More Voices, Better Choices

Barriers and Solutions in using M4D:
Connecting Directly to Citizens for Scalable Impact

Farmer, Leah and *Dr. Boots, Mark*
VOTO Mobile, Kumasi, Ghana
leah@votomobile.org or *mark@votomobile.org*
+233 548 358 213 or +233 264 370 0546

Abstract Despite the increasing number of mobile engagement initiatives, few have become scalable long-term successes. For a mobile engagement project to create real impact, affordable and scalable technology is a necessary starting point, but elements of culture, psychology and human design must be considered. In this paper, we identify four prevailing barriers to mobile engagement projects based on VOTO Mobile's experience providing technical and human support to social organizations in multiple sectors. We examine these barriers by presenting evidence from partner projects, and provide recommendations using both technical and human design elements.

Introduction

Mobile For Development (M4D) is an emerging field with the potential to revolutionize social and public-sector challenges in health, education, agriculture, project monitoring, and governance, by offering direct two-way communication with constituents at scale through pervasive mobile phone access. Despite the increasing attention paid to mobile engagement projects, there have been few rigorous evaluations performed to assess their impact, and few that have become scalable long-term successes. In this paper we examine four prevailing barriers to M4D success based on VOTO Mobile's experience providing technical and human support to social organizations in multiple sectors. These barriers include (1) literacy, accessibility and technology limitations, (2) challenges with Mobile Network Operator (MNO) connections, (3) unreliable delivery and connectivity, and (4) lack of human design knowledge and best practices. We examine these barriers by presenting the experience of our partners, and suggest solutions using both technical and human design elements.

Barrier 1: Literacy, Accessibility and Technology Limitations

The best development programs and government policies are formed when considering the needs of all citizens. In the past, gathering broad-based feedback from dispersed populations has been difficult for many reasons: rural distance, low literacy, language diversity, and limited resources. In recent years, the explosion of mobile access throughout the developing world has created new possibilities to reach these citizens directly. Similarly, mobile provides an exciting new channel for sharing health and educational information.

Across these sectors, hundreds of M4D initiatives have launched in the past 5 years, but the vast majority (87%)[1] have focused on text-based methods (SMS, USSD, and web). With illiteracy rates as high as 38% in Sub-Saharan Africa[2], these initiatives exclude many citizens from the potential to access information or participate in feedback loops. Under evaluation, a number of SMS initiatives have identified literacy as a major barrier to reaching those who are most in need of the health, educational

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[1] UNESCO, "Education for All Global Monitoring Report 2010: Reaching the marginalized". Regional Fact Sheet- Sub-Saharan Africa. *UNESCO*, 2010. Web, 1 December, 2013.

[2] Dodson, Leslie , Sterling, Revi and Bennett, John K. "The Mobile Utility Gap and Literacy Challenges in Oral-Language Communities: SMS use by Berber Women in Morocco", *ATLAS Institute, University of Colorado, Boulder*, 2012. Web, 1 December, 2013.

and communication benefits of mobile engagement.[3] In 2012, Ghana-based partner Savana Signatures launched a mobile engagement maternal health pilot project using SMS. Monitoring and evaluation discovered that 80% of the participating mothers required someone else to read and translate the messages for them. A number of projects have gathered evidence of respondents who cannot engage, including 'call me back' responses sent in reply to text surveys.[4] But incorporating voice service is challenging: compared to SMS, it is more technologically complex, there is a lack of reusable, general-purpose software tools, and it requires deeper integration with MNOs (Barrier 2).

In our experiments in Ghana, VOTO has found that interactive voice (IVR) is key to hearing from an inclusive audience, and produces significantly higher response rates. In national surveys comparing SMS and voice, we found that SMS produced a response rate of 1.7% with an overwhelming urban bias. By comparison, voice surveys have a participation rate of over 20%, with 37% of respondents from rural areas and 38% female respondents. In November 2013 we compared a national random-dialed voice survey against an online survey with email invitations. After 3 days, the voice survey had a participation rate of 32%, providing 636 complete responses from 40.2% female respondents and 47.1% rural. The online survey produced 91 responses from 12,000 invites (0.76% participation rate). Only 18.3% of these respondents were female, and 10.6% from rural areas. The significant demographic bias affected the response to key questions: 80% of email respondents supported an increase in electricity tariffs in exchange for higher service quality, compared to 50% of telephone respondents.

