Mobile Internet User Experience: Cost-Benefit Estimation by Users in the Western World.

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ABSTRACT
User experience of the mobile internet is often inferior when compare to the desktop. This paper argues that the more cumbersome interaction on a mobile phone is only one reason for this. The bigger reason is the lack of killer applications. While it is crucial to be able to access any web page from the mobile web browser, it will be as crucial to have certain web-based applications that first aim for the mobile context and then for the desktop.

Author Keywords
User Experience, Mobile Internet, Perceived Cost, Perceived Benefit

ACM Classification Keywords
H.5.1 Hypertext navigation and maps, H.5.2 User Interfaces, H.5.4 Hypertext/Hypermedia Theory, User issues

INTRODUCTION
User experience (UX) in mobile web browsing is a complex issue: Firstly, user experience is a dynamic and intangible phenomenon. Secondly, the system providing the user experience is complex with a multitude of stakeholders with conflicting interests [7, p.35] [4, p.16ff]. This combination creates a multi-layered and complex system that requires thorough understanding for having appealing results. Usage numbers of the mobile internet in the western world show that only few people using the internet do so on a mobile device. MediaScreens [5] reports that only 5% of all US broadband subscribers with internet-enabled phones use it on their mobile device. Similar numbers can be expected for Europe as well and are often falsely attributed to the poor user experience of the mobile internet because of low speed, difficult navigation and inconsistency with the desktop internet. While these are polarising factors, the real problem is the low value perceived by many potential users. Working with understanding the common users' attitude towards the internet we conducted an admittedly small set of qualitative interviews that highlighted the problem that users had difficulties to see a real benefit of the mobile internet [4, p.45]. Actually, a rather large portion of the interviewees (non-technical students that use the internet and represent the early majority) saw the benefits of getting online but were also anxious about spending already too much time online.

This position paper reflects some of our observations and thoughts from working with the user experience of the mobile internet. It is intentionally not conforming to the prevalent attitudes towards mobile web browsing in the western world (i.e. North America and Europe). Our goal is to have it as a starting point for a discussion amongst researchers and practitioners within mobile internet user experience. While we believe in the importance of giving users an easy way to access the same sites on their mobile phone as the desktop, we wonder about the need of specific Internet services that target the mobile users.

BACKGROUND

User Experience
Kankainen [3] created a model for how user experience happens. Figure 1 shows a redrawn and slightly enhanced version of her model: It states that the current experience is based on the previous experiences and expectations. This means that the user experience starts on an emotional level when considering whether to use a system. If the user deems the system worth to be used, the actual interaction will occur [6]. From this moment of interaction the factors of context, user motivation and actions towards the system shape the user experience and thereby influence future expectations and later use.

The Long Tail
A second wide-spread theory about how business on the internet works is the theory of the long tail by Anderson [1]. In essence it claims that a few big sites have a high number of users but that the cumulative number of users from small sites is far higher. These big sites with a high number of users could also be called killer applications as they appeal and attract a wide number of users. The appeal of the smaller sites may be high for the people using them, but the general awareness of their existence is low.

COST/BENEFIT OF MOBILE AND DESKTOP INTERNET
We see - along the argumentation of Davis [2] the notions of cost and benefit in a more abstract way involving more than the monetary factors such as attention costs or emotional benefits. Bringing the desktop internet to the mobile phone replicates these costs and benefits but also adds mobile specific factors to the balance sheet.

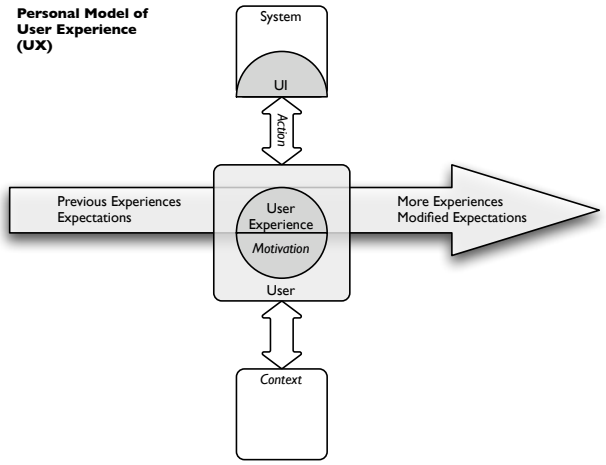

Figure 1. UX, User Centred View.
Redrawn and enhanced from Kankainen [3, p.32]; The current user experience depends on previous expectations, the user's motivation and the context of use while it influences the user's actions and the future experiences.

