
Reality Testing: HCI Challenges in Non-Traditional Environments

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Abstract

Non-traditional environments often change rapidly without forewarning, are difficult or impossible to control, and have other environmental and operational constraints that cannot easily be modeled in a laboratory, partly because the necessary level of ecological validity is almost impossible to achieve in the artificial lab environment. Current in situ field study evaluation techniques are insufficient in these environments. Furthermore, it is often difficult or impossible to ascertain which behavioral data are needed to answer questions about user requirements, UI design, and user acceptance. In this workshop, we will use case studies to create and explore frameworks for future non-traditional field study evaluations.

Keywords

Non-Traditional Environments, Ecological Validity, Evaluation Techniques, Ubiquitous Computing, Usability Testing, Performance

ACM Classification Keywords

H.5.2 [User Interfaces]: Evaluation/Methodology

Introduction

A common debate among mobile application designers is whether to conduct user studies in situ or in laboratory environments. Some researchers have noted [1,2] that traditional laboratory usability studies are

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inappropriate for mobile applications because so many aspects of the environment in which such applications will be used are impossible to create in a laboratory setting. Others have argued that field studies do not yield more accurate or informative data than laboratory studies for mobile applications [5]. New field study evaluation techniques are being explored for mobile computing [10], but these techniques do not yet capture users' needs in non-traditional environments.

Non-traditional environments often change rapidly without forewarning, are difficult or impossible to control, and have other environmental and operational constraints. Examples of non-traditional environments include, but are not limited to, healthcare facilities, emergency response, home environments, and military areas. Current field study evaluation techniques are inadequate for these environments, partly because they do not account for the limited space, privacy concerns, safety, and stress, and partly because they cannot provide the level of experimental control afforded in the lab. In addition, it is unclear what behavioral data are needed to ensure validity of findings intended to inform the design of novel technologies and applications. Since it is almost impossible to achieve sufficient ecological validity in the lab, it is thus essential to improve field study methods.

During this workshop, we will exchange case study results both on behavioral data and on field study methodologies. The purpose of the workshop is to discuss how we can create a framework for conducting usability studies, design metrics and measures for these studies, deploying applications, and monitoring applications in non-traditional environments.

Motivation

Researchers at Indiana University are developing a Dietary Intake Monitoring Application (DIMA) to assist end-stage renal disease (ESRD) patients monitor their fluid and sodium consumption [4]. User studies are conducted during patients' dialysis sessions because this time is the most convenient for the patients. The user study space is small, stressful, and the amount of recording equipment is limited due to privacy concerns legislated through the Health Insurance Portability and Accountability Act (HIPAA).

Researchers at Georgia Tech are developing decision support systems on mobile devices for emergency responders and maintenance workers in the military [6]. The operational environment of these applications are high-stress, cramped and often involve unusual equipment (hazmat suits), making a realistic simulation in the lab difficult. Yet these same conditions make in situ testing challenging.

Researchers at Carleton University are involved in defining performance criteria for novel technologies, for example delay tolerance in a push-to-talk technology over a cellular network. Their attempts to artificially create credible situations in the lab that would be perceived as 'critical' or 'uncritical' were unsuccessful [7]. This failure to impress participants into exhibiting the predicted behavior was true also in another experiment testing channel switching behavior in interactive TV, which is also characterized by varying delays [8]

Numerous mobile applications such as navigation aides for the visually impaired [11] and mobile tourist guides [3] are being developed that would benefit from non-

traditional in-situ testing. Guidelines indicating how to choose safe terrain that adequately tests the application do not yet exist.

Researchers have used case studies, such as those above, to create user study frameworks for traditional ubiquitous computing environments [9, 10, 12]. One of the goals for our workshop is to learn about more case studies in non-traditional environments to create a framework to help future researchers selecting both the most suitable behavioral data and appropriate data collection methodologies.

Challenges Addressed in the Workshop

- Identify case studies that cover several themes associated with non-traditional user studies
- Identify metrics to measure study success
- Maintain safety & health of all involved
- Gather usage feedback unobtrusively
- Identify data recording methods when traditional methods (video, voice) are not allowed
- Understand relevant ethical issues
- Explore associated costs (time and financial)

Goals of Workshop

- Share relevant experiences and research
- Discuss challenges associated with user studies in non-traditional environments
- Identify key themes for developing a framework for user studies in non-traditional environments
- Develop a network to discuss studies in non-traditional environments for future scholarly endeavors

Attendee Background

Our workshop is highly relevant for the CHI community because laboratory and field user studies are necessary when developing usable and acceptable applications. Non-traditional environments pose many challenges that are not addressed in current usability methodologies. The workshop can start a dialog between conference attendees about alternative in situ evaluation methodologies. Conference participants for this workshop would be interested in usability evaluation, interdisciplinary study, interaction techniques, and mobile or ubiquitous technologies

Workshop Organization

Applicants will submit a 2-4 page position paper describing case studies, research, or experiences. Papers will be judged on expertise and research experience in non-traditional environments. Fifteen to twenty researchers will be invited to the workshop.

Prior to the workshop

The workshop organizers will identify the application domains represented by participants and will develop a set of themes that span application domains based on papers. Example themes include ethics, privacy, safety and stress. Application domains, themes, and all papers will be posted on the workshop website.

Participants will be asked to prepare a short presentation on their case study or application domain, addressing the identified themes that are relevant to their work.

During the workshop

- *Introductions* 2-minutes for introductions of people and their research interests.

- *Application Domain/Case Study Segments* A series of 3-5 segments that introduce the attendees to the relevant application domains. Each segment will start with an overview of the domain area followed by case study presentations. Case studies can be presented anonymously if participant is concerned about organizational identity.
- *Breakout sessions* Participants will contribute to three breakout sessions to discuss domains, themes, and framework issues surrounding field studies in non-traditional environments.

Following the workshop

A summary of the workshop will be submitted to the SIGCHI bulletin and other publications. Organizers and interested participants will continue formalizing the framework for later publication.

Conclusion

Researchers need field study methodologies for non-traditional environments because current mobile field study methodologies are inadequate. In this workshop, we will brainstorm how to gather requirements, design usability studies, deploy and monitor applications in non-traditional environments.

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Call for Participation

The proposed workshop focuses on the challenges associated with conducting user studies in non-traditional environments. Non-traditional environments often change rapidly without forewarning, are difficult or impossible to control, and have other environmental and operational constraints that cannot easily be modeled in a laboratory, partly because the necessary level of ecological validity is almost impossible to achieve in the artificial lab environment. Current in situ field study evaluation techniques are insufficient in these environments. Furthermore, it is often difficult or impossible to ascertain which behavioral data are needed to answer questions about user requirements, UI design, and user acceptance.

In this workshop, you will share your experiences, learn about case studies, and participate in discussions and break-out groups. You will have the opportunity to network with other participants and learn about methods to deploy and monitor applications in non-traditional environments. We will continue collaboration efforts and publish the metrics and framework.

People interested in participating in the workshop should send a 2-4 page position paper to RealityTesting@gmail.com by December 16, 2005 containing:

- Your name, affiliation, and contact information
- Short bio
- Details about your research and how it relates to conducting user studies, requirements gathering, UI design, or user acceptance in non-traditional environments

Papers will be judged on expertise and research experience in non-traditional environments. Case studies can be presented anonymously to protect organizational identity.

Please email questions to Gitte Lindgaard (Gitte_lindgaard@carleton.ca) or Katie Siek (ksiek@cs.indiana.edu).

More information available at <http://www.cs.indiana.edu/surg/CHI2006/>.