While IVR has the potential to offer improved accessibility and engagement, most organizations lack the technical capacity to start using it. Existing software tools are fragmented by features: many support only SMS, others only incoming voice calls, or only outgoing calls. Others are fragmented by application: for example, sector-specific solutions that solve specific problems within maternal health, or agriculture extension. This leads to limited reuse, duplication of effort, and expensive custom development for each new project. Yet the core technology required to send interactive messages to expectant mothers is no different than the technology required to share updated market prices with farmers. To address this barrier, VOTO now offers an integrated, ready-to-use software platform that enables organizations to start sending interactive content immediately through voice or SMS, based on whichever channel is best for each subscriber. The web-based service allows organizations to build messages and surveys using their existing technical capacity, and takes care of sending and monitoring delivery. Proving the power of universal tools, the platform has allowed organizations across multiple sectors (health, project evaluation, journalism, research, and governance) to reach across barriers of literacy, language, and distance.

Barrier 2: Challenges with Mobile Network Operators Relationships

Mobile Network Operators (MNOs) are simultaneously the greatest enabler and the greatest barrier to providing M4D services. Broad network coverage has turned mobile into a communication channel with amazing reach and accessibility, but social-sector organizations struggle with technical and business hurdles to establish the connections required to launch M4D services. VOTO has observed that it takes 1 – 2 years for organizations to achieve the MNO integration they require, and many are never successful. Other sources report similar experience.[5]

MNOs are responsive to two primary incentives:
1. revenue sources that significantly affect their bottom line, and
2. exclusive promotions that drive new subscribers to switch to their own network.

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[3] Raftree, Linda. "Revisiting the SMS violence reporting program in Benin", Wait...What? Bridging Community Development and Technology, *Kurante*, 13th January, 2011. Web, 1 December, 2013.

[4] Friscira, Elsa , Knoche, Hendrik and Huang, Jeffrey. "Getting in touch with text: designing a mobile phone application for illiterate users to harness SMS". *ACM DEV'12 Proceedings of the 2nd ACM Symposium on Computing for Development*, Article 5. New York, 2012. Web, 1 December, 2013.

[5] GSMA Mobile and Development Intelligence, "Urban English". Urban Planet Mobile, 2012. Web, 1 December, 2013.

Unfortunately, small- and medium-scale social change programs usually offer neither.[6] As a result, MNOs are unable to prioritize time and resources to enable integration of M4D services. Additional structural factors make integration even more challenging:

1. MNOs are oriented towards "value-added service" (VAS) business models; these use revenue sharing agreements where end-users pay to receive content, and revenue is split (typically 70% to the MNO and 30% to the content provider). Existing frameworks are rare for services that are free for end-users, where sponsoring organizations pay competitive pricing for outgoing and incoming calls. In the absence of a competitive pricing standard, MNOs try to set high costs for social-sector users, especially for voice.[7] In many markets we have tested, VOTO has found it is actually less expensive to send outgoing calls at current consumer rates than to sign agreements for business/VAS integration[8].

2. In countries with many competing MNOs, if an organization wants to offer toll-free or short-code connected services, they need to negotiate agreements and technical integration with every individual operator. (In Ghana alone, this would include MTN, Vodafone, Airtel, Tigo, Glo, and Expresso.) This further extends the time, cost, and technology required.

3. The process for achieving technical integration varies by MNO, as there is no single standard or "API", creating a high technical barrier for organizations. The process can require many stages of reports, specification documents, security audits, system interface descriptions, etc., which can rarely be reused across operators.

