

Leveraging the Context of Use in Mobile Service Design

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Abstract. User-centered design for mobile devices and services is becoming increasingly difficult. Not only do the devices have inherent usability constraints and widely divergent characteristics, but also the mere mobile context of use presents an array of design challenges. Besides challenges, the mobile context of use also offers opportunities for truly helping people accomplishing their goals more effectively. In this paper we discuss the value of understanding the mobile context of use and propose a structured approach to improve the design of, what is ultimately an user's "ecosystem of connected terminals".

1 Introduction

The mobile industry is on the brink of its second wave into the mass consumer market: the mobile Internet. Whether this second wave will be as successful as the first one, which led to the mass adoption of the mobile phone for voice communication, is currently the subject of heavy debate amongst large groups of people inside and outside the industry. One side of the debate points at the demise of WAP to underline their argumentation while the other side points at the success of SMS and I-mode.

Looking in hindsight from a HCI perspective, the success and failure of SMS and WAP respectively, can be explained by looking at the balance between the *value* to the user these services offer versus the 'basic' usability. Apparently SMS offers people so much value in terms of social interaction and communication that the user is willing to invest time in a poor user interface. At this moment WAP is obviously at the wrong side of the balance: poor value on top of poor usability. These examples illustrate that success in the mobile industry is more a matter of addressing "killer values" than offering "killer applications".

Because of the inherent usability constraints of mobile devices, the strategy for designing successful services for the mobile internet seems to be clear and simple.

1. Try to 'design' services which offer a high enough value to the user to overcome the usability constraints;
2. at the same time, try to minimize usability problems within the device constraints.

In the following sections we will focus on the first part of the above mentioned strategy: how to design services that offer true value to the user and how understanding the mobile context of use can broaden the design method, especially in the early conceptual design phases.

2 Leveraging the mobile context of use

A famous saying by Dutch soccer player, Johan Cruyff, goes like this: “Every disadvantage has its advantage”. At first sight the mobile environment only offers disadvantages: small screens, limited input possibilities, limited browsers, poor data-transfer performance, distracting environments of use, etc. However, mobile technology potentially also has some unique and distinct advantages in the fact that a lot of information about the context of use is available without requiring user-input. Context information that could be detected are the user’s *identity*, the user’s *location*, the local *time* and the *device* being used. By utilizing this information in a creative way, new innovative services can be developed that can support users accomplishing their goals in a more effective way.

- **Identity.** Can be detected by using the user’s unique phone number. This makes it possible to offer highly customized services, based on user preferences.
- **Location.** Not widely supported by operators yet, but given the essence of the mobile context of use, location based services can potentially offer tremendous value to users. For example, locating the nearest taxi stand without having to punch in a postal code (which the user does not know anyway).
- **Time.** Already used in currently available services, for example in weather and traffic information services. Creatively linked to the other properties like identity and location, services can become much more relevant for the individual user and thus more valuable. Consider a service that alerts a particular motorist about an upcoming traffic jam on his/her route and immediately suggests alternatives.
- **Device.** At a certain moment a service will need to “push” information to the user’s device. As the range of different devices is growing rapidly, the service will need to detect what type of device is used in order to provide an optimized user experience.

Especially in the early conceptual phases of the design process, it can be very inspiring and useful to match a specific context of use to user goals and generate service ideas and concepts on the basis of this. Table 1 shows an example of this approach to discover potential service ideas for “mobile movie information” [1]. For each of the possibilities of identity, location and time, an example is given. A possible next step would be to flesh out the examples further using another design method like personas and scenarios.

As can be seen, this approach enables designers to quickly generate a large set of possible service and design concepts. The context property “device” will have to be taken into account as soon as the high level concepts are more detailed. For small phones, for example, the service might send an SMS to the user containing which movies are playing at the nearest cinema. For mobile PDA’s the service might deliver the same information as a Flash object with movie trailers.

Also after the initial idea generation, of course, the current technological constraints and possibilities need to be taken into account. Many ideas might be unrealistic at the moment, but this should not interfere with the initial idea generation.

Table 1. Generating service ideas.

Service example: Movie Info	Identity	Location	Time
General Movie Info			
Give me information about movies based on my favourite genre, director, and actors.	X		
Which cinemas are in the neighbourhood?		X	
Which movie plays at 21.00?			X
Is there a movie that I would like playing in my neighbourhood?	X	X	
Can we still go to a movie tonight, playing in a cinema nearby?		X	X
When is my favourite movie coming out?	X		X
Is there a movie that I would probably like, playing tonight in a cinema nearby?	X	X	X

3 The next level: the user’s ecosystem of connected terminals

In the previous section the focus has mainly been on the context of use of a *single* device. With the rapid growth of the mobile Internet, however, industry players are more and more offering services through different channels: web, WAP, phone resident applications, PC resident applications, etc. Operators, for example, are currently vigorously setting up mobile portals besides their already existing web portals. Usually, the services are only copied and adapted to the smaller screens of mobile devices. Mobile phone manufacturers have since long offered phone resident PIM services, like an address book and a calendar. PC applications are also added to support synchronization with PC applications like MS Outlook. More recently, phone manufacturers are also offering services through own web and WAP portals. Mainly CRM services, but recently also download services for ring tones and phone display graphics.

