Studying Screen Interactions Long-term: The Library as a Case

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ABSTRACT

This paper presents the design and long-term study of BiebBeep, a large interactive touchscreen that has been developed with the aim to augment the information and social function of a library. BiebBeep displays user-generated and context-relevant content, such as information about local events and book trailers. The system's distinctive feature is that people can add information to the screen themselves, such as tweets and Flickr photos, so that the library and its visitors can inform and connect with each other. For more than a year, the BiebBeep system has been iterated and studied in the library. The research approach presented is an exemplar of the study of a public screen *in situ* for *long-term* to best meet the demands for its actual use in present and future.

Categories and Subject Descriptors

H5.m. Information interfaces and presentation: Miscellaneous.

General Terms

Design, Experimentation, Human Factors.

Keywords

Library 2.0, large display, touchscreen, user-generated content

1. INTRODUCTION

In March 2010, a new library building in the Dutch city Almere, was opened. The library's ambition was to be more than a dusty storage place for books and to improve its services. To meet the demands of current and next-generation users, libraries –such as the one in Almere– nowadays face the challenge of innovating their physical and virtual services and utilizing digital media to provide state-of-the-art, so called Library 2.0 services. Casey [2] describes this Library 2.0 concept as a modernized form of library service whereby the focus lies on user-centred change and participation in the creation of content and community. For this purpose, interactive displays and social media such as Twitter offer interesting potential. This paper explores the use of interactive media to strengthen library information and communal services to improve the functioning and relevance of the library in the present and future. For this purpose, the design and study of BiebBeep is presented, an interactive display built to support Library 2.0 services. In order to meet the demands of its actual usage, BiebBeep was studied in Almere's library for long-term. A Living Lab approach was taken, which meant that the development and study was conducted in strong partnership with the library and was characterized by public participation and frequent evaluation in-situ.

2. BIEBBEEP: AN INTERACTIVE SCREEN

The design of BiebBeep was initially motivated by an in-house and focus group study that indicated that the library's social functioning and information services could be improved. The screen, which has a prominent place in the library (near the entrance), tries to address this by displaying user-generated content (via Twitter, Flickr and YouTube) and context-specific information, such as the latest additions to the library collection, local news, facts and figures of (cultural) events and activities happening in the library and Almere region. BiebBeep presents this information on a large 42-inch touch screen in portrait orientation. Information objects that are obtained from the Internet, such as RSS news feeds and Tweets, flow slowly in vertical direction. By touching an information object, users can take a closer look at the specific content item. BiebBeep enables library members to create content by uploading information via Twitter (by using the tag @schermalmere in their Tweet), images via Flickr and movies via YouTube (by using specified tags such as schermalmere). Library employees can also upload additional information via a purposely-designed Content Management System-tool that can be accessed via a web browser.

2.1 Related Work

Although public displays are often used for advertising, these can also be used for other purposes [8]. In the literature (e.g. [1, 5]), public screens have been described as a means to inform and connect. However, exploiting such potential requires understanding of screen interactions that will occur in its actual usage context. Hence, to capture meaningful accounts from the public, screens should be frequently evaluated and used in the setting that it is designed for. For this purpose, a Living Lab approach –that represents a user-centric methodology for prototyping, validating and refining complex solutions in evolving real life contexts– offers interesting opportunities. However, according to Følstad [3], the current body of literature indicates a lack of common understanding of how Living Labs can be used for ICT innovation and development. Indeed, in-situ studies that capture interactive displays in such context of use for long-term are rare. The few that have conducted such studies (e.g. [7]) point to the costs and effort involved in real system deployments, which should not be underestimated. However, to better address users' actual needs over time, researchers [6] have suggested that in-situ studies are considered necessary and valuable in demonstrating how people use technology in their intended setting.