4. Lastly, some MNOs have a preference to run voice services within their own technology environment, charging consulting fees for setting up messages and polls, but not being able to provide a "self-service"

interface that would allow social organizations to quickly iterate and adjust their content.

The prevailing MNO structures can work for companies like commercial banks and VAS firms that run competitions and mobile advertising. VOTO's experience supporting small NGOs, social enterprises, and local governments reveals they have a very different set of needs:

1. They cannot afford large setup costs, or large time delays in launching pilots.
2. They rarely have strong technical capacity to lead an MNO integration process.
3. Since they are unlikely to launch the ideal messaging campaign or survey on the first try, they need "self-serve" platforms that let them easily adjust the content and send out new iterations, as well as monitor the results directly, over the lifetime of the project.
4. For accessibility and inclusion, they need to be able to reach subscribers on all networks.

The MNO barrier has led to a common assumption that voice services are implicitly difficult and very expensive.[9]

VOTO is solving this barrier with a two-stage process. We have developed our own custom hardware that can start sending and receiving both voice and SMS at consumer rates; we use this to launch service in new countries on demand within days, rather than months/years. Unlike tools that use a single Android phone for sending and receiving local SMS; our hardware offers medium scalability from the start (32 simultaneous voice calls, and more than 640 SMS per minute). As an example, this approach was able to conduct a 7-minute voice survey with over 2700 Ghanaian respondents in 3 days.[10]

In the second stage, over time, VOTO acts as an aggregator for social/public-sector users; by combining

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[6] Trying to incorporate these incentives can even conflict with social goals: for example, offering exclusive service on one network conflicts with the goal of making health information accessible to as many people as possible.

[7] GSMA Mobile and Development Intelligence, "Urban English". Urban Planet Mobile, 2012. Web, 1 December, 2013.

[8] This differs from the SMS market, where volume pricing can be more than 5X lower than consumer rates.

[9] Lucini, Barbara Arese. "Value of Voice- an unsung opportunity". *GSMA Mobile for Development Intelligence*. Web, 1 December, 2013.

[10] Martin, Asiedu. "Tariff Debate: Half of Ghanains willing to pay more for better utility services- Poll" *CitiFMOnline*. 15 November, 2013. Web. 1 December, 2013.

their volume, we build up a strong negotiating position with MNOs. We then pursue MNO integration on their behalf, and the platform seamlessly transitions to use these new channels. Full integration can offer more features, such as short codes, configurable caller ID, and toll-free incoming calls/SMS.[11] Both methods bring interactive voice and two-way SMS within the financial and technical capacity of social organizations, and enable them to innovate and launch new services in just days.

Barrier 3: Unreliable delivery and connectivity challenges

Approximately 1.2 billion people - 20% of the world's population - are living without access to electricity[12], yet many of these still have access to a mobile phone. Since rural disconnected populations are often the ones that can benefit most from improved communication, M4D projects should focus on being accessible to them. However, this introduces several new challenges:

5. Without electricity, people only charge and switch on their phones sporadically (for example, using a central charging station when visiting town).
6. The same communities are often on the very edge of network connectivity, so outgoing calls often fail to connect.
7. Even when within range of towers, we have found that network saturation and poor network reliability prevent most calls from connecting on the first try. Also, these groups of citizens are most often away from their phones (cooking, working in the field), leading to a high rate of missed calls.

The last challenge is easiest to solve: VOTO's outgoing call system automatically retries missed calls using a pattern that is optimized for getting past network congestion, as well as times when people are away from their phones.

Improving delivery over limited connectivity requires a shift in thinking about scheduling: from timing decided by the sending organization, to timing that works for the end-user. For ongoing projects, a starting point is to understand what timing would work best for a group of end-users. A better option is to simply ask individuals what day and time they would each like to receive

messages (something easy to implement in VOTO's advanced scheduling features).

