

Key scenarios, contextual walkthrough and context trails – tools for better and more accessible mobile designs

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Abstract. In this paper we discuss the dynamic and non-optimal nature of mobile usage, and how this impacts on design and evaluation. We suggest that non-optimal usage conditions needs to be explicitly considered and that they can serve both as a design tool and as a motivation for designers/developers to create more accessible mobile solutions. We outline three design tool concepts: key scenarios (text and/or image and/or short video), contextual walkthrough where non-optimal condition situations are added to a heuristic evaluation and a context trail where a physical trail is created which allows designers/ developers/ usability experts to experience many of the consequences of non-optimal situations.

Keywords: design for all, inclusive design, mobile, design, accessibility, context, interaction

1 Introduction

When designing for mobile usage, the context in which the application or device is used will impact drastically on the user experience. To cover this explicitly, the concept of “situation induced disabilities” has been introduced [1], [2] indicating the importance of involving not only real users but also real (non-lab) situations when evaluating mobile solutions. There are many barriers to more inclusive design solutions [3] and recognizing that non-optimal usage situations causing situation induced disabilities is something which happens to everyone has important advantages:

- 1) Accessibility no longer becomes a question of “us and them” implicitly favoring an inclusive approach
- 2) Focusing on users in general is motivating for designers and developers without particular interest in accessibility

To involve the context explicitly is equally, if not more, important also for the early stages of the design process, since shortcomings of early design concepts are difficult and expensive to correct downstream. Performing a contextual focus group (e.g. discussing while walking) will generate different results and insights compared to a stationary exercise where all participants sit around a table [5].

Many common design tools, such as Personas [4], are focused heavily on characteristics of the user, and approaches like Scenario Based Design [8] involve aspects of usage context. However, since such approaches often consider either abstract representations of users or the actual use situation out-of-context, we feel that current tools need to be extended to cater more effectively to the highly dynamic and context-dependent nature of mobile usage. We suggest that a wider use of such tools will lead to mobile applications becoming more accessible as well as easier to use for everyone.

2 Design for context

According to Dey [9], context is “any information that can be used to characterize the situation of an entity. An entity is a person, place, or object that is considered relevant to the interaction between a user and an application, including the user and applications themselves.”

The situated character of human action is further reflected in Suchman’s [10] statement that “the organization of situated action is an emergent property of moment-by-moment interactions between actors, and between actors and the environments of their action.”

Here, the term “moment-by-moment” is crucial, because many designers, developers and marketers tend to focus too closely on fairly stable user populations and target groups – as if user behavior is in some way more predictable if you know who the user “is”. When designing for context-dependent use, we instead focus more closely on what people “do”, and more specifically on how their actions change (or stay the same) depending on dynamic and emerging situations. Thus, we focus on the design of applications and systems that are sensitive to the ways in which people respond to the particulars of events in order to “make things work”. Much like contextual inquiry [11] focuses on how people experience tools and systems in the context of actual, ongoing work, we are focused on ways to deepen the designers’ and developers’ understanding of mobile user experiences “in the wild” [12], allowing them to make better design decisions based on an understanding of how human cognition and action adapts to its surroundings.

3 Key scenarios, contextual walkthrough and context trails

Both designers and developers typically work in an office environment, meaning that the situations they encounter, and the contexts in which they work, are often very different from the actual mobile usage situations and contexts.

We suggest that it is important to explicitly make a range of different usage situations available to the design-team. Such scenarios (i.e. key scenarios) should be documented both with pictures (similar to those in Fig 1) and short video clips giving a richer perspective of the context-dependency and dynamics of mobile usage.

We argue that the mobile situation is inherently dynamic, but we often fail to recognize how quickly the users switch between different situations and contexts, and to be able to consider not only the use case of “sitting at a desk” or “making a phone call”, one needs to define a range of scenarios covering noisy environments, bright sunlight, moving around, one-handed usage, situations where the environment needs a lot of attention (e.g. crossing a street), etc.



