

Towards a Life Cycle Framework of Mobile Service User Experience

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ABSTRACT

Recently, interactive Internet services – also referred to as Web 2.0 services – are attracting users with their new features based on social networking, user-generated content and service mash-ups. Compared to physical products, the user experience of Web services has several special challenges, such as the intangible characteristics and dynamically changing content of the service, and multiple interaction styles on different service platforms. In this paper, we focus on the *service user experience (SUX) life cycle* and present a tentative framework for the SUX elements across the phases of the service life cycle. We conclude by discussing how the special characteristics of mobile services should be taken into account in the SUX life cycle framework.

Keywords

Web 2.0 services, service user experience (SUX), service usage life cycle, mobile services

INTRODUCTION

The new types of Web 2.0 services are based on features such as social interaction and networking, mash-ups of services and user-generated content (O'Reilly 2005). Examples of this type of services are Facebook, Amazon and Booking.com. Some of these services are now being transformed into the mobile platforms, and thus the multi-platform usage is becoming a reality. Also new types of cross-media services are emerging which exploit the benefits of combining and providing service elements on multiple platforms, such as Nokia's Sports Tracker.

User experience (UX) is related to the user's experiences with technology or technology-enabled services and applications within certain context (see e.g. Hassenzahl & Tractinsky 2006, Mäkelä & Fulton Suri 2001). Service experience (see, e.g. Rowley 2006) is affected by factors such as perishability, intangibility and self service nature of the services. *Service user experience (SUX)* can be seen as a combination of factors of service experience and user experience (Väänänen-Vainio-Mattila et al. 2008).

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According to the SUX model, the new aspects that affect SUX involve, for example, the coherence of experience of the service components, social aspects of service interaction, dynamically evolving service content and multiple interaction methods.

In mobile applications and services, user experience is heavily dependent on the contextual factors (Dey 2001, Häkkinen 2007). In addition to the context, attributes related to the user and the system affect user experience (Hassenzahl 2006, Roto 2006). Roto (2006) found in her study of UX in web browsing that UX is affected by the system attributes related to the mobile terminal, the service or site design, the browser application, and the network connection. Thus, a multitude of factors affect the user experience in Web 2.0 type of services on mobile devices.

As UX of products and services is dynamically evolving over time, it needs to be investigated from a temporally holistic viewpoint, covering all phases that take place before, during and after product/service usage. In this paper we aim at defining a tentative framework of UX for such *service usage life cycle*. We will first present the main factors of Service User Experience (SUX) and then describe the phases of SUX life cycle. Following that, we will discuss the UX issues in the different phases of the service usage life cycle. We will conclude the paper by discussing the special characteristics of the UX of mobile services in the life cycle framework.

SERVICE USER EXPERIENCE (SUX)

Väänänen-Vainio-Mattila et al. (2008) discuss the special characteristics affecting the Service User Experience:

- Coherence of service interaction: Web 2.0 services are often composed of mash-ups which combine content from various sources whose user interface (UI) components may have different interaction logic.
- Social navigation: Users interact with each other either explicitly by messaging, or implicitly by letting other users see their interaction behavior, such as ratings, navigation paths, or purchasing data.
- Temporal experience: The service changes dynamically and evolves over time, e.g. in terms of its content, functionalities and UI.

- Intangibility of services: Service, as opposed to a physical product, is intangible. It cannot be touched, it may move its access point or even disappear.
- Multiple interaction styles: Services may be used via different UIs on different platforms, including PCs, mobile devices and public terminals.

In summary, SUX has additional design requirements to the “normal” product UX. In addition to the elements listed above, *trust* is a crucial factor in SUX. These SUX factors become evident in the new types of Web 2.0 services with e.g. user rating data or mash-up components. Even though Web 2.0 services are not yet largely available on mobile devices, it is only a matter of time before the variable contextual factors and other mobile interaction requirements need to be combined with SUX requirements.

SERVICE USER EXPERIENCE LIFE CYCLE

In general, it seems that UX has often been addressed from the marketing perspective. In terms of user experience design, the focus has often been in the active usage of the product or service. We argue that the whole usage life cycle should be investigated carefully.

