

---

# Messaging Systems For Development: Connecting End Users To Experts Across Domains and Borders

**Trevor Perrier**  
University of Washington  
tperrier@cs.washington.edu

## **Abstract**

This proposal underlines the importance of messaging systems in the HCI4D space and explores how the design of such systems can evolve. The primary messaging channels used by ICTD projects are voice and SMS. While these are important for allowing universal access, as data enabled phones become more prevalent the HCI4D community should explore building messaging systems that integrate old and new channels. The author of this proposal is interested in working with a group that wants to connect end users with domain experts over multiple channels including such as voice, SMS, WhatsApp, or Telegram.

## **Author Keywords**

ICT4D; M4D; SMS; mHealth; HCI4D;

## **ACM Classification Keywords**

H.5.2 [**User Interfaces**]: Interaction styles

## **Introduction**

One common theme in the HCI4D community has been the ubiquity of mobile devices and how they can be used as a catalyst for development. This area, broadly referred to as Mobiles for Development (M4D), has shown promising results across the domains of health, finance, agriculture and education. In this regard M4D

can be seen as a platform. Specific ICT4D interventions can utilize this platform to achieve individual goals. One way to categorize mobile deployments is intended users are employees or customers. For example, projects may focus on building tools for community health workers or government officials who are provided with standard devices and resources. However, if a project is aimed at all pregnant women attending a clinic or all farmers in a village the service must be able to work on any mobile device.

In this proposal we focus on this second class of M4D projects, which we call universal applications since they must be accessible on every mobile phone. When these systems are used to connect domain experts to end users the interfaces designed for user-to-user messaging must be modified. A well designed messaging interface can enable a single domain expert to interact with hundreds of end users increasing the scale and reach of a project.

### **Areas of Interest**

This proposal explores two broad areas of collaboration that the author envisions are applicable to the HCI4D across borders workshop. Each area introduces novel ideas in the HCI space for messaging system that connect experts to end users or users to users. Both areas would benefit by and cross border collaboration.

#### *Mixed Medium Messaging*

There have been many projects across multiple domains that demonstrate innovative and useful methods of incorporating messaging systems into development interventions. SMS has been used for information retrieval [5], data submission [1], and two-

way messaging for awareness [4]. There have also been many projects that use IVR [2] [3]. However, there are few projects that explore the use of both IVR and SMS within one system. Each medium has its own advantages and disadvantages for example SMS requires literacy while with IVR it is expensive for users to review past messages. A mixed IVR/SMS system represents a design space that would benefit from collaboration across boards in order to explore how language and culture affect the use of both systems.

A maternal health messaging system that could be accessed either by voice or SMS would be ideal for exploring what determines an individual's preference for one channel or the other. It may be that the choice of channel changes based on the content or social situation. A mix of cultural, demographic, and contextual variables most likely influence which medium an individual uses and cross border collaborations would help understand how human and technological dynamics interlock.

#### *Messaging Along Technology Gradient*

Another HCI area that M4D projects should explore is how services can support universal access while also supporting new technology as it becomes available. Even though there has been wide spread adoption of smartphones in the developing world M4D projects should not unilaterally adopt a smartphone solutions. Rather, services need to adapt gracefully along the technology gradient of their users. This allows them to meet users on the digital tools they are using as well as take advantage of improved features on data channels and smartphone apps.

Suppose we are trying to deploy an SMS based maternal health awareness service that allowed two-way communication between domain experts (nurses) and end users (pregnant women). If such a service were to adapt along the technology gradient of the mothers it would use SMS as a default channel but could also send messages over WhatsApp or Google Hangouts. Users already using a different messaging service should not be forced to use SMS and users who don't typically use messaging apps should not have to download and install a dedicated application in order to receive messages. A messaging system that adapts along the existing technology gradient could also allow users of one messaging application to interact with users who only have SMS. For example, using the same maternal health service, imagine if the nurses - who already have and use smartphones - could use a messaging application on their Android phone to respond to SMS messages from patients.

### **Research Questions And Goals**

The ideas discussed in this proposal align with the author's research goals of exploring the design space around messaging systems that connect domain experts to end users. This fits into the larger goals of the HCI Across Borders workshop because many ICT4D projects aim to reach patients, farmers, entrepreneurs, learners, and other end users through mobile devices. While the technologies for creating universal access multi-channel messaging systems are the same across different domains, it requires collaborations across disciplines and cultures to design the tools appropriate for an individual deployment. These tools can add to the design process of other proposals aiming to target end users.

The design space of M4D messaging applications raises many interesting research questions. It is useful to think about how voice and SMS systems can be applied to different domains in constructive and appropriate ways. Exploring how these systems can grow and adapt to new technologies and the realities of real world deployments is also very interesting. Finally, examining the trends of how people interact with M4D services over the course of a deployment can lead to useful insights for the design of future applications.

### **References**

1. C. Asimwe, D. Gelvin, E. Lee, Y. B. Amor, E. Quinto, C. Katureebe, L. Sundaram, D. Bell, and M. Berg. Use of an Innovative, Affordable, and Open-Source Short Message Service-Based Tool to Monitor Malaria in Remote Areas of Uganda. *The American Journal of Tropical Medicine and Hygiene*, 85(1), July 2011.
2. A. Joshi, M. Rane, D. Roy, N. Emmadi, P. Srinivasan, N. Kumarasamy, S. Pujari, D. Solomon, R. Rodrigues, D. Saple, K. Sen, E. Veldeman, and R. Rutten. Supporting Treatment of People Living with HIV / AIDS in Resource Limited Settings with IVRs. CHI '14, New York, NY, USA.
3. I. Medhi, S. Patnaik, E. Brunskill, S. N. Gautama, W. Thies, and K. Toyama. Designing Mobile Interfaces for Novice and Low-literacy Users. *ACM Trans. Comput.-Hum. Interact.*, 18(1), May 2011.
4. T. Perrier, N. Dell, B. DeRenzi, R. Anderson, J. Kinuthia, J. Unger, and G. John-Stewart. Engaging Pregnant Women in Kenya with a Hybrid Computer - Human SMS Communication System. CHI '15.
5. R. Veeraraghavan, N. Yasodhar, and K. Toyama. Warana Unwired: Replacing PCs with mobile phones in a rural sugarcane cooperative. ICTD '07.