Information Service or Online Community? Putting 'Peer-to-Peer' in Social Media for Rural India

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Abstract
There are a number of one-way information services targeting rural populations in India, but very few multi-way online communities. While many factors that drive active peer-to-peer exchange in traditional social media apply in developing regions, they do not tell the full story. In this paper, I identify three unique factors for the developing regions context: The cost to access the service, the subject matter or type of exchange, and the influence of the administering institution. I describe how each of these determine the extent and depth of peer-to-peer interaction in our voice social media deployments in India, and how they can be leveraged to support greater p2p exchange.

Keywords
Social Media, ICT4D, SM4D, mobile phones, voice-based social media, India, agriculture

ACM Classification Keywords
H.5.2 User Interfaces: Voice I/O User Interfaces; H.5.2 H.1.2 User/Machine Sys- tems: Human Factors

General Terms
Design, Human Factors

Introduction

Avaaj Otalo ("voice porch") was launched in 2009 as a collaboration between Stanford University, IBM Research India, UC Berkeley, and Development Support Center (DSC) in Gujarat, India. The service was designed for small-scale farmers in Gujarat to access and share agricultural information over the phone. Avaaj Otalo (AO) features a voice-based question and answer forum for callers to post questions, listen to previously posted question and answers, and to respond to questions themselves.

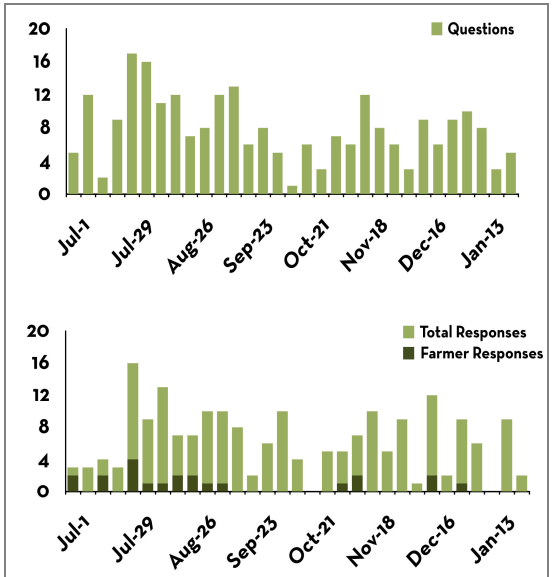

Figure 1. Top graph: weekly number of approved questions posted to Avaaj Otalo from July 2010. Bottom graph: weekly number of approved responses total (light) and by farmers (dark)

Traditional media such as television and radio are unidirectional. Avaaj Otalo was envisioned to complement DSC's self-produced weekly radio program as an aggregative feedback channel for radio listeners to follow up, ask questions, and leave comments to guide future programming. AO was also inspired by models in India attempting to support grassroots innovators[1] to serve as a platform for farmers to share what they knew with others. Voice keeps the barrier to content creation low; as long as can speak into the phone, you can be an expert in the system.

With these motivations we designed and deployed Avaaj Otalo as a pilot project in 2009, and re-launched for open access in January 2010. Since the pilot, the system has deviated from the original vision of a peer-to-peer knowledge-sharing platform. While farmers continue to ask questions, responses from peer farmers has approached zero (see Figure 1).

[1] Digital Green (www.digitalgreen.org), SRISTI (www.sristi.org)

The majority of responses come from DSC's staff members, who moderate the forum and monitor it regularly to respond to new questions.

Farmers asking/NGO answering is a perpetuation of the top-down model the system was intended to break from. Why has AO not delivered fully on this goal? One reason is that both AO users and DSC continue to subscribe to the top-down paradigm. In interviews, DSC staff members expressed doubt about farmers' ability to answer questions with acceptable quality. Preference for NGO-provided answers has been echoed by farmers themselves. In one survey, 65% of AO users stated they preferred answers to come from the NGO staff only, while 35% preferred to hear both farmers and staff (none said farmers only)[2]. For farmers as well as DSC, AO is perceived more as an information service providing access to information from DSC, not an online community of farmers.

However, there is evidence that peer-based information delivery can be more effective than institution-based for our target user communities. In a recent controlled experiment, we found that AO users followed up on agricultural advice from peer farmers more than when the same information came from university scientists ($p < .05$). A follow-up question is how social media for such communities can be designed to encourage more and deeper peer-to-peer exchange.

[2] Patel, N., Chittamuru, D., Jain, A., Dave, P., and Parikh, T.S. Avaaj Otalo: A Field Study of an Interactive Voice Forum for Small Farmers in Rural India. In Proc. CHI 2010.