Author(s)	Viewpoint	Life cycle stages/phases
Roozenburg & Eekels, 1995	Whole product life cycle	Manufacturing, assembly, distribution, installation, operation, maintenance, use, re-use, disposal
Von Niman et al., 2006	Products and services lifecycle	Pre-purchase/pre-subscribe, purchasing/subscription, ownership, repurchase/upgrade
Sward & Macarthur, 2007	UX lifecycle within components	Marketing and awareness, acquisition and installation, product or service use, product support, removal or end of life
Ketola, 2005, 2006	Out-of-Box Experience	First use, normal use, last use
IBM, 2004	Elements of initial experience	Packaging, unpacking, hardware setup, power-on, configuration, introduction to use, getting to work, further assistance

Table 1. Related literature on usage life cycle phases.

Table 1 summarises related work which have addressed product and service usage life cycle phases. Roozenburg and Eekels (1995) present a “product life cycle” between the origination and disposal with the following stages: Manufacturing, assembly, distribution, installation, operation, maintenance, use, re-use and disposal. Von Niman et al. (2006) present a “products and services life cycle” from a user perspective as consisting of the following stages: Pre-purchase/ pre-subscribe, purchasing/ subscription, ownership and re-purchase/upgrade. Sward and Macarthur (2007) define the UX “components” as marketing and awareness, acquire and install, product or service use, product support and removal or end of life.

Ketola (2005, 2006) discusses the typical phases of the Out-Of-the-Box Experience and users’ challenges in the early phases of taking the product into use. However, there seems to be no reports on the whole service usage life cycle and how UX should be addressed in each phase.

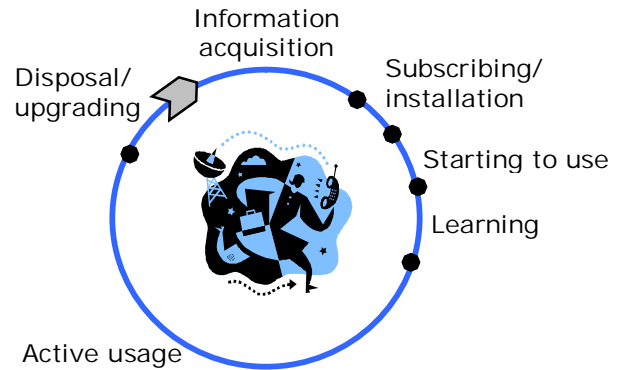


Figure 1. Phases of SUX life cycle.

Figure 1 shows our proposal for the phases of service usage life cycle. The life cycle starts with information acquisition or the phase in which the user acquires information about the service, e.g. through marketing or word of mouth. The next phase of service subscription and installation is very critical, as this is the “gate” of actually taking the service into use. Starting to use the service and then learning its different features should happen smoothly, as the first impression of the service usability and usefulness will impact if the user actually wants to become an active user of the service. The active usage phase varies broadly in length, in usage frequency and in case of mobile services, the usage contexts. Finally, the user may upgrade the service or simply dispose it, and/or move to use another one in case there is no motivation to continue the service usage.

In each stage there are several UX targets that need to be addressed in service design. For example, in the subscription phase the user should be offered the right service in the right moment, and the installation should proceed with minimum effort. In the learning and active usage phases, the service UX should be efficient and emotionally satisfying. The disposal should happen as fluently as the installation, without extra user actions.

TOWARDS A LIFE CYCLE FRAMEWORK OF SERVICE USER EXPERIENCE

Above we presented the SUX factors (for details, see Väänänen-Vainio-Mattila et al. 2008) that need to be addressed when designing for attractive and acceptable Web 2.0 services. To get a holistic view to service user experience, Table 2 presents a tentative framework how the service user experience (SUX) factors can be aligned across the phases of service usage life cycle. This framework attempts to create the full picture of service design issues and requirements from the SUX perspective.

