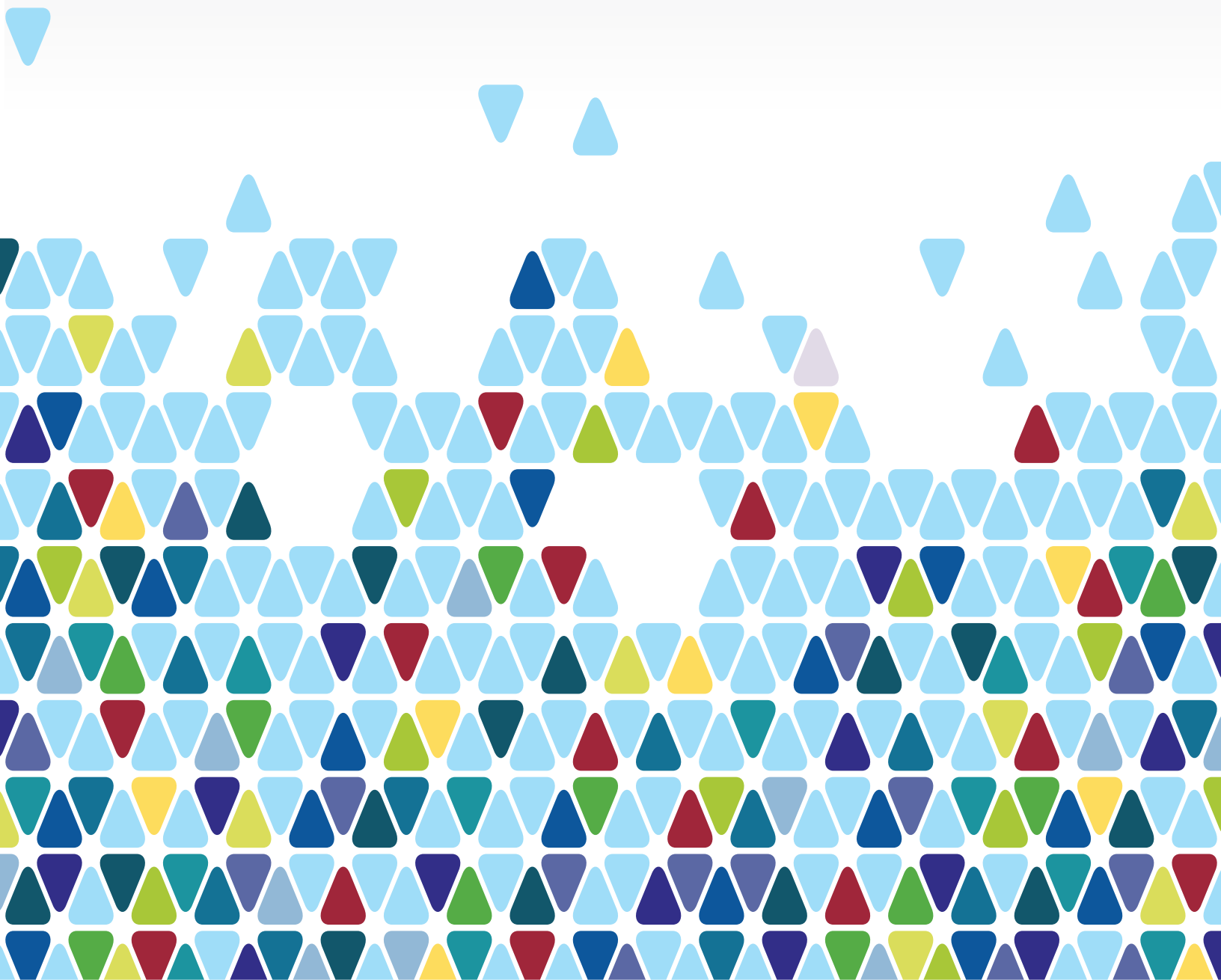


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The Use of IVR to Support Monitoring and Evaluation of Media Interventions: A Case Study of the VOTO System in Rwanda



CARGC Press is pleased to present this CARGC Report, “The Use of IVR to Support Monitoring and Evaluation of Media Interventions: A Case Study of the VOTO System in Rwanda.” In this report, Lauren Kogen, an Assistant Professor at Temple University and an alumna of the Annenberg School Ph.D. program, and Briar Smith, Associate Director at the Center for Advanced Research in Global Communication, explore the potential that Interactive Voice Response (IVR) systems have as both a distribution and monitoring and evaluation (M&E) tool, noting the limitations the current state of IVR technology imposes.

The report presents the findings of the United States Institute of Peace (USIP) funded grant, “Amplifying Peace: Testing Mobile Interaction in Rwanda.” Funded and implemented under the auspices of the Center for Global Communication Studies (CGCS) –which starting July 1, 2016, merged with the Project for Advanced Research in Global Communication (PARGC) to constitute the Center for Advanced Research in Global Communication (CARGC), an institute for advanced study dedicated to the study of global communication in public life—the project explored mobile IVR technology for those engaged in peacebuilding,

investigated the usefulness of the platform for information dissemination and information collection, and evaluated the platform as a tool to improve monitoring and evaluation.

Building on Radio La Benevolencija’s (RLB) established infrastructure of radio programs for peacebuilding in the Great Lakes region of Africa, a pilot study was implemented in Rwanda to demonstrate how mobile phone technologies can 1) amplify the reach of radio programs; and 2) streamline (M&E) of radio programs. This work fills an evidence gap often found by organizations in the development field who are interested in using ICTs, but have inadequate information about effective and practical ways to do so, or which ICTs would be the most appropriate for their projects.