Increasing Peer-to Peer Interaction

Previous research on social media has been guided by the question of what motivates individual contribution to online communities[3]. Several frameworks have been developed describing social psychological motivations such as reciprocity, prestige, learning, self-efficacy (self-interest motives), moral obligation, and community enhancement (public-good motives). While these frameworks are useful, they do not offer a complete picture for what influences peer-to-peer exchange in developing regions. Below, I identify and describe three additional factors that play a significant role in this context: affordability of the system, the type exchange, and the influence of the administering institution.

Affordability Affects Usage and Contribution

The cost of access significantly impacts how much low-income communities use online information systems. When first launched, Avaaj Otalo was available through a toll-free number. During that time there were 5 calls per user, per week on average, with an average of 300 seconds per call. When the line was re-launched for open access over a paid line (callers in India pay for outbound calls at roughly 2 cents/min) calls dropped to 0.3 calls per user per week and 121 seconds per call. We find the same dropoff in usage with metered access when comparing across deployments. A toll-free agricultural forum we have deployed in Madhya Pradesh (in collaboration with Digital Green) received 6,021 calls from 660 unique callers between July 2010 and January 2011. In the same time period, Avaaj Otalo (metered access) received 4,676 calls from 1,122 unique users. In a recent survey of AO users, 45% of interviewees mentioned (unprompted) that cost factors into their decision of whether to call the system.

While it is clear that making the system cheaper or free would lead to more usage, it does not necessarily translate to more contribution. Comparing our toll-free and metered deployments from July 2010 to January 2011, the toll-free line received 7.64 calls to every message post to the system, while the metered AO line received 5.77 calls per post. I claim that more judicious and targeted use of free access can increase both usage *and* contribution.

As a next step, we will conduct a controlled experiment comparing different schemes for making the system selectively free to induce more p2p contribution. Figure 2 outlines the experiment design.

Study 1: Make Calling or Posting Free	
Condition	**Description**
FREECALL	Alerts + Motivational Message + One free call credit
INTERACTIVE-MESSAGE	Alerts + Motivational Message + Prompt for message
INTERACTIVE- RATE	Alerts + Motivational message + Prompt to rate

Figure 2. Experiment design for comparing alternative schemes for soliciting more contribution to AO. Subjects will receive regular phone calls from AO according to these conditions. Alerts are actual information from the system.

In the FREECALL condition, subjects will receive a free inbound phone call with some latest content from the system, along with one free call credit. In the

[3] Kollock, P. The economies of online cooperation: Gifts and public goods in cyberspace. In Communities in Cyberspace (1999)

INTERACTIVE conditions, users will receive the same informational content along with a solicitation for contribution. We hypothesize that the FREECALL condition will lead to more usage and the INTERACTIVE condition will lead to more usage and contribution.

Subject Matter Matters

In Avaaj Otalo, Q&A may not be the most conducive format for farmer-to-farmer exchange. Farmers have reported feeling hesitant to respond because they do not want to take responsibility for answers that are incorrect or cause monetary loss. They may also prefer to defer to DSC. On the other hand, farmers may feel more comfortable sharing in an open-ended way, and speaking more from personal experience. Experience-sharing can potentially lead to deeper, conversation threads as opposed to question-answer message pairs. During Avaaj Otalo's pilot, a common re-purposing of the forum was for entertainment; farmers freely posted renditions of old Bollywood songs and jokes, and some even suggested that a separate forum be dedicated to songs. The extent of peer-to-peer communication depends on the subject matter being exchanged.

Collaborative filtering is a popular feature of online communities on the web. Users categorize or rate content, which is aggregated and used to recommend content to other users. Though this is not as direct as exchange of content, it indirectly communicates and serves the community. In future work, we will be experimenting with rating systems as well as open-ended experience sharing in AO and similar systems.

Administrators Are Influential

Avaaj Otalo and our other voice social media deployments rely on grassroots organizations to administer, provide content, and promote the service. They are the institutional face to the service, but unlike most social media on the web, they are themselves an active presence within the online community. The institution's presence can have an adverse effect on peer-to-peer exchange, causing a turn away from peer users and toward the institution. However, there are two general ways institutions can encourage more p2p interaction. The first is to make the system more interactive by making it highly responsive, and regularly pushing relevant content. The second is to encourage contribution through appropriate motivational messaging. The messaging can appeal to self-interest motives (i.e. prestige as in "your input will bring you recognition from farmers across the state"), or group-motives (i.e. "providing input will benefit the entire listening community"). In an upcoming study we will test the efficacy of various psychological motivations in eliciting contribution.

Conclusion

For facilitating true community development through online platforms, technology is only a part of the equation. While the system can provide functionality to better facilitate contribution from the user community, p2p sharing also depends on the type of content being exchanged, and the perception of the system amongst users. Unique to typical social media contexts, social media in developing communities often include the administering institution as an influential voice in the online community. Thus administrators, through moderation and outreach practices, and use of motivational messaging, can play a significant role in shaping the extent and depth of p2p interaction.