Since the desktop internet is already successful we can assume that the relation of cost vs. benefit is suitable for the users. Our interviews [4] showed that the for most people the benefit of the internet is saving money and time. Getting things cheaper or even for free, such as shopping, gifts, e-mail, information or entertainment is an essential part of the internet. The cost of these activities seem to be reasonable and people use them. Accessing the internet on a mobile device adds these additional factors into the balance:

Money The desktop internet is psychologically almost free. Unless using public hotspots the user most often only sees a monthly flat-rate bill for accessing the web. On mobile phones most of the time still every megabyte counts but this is hopefully about to change.

Effort The desktop internet set the standard for what effort it takes to navigate the web. This standard is still high for some people. Doing the same thing on a smaller device with limited input will always result in extra cognitive effort. In the worst case users may reject it because they feel stupid.

Time Again, the desktop internet is the point of reference. Compared to that, the mobile internet will always be slower. Even with the same internet connection (i.e. WiFi) the lower processing power and limited interaction will make it feel slower.

Attention A visual media, the internet mainly uses our primary communication channel. This focus of attention is possible in safe environments like offices and homes. Even with a laptop users sit down to use it; with mobile phones users will be moving in unruly contexts. This means that paying attention to anything will bear a high cost and is less likely to happen [7, p.55f].

Benefits of Use The three things provided by the internet are entertainment, information and communication/community. Currently, mobile people satisfy these demands by other means. This, however was also the case in the home environment and may change when suitable services are available.

Mobility This is the biggest advantage of mobile internet: The ability to access it from almost everywhere and when moving.

POSITION STATEMENT

Mobile internet usage numbers are continuously rising as aforementioned costs shrink, possibilities grow and people discover the benefit of mobility while getting used to solve their problems with the help of the internet. We believe that this evolution provides steady growth in user numbers as it works on the long tail with many people using different sites to find their information online. However, mobile killer applications that capture people's awareness and attract large amounts of new users cannot be created by making the desktop Internet available on the mobile phone. Killer applications are these few big sites that appeal to everybody and provide a universally desirable benefit. They are new, not replications, they fulfil a genuine need that is specific for the use context.

This is where the cost/benefit estimation comes into play [2]. We believe that users estimate the cost versus benefit of using a service or system just as Roto observed that they estimate the time it takes to load a page [7, p.45]. Our qualitative interviews with possible users [4] showed that for them still the cumulative cost of the mobile internet seems to outweigh the benefits. The mobile internet has a hard competition with the traditional means to get entertainment, information and communication on the move. Mobile entertainment has been delivered by music players since the Sony Walkman. Mobile information finding and communication has traditionally been covered as well by other sources such as calling/texting friends and public displays and interaction. These options have a better estimated cost-benefit ratio which is why they are being used and then get the chance to provide user experience. The mobile internet estimated cost-benefit ratio can -

as we have shown above - be only sub-optimal when replicating the desktop. The only way to improve its image significantly is by adding additional benefits, genuinely appealing to the mobile user.

SOLUTION IDEAS

The means how these killer applications are provided by the web can vary by means from widgets to web sites. The crucial factor is that they need to be designed with mobile use in mind first. Later they can also add suitable features for desktop users but the activities for both users are different and only focussing on the mobile user first will provide a suitable user experience. This is a crucial shift of attitude away from replicating the desktop web towards aiming for primary mobile services.

To create this additional benefit it is crucial to take advantage of the device specific properties. On one hand access to device input and output (i.e. camera, vibration, loudspeaker or microphone) give users new ways to interact with online services. On the other hand - and we see this as far more important - online services need to take advantage of the user's mobile computing and communication device. This is a unique selling point.

Having access to GPS or triangulation data enables location aware services that will be naturally more interesting for moving users and not the ones accessing the internet from their couch. Navigational help and location based services are only the tip of services that could use location data. Location-based communication and communities may provide a totally different set of mobile services that users may be interested in.

Another possibility is to advance in the direction of integrating the interaction with the internet across devices. Workflows that can spread from the desktop to the phone and vice versa will give users more reason to switch between devices and to use the most suited device for each task. The phone has immediate advantages there such as being carried all the time and being fast to switch on. It can also feature another set of sensors (GPS, accelerometers, body functions, etc.) that provide other information that the desktop. In this sense the phone can become more of a personal representation, one's business card on the web.

CONCLUSION

The ability to access the Internet by a desktop-like mobile browser will always remain for the valuable long tail. However, to quickly attract large user numbers to the mobile web mobile-specific killer applications will be needed. These must be first tailored to the mobile context and will feature applications that are not to be found on the web today. Form technical point of view, these may use widgets or web sites that are also available on the desktop, but from creation attitude they need to be all-new and revolutionary. That day, when it is possible to say one task that a normal user at home will solve easier on the mobile phone than on the computer, that day, the step to a flourishing mobile internet has been taken. Until then, the mobile internet will grow its user base but still feel like small and slower brother of the "real internet". And only then, interaction will happen and user experience will become the real issue.

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The opinions presented in this paper are not necessarily those of our employers.

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