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INTRODUCTION

Background

Information communication technologies (ICTs), and in particular mobile phones, hold great potential to improve interventions in Africa and elsewhere that seek to provide information to the public. They offer the possibility of amplifying the public’s access to information, strengthening citizen voices, and promoting greater political engagement by the public, all with important implications for peacebuilding. Ushahidi, for example, has received widespread attention for allowing citizens to send reports of incidents during disasters via the Internet or SMS (see, for example, Gao et al 2011); others have seen social accountability efforts, such as monitoring the actions of leaders, facilitated by ICTs (see, for example, Grossman and Hanlon 2014).

However, despite much excitement about ICTs, the practical evidence of their effectiveness is lacking, particularly for organizations trying to use ICTs to facilitate governance and peacebuilding outcomes (Gagliardone et al. 2015; Koltzow 2013). There are few evaluations of ICT endeavors in the public sphere that can help other practitioners and scholars understand the best ways to make use of ICTs to promote development outcomes. Many media organizations in the development field are interested in using ICTs, but lack the information they need to do so, including which ICT platforms would be the most appropriate for their projects (Kogen et al. 2012).

One ICT platform that is receiving increasing attention is Interactive Voice Response (IVR). IVR automates interaction with mobile phone users using a wide array of pre-recorded material. Computers detect voice and touch tones during a phone call, and respond with pre-recorded or dynamically generated audio (“IVR” 2013). Such a system offers opportunities both for distributing media content and for collecting feedback and other monitoring and evaluation (M&E) data from media consumers. The aim of this project was primarily to add to the knowledge base on how organizations can use IVR to support M&E efforts, though we also address our observations on using IVR as a distribution tool.

IVR as a Distribution Tool

One potential use of IVR is to provide information to citizens in developing regions, including providing interactive health services, agricultural information, and news (Sharma Grover, Stewart, and Lubensky 2009; Ndwe et al. 2008; Powell 2012). Freedom Fone, one IVR provider, describes the benefits of using audio rather than SMS as “address[ing] language and literacy barriers when reaching out to the millions of people living on the margins of the information society” (quoted in Powell 2009, 10). The Voice of America (VOA) Africa noted that many Africans are willing to listen

to audio programs over their phones, even 20-minute programs, even though “no one in America would do this” (Ferri quoted in Powell 2009, 24). Indeed, currently 53% of Ghanaians and 57 percent of Kenyans listen to the radio through their mobile phones (Balancing Act 2014).

IVR as an M&E Tool

Despite a renewed emphasis on project evaluation by the U.S. government and other development donors in recent decades, there is a dearth of rigorous development evaluation literature in the public sphere. Organizations struggle to produce evaluations that are useful to donors, other practitioners, and themselves for the purpose of improving future iterations of interventions. The most rigorous evaluations are often well beyond the budget of small projects aiming to create sustainable social change at a grassroots level (Deaton 2009). Evaluations in conflict-affected regions are even more complex, and therefore more expensive (Koltzow 2013). IVR provides the possibility of collecting large quantities of qualitative and quantitative data for very little cost, by asking questions of mobile phone users rather than having to interview respondents face-to-face. It offers benefits beyond SMS data as it can collect voice data.

The Pilot Study

This pilot study used IVR *both* to distribute content and to collect data from listeners, through a survey that listeners heard after the end of the program. Collecting data on media content, via a mobile phone survey, has disadvantages. For example, in its most basic form, it cannot be used to evaluate *differences* between those who heard the content and those who did not because only listeners would be receiving the survey. In addition, survey questions need to be simple and brief so that they are answered correctly and so that listeners are willing to stay on the line through the end of the survey. For these and other reasons, IVR is unlikely to offer a full replacement for more rigorous evaluation methods. Nonetheless, IVR potentially offers several M&E benefits: allowing project implementers to better gauge how listeners are experiencing programs, monitoring **mobile phone reach** (the number of listeners who listen through their mobile device), **knowledge** (whether the messages provided by the program are properly understood), and **feedback on program content** (engagement with program, enjoyment, desire to listen in the future, identification with/likability of characters, open-ended feedback, etc.). All of this information can be used throughout a project to improve design and gauge impact.

Conducting monitoring and evaluation can be a challenge for many organizations, particularly peacebuilding organizations working in conflict-affected areas where travel can be difficult and data collection hurdles can be unpredictable. Therefore, a technology that offers the potential to quickly, usefully, and safely collect data would be a valuable addition to M&E toolkits.

The use of IVR technologies to promote development outcomes is in its infancy. Up until this point IVR has been used primarily for commercial purposes, such as conducting surveys for companies and providing voice-automated menus. Therefore, with regard to peacebuilding and other development organizations interested in this technology, the novelty of the approach means

there is little analysis of the different IVR platforms available, and navigating options is difficult. Organizations interested in using the technology are hard-pressed to decide whether it makes sense for them, and if so, which IVR system to use.

The Center for Global Communication Studies (CGCS) therefore explored the use of one IVR platform – VOTO – to distribute radio programming in Rwanda. The Center partnered with Radio La Benevolencija (RLB), an NGO with extensive experience in peacebuilding in post-genocide Rwanda and in the Great Lakes Region.

Tapping into RLB's established infrastructure of radio programs for peacebuilding in the Great Lakes region of Africa, CGCS carried out an intervention in Rwanda to illuminate how RLB and other organizations attempting to influence the public through radio programming might usefully employ IVR.