Fig. 1. Mobile usage

Such video scenarios and pictures need to be shared in the design team – key pictures should be posted on the wall and video clips should be easy to access for everyone involved in the development.

In addition we suggest that it is important that these situations are used to both stimulate ideation and to guide evaluation of ideas and concepts. The question “how well does this design work in key scenario x, y or z” should always be on top of the designer’s agenda.

We also suggest that early testing methods, such as a cognitive/heuristic walkthrough [6], need to pay closer attention to the dynamics of mobile usage. This shift of perspectives could be facilitated through imagination (e.g. contextual walkthrough) or through a more situated, physically oriented exercise (e.g. context trail). Although there are versions based on activity theory which attempt to involve activities and contexts more explicitly [7], we suggest that using a more streamlined and effortless method for context involvement would be useful.

Many methods originate from the design of desktop systems – a kind of usage situation which often is close to optimal – good lighting conditions, quiet environment, few disturbing elements etc. Mobile situations are much more often non-optimal – bright sunlight might make the screen hard to see, a noisy environment may make the audio hard to hear, the device might be kept in a bag etc.

By focusing too much on persons and abilities (as may easily happen when talking about Personas or Target User Groups) the influence of the mobile context may easily be obscured. Looking at abilities, one is easily tempted to state that a typical user will have good eyesight, good hearing and no motoric or cognitive problems. Re-writing this in terms of a specification of context one gets:

1. Optimal lighting and the user can easily look at the screen
2. Quiet environment without sound restrictions
3. The user holds the device in the hands (no gloves or similar) and no external vibrations or shaking makes it hard to feel touch feedback
4. The user has nothing else in the hands and can use both two handed and one handed grips. No shaking or vibrations that interfere with the ability to interact.
5. The context does not require any attention.

Looking at this list it is clear that an “optimal” situation where all these points are true is far from typical as a mobile usage situation. In fact different non-optimal conditions often occur:

1. Non-optimal lighting (e.g. bright sunlight), or the user has or wants to look elsewhere (while crossing a street, negotiating rough terrain, etc).
2. Noisy environment (e.g. in a crowd, by a busy street, at train station, at festival or fair, etc) or an environment where sounds are not suitable (e.g. meeting, concert, theater, bird-spotting – not to frighten the birds etc)
3. Situation which limits your ability to touch the device - cold hands, using gloves (cold weather or keeping the device in a pocket or a bag) or external vibrations/shaking makes it hard to sense the feedback.
4. Situation which limits your ability to manipulate the device like having to hold something else in one or both hands (eg. umbrella, bag, take away coffee, ice cream, pram, child etc) or shaking/vibrations that make it difficult to interact.
5. Context that requires attention (eg. other people, traffic, sights, scenery etc)

We suggest that the above points can be used either as is to enhance heuristic tests – asking “how does this work under non-optimal lighting, in a noisy environment etc” or as a starting point for generating device or application specific scenarios.

In the following we outline three design tool concepts we are currently working on. These concepts are intended to be used in early design, and in all situations where one needs “quick and easy” evaluations. They are to be complemented by more detailed

investigations and tests – but unless this kind of considerations are included already in the early design stages there is a significant risk that resulting designs will require an optimal (but less realistic) usage situation and will tend to cause significant user irritation when used under non optimal (but realistic) conditions.

2.1 Key scenarios

Key scenarios are scenarios where the application or device to be developed will be used. They are based on optimal as well as non-optimal environmental situations. We recommend that one includes both typical scenarios as well as less typical (and thus more design-critical) ones (in order to better take the dynamic nature of mobile usage into account). Each scenario consists of a short text describing the situation, one or several photos illustrating it, and if possible also a short video clip to better show the dynamic aspects of the situation.