In this highly competitive market a lot of overlap is occurring which is not beneficial to the clarity and usability of mobile services as a whole. Consider the messaging service. People can use PC-based Outlook for email, phone-based SMS, web-based email and SMS through many web portals from operators, manufacturers, etc. And very soon, all this will also be offered through different mobile devices.

In this emerging setting the competitive edge will eventually also have to come from offering more value by taking the context of use into account. Even though the industry likes to talk about “virtual services”, people with their millions of years of history of handling artifacts, will probably view the mobile Internet as a, what we call, “ecosystem of connected terminals”, where the interaction with each terminal is dependant on the context of use. Multi-channel services in this ecosystem should also try to take advantage of the specific context of use of each channel in such a way that the different channels reinforce each other. User tasks, and more important mindsets, differ according to the context of use. Fig. 1 illustrates this principle for a mobile calendar.

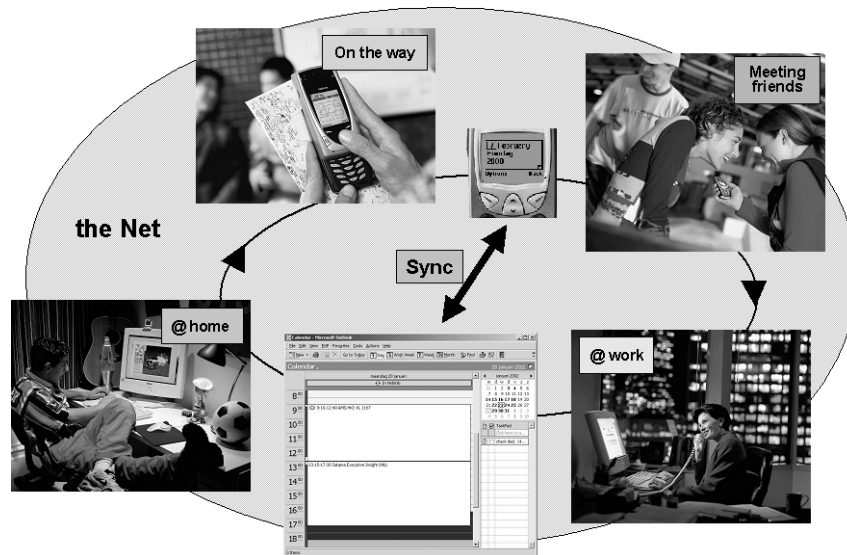


Fig. 1. A mobile calendar service within the user's ecosystem of connected terminals.

Mobile calendar services with synchronization features can offer a much higher value when taking into account the context of use in different situations and how this influences or even determines user tasks and user mindsets. The following overview lists a few context dependent characteristics that can serve as input for further identifying user requirements.

- **@home.** Private; focus on social life; often less time-critical; less concurrent tasks; large UI. Context is especially fit for managing social appointments and setting mobile reminders.
- **@work.** Business; focus on professional life; more time-critical; more concurrent tasks; large UI. Context is especially fit for managing business appointments and setting mobile reminders.
- **On the way.** Private/business; focus on social/professional life; time-critical; more unrelated concurrent tasks, ad-hoc; small UI. Context is especially fit for receiving mobile reminders; there is also limited room for simple calendar management (for example in a train).
- **Meeting friends.** Private; focus on social life; highly time-critical; many unrelated concurrent tasks, mainly ad-hoc; small UI. Context is especially fit for receiving mobile reminders; there is hardly room for calendar management, quick note-taking should be supported, for example a quick SMS-like reminder to oneself, which can be dealt with at home or work.

4 Conclusions

Leveraging the mobile context of use as part of the design approach is crucial for increasing service value and decreasing usability problems. Systematically using context elements such as location, time, and identity, allows designers to generate a variety of concept alternatives. Not only for “isolated” mobile services but also for multi-channel services delivered through mobile and desktop devices as part of an “ecosystem” of connected terminals.

References

1. van Welie, M., de Ridder, G.: Designing for Mobile Devices: a Context-Oriented Approach. (2001) IBC Conference “Usability for Mobile Devices”, 9-11 May 2001, London, UK