This report sought to answer the following key research questions:

- Does the addition of audio programming via mobile devices have the potential to increase the reach of RLB's programming?
- Can IVR systems collect both quantitative and qualitative data?
- Does IVR software provide useful feedback for radio program implementers?
- Is the IVR platform easy for the public to use, or would end-user training be required?
- Is the public (or particular demographic groups) willing to take part in the surveys?
- What factors (e.g., time, cost, technical know-how, mobile phone ownership) pose the greatest challenges to usefully implementing an IVR system?

Summary of Findings

We found that IVR has high *potential* to be used both as a distribution tool and as an M&E tool. In our case study, there was a high demand for IVR content: almost 900 calls were made to hear the content in a span of three weeks (with limited advertising and in a country about the size of Maryland), suggesting that IVR technologies certainly have the potential to significantly increase the reach of radio programs. There was also a moderate level of willingness to take part in the survey after the program – approximately one fourth of calls resulted in a completed survey⁴ regarding the program they had just heard. Feedback from focus groups suggests that people are not only willing but even *excited* to be able to provide program feedback through the IVR system.

The data collected was useful in terms of measuring audience demographics, receiving feedback on the programs, and understanding program impact. The system successfully collected both quantitative and qualitative data. The system was also easy for the public to use, and so could be implemented on a wide scale with no end-user training required. These findings are discussed in more detail below.

However, despite these promising attributes, the technical limitations of the VOTO system and the resulting cost of gathering the data turned out to be too great to warrant a recommendation of the

platform for conducting joint quantitative and qualitative M&E at this time, at least for organizations without in-house expertise in computer programming. Our findings suggest that the current state of IVR technology is not sufficiently developed to support M&E efforts that combine quantitative and qualitative feedback (though only one IVR system was tested here). The report will discuss the findings from our case study, answering the questions listed above, including who was willing to use IVR, the benefits and disadvantages of VOTO and other IVR platforms for the purposes of monitoring and evaluation, and recommendations for the future.

REVIEW OF EFFORTS TO USE IVR FOR DEVELOPMENT AND PEACEBUILDING

There is growing recognition of the potential for IVR to provide information in development contexts, including in conflict-affected regions (for a review, see Marchant, 2016). Among its most promising features is that it does not require literacy (Himelfarb, 2010; Patel et al. 2010), it allows audiences to access radio content when it is convenient for them (Marchant 2016), it can provide access to taboo information (such as information on gender-based violence) anonymously and discreetly (Marchant 2016), and it can be a safer way to distribute content and collect data in a region immersed in conflict. For example, radio stations may be targeted by violence in order to limit spread of information. IVR can combat this because often it is too difficult to target cell phones (Marchant 2016). Additionally, fieldworkers are able to collect data from a central location rather than traveling in potentially unsafe areas.

According to Marchant's (2016) review of the use of IVR in development and peacebuilding contexts, IVR is generally used for three purposes: distributing information, collecting data, and connecting audiences to services. In terms of using IVR to distribute information in development contexts, a few isolated case studies exist of organizations that have used IVR to provide media content to beneficiaries. For example, the media development organization Fondation Hirondelle uses IVR to help diaspora populations in the West access programming from the organization's partner radio stations in Mali and elsewhere (and hopes to extend the service to listeners in Africa as well) (Marchant 2016); the Institute for War & Peace Reporting launched an IVR-based news service in 2010 in Afghanistan (Himelfarb 2010); Voice of America has provided some of its radio programming over IVR in Africa (Powell 2009); Farm Radio International (FRI) (2011) used IVR to distribute farming information to mobile phone users in Ghana and Tanzania. However, aside from FRI's very useful report chapter on their experience with Freedom Fone (2011), there has been no systematic write up of these efforts, to our knowledge.

In terms of using IVR to collect information in development contexts, there is equally little information available. Organizations typically choose to use simpler technologies if they are using ICTs to collect data. Crowdsourcing SMS platforms like Frontline SMS and Ushahidi are the most popular for collecting user data. These are typically used for mapping but are sometimes used for M&E (Bott and Young 2012). Data collection, including surveys, can be conducted via SMS, but of course this requires the literacy of the respondent, and they are very limited in terms of how

much qualitative data can be input. SMS and mobile phones are also frequently used simply to contact radio stations or individual radio programs in order to share information or take part in a radio conversation (Nassanga, Manyozo, and Lopes 2013), but this sort of data is rarely collected systematically or used to assess program success.

There are a few anecdotal instances of organizations using IVR for M&E purposes in development contexts. Koradia and Seth (2012) used the Asterisk IVR platform to collect voice data which was transferred to the Internet. Farm Radio International (FRI) and Grossman (both interviewed in Marchant 2016) used the VOTO IVR platform in Uganda to collect quantitative survey data.

There are several good reasons why IVR technologies have not made greater inroads into the development world (for a review, see Marchant 2016). Besides simply being new and unknown, the technology faces other severe barriers. For one, usability is a major concern. According to Marchant (2016) who conducted interviews with experts in the field, IVR is not easy for audiences to use, and they often need to be trained. This can be cumbersome and expensive. Additionally, project staff need to be trained at the back-end as well in order to manage the system and collect and interpret data. This often requires “in-house technical expertise that many NGOs lack” (Marchant 2016, 15). FRI, for example, has been able to successfully use the VOTO platform, despite technical hurdles, because they have a team of programming experts who manage the system (Heather Gilberts, personal communication, July 2016).

Costs are also often prohibitive. Those using IVR in development contexts tend to be working with small and very tight budgets, and IVR systems can include many costs, including initial installation of the system, training personnel to manage the system, and the cost of the beneficiaries' phone calls (if the organization is covering the cost of the calls themselves).

