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A Pragmatic Approach to Testing Issues in a Mobile Platform that Does Not Yet Exist

The CAMMP Story

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ABSTRACT

This paper reports on user studies conducted in a project dealing with a converged mobile rich media platform. We address the questions of the selection of test methods and their application through an iterative process. We argue that a varying degree of simulation of test variables such as the environment, the service or the mobile device behavior optimizes the evaluation in terms of cost-efficiency and results quality, while providing flexibility and ease of use to the researchers conducting the evaluations.

Categories and Subject Descriptors

H.5.2 [Information interfaces and presentation (e.g., HCI)]:
User Interfaces – *Evaluation / Methodology*

General Terms

Experimentation, Human Factors

Keywords

User studies, methods, iterative approach, mobile media

1. INTRODUCTION

The question of how to evaluate mobile services with end users has been addressed by many researchers, concerned either with defining an evaluation framework [1], selecting the methods [5], the test environment ([2]) or the degree of realism of the prototype used [6]. However it seems that no formal approach exists for conducting user studies in the context of a long lasting project dealing specifically with mobile rich media. Instead, ad-hoc methodologies seem to prevail because of various constraints such as the project organization or the amount of resources available.

1.1 Context of the Study

The work reported in this paper takes place in the context of the Danish Converged Advance Mobile Media Platforms (CAMMP) project¹, which addresses the convergence of media services with mobile technologies. In this purpose, CAMMP merges 3G mobile technologies with Internet, digital TV and radio and investigates the potential of this new infrastructure which combines traditional media and user-generated content. Eight academic and industrial partners are involved in one or more of the five work packages

covering areas such as User requirements & testing (for which the work presented in this paper is conducted), Physical infrastructure or Services and content architecture.

2. PRAGMATIC, ITERATIVE APPROACH

CAMMP is a four-year project which follows a yearly iterative cycle. Each work package constantly and progressively develops its knowledge and/or skills in its focus area. In the authors' work package, the iterative approach to user studies is highly inspired by Nielsen's guideline concerning iterative design ([7], p. 106), which recommends to combine iterative design and evaluation. This approach has been largely used in previous software development projects and appears reliable. However in our case, the "product" of interest is a platform that combines various concepts, services and devices that are under investigation and/or development, and therefore not necessarily available yet. The purpose of the iterative process is then to build a pool of knowledge on issues ranging from general concepts to specific usability issues related to the platform, relying on test setups of varying degrees of simulation. At the end of the project, CAMMP will have uncovered a selection of focus areas including user expectations, design, functionality, usability, pricing, etc. Between each iteration, the issues of interest for the next iteration are mostly derived from previous results. The choice is also coordinated with the other work packages in order to synchronize the overall project development.

2.1 Combining Traditional Test Methods

The methods used in CAMMP include traditional usability evaluation ones carried out either in a laboratory, a simulated environment or outside in the field. A non-definitive list of methods relevant for the testing activities in CAMMP is reported in [8]. These methods include *Individual interviews* and *Panel discussions* (task-based, situated, in a lab, open, semi-structured, etc.), *Usability evaluations* (lab-based, in a simulated environment) and *field trials* (large scale, unsupervised).

The order in which these methods are used and the choice of methods to be applied to investigate a specific issue depend on three factors: cost-efficiency, result quality and prototype availability. With regards to the latter, since the project goal is to investigate new technologies, future services or interaction paradigms, conducting user tests requires simulating part of the setup. For instance the first iteration included a high level conceptual evaluation of mobile broadcast TV acceptability. For

¹ <http://www.cammp.aau.dk/>

this study, we used DVB-H capable Nokia phones. However, the DVB-H network infrastructure being not available in Denmark yet, a portable broadcast solution had to be specially developed. From this investigation some issues emerged, from both the participants and the facilitators. The latter then selected some of the issues to be further investigated during the next iteration. A new set of prototypes and simulating strategies was therefore required and thus developed. As depicted in Figure 1, this way of conducting test iterations leads to the discovery of new issues to be investigated in a cyclic fashion.

