadily advancing, but overall, is still in early stages. The proposed UX framework shows a high level structure for constructs of interest. Specific constructs within these categories will vary according to the product or service being assessed. A deeper understanding of what UX means provides a greater ability to set strategic direction for the UX, guide design goals, and assess UX outcomes. It is suggested here that setting UX goals on these or a subset of variables begins the right conversations that can link the strategy of the top decision makers directly to the project team and designers.

4 Setting UX Goals

Leading companies that consider UX as a core part of their business have been using UX quality measures as formal decision gates in their development processes. Based on a series of informal benchmarking interviews, companies including IBM, Microsoft, British Telecom, Google, and Yahoo each use some form of UX quality assessment data as part of ongoing assessments and go/no go decisions regarding product release. These and other companies, including Philips, Ford, and Proctor &

Gamble have indicated that they routinely assess the UX of products throughout the development process. The methods used for assessing UX in these companies tend to be part of a larger user-centered innovation effort.

From a goal setting and measurement perspective, the components of UX can be scoped and prioritized according to the type of product, comparative usages, target user segment characteristics, context of use, and business goals. These factors may each influence what components of UX are to be highlighted. For instance, given the context of use and the competitive landscape, in some cases (such as entertainment product development), emotional appeal will have a higher priority than in other cases such as in business applications. As relative priorities are set regarding the product vision, business strategy, and the UX constructs to be targeted, specific goals can be set.

Setting UX quality requirements should occur early in the product planning stage and well before detailed usability requirements or detailed use case development. It is important set these intended levels of UX quality early so that checkpoints can be inserted to ensure the final product will elicit the intended perceptions, emotions, thoughts, and attitudes from the target market segments. UX quality goals communicate both to the development teams and to top management the clear targets regarding how good the UX associated with the usages must be. Here, we describe a brief outline of three broad steps in setting UX quality goals.

The first step in setting UX quality goals involves identification and prioritization of the relevant UX dimensions. Market research, needs-finding processes (such as market segmentation, ethnographic research, and usage model definition) define the nature of the product opportunity (Anderson, Bramlett, Gao, & Marsh 2007). These need to be described and rank ordered in terms of the vision for the high-level key features and usages. Particular attention and priority should be given to the features and usages that are end-user noticeable, will be included in the marketing messaging, and differentiate the system from others that will be on the market. In addition, any usages involving perceptual quality (such as acoustics, video quality, audio quality, or even tactile thermal properties) can be called out as relevant according to the end-user value propositions being targeted.

The second step is targeting specific (and measurable) UX dimensions for each of the key usages and features. The UX conceptual framework provides guidance regarding the categories of constructs to target. This involves assessing what emotions, attitudes, perceptions, and thoughts are being targeted for the planned end-user value propositions. Selecting the proper dimensions to target and how to best measure them is where a background in psychological assessment, psychometrics, and/or ethnographic methods is essential. The variables, study design, and measurement techniques selected should be based on branding/marketing strategies as well as practical and experimental design considerations.

The third step is working with the UX owners to assign guidelines and cutoffs (quantitative or conceptual guidelines) for each of the key features with respect to the variables being measured. To do this, competitive analysis benchmarking data or prior baseline data can be used. If no prior UX data are available, then judgment based on experience with similar types of systems can be used to start with. The main objective is to set explicit goals for UX quality well in advance of product development so that these goals can serve as clear targets and bring appropriate attention to the UX

throughout the development cycle. By highlighting what should be the UX outcomes to development teams and the accountable stakeholders, strategies and resources can be channeled to ensure user-centered design processes are prioritized appropriately with other business demands.

After goals have been set, measurements to assess the state of the UX can be planned. We refer to these checkpoints as critical UX milestones in the program timeline. At these milestones, decision makers and sponsoring executives can now have UX data to weigh tradeoffs that may affect both the future UX plans and other business outcomes. Common questions that UX quality assessment can help answer include: How good are the different aspects of UX for the target market? What levels of perceptual qualities will consumers notice and value? How does the end-user value proposition change when ecosystem partnerships or key functionality changes? How will the product compare to other product experiences?

Discussing and setting UX quality goals is particularly relevant in companies undergoing transitions toward establishing user-centered processes. It increases emphasis and visibility of the design function, key usage models being developed, and serves to communicate clearly the priority of UX relative to other objectives.

5 Conclusion

UX has become a hot topic and a key potential differentiator in competitive markets. This paper proposed a simple applied framework for conceptualizing the components of UX in order to communicate with UX stakeholders and advance goal setting and measurement within applied settings. The framework involves psychological constructs of UX that go beyond traditional validation, assessments of usability, and narrow conceptions of UX. The UX framework highlighted the roll of human perceptions, emotions, thoughts, attitudes, and behaviors resulting from the interaction with all aspects of the product over time.

Setting explicit UX goals guided by this framework and setting milestones at key gates in the development lifecycle, helps align team members with the business strategy regarding UX and affords attention in the right places regarding UX objectives. Focusing attention on the UX to management and executive sponsors not only generates appropriate support for design related functions but also helps to get the team pulling in the same direction when tradeoffs need to be made.

UX data collected throughout product development can be used to inform status compared to UX goals and to directly influence current and future product direction. innovation. By increasing visibility through explicit UX goal setting and measurement across stages of development, not only is UX emphasized as an important organizational objective, but strategies and resources can be better channeled to ensure user-centered design processes are prioritized appropriately relative to other business demands. In the future, UX studies based on behavioral research and psychology assessment techniques will go well beyond the classic satisfaction surveys and usability studies. As UX continues to become recognized as critical value propositions for customers, these techniques hold promise to provide deeper insight and better control into the design of successful products.

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