Overall, according to Marchant (2016), there is much excitement about IVR technologies, but IVR systems are still in a “trial-and-error stage in developing countries” (19). More information is needed on what systems have worked under particular conditions, and which systems are most cost-effective based on particular needs.

METHOD

Our project sought to answer the following primary research questions:

With regard to IVR as a distribution tool:

- Does the addition of audio programming via mobile devices have the potential to increase the reach of RLB's programming?

With regard to IVR as an M&E tool:

- Can IVR systems collect both quantitative and qualitative data?
- Does IVR software provide useful feedback for radio program implementers?
- Is the IVR platform easy for the public to use, or would end-user training be required?

- Is the public (or particular demographic groups) willing to take part in the surveys?
- What factors (e.g., time, cost, technical know-how, mobile phone ownership) pose the greatest challenges to usefully implementing an IVR system?

The site selected for the pilot study was Rwanda. Mobile phone usage in Rwanda is increasing rapidly. According to Rwanda's National Institute of Statistics, as of 2010/2011, 45.2% of households in Rwanda had at least one mobile phone, and this figure was 79.6% for the capital city, Kigali. Rwanda was therefore selected as useful location to test an application which would offer a way to take advantage of this growing trend of mobile phone ownership.

Radio La Benevolencija's peacebuilding programming focuses specifically on educating audiences about 1) the cycle of violence and 2) healing from the trauma of mass violence. Its radio drama series in Rwanda, *New Dawn*, has been airing for nearly a decade, and more than 80% of the national population regularly tunes in to the program. A recent evaluation of RLB (Kogen 2013) revealed significant positive impact of its programs on knowledge, attitudes, and behaviors regarding reconciliation and healing. The popularity of RLB's programming in Rwanda also offers a worthwhile test of whether citizens are willing to listen to radio programs over their phones if the content is in demand. RLB has been experimenting with the use of ICTs by recently setting up an SMS system for listeners to text in feedback on its radio drama series – and has been moving toward a more systematic approach to using ICTs to promote its goals.

For this project, RLB created a short add-on to their regular programming – a new segment about the main characters of their popular radio drama *New Dawn*.

Setting Up the IVR System

We needed an IVR system that would be able to collect both quantitative (numbers / touchtones) and qualitative (voice) data, as we consider this crucial for monitoring projects. Quantitative data is insufficient for monitoring and evaluation under complex scenarios in which numbers alone can be misleading and which do little to help improve the intervention.

Freedom Fone, one of the most well-known (and free) IVR platforms, did not collect voice data, and so was ruled out. We weighed the pros and cons of various systems including Freedom Fone, Vocantas, TechnoBrain, Confermit, Voneto, OneReach, VOTO, Newfies, and Textit. RLB staff based in Rwanda made the final selection based on their knowledge of on-the-ground limitations. Based on cost as well as the ability to collect both numerical and voice data, our options were reduced to Newfies, Textit, and VOTO. Newfies required programming that would run into the thousands of dollars and was thus ruled out. Textit has similar functionality to VOTO (IVR with text) but has a less user-friendly set up. Thus RLB ultimately selected VOTO for the project. RLB staff on the ground were in charge of implementing and running the system and collecting data. VOTO is a Ghana-based tech start-up that offers an interactive SMS and voice call platform for governments, NGOs, and other organizations to collect and disseminate information. The platform is Internet based,

requiring no software installation or equipment purchasing (save a mobile phone to connect to the platform), and the information is stored on a cloud server, which is then downloadable in excel format from their server over their interactive client interface.

An annual license for a four digit toll free number was purchased from the Rwanda Utilities Regulatory Authority (RURA) with the intent to link it to MTN and Tigo (two of the major mobile service providers in the country) but it was later understood that the toll free number only worked on the MTN number and therefore the calls would only be toll free for callers from this particular network. While MTN has the best network in the country, Tigo is the cheapest network and a large proportion of the rural audience uses Tigo or other smaller carriers because of lower call rates. So that users would not have to pay for the call, a toll-free number registered with MTN was used and RLB implemented a 'flashing' system (also known as a charge reversal service) that allowed listeners to call in regardless of their network. The call would automatically be terminated and a few seconds later the listener would receive a call back, thus ensuring that there would be no charge to the caller.

Pre-Testing

A focus group discussion (FGD) was conducted prior to launch to troubleshoot problems with the system and determine whether end-users could use the system without training. Potential participants were recruited by purposive sampling in semi-rural and completely rural districts outside of Kigali and 30 were randomly selected for the FGD with varying levels of education, age, and gender. The FGD covered the content of the survey (its length, question clarity, clarity of instructions, and audio quality) and the users' overall experience with the tool (ease or difficulty of use) and the results were used to refine the survey questions as well as guide technical edits and tweaks to the system. The focus groups revealed several glitches in the software – calls were dropped or questions were skipped – but it was determined that these glitches could not be fixed and that the VOTO system was still the best option available. Small changes to the survey were made based on user feedback. For example, some of the callers could not tell whether they were talking to a person or a machine. The introductory message was therefore re-recorded to make it clear that audiences were not speaking with a human being and questions were recorded alternating between a man and a woman's voice. Some of the focus group members also suggested including instructions for the different parts of the survey, rather than only one set of instructions at the beginning. This change was made as well in order to facilitate comprehension.

In general, focus group respondents had little difficulty navigating the system – a surprise given that much of the research has suggested that this is one of the key challenges of IVR projects. This finding was duplicated with the wider population once the project was launched.