SUX factor SUX life cycle phase	Coherence of service interaction	Social navigation and interaction	Dynamically changing service	Intangibility of the service	Multiple interaction styles
Information acquisition	Coherent presentation of service components in the marketing materials.	The service could provide previews of recommendations from other users.	Information about the dynamic nature of the service contents (e.g. update frequency).	Marketing materials with concrete illustrations of the UI and benefits.	There should be information about the interoperability of the service over different platforms.
Subscribing/ installation	Overview of the installed service components.	Peer-to peer support.	-	Immediate feedback of the success of the installation.	Service works instantly on various platforms.
Starting to use	Tutorials for the service.	Guided tours by more experienced users. Examples of use cases available.	Limited dynamical changes in the early phases of usage.	Options to present only a limited version of the service.	Guidance for usage on different platforms.
Learning	System support for combining usable service components (mash-ups).	Support from other users; example usage patterns from other users.	Visual and written instructions for the dynamic aspects of the service.	Clear user interface metaphors or visual layouts for the service.	Similar interaction logic and visual components on different terminals.
Active usage	System support for new service component selection.	Support for clear awareness of various user groups and their activities in the service.	Continuum of interaction models; overviews of dynamic aspects of the service.	Visual, auditory and haptic cues from the service user interface.	Coherence of interaction models on different terminals.
Disposal/ upgrade	-	Disposal of personal information in the service or transfer to the new version.	Overview of the dynamically changed contents of the upgraded version.	Clear feedback of the disposal/ upgrade of the service.	-

Table 2. SUX life cycle framework including examples of related service design targets.

Table 2 suggests that various usage life cycle phases emphasise different user experience design targets. For example, in the early phases of subscription and use the support materials should illustrate concretely the characteristics and benefits of the service. Also, the dynamical nature of the service must be moderated in the learning phase of service usage. When users use the service in an active manner, the coherence of multi-platform interaction models needs to be supported. In this phase, also the dynamically changing contents and interaction of the service may be more acceptable and appreciated by the users. In the disposal phase, the user must be able to delete the personal information shared with others. Furthermore, if the service is upgraded to a new version, the new version must be introduced in relation to the old version.

Special Characteristics of Mobile Services in the SUX Life Cycle

The framework presented above presents design targets that are generic to any Web 2.0 type of services, independent of the platform (end user terminal device) through which they are used. In this section we discuss special issues of mobile services in the SUX life cycle framework.

Roto (2006) has explored the UX issues of mobile browsing in detail. Here, we focus on the two dominant factors that affect the UX of mobile services: the mobile context and terminal device user interface (UI) capabilities.

Context includes technology, physical, task, and social context (ISO13407 1999, Dey 2001). The central limitations of the mobile context arise from the technology context, with inherent challenges of network reliability and device/service compatibility. In the information acquisition and subscription/installation phases the compatibility of the service with the user's terminal capabilities should be clearly presented. Also the physical context may pose challenges to the service user experience; for example, the varying background noise may distract or prevent the enjoyable active usage of the mobile service. The task context with high level of multitasking may increase challenges in service interaction in any life cycle phase of the service usage. The social context within the service usage (i.e. other service users) may be one of the most rewarding aspects of mobile SUX, throughout the whole usage life cycle.

The mobile terminal devices have inherent limitations of input and output features. Both the screen size and input

capabilities with the limited keyboards pose restrictions to the user experience. These restrictions are especially challenging in the starting to use and learning phases of the SUX life cycle. In the active usage phase, users should be able to personalise the mobile service according to their preferences; this user adaptation should take into account all SUX factors.

In addition to the contextual factors described above, the main benefit of mobile services is the context-awareness of the services. For example, the capability of the mobile service to adapt itself to the variety of user situations can support SUX in many ways. Furthermore, the dynamic nature of the service user interface could be aligned with the given context, or certain types of social interaction can be emphasised in different usage situations.

SUMMARY AND FUTURE WORK

In this paper, we have presented a service usage life cycle framework which aims at taking into account the holistic factors of service user experience (SUX). We have also discussed the framework from the perspective of mobile services, in which the technology context is a limiting factor especially in the early SUX life cycle phases. However, other capabilities of mobile services – especially the social interaction within the service – may offer new, attracting possibilities throughout the SUX life cycle.

The presented framework is tentative and will be developed further in our future research. For example, we intend to map the experiences from various case studies – for example mobile journalism, on-line communities or educative game services – to this framework. The findings could also be developed into SUX design guidelines.

In addition to the usage life cycle, the service development life cycle is interesting due to its special characteristics of being fast, iterative and sometimes, user-driven (Väänänen-Vainio-Mattila et al. 2008). It is also important to consider, how the users of the services can participate in the service creation, and how in that case the development and usage may become intertwined. Service development life cycle is not the focus of this paper but we are working on this topic further to gain a full understanding of service development and usage, and how good SUX can be developed into new types of services – including the mobile services.

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