3. STUDY

Almere's new library has been organized as a Living Lab to explore the potential of library 2.0 services. In this way, the library serves as an open playground that provides testing, experimenting and validation to enable understanding of the user situation and innovation of solutions that fit in a changing

environment. Consequently, the design and study of BiebBeep, which lasted over a year, was highly iterative, user-centred, mostly done on-site and conducted in close collaboration with the stakeholders. The following studies were conducted:

- Focus group study with library members and staff (n=16)

The advantage of a focus group study was that the library members and staff were actively encouraged to contribute ideas and suggestions with respect to the design and functionality of the system so to feel more involved right from the start of the project.

- Pilot user study in a university canteen

To improve the robustness and usability of the system before its final installation in the library, a one-day observational study was conducted in a university canteen. BiebBeep's software was slightly modified to show relevant content for this study location.

- Initial and repeated user studies on-site

In three days (15,5 hours in total), 403 people passing-by the screen were observed in the library. After ten months, the study was repeated to evaluate usage after a longer period of time. During second observation (3 hours long) 309 people were observed. In the first[1] and second[2] study, a total of 38 people were also interviewed after interacting with the system (n^1=28, n^2=10).

- Tweet analysis: Capturing user participation via Tweets

Tweets posted to the screen were stored and collected to uncover the kind of messages that people posted. Algorithms were also developed to detect the different Twitter-active groups within the library and understand relations of groups and word use similarity.

- Distant monitoring by logging touch interactions

An on-line tool has been developed for the purpose of logging and tracking users' interactions with the screen.

3.1 Results and Discussion

Due to the iterative study approach, most issues, such as screen readability and desired features such as book tracing could be addressed right away. However, issues such as multi-touch responsiveness and particularly noticeability of the screen still remain an issue. During the first study, many people (n=403) were observed to pass by the screen, but only 10% people really looked at the screen for more than ten seconds and only 2% interacted with the system. The second observation showed an increased interest to interact (by 8%). However, this can be explained by a number of varying 'wild' factors, such as library demographics (youngsters seemed to be more attracted to the screen). The issue of attracting people to the screen has also been noted in other research (e.g. [4]). Still, the results from the online-tool showed that from November 2010 till October 2011 there was a rather stable and reasonable average of 110 touch interactions a day.

In a dynamic context such as a library, the situation and needs of the public constantly evolve and change over time. The changing context needs to be considered, so that the system can evolve simultaneously. In doing this, involving different stakeholders was considered valuable, for example in stimulating interesting content. BiebBeep enables the library to become a place where text-based content is no longer only statically stored and transferred, but where it can be created, dynamic and take on different forms. The study participants particularly liked this addition of dynamic information, such as announcements concerning cultural events and library activities. The logged interactions with the screen and user observations indicated that the most watched items on the display were the pictures and videos. This suggests an interest in consuming other forms of media than text-based content. When looking at the extent social interaction is facilitated by the system, it can be noted that direct screen interactions mainly occurred between people who were already familiar to each other. However, the Twitter functionality seems to have potential of bringing people of the diverse Almere community together, which would normally not often engage or come in contact with each other. Between November 2010 and January 2012, 478 tweets were posted by 185 people. Participants engaged with each other via Tweets that were often used to announce their presence (more than 150 Tweets). Some examples of this were: "Just arrived in the library" or "Hello, Almere…". The Twitter analysis also revealed an interesting link between the different groups of Twitter friends and word use similarity.

4. CONCLUSION

This paper described the design and study of BiebBeep, an interactive screen for augmenting the social and informational function of a library. The study results motivated the design, functionality and dynamic —user-generated and localized— content the system offers. The different studies presented and the approach taken is an example case of how a touchscreen for offering Library 2.0 services can be studied long-term. The study results and BiebBeep continued presence in the library show that most users and staff consider BiebBeeb as a valuable addition. Challenges, such as screen noticeability still remain and need to be worked out so that public touchscreens can become a real beneficial contribution and positively engage users in the present and future. As such, this work could be seen as an example case to inspire user-centered participation in the creation of content and community and more long-term study of large public displays.

5. ACKNOWLEDGMENTS

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