Promoting the System

The IVR content was advertised using radio spots on Radio Izuba, which is broadcast in the Eastern province of the country. This is a mostly rural area, chosen in order to see if IVR would be used by those who are the target audience of RLB's programming: the rural poor (also those

assumed least likely to have access to mobile phones). In August 2015, 15 60-second radio adverts were run on Radio Izuba to make people aware of the system and how to use it. RLB also distributed 300 flyers in three districts in the Eastern province where Radio Izuba has the most listeners. Token prizes (an RLB T-shirt or umbrella) were offered to the first 100 listeners.

FINDINGS

IVR as a Distribution Tool

At the end of the pilot period – September 15 to October 3, 2015 – the system received 851 calls representing 226 unique callers. (Many callers called in several times, for reasons discussed below.)

The findings suggest that the IVR system worked well as a tool to increase the reach of RLB's radio programming. This is consistent with findings from other organizations mentioned above that have used IVR for content distribution. 22% of the survey respondents indicated that they listened to the program in a group. Thus, the programming reached more than the individual number of phone calls would suggest, though we did not collect data on average listening group size.²

However, the positive response by the audience came at a high operational cost, and was coupled with a severe logistical hurdle: Because many poor Rwandans use cellular networks that are unreliable, many of the calls were dropped. Because of the set-up of the system, it is impossible to tell whether listeners called back to finish listening to the content. Because of the sometimes poor connection, callers also complained about the sound quality compared to listening over the radio.

The cost of the phone calls was also found to be prohibitive (see table on page 15). RLB will not be using the IVR system for distribution after the conclusion of this study unless it can find a way to reduce costs, such as by making a deal with one of the local telecomm companies. The cost of content distribution via IVR is a hurdle that has been found by others as well (Marchant, 2016).

IVR as an M&E Tool

The second set of research questions was designed to interrogate whether IVR has potential as an M&E tool. Several of our findings suggest high *potential* of the IVR system for M&E use: the willingness of respondents to take part in surveys, the quality of the data received, and the ease of navigating the system by end-users.

Willingness to take part: Responses from our focus groups indicate that there is a high degree of willingness and desire to participate in the survey questions and that having their opinions heard was one of the most satisfying things about using the system:

The reason why I called is that I love [*New Dawn*]. But I was also curious to hear those questions associated with a [*New Dawn*] episode. In the end, the experience of being given an opportunity to provide my feedback is much appreciated. - FGD participant

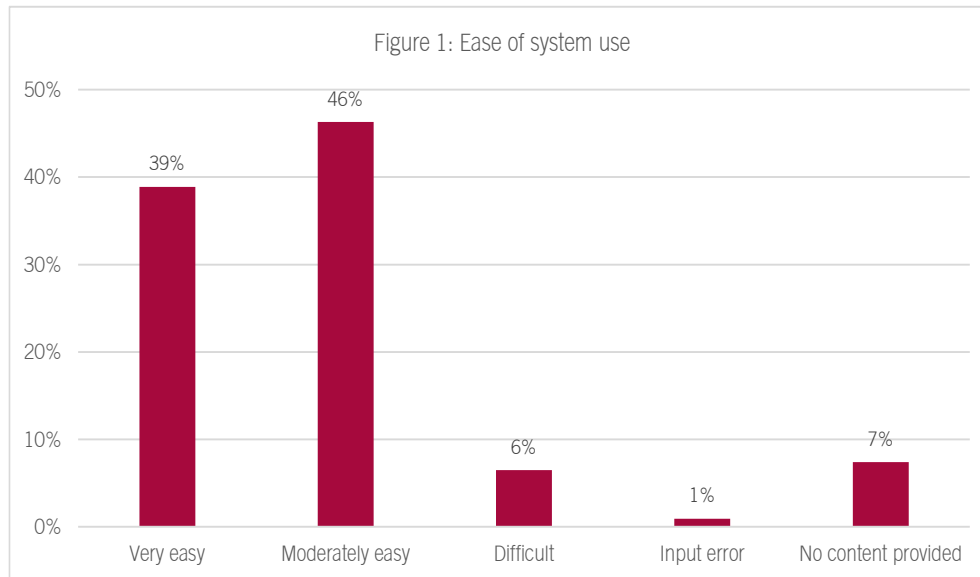
When the system comes back, there will be even more people ready to use it as we have already started spreading the word about it in our villages. We appreciate having a means to express our views on the show. - FDG Participant

These sentiments appear to have extended to the larger population that called in. Approximately 25% of callers completed the survey, a decent response rate that is likely to have been even higher had the system operated with fewer glitches. In fact, many respondents called the system back numerous times to complete the survey – likely because their calls had been dropped. When asked in the survey what they liked or did not like about listening to the content over their phones, one of the top responses given was that they liked being able to give feedback about the program over the phone through the survey.

Quality of data: *New Dawn* is an edutainment program which promotes messages regarding peace and reconciliation. RLB was able to effectively collect quantitative demographic data about the audience that listened to the show (described in the section “Demographics” below) and quantitative and qualitative data pertaining to 1) feedback on the show and 2) information regarding how well the show was understood by audiences. In terms of feedback, respondents were queried on their perceptions of the content they heard on the phone, which can inform *New Dawn* script writers of what the most attractive or compelling storylines are, or where improvements can be made for the production of future episodes. The respondents were asked to rate how enjoyable the program was, from 1 to 3. Sixty-nine percent of callers rated the program as “very enjoyable.”

