Social Computing Applications for the Next Billion Users

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INTRODUCTION

As researchers who have focused on evolving and applying principles of social computing [4] to the domain of collaboration for the past decade, we view the focal points of *Mobile Applications for Underserved Users* (i.e., applications based on handheld devices and the populations of so-called developing countries, often referred to as the "next billions") as areas where we might be able to create value while extending the reach and underlying principles of social computing.

THE NEXT BILLIONS OPPORTUNITY

From a purely business perspective, the "other 90%" (the segment of the world population that does not have access to standard desktop computing) represents a significant opportunity for information technology providers, particularly as the desktop market becomes saturated [11]. Our interest in participating in this challenging arena is also fueled by our personal beliefs and goals as members of the global community. We also believe that social computing principles – such as making online social interaction visible, supporting grassroots communication and activity, and fostering social dynamics – can be leveraged to support transformative action by 'next billions' entrepreneurs (i.e., people from countries in sub-Saharan Africa, the Indian sub-continent and South/Central America). An important new focus for our work over the next decade, and for the global community, including next billion users, is to create technologies, practices and solutions that will drive bottom-up solutions to the vexing problems of poverty, illiteracy and disease that are so widespread in these countries. (We note, however, that most so-called "developed" countries, such as the USA are not strangers to these problems).

THE MOBILE WEB PLATFORM

Ongoing advances in cellular technology and the rapid penetration of cell phones in non-urban areas, make them an attractive platform choice for reaching underserved populations, where adequate power and wired infra-structures cannot be assumed. While other approaches are being explored that depend on "desktop" models (e.g., the one laptop per child initiative [18]), the proliferation of cell phones provides an alternative that can be used widely now to experiment and develop a repertoire of examples for working with underserved populations. The International Telecommunication Union, a UN organization, reports worldwide penetration of cell phones to have reached 50% in 2008, representing a four-fold growth on the 12% worldwide penetration reported in 2001 [14]. In Africa wireless phone usage has leapfrogged land lines, with over 200 million subscriptions in 2008 compared with 10 million in 2004 [6]. Overall, 68% of the world's wireless subscriptions are in developing nations. While a significant proportion of the cell phones deployed in next billions countries are believed to be lower-function units (e.g., SMS text messaging and voice but no visual display), the cost of the technology is expected to decrease significantly over the next five years. This means that applications can be designed for deployment on something akin to current high-end phones. In addition to having at their disposal the computing capabilities of the personal computers of the mid-90s, these applications can leverage a wealth of social computing and web 2.0 ideas.

EMERGING PARADIGMS OF USE

In preparing ourselves to work in this area we are taking note of a growing set of examples of grassroots applications of cell phones to business and personal needs that are being seen around the world. For example, a colleague of ours riding in a cab on the way to the Beijing airport overheard her driver calling another driver to discuss the best route to take to the airport, given traffic-clogged roads. Engaging the driver in conversation afterwards, she discovered that he often calls on members of his social network to get an up-to-the-minute picture of dynamic road conditions. Earlier in the trip, our colleague reported that she had also received a follow-up call from her aesthetician the day after she had received a facial, reminding her to use sun block as it was a particularly sunny day in Beijing. Both of these examples demonstrate ways in which workers and entrepreneurs have incorporated cell phones into their business practices to provide better service to their customers.

Social computing principles can readily be incorporated into examples like these. For example, if a cab driver does not know anyone who has recently been to the destination to which he is headed, a social computing application that collects reports from a broad network of drivers and makes them visible could be used to extend the driver's personal network. Since many of the reporting drivers might not be

known to the driver needing information, ratings based on the accuracy of previous reports could be provided to enable reputations and trust-based mechanisms to develop.

These and many other emerging examples raise a variety of issues that will need to be considered to design successful applications for the mobile + next billions space. We discuss some of them in the next section.

DEVELOPING APPLICATIONS FOR UNDERSERVED USERS

We do not have delusions that our experience in designing and deploying collaborative applications on the desktop [4] or even on mobile platforms [8] will translate straight-forwardly into success in the next billions mobile space. Paul Polak, whose decades-long work has aimed at bringing focus to the world's poorest populations [13] states: "The majority of the world's designers focus all their efforts on developing products and services exclusively for the richest 10% of the world's customers. Nothing less than a revolution in design is needed to reach the other 90%." [15]. This remark underscores the creativity and radical departure in thinking that will be required. In working to revolutionize our thinking, we will make use of one of our core areas of expertise, namely ethnographic research, interpreted broadly. This includes careful studies of users engaged in typical activities in their local environments [5], interview studies [3] and analysis of behavioral records [2, 17].

As we have noted, many opportunities for work with underserved populations may include working in non-Western countries. IBM's global research labs, as well as a rich social science literature examining cultural differences, can be leveraged to guide our work in cross-cultural settings. We will also draw from colleagues who work at IBM facilities in developing nations. We have already begun work with a team at IBM's India Research Lab in New Delhi that has several years of experience deploying applications to underserved populations in rural India [10].

In addition, there is a growing literature on finding ways to use technology to empower underserved communities, from basic research [12] to detailed ethnographic work [1, 9] to design research [16] to iterative design [7] to deployments [10]. This literature is extended by work in related disciplines such as design. For example, the *Design for the Other 90%* exhibit at the Cooper-Hewitt National Design Museum [15] showcased a highly diverse set of projects (treadle pumps, Internet motorbikes, q-drums; see Figure 1), each of which takes into account unique constraints of building solutions for poor people in the developing world.

We find such work inspirational because it provides a new frame of reference – causing us to reconsider our

Figure 1. An African child using a "q drum" to roll water home from a well. Cooper-Hewitt Museum, http://other90.cooperhewitt.org/design/q-drum

assumptions with respect to the design, implementation, and study of technology. We also find it inspirational because we suspect that gaining this new perspective may have considerable implications for the work we do in the so-called "developed world" as well – allowing us to come back to familiar situations with new eyes, and taking us in directions we would not have considered before.

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