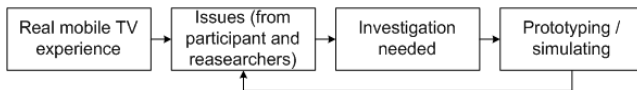


Figure 1 CAMMP's iterative test cycle

2.2 The Case of Transition Delays

The issue of transition delays while browsing through mobile television channels illustrates the pragmatic approach presented in this paper. The first test iteration included two interview-based experiments. This choice of methods for the first iteration follows common practice that favors low-cost informal methods [9] for lab evaluation of mobile products [4]. As described in details in [3], the first evaluation consisted in a face-to-face task-based interview in a busy public setup where participants were asked about the general acceptability of watching mobile television in such an environment. An existing mobile television solution was used during the test, which was evaluated by the participant in terms of first impression and general usability issues. The second test consisted of semi-structured interviews conducted in groups discussing the concepts of competition and collaboration on mobile devices.

Most participants taking part in the first evaluation as well as some participants from the second study reported that one of the main issues with the demonstrated application was the time it took the system (approximately 6-7 seconds) to change channel when users pressed the 'next channel' button. Therefore, after disseminating this finding to the other project partners, it was decided to pursue the investigation of the issue in the following iteration.

During the second test iteration (currently being conducted), a task-based evaluation setup is used to investigate this issue. In addition to identifying a threshold of acceptable delay when switching between TV channels on a mobile phone, the impact of both the environment (sitting in a quiet lab or in a simulated bus) and the type of transition (black screen with waiting icon or smooth transition) are evaluated. In later iterations, it is intended to validate these results in a setup offering an increased realism for instance with a fully functional media player tested in an unsupervised field trial.

3. CONCLUSIONS

The iterative approach to user testing discussed in this paper has so far allowed the CAMMP researchers to conduct a diversity of user experiments, investigating various aspects of the user experience with a mobile rich media platform. The work

conducted in the two first test iterations involved a rather high degree of simulation and a low degree of realism. In the upcoming test iteration, the realism will be increased by conducting experiments out in the field instead of in a lab, and by introducing prototypes at a higher stage of development. Doing so will also decrease the amount of simulation required to conduct proper experiments.

4. REFERENCES

- [1] Coursaris, C. K. and Kim D. J. 2006. A qualitative review of empirical mobile usability studies. In Proceedings of the Twelfth Americas Conference on Information Systems (Acapulco, Mexico, August 4-6, 2006). AMCIS 2006, 2885-2897.
- [2] Duh, H. B., Tan, G. C., and Chen, V. H. 2006. Usability evaluation for mobile device: a comparison of laboratory and field tests. In Proceedings of the 8th Conference on Human-Computer interaction with Mobile Devices and Services (Helsinki, Finland, September 12 - 15, 2006). MobileHCI '06, vol. 159. ACM, New York, NY, 181-186. DOI=<http://doi.acm.org/10.1145/1152215.1152254>
- [3] Fleury, A., Pedersen, J. S., and Larsen, L. B. 2009. Two perspectives on mobile television: Consumption in a social context and collaborative/competitive behaviors. In Proceedings of the Ninth Danish Human-Computer Interaction Research Symposium, (December 2009), 18-21.
- [4] Kjeldskov, J. and Graham, C. 2003. A review of mobile hci research methods. In Human-Computer Interaction with Mobile Devices and Services, vol. 2795/2003, 317-335.
- [5] Kjeldskov, J. and Stage, J. 2004. New techniques for usability evaluation of mobile systems. In International Journal of Human-Computer Studies, 60(5-6), 599-620.
- [6] Lim, Y., Pangam, A., Periyasami, S., and Aneja, S. 2006. Comparative analysis of high- and low-fidelity prototypes for more valid usability evaluations of mobile devices. In Proceedings of the 4th Nordic Conference on Human-Computer interaction: Changing Roles (Oslo, Norway, October 14 - 18, 2006). A. Mørch, K. Morgan, T. Bratteteig, G. Ghosh, and D. Svanaes, Eds. NordiCHI '06, vol. 189. ACM, New York, NY, 291-300. DOI=<http://doi.acm.org/10.1145/1182475.1182506>
- [7] Nielsen J. 1994. Usability Engineering. Morgan Kaufmann.
- [8] Pedersen, J. S., Fleury, A., Sørensen, L., Heinze, E., Nicolajsen, H. W., Winbladh, J., and Wieland, J. L. 2009. State of the art literature study of methods for evaluation framework. CAMMP project deliverable D1.2.
- [9] Vredenburg, K., Mao, J., Smith, P. W., and Carey, T. 2002. A survey of user-centered design practice. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems: Changing Our World, Changing Ourselves (Minneapolis, Minnesota, USA, April 20 - 25, 2002). CHI '02. ACM, New York, NY, 471-478. DOI=<http://doi.acm.org/10.1145/503376.503460>