Respondents were also asked to describe, in their own words, what they liked about the episode that they heard. An evaluation of this qualitative data can help the organization better understand how the audience is reacting to the show. Questions about how the audience understood messages presented in the show could, in future versions of the survey, indicate whether the message and attitudes they are promoting in the show are truly coming through to the audience. In other words, data collected through IVR could help organizations determine what kind of an *impact* the show is having on audiences.

Ease of use: Among factors that may contribute to IVR’s use as an M&E tool is the reported ease of using the system itself to answer questions. Eighty-five percent of respondents said the system was moderately or very easy to use (88% if we look only at young callers); 91% said they would definitely use it again in the future (93% if we look only at young callers). Ninety-one percent of those who never attended school said they would use it again, suggesting education and literacy were not needed in order to navigate the system.



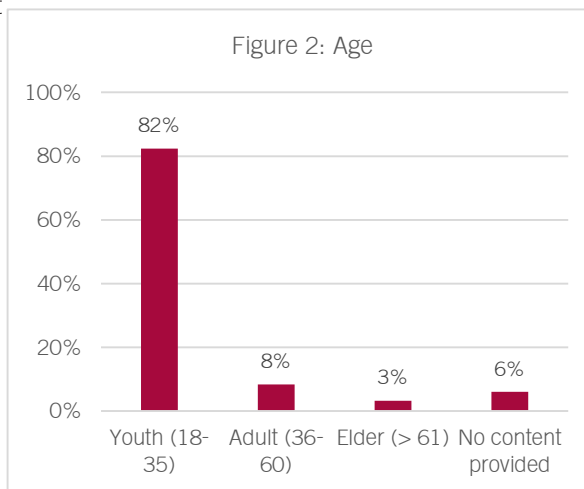
Technical hurdles: Despite these positive attributes, there were many problems with the system. Approximately 29% of callers only answered part of the survey. Our FGDs suggest that this was likely due to the fact that the phone call was dropped by the system or by the wireless network. Another portion (13%) of the callers had to call back several times to complete the survey.³ Finally, the VOTO system also seems to have ‘lost’ much of the voice data. This is our assumption from the fact that the VOTO website indicated the presence of audio files for many of the audio questions, but the audio files were blank. Given the high percentage of missing audio questions compared to text-based questions, it seems likely that the respondents answered these questions but the audio was lost. Piecing together dropped calls and organizing the data from the VOTO system meant that while the VOTO system is essentially free, a large amount of money (over \$5,000) was spent to analyze and clean the data – a problem that other organizations using IVR have had as well (Marchant, 2016). Some of the problems with the data were due to the fact that calls had been dropped, which may have been due to the cellular network rather than the VOTO platform.

Demographics of IVR Users

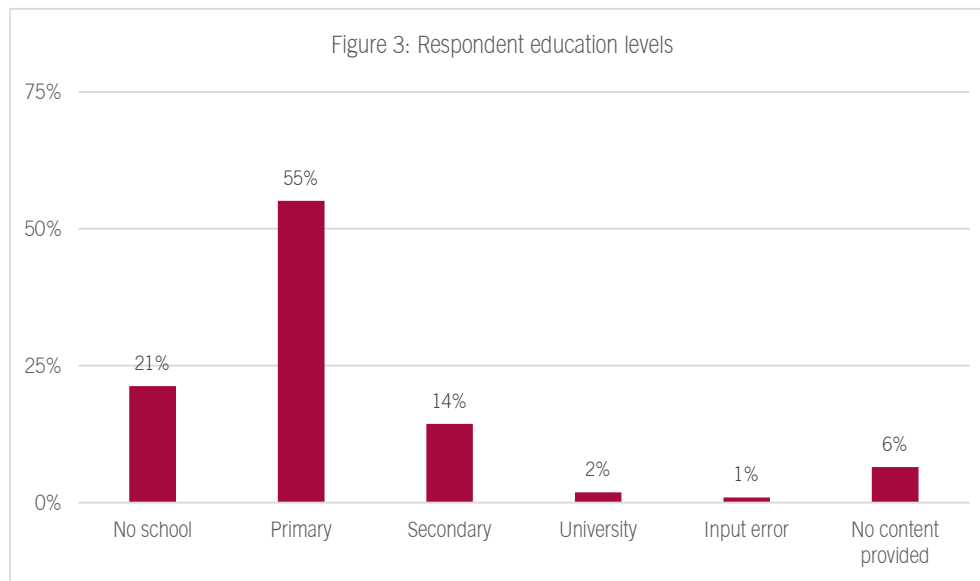
One of our research questions addressed *who* would listen to a radio program through a mobile phone / IVR system. Our study cannot provide quality information on urban vs. rural demographics, as it was only conducted in one region of Rwanda; it also cannot answer the question of whether poor audience members would be willing to *pay* the cost of calling to hear programming, since in this case the calls were free. We did, however, collect information on age, education, gender, and phone ownership. This data is promising, and suggests that a broad sector of the public is able and willing to access programs through IVR technology and complete IVR surveys.

Gender: About 27% of survey respondents were women. One common concern regarding the use of ICTs for development is that women are less likely to have access to mobile phones than men (Aker and Mbiti 2010). While this is certainly borne out by this study, it is reassuring that approximately one third of female listeners indicated that they listened in a group setting, compared to only one fifth of men.

