

Mobilizar: Capturing User Behavior with Mobile Digital Diaries

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ABSTRACT

In this paper we present *Mobilizar*, a web-based mobile tool that facilitates the implementation and data collection of self-reported user behavior. Mobilizar was designed with both the researcher and the participant in mind. It provides investigators with a way to setup a new diary study in a matter of minutes and to electronically collect diary data from participants by using internet-enabled mobile devices. These devices promise to alleviate the burden of carrying a paper-and-pencil diary by instead using the participant's own device. It also gives participants the flexibility to report their behavior in different ways such as making text, voice, or picture entries that fit their current situational constraints. In this paper, we describe the user interface design of Mobilizar and how it may be used to conduct diary studies with mobile devices.

Keywords

diary studies, data gathering, mobile devices

1. INTRODUCTION

Diaries are research instruments that allow the capturing of on-going everyday experiences in a way that emphasizes their contextual and situated aspects [1]. Its use in HCI may be traced back to the 1990s in which researchers started using the method to study interaction with technology in the workplace [4]. In recent years, there has been an increase in the use of diary studies in the CHI community to study mobile devices (e.g. [5]). As these studies have shown, the use of diaries is most appropriate for investigating settings in which participant observation interferes with the natural behavior of the subjects under study, thus affecting the integrity of the data that is captured.

There are two categories of diary studies that in some cases can be used in conjunction: (1) elicitation studies and (2) feedback studies [3]. Elicitation studies allow researchers to reduce the obtrusiveness involved in gathering qualitative data from participants. Feedback studies are intended to gather more structured data requiring the use of questionnaires as part of the diary. Mobilizar supports both of these modes by providing reporting of qualitative and quantitative data. We allow investigators to use any combination of free form questions that help gather qualitative data



Figure 1: Reporting a text snippet via mobile UI

and multiple choice questions that help gather quantitative data. Recent evaluations of diary reporting systems such as *txt-4-l8r* [2] have suggested the importance of lightweight reporting in diary studies. We followed similar principles by allowing participants to self-report notes instead of full questionnaires.

2. DESIGN

2.1 Report Short Diary Entries

There are three different types of diary designs that may be used to have participants self-report their behavior. Participants may report the behavior at fixed times, at varying times, or right when it happens [1]. However, regardless of the method chosen by the researchers, self-reporting behavior could potentially be a time-consuming and cognitive intensive task for participants. Therefore, one of Mobilizar's design objectives was to lower the burden that participants experience during diary studies. In Figure 1, we show Mobilizar's reporting user interface. Our prototype was implemented to be used on smartphones with advanced web browsers such as Mobile Safari - on iPhones - and Google Chrome - on Android-based systems. The workflow is simple: a user logs in to Mobilizar with their account (and may opt to stay logged in to skip this step on subsequent entries), enters a short text snippet about their behavior, selects the pertinent study from the drop down menu, and sends the entry to the web server.

Similar to other diary systems [3], Mobilizar allows partic-



Figure 2: Answering questions about each entry

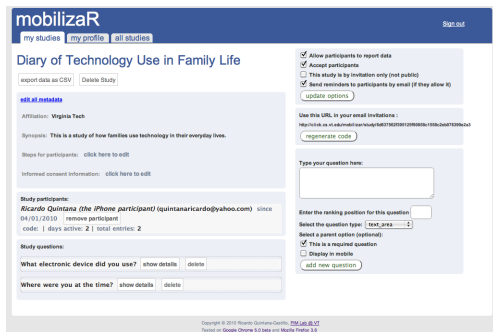


Figure 3: Setting up a diary study on Mobilizar

Participants to report entries through other means as well. Participants may report entries through email to an email address that is automatically generated for each study and participant. The emails may contain any combination of voice, picture, and text information. We have found from our informal interactions with some of the participants of a study that we are running at the time of writing that using email works for them because they already use it regularly and they may use it from any client. We have not noticed in this study a heavy use of picture or voice entries, but we believe it could be useful for other types of diary studies that require capturing information in different forms of media.

2.2 Report Details Later

A drawback of using a lightweight capture technique for reporting behavior is that the data collected through those means may not be enough data for a given research project. To supplement this data researchers may conduct follow-up interviews or they may ask more detail questions about each one of the diary entries. Mobilizar alleviates this limitation by allowing researchers to create a questionnaire that may be delivered to participants for each entry. We currently support three types of questions: (1) free form text questions, (2) select-one-multiple-choice questions, and (3) select-many-multiple choice questions. This way researchers can elicit both qualitative or quantitative data depending on their study's needs.

Figure 2 shows the user interface that participants use to answer their questions. The left-hand side of the view has a list that contains each day that the participant has reported entries with the number of entries that are left to be answered. A participant accesses the entries by clicking on a day in the list and a list of entries is shown on the

main section of the view (right-hand side). Each one of these entries may be expanded to reveal the questions and save the answers to those questions.

2.3 Manage Diary Study

We believe that the designers of other electronic diary systems have not emphasized the importance of creating an infrastructure that may be used for running more than one diary study and for quickly setting up those new studies. Figure 3 shows how Mobilizar allows researchers to create new studies in a matter of minutes by providing an AJAX enabled panel that facilitates incremental and iterative addition of questions, permissions, and metadata. Studies may be made public to all mobilizar users or they may be implemented by invitation-only using a secret URL address. Furthermore, study-related materials may be made available online on the diary study page. To construct the entry questionnaires, questions are created through an AJAX form. Questions may also be managed by changing their ordering, adding options (for multiple choice questions), and adding conditionals.

3. SUMMARY AND FUTURE WORK

In this paper we presented Mobilizar, an electronic diary tool that allows participants to self-report behavior quickly by using short snippets of text, pictures, and voice entries. Our future plan for Mobilizar is to support other mobile platforms, such as native iPhone, Palm, and Android, to provide offline self-reporting of behavior in situations that internet connectivity is an issue. We hope that Mobilizar becomes a tool that helps researchers from different institutions that do mobile HCI, HCI, and social science research to run diary studies.

4. ACKNOWLEDGMENTS

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5. REFERENCES

- [1] N. Bolger, A. Davis, and E. Rafaeli. Diary methods: capturing life as it is lived. *Annual review of psychology*, 54:579–616, 2003.
- [2] J. Brandt, N. Weiss, and S. R. Klemmer. txt 4 l8r: lowering the burden for diary studies under mobile conditions. In *CHI '07: CHI '07 extended abstracts on Human factors in computing systems*, pages 2303–2308, New York, NY, USA, 2007. ACM.
- [3] S. Carter and J. Mankoff. When participants do the capturing: the role of media in diary studies. In *CHI '05: Proceedings of the SIGCHI conference on Human factors in computing systems*, pages 899–908, New York, NY, USA, 2005. ACM.
- [4] J. Rieman. The diary study: a workplace-oriented research tool to guide laboratory efforts. In *CHI '93: Proceedings of the INTERACT '93 and CHI '93 conference on Human factors in computing systems*, pages 321–326, New York, NY, USA, 1993. ACM.
- [5] T. Sohn, K. A. Li, W. G. Griswold, and J. D. Hollan. A diary study of mobile information needs. In *CHI '08: Proceeding of the twenty-sixth annual SIGCHI conference on Human factors in computing systems*, pages 433–442, New York, NY, USA, 2008. ACM.