Full support for intermittently-connected users requires focussing on *incoming rather than outgoing calls*: giving end-users the ability to access information or provide feedback on-demand, on their own schedule. Our experience with a district government pilot in Chereponi District, Upper East, Ghana found that only one in seven communities had access to electricity. The remaining citizens would travel in to central markets once a week to charge their phones and place calls. To engage users like these, we modified our system to automatically route incoming calls to the last content they were intended to receive via outgoing messages, effectively letting them access their missed calls. We also expanded incoming call handling to let them select information on demand from a menu of options. This feature is also key to the new Savana Signatures voice-based maternal health service. Expectant mothers can call back to any missed calls; a menu lets them listen to past messages, connect to a live midwife for additional questions, register a friend, or de-register from the service.

Finally, when monitoring engagement in an M4D project, incoming calls provide the most genuine indicator of end-user value. The number of SMS or outgoing calls sent reflects only the ambition and budget of the implementing organization. The number of outgoing calls answered reflects the willingness of end-users to tolerate your content, while a large quantity of incoming calls shows they truly find value in your service.

Barrier 4: Lack of human design knowledge and information sharing

Reliable, easy-to-use technology is only the first step to implementing a successful mobile engagement project. Whether the goal is to influence health behaviours, incentivize citizens to report violations, or minimize bias in a national survey, the final challenge involves designing effective content based on cultural and human factors. Organizations should consider how they will collect contact information, who they are hearing from and excluding, how they will incentivize participation, and how to design content for understanding and accuracy.

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[11] In the interim, we use a "flash" or "call-back" process to let end-users make incoming calls for free.

[12] The World Bank. "Energy- The Facts" *The World Bank*, 2013. Web. 1 December, 2013.

Local partners are best at providing context and on-the-ground sector knowledge; however almost all are starting from zero prior experience with mobile engagement. The great opportunity, however, is that it could be fast and affordable to measure engagement with M4D services, providing abundant opportunities for A/B comparisons of different content framing, tone, messaging frequency, structure, incentives, etc. When sending one-way SMS, it is impossible to know if the message has been read, considered, and understood. A great advantage of voice is that it is possible to record how many calls were answered ("read"), the number of missed calls and call-backs, the exact amount of time each recipient listened for, and even how long they reflected on their answers before responding to survey questions. In Savana Signatures' maternal health service, we use interactive questions to ask women about their trust in the messages and even to self-report their behaviour; we use this to compare the effectiveness of different strategies (e.g.: recordings voiced by male doctors vs. a female community health worker). In national surveys, we track the increase in participation that comes from using celebrity radio hosts to voice the survey. In behaviour change projects we are testing the credibility of messages voiced by famous athletes, traditional leaders, and respected community members.

While some best practices are sector-specific, many general ones are failing to be shared across the M4D community. VOTO is addressing this barrier in two ways: Upcoming versions of our software platform will make it instant to compare the effect of different designs on answer rates, participation rates, responses to survey questions, and long-term engagement. For example, an organization could instantly compare the listening time of all messages with female voices against all male voices. Most importantly, this tracking feedback is immediately visible to organizations through the web application so they can iterate on their services.

Secondly, we are learning hands-on with user organizations, as they learn what it takes to make mobile engagement effective in different contexts; we then share generalized best practices across our network of users, and through VOTO University[13], a public knowledge-sharing database and community of practice.

Conclusion

As an ICT social enterprise, VOTO has defined its strategy to eliminate these four barriers so that organizations can rapidly launch M4D projects that lead to impact. Our goal is to make it possible for a local sector expert to launch her own mHealth, mGov, mAgric, mEtc service in less than a week, without needing any technical capacity, without needing to deal with mobile network operators, and making it accessible to as many constituents as possible through the most basic phones (e.g.: voice in local languages or interactive SMS). We want to enable district government officers to connect instantly with 20,000 citizens to hear their priorities for better service delivery, and enable NGO managers to evaluate their projects in real-time, over their whole lifetime, by directly asking beneficiaries for feedback. Finally, we aim to learn, generalize, and share best practices and human factors that will optimize the chances for M4D initiatives to produce scalable long-term impact.

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[13] VOTO Mobile. VOTO University, 2013. Web. 1 December, 2013. http://u.votomobile.org