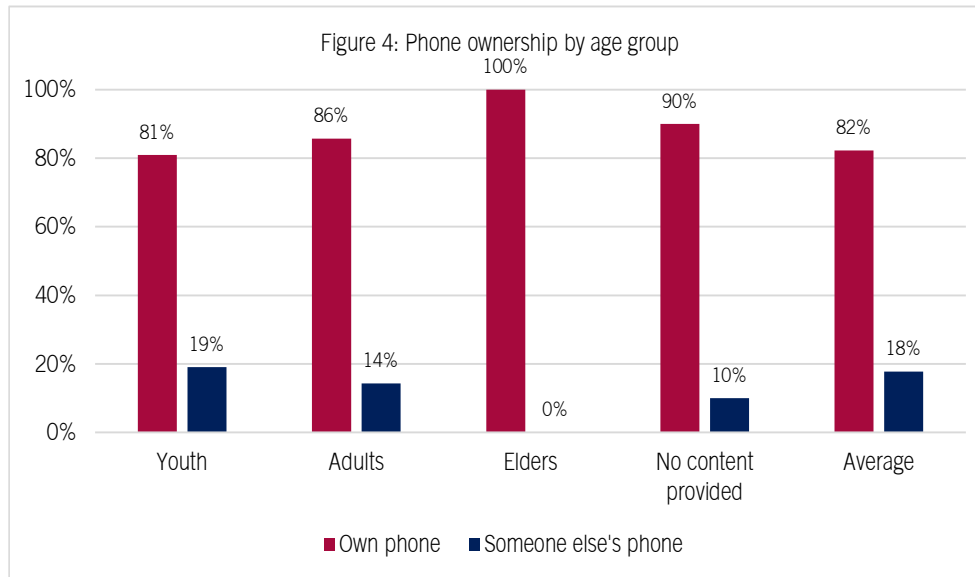
Age: The vast majority of survey respondents (approximately 82%) were youth between the ages of 18 and 35. This is not surprising given the demographics of the Rwandan population and of mobile phone usage. Sixty-one percent of the Rwandan population is under the age of 25 (in part due to the lasting effects of the 1994 genocide). It is also expected that younger generations would be more comfortable using mobile phones.



Education: The majority of survey respondents (approximately 55%) had only completed primary school and 21% of respondents had not attended school at all. In terms of IVR potential, this is hopeful: it indicates that IVR technology accessed through mobile phones is not a tool for the elite, and has the capacity to reach poor and uneducated populations.



Phone ownership: Eighty-two percent of all calls retained after data cleaning were made by respondents who own phones and 18% of the calls were made by respondents who borrowed phones to respond to the survey. Older respondents were less likely to be using someone else's phone.



DISCUSSION AND CONCLUSION

This report described a pilot study using the VOTO IVR platform to 1) distribute content and 2) collect quantitative and qualitative monitoring and evaluation data regarding a media program in Rwanda. In addition to showing that the VOTO system worked well as a distribution tool (though expensive) – our findings suggest great potential for the use of IVR as an M&E tool. Unfortunately, we cannot recommend a particular system as yet having the capacity to offer an efficient and cost-effective system for NGOs looking to collect qualitative and quantitative data cheaply and accurately.

The pilot study here offers several reasons to be optimistic about the future use of IVR as an M&E tool:

1. Eagerness of respondents to provide data: The respondents in our project confirmed, both through the pilot IVR survey and the focus group discussions run before and after the intervention, that they are willing and eager to provide feedback on the intervention. It is difficult to tell what portion of listeners chose to answer the survey questions, as many callers experienced dropped calls and were therefore unable to complete the survey. Eight hundred and fifty-one total calls to the line produced a total of 216 survey

responses, but there is reason to believe that this number would have been higher had the system had fewer technical problems. Many of the respondents called back multiple times to complete surveys after their calls had been dropped.

2. Ease of use: A major issue in the literature on IVR is the need to train end-users. However, in this case no training was needed. Rural, uneducated populations were able to use the system with few problems. Literacy was also not an issue (as it is for SMS survey questions) since the survey used voice prompts and respondents only had to select numbers or speak their answers.
3. Ability to collect both quantitative and qualitative data: The ability of the VOTO system to conduct a simple survey with both closed-ended (quantitative) and open-ended (qualitative) responses is exciting and suggests a new way that organizations providing media content can gather high quality data about 1) program reach / demographics of audience members; 2) feedback about content; 3) basic information about program impact. Very few IVR systems currently seem capable of doing this at a reasonable cost in a development context.

However, major hurdles to the platform meant that ultimately, the system was considered impractical for either program distribution or data collection:

1. Dropped calls: the mobile network that most poor Rwandans use is not as reliable as the more expensive networks. Therefore, many of the calls to the system were dropped. It was not possible to tell if respondents listened to the entire program or were willing to call back to hear the rest of the program if cut off partway through. Approximately 42% of survey responses were either incomplete or responses in which the caller had to call back several times in order to complete the survey. It is likely that this problem would occur in other countries as well in which development NGOs target audiences that are likely to use the most inexpensive cellular networks.
2. Hard-to-interpret survey data: The VOTO system erroneously labeled calls as 'finished' (having answered the survey) when the caller had not. In fact, the number of calls that received the 'finished' label was nearly five times the actual number of callers who did finish the survey and over half of the calls that received the 'finished' label had not answered any questions. The spreadsheet extracted from the VOTO system indicated cases in which there was supposed to be audio registered (answering the open-ended questions) but for which there was no audio registered; cases in which audio files were downloaded from the system but did not correspond to the excel sheet; and cases in which audio files for one question actually pertained to a different question. This produced an incredibly messy data set in which the audio files did not correspond to the quantitative survey data that the system recorded, and the only way to match up the open-ended response data with the close-ended response data was to manually match up the data using respondents' telephone numbers. There was added complexity due to the presence of multiple calls where respondents partially answered survey questions,

which also had to be manually patched together to form one complete call record, which was then manually matched to the audio files of their answers to the open-ended questions.