An example of a key scenario for a pedestrian tour guide application could be crossing the street (fig 2). A short text can be added describing the situation and the implications for the mobile interaction:

Crossing the street: As a person is crossing the street, he or she has to attend visually and cognitively to the traffic. In addition the environment is usually noisy, making it difficult to hear sounds from the device.



Fig. 2. Crossing the street ("Pedestrian Crossing to Pentoville Road" www.flickr.com/photos/poeloq/259176911 by poeloq, licence Creative Commons BY)

2.2 Contextual walkthrough

In a contextual walkthrough one or several experts go through the design (just as one would do with a cognitive walkthrough), but in addition the experts consider different

user contexts. As noted by Bertelsen [7], “the basic problem with the [cognitive walkthrough] is the absence of the real context of interaction”. Thus, as a support for this exercise, specially designed context cards or images/videos are used to help the expert consider the consequences of a particular use situation by prompting and triggering the consideration of realistic contexts. These cards are based on the optimal and non-optimal condition lists and contain different key scenarios (as the example in section 2.1).

2.3 Context trail

Context trail is an immersive method to gain user insights through interactive, situated usage situations. In a context trail a physical course is created where the designer/expert/developer encounters typical problems herself/himself, prompted by critical scenarios provided through context cards. The course can consist of exercises such as: hold a cup of coffee in one hand while doing task x, use the application while walking or cycling, use it in a noisy environment, use it in the dark, bright sunlight or when it is cold, raining (under an umbrella) etc. Just as for the contextual walkthrough tool, key scenarios can be used – in the case of the 2.1 example the designer/developer/expert crosses either a real or a simulated (and thus safer) road. By interviewing participants with respect to their experiences through the journey and through review of e.g. video recorded material, critical situations may be highlighted, analysed and addressed through design iteration.

4 Discussion and conclusion

In this paper we outline three design tool concepts intended to be used whenever more extensive tests and real-life investigations are not possible. They are particularly suited to the early design stages, but can also be used for heuristic evaluations later in the process. Our approach lies close to [7] in that we explicitly consider the activity in a context, but we suggest a less detailed approach to make it easier to incorporate our methods in SCRUM or other agile development methods.

We base our approach on the recognition that non-optimal usage conditions are common in mobile usage, and suggest that at least the following conditions need to be considered (on their own or in different combinations) in order to design good mobile solutions:

1. Non-optimal lighting (e.g. bright sunlight), or the user needs or wants to look elsewhere (while crossing a street, negotiating rough terrain, etc).
2. Noisy environment (e.g. in a crowd, by a busy street, at train station, at festival or fair, etc) or an environment where sounds are not suitable (e.g. meeting, concert, theater, bird-spotting – not to frighten the birds etc)
3. Situation which limits your ability to touch the device - cold hands, using gloves (cold weather) or keeping the device in a pocket or a bag.

Alternatively a situation where external vibrations/shaking make it hard to feel the feedback.

4. Situation which limits your ability to manipulate the device like having to hold something else in one or both hands (e.g. umbrella, bag, take away coffee, ice cream, pram, child etc) or being in a situation where external shaking or vibrations limit your ability to interact.
5. Context that requires attention (e.g. other people, traffic, sights, scenery etc)

We do not suggest that all parts of any application need to work under all these critical conditions, but we do argue that any designer or developer needs to think about various, realistic and thus non-optimal conditions and consider how they relate to their current product to avoid “accidentally” ending up with a product which can exclusively be used under optimal conditions (such a product is often also quite inaccessible).

We argue that designing for non-optimal usage conditions will result in solutions that are also more accessible – in fact we suggest that arguments building on non-optimal usage/situation induced impairments may be a good way of reaching designers and developers with little interest in accessibility.

We have suggested three basic tools for including non-optimal contexts in design processes: key scenarios (text and/or image and/or short video), contextual walkthrough where non-optimal condition situations are added to a heuristic evaluation and a context trail where a physical trail is created which allows designers/ developers/ usability experts to experience many of the consequences of non-optimal situations.

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