Understanding Use Situated in Real-world Mobile Contexts

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ABSTRACT
Our understanding of users' everyday practices in their natural contexts is still very limited. Insights are often only available from studies conducted outside of the context itself. I propose a new approach to study use situated in real-world everyday mobile contexts (at the time and place where the activity is happening) by leveraging three key-enablers: (1) the high penetration of smart phones, (2) their easy programmability and (3) the large-scale distribution channels for mobile applications that come with the platforms. My approach suggests a triggered response solicitation, which prompts the user for responses on feelings, experiences and practices whenever specified context variables are true. The approach is still in an early conceptual phase and will be applied in the area of understanding citizen participation out and about in the city.

Author Keywords Situated use, real-world everyday mobile contexts, mobile user studies, mobile applications, distribution channels.

ACM Classification Keywords H.5.2 User Interfaces: Evaluation/methodology.

General Terms Experimentation, Human Factors.

INTRODUCTION

Our understanding of users everyday practices in their natural contexts (e.g. at home, on the way to work, in the supermarket) is still very limited. Insights are often only available from studies conducted outside of the context itself. Current methods are not apt at providing these insights on an arbitrary subject of choice. In-situ observations are not always possible and (contextual) interviews do not contextualize the situation enough in the sense that they do not normally catch the user in the right place and time the activity takes place. They are still subjective accounts of users constructed ex post reporting on activities they carried out earlier. This makes it difficult to understand users' practices situated in the actual context they take place in.

I argue that it is beneficial to study users' activities situated in their real-world everyday mobile contexts at the time and place they are actually conducted – i.e. when the user is into the activity, is mobile and out and about. I propose that smart phones "as the most mainstream manifestation of ubiquitous computing" [5, p. 4795] in combination with large-scale distribution channels for mobile applications offer great opportunities to conduct this kind of mobile user studies. Incentives could be provided for users to join the study.

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RESEARCH CONTEXT

The presented approach is to be developed and applied within the eGov+ project at Aarhus University, where we do research on supporting public services through Web 2.0 and mobile technology. More specifically will the approach be valuable in an endeavor to understand and design citizen participation embedded into the actual contexts where taking action matters – that is, out and about in the city, on the way to work, while shopping or with friends when the issue at hand is apparent to the citizen. Current work within the project includes citizen involvement in land use planning.

PROPOSED APPROACH

Data Gathering Strategies

In order to gather insights from the user in the situations where the activity takes place, I am following a prompting strategy. The initial idea originates from the Experience Sampling Method (ESM) developed by Csikszentmihalyi [1]. With ESM, study subjects will be asked to respond to questions written into a journal whenever a beeper signal goes off. I take this one step further and include the context into the equation of when to prompt the user and also inquire for more qualitative feedback (e.g. user stories and experiences; see [6], [3] and [2] for similar approaches).

[5] gives a brief overview of methods already used in mobile user experience research, such as ethnographic methods, mobile user stories, diary methods, and cultural probing as well as the challenges associated with them.

With my approach, I prompt the user for a response whenever various context variables are detected to be true. These context variables could be specific geographical locations (e.g. at home, at work, at the supermarket, passing by the town hall) or the vicinity to other specific relevant or interesting places, specific times of the day or days of the week, the proximity to other interactive technology (e.g. computer, TV), the level of movement of the user (e.g. running, standing, walking), but also the social context and with whom the user interacts (e.g. through other known or unknown devices around) or any other context variable that may be interesting for the research question at hand. A different strategy would be to prompt users for responses at arbitrary or random times of the day. Here, one could acquire an overview as well as chance encounters of activities, which may not be possible with a more focused approach.

The questions or responses solicited are dependent on and to be adapted to the specific research question under

investigation. They could for example relate to the user's current activity, to the context the user is in, to the user's social interactions, to the user's experience of something or generally the user's (emotional) state of mind. They could be both quantitative and brief qualitative responses.

A slightly different approach could be to ask the user to provide feedback in specific situations manually on her own terms (i.e. without actively prompting her) when the user is experiencing something specific. See [4] for an example of a study where users were asked to report on situations where they experienced security technology in some form or another as part of their everyday use.

App Design Considerations

Based on the proposed data gathering strategy, the mobile application consists of a form for response solicitation, which is presented to the user. It should be as flexible as possible for the researcher to assemble such a form from a list of pre-defined user interface widgets. These could be elements to ask open-ended questions, text fields for diary entries, scales and ranges to select from, possibilities to take photos or record video and audio samples and so on.

The mobile application itself runs on the phone in the background monitoring the previously specified context variables. If any of the set-up rules for user prompting match (including those for how often users should be prompted) the application starts up, notifies the user (e.g. via ringtone or vibration) and presents the user with the response solicitation form. This will show the user interface elements as specified by the researcher above and a button to ignore the specific request for response.

Apart from the response solicitation form itself, the researcher should also be able to choose from a list of context variables and other phone sensor data (e.g. user movement patterns, user location, time) the information that should be logged for later analysis. Similarly, interaction logs could be recorded, which would show when the user was prompted, which context variables or rules triggered the event and whether the user responded or not.

Certainly, when installing and running the application, the user would be made aware of the data gathering and the possibility to ignore requests when busy or otherwise not able to respond. The user could not participate altogether.

App Distribution Strategies

Depending on the research focus, the mobile application for triggered response solicitation would be distributed through app stores or markets from the relevant platforms. This allows for a wide audience of somewhat technology savvy, already smart phone-using users. Furthermore, it allows for participants that are geographically well distributed and to some extent also economically and socio-demographically. Yet, demographic reach may be limited with not being able to reach lower levels of society as well as certain age groups. Though in general, a broad range of users can be reached without much effort.

Furthermore, the selection of study participants is far more uncontrolled and anonymous compared to other user recruiting techniques. The actual demographic of the user base or group of study participants needs to be solicited from each user when setting up the application. This can either be done anonymized or with pseudonyms.

A key enabler for this kind of research is the easy update functionality inherent in these application distribution channels. Through this, iterative research becomes possible: Researchers being able to test out their response solicitation forms and improve and iterate over them to reach a final questionnaire layout after some initial trial period. Similarly, the already existing user base of installed applications can be repurposed for other research questions by pushing a totally new response solicitation form, a new set of variables to log and new prompting rules regarding context variables. In this sense, the installed application can be seen as a bridge into the users' everyday life.

CONCLUSION

I presented an approach to study use situated in real-world everyday mobile contexts by letting study participants report feelings, experiences and routines while in the moment (right then, not later; right there, not elsewhere). I achieve this by leveraging the high level of smart phone penetration and their easy programmability in connection with large-scale distribution platforms and their opportunities for iterative research. The approach is still in a very early conceptual phase, but will be applied to investigate opportunities for embedded citizen participation. Still many practical, legal and especially ethical issues need to be investigated as well as the validity and reliability of the data gathering method shown.

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