3. Data cleaning: The need for extensive cleaning of the data set vastly increased the cost of the system as a whole. Fees paid to clean and interpret the data totaled over \$5,000. For the small organizations we had hoped could use IVR to streamline M&E costs, this number is prohibitive, and was for a sample of fewer than 900 calls.
4. High cost of calls: While the VOTO system is essentially free (there is no hardware to purchase), credits must be purchased for the phone calls to go through. This pilot study required over \$1700 in credits and the purchase of a basic smartphone in addition to other associated costs that increased the total average cost of each phone call.

Item	Price (USD)
Phone to implement IVR system	\$264
Call reversal charges	\$148 per month
Internet top ups (for smart phone to connect to Telerivet system which routed calls to VOTO)	\$133 per month
VOTO Credits	\$1,725 (851 calls @ \$2.03 per call)
TOTAL for month-long survey	\$2,270

In the end, our conclusion was that this was not a sensible system for RLB. The organization did find the ability to use mobile phones for data collection helpful, and will be trying another (more limited) system in which audience members can send in voice messages or SMS texts to provide feedback. It was RLB's conclusion that the IVR service, while helpful in the end, was not cost effective and required a level of technical expertise that they did not have currently at the organization. In the past, they have employed a technical consultant at the station who was somewhat familiar with IVR systems and who helped with the system set-up phase of this intervention, but as he is no longer on staff, the investment in another technical consultant familiar with IVR would be prohibitive for the organization.

But technological advances happen constantly, and quickly. It is possible that VOTO or another system will address the hurdles listed here soon. One of the other systems mentioned above may begin to integrate numerical and voice data as well at a reasonable cost. The biggest problem that needs to be addressed by VOTO, at least in this case, is making sure that the data collected is collated and fed back to the client in a way that is usable without spending copious amounts of time cleaning the data.

Another feature that would be helpful for IVR systems would be more multi-functionality, such as the ability for respondents to enter text, in addition to numerical and voice data in the same survey. For example, if VOTO offered the ability to record text input, we might have chosen this option for the demographic data collection.

Recommendations

For those organizations that do try IVR to support M&E efforts, we make the following recommendations:

- Use an IVR system that can collect both quantitative and qualitative data, if possible. This will provide the richest material in terms of improving the project and understanding impact. For one, most IVR surveys will need to be very short and simple (e.g., ten or fewer questions, no skip patterns) in order to garner responses, and so it is difficult to gather high quality data about the impact of the program through a few closed-ended survey questions. Secondly, in the case study presented here, respondents would not have been as eager to take part in the survey if they did not have the opportunity to leave open-ended feedback and suggestions regarding the show.
- When possible, make an arrangement with a local telecomm operator to reduce the cost of calls. Local technical infrastructure, meaning direct connections to the mobile network operators in a country, drives down costs and reduces the rate of dropped calls. VOTO informed us that in Uganda, for example, setting up local offices brought down call costs 20-50%. This integration creates a more reliable connection and eliminates the need to route the calls over the Internet, as was the case here. This direct connection would have almost completely eliminated the technical issues we experienced. Although local integration requires high start-up costs, the savings are long-term.
- When possible, coordinate directly with platform managers from the IVR service employed. They may be able to smooth out technical kinks more efficiently than in-house managers.
- If the media content is included in the phone call, make sure to ask respondents about listening group size, since many respondents may be listening in groups, and total calls may therefore underestimate reach.
- If media content is included in the phone call, keep it short. If calls are frequently dropped, it will be less likely that listeners will make it to the end of the broadcast (and to the start of the survey).
- Create an option at the beginning of the call that allows listeners to skip straight to the survey, in the event that their call was dropped and they would like to answer more survey questions without listening to the audio program again.
- Conduct formative research before beginning the project in order to understand who has access to mobile phones and the *ease of use* of the IVR system. Implementation of IVR will be a waste if the target audience does not have access to mobile phones or cannot figure out how to use the system.

- Be sure to publish and circulate findings about experiences with various IVR systems and contexts. This is still a new area and still in a trial-and-error period. Practitioners on the ground will benefit greatly from hearing the experiences of others with respect to which IVR systems work best under which contexts, and IVR system administrators can use the information and feedback on user experience to fix technical problems and enhance the interface and performance of their products. This was one case study, and may not be reflective of other IVR systems in other contexts.

While we are optimistic about the ability of IVR as an M&E tool in the future, we do *not* mean to suggest here that, even with improved IVR systems, IVR can or should replace high quality, rigorous M&E designs. High quality evaluations of many development projects are lacking, and require deep and critical interrogations of the design process and the impact of the project. IVR can begin to answer some of these questions, but it cannot answer all of them, and cannot answer any of them completely. We recommend that IVR and other similar types of systems be used as a part of formative evaluation and periodic monitoring, to get a sense of how the project is doing and where tweaks might be made. These should *supplement* more in-depth evaluation techniques that can give a fuller picture of whether or not a project is working and why.

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Endnotes

- ¹This portion likely underestimates the total number of callers willing to take part. Many of the calls were dropped by a poor mobile connection. This is discussed further below.
- ²Of course, it should be noted that in our pilot study, calls to receive content were free. We were not able to test whether people would be willing to pay to listen to the programming.
- ³Callers from the same phone number that called the system several times and answered different parts of the survey during each call are assumed to have had their calls dropped.



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