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MINDFUL SOCIAL CHANGE

NATIONAL GEOGRAPHIC NEWSWATCH · ARCHIVE

MOBILE MESSAGE & DIGITAL DIVERSITY

Guest articles on mobile technology and social change, 2010–2014

Between December 2010 and October 2014, Ken Banks produced a series of guest articles for National Geographic's Newswatch blog, first as Mobile Message and later as Digital Diversity. Each piece looked at how mobile phones and other appropriate technologies are being used around the world to improve, enrich and empower lives, told by the people doing the work.

National Geographic has since removed the series from its site. The 50 articles collected here have been recovered from the Internet Archive's Wayback Machine, with their original text and images. The first 49 are the series articles, oldest first. The last is an announcement of an award Ken Banks received, included for completeness.

Produced by	Ken Banks, kiwanja.net
Originally published	National Geographic Newswatch
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Articles	49 articles, oldest first (24 as Mobile Message, 25 as Digital Diversity), then an award announcement
Recovered from	Internet Archive, Wayback Machine

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Looking for support with your own social change work? See kiwanja.net/work-with-me.
Ken Banks offers coaching, mentoring and strategy support.

Technology, Anthropology, Conservation and Development: A Personal Journey

By Ken Banks · 8 December 2010

*In **Mobile Message**, a new series of blog posts for Nat Geo News Watch starting today, innovator, anthropologist and National Geographic Emerging Explorer Ken Banks shares exciting stories about how mobile phones are being used throughout the world to improve, enrich, and empower billions of lives. This first post sets the stage.*

As a child I had a fascination with the natural world. It helped being brought up in Jersey, one of the Channel Islands between the English and French coasts where Gerald Durrell set up a zoo in the late 1950s that would become famous for its pioneering work, captive-breeding endangered species. It also helped having grandparents who were ardent amateur naturalists, and a mother who followed closely in their footsteps.

I remember flicking through old *National Geographic* magazines in awe, scissors in hand, and being fixated by David Attenborough's natural history programs on the BBC, wondering what it would be like to visit "deepest darkest" Africa and see the wildlife first-hand.

Looking back, I really wasn't that different to many children my age. Only, my dreams came true.

1993 was a big year for me. I was already beginning to turn my back on a career in information technology when I was selected to be a team member for a school building project in northern Zambia. Those five weeks changed the course of my life as I became hungry to learn more about the developing world, and the tensions between wildlife conservation and human development.

Another trip to Africa followed in 1995, this time to Uganda. Later the following year I left Jersey and my journey was well and truly underway. The next few years took me to Sussex University to study Social Anthropology and Development Studies, and then back to Africa to run a primate sanctuary in Nigeria. It's safe to say that after all this I was well and truly hooked.

Exactly ten years after I first set foot in Zambia came the first real opportunity to put all I had learnt since to good use — a dream job at the intersection of technology and conservation.

Back in 2003 mobile phones were just beginning to get smart. For the first time they were integrating cameras and color screens, and were able to access the Internet and play music and video. Witnessing this, a small team at Fauna & Flora International in Cambridge (UK) asked two important questions: How could these new devices be used to promote conservation in the "developed" world, and how could they be used to assist conservationists and development practitioners on the ground in the "developing" world? It was my job to help find the answers.



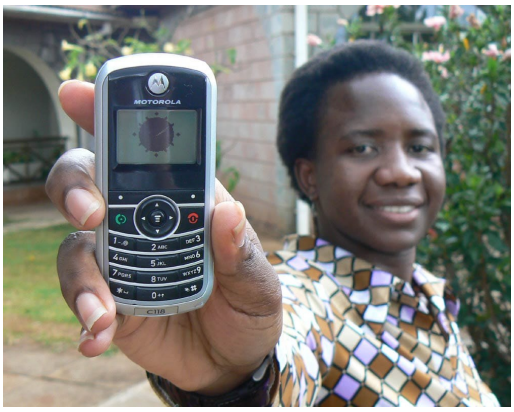
Bushbuckridge, on the borders of Kruger National Park, South Africa. My first taste of mobile fieldwork almost eight years ago.

Photo credit: Ken Banks, kiwanja.net

Today, with over 500 million subscribers across Africa alone and more people around the world owning a phone than not, mobile phones seem to be everywhere. Farmers are now able to access market information through their phones, increasing income in some cases by up to 40 percent. Casual labourers can advertise their services and avoid downtime waiting on street corners for work to come their way. Unemployed youth can receive alerts about job vacancies. And, for the first time, the unbanked can transfer money to relatives, or make payments for goods and services, through their phones.

Mobile phones also provide health information and advice, remind people when to take their medicine, and allow citizens to engage more actively in civil society by monitoring elections and helping keep governments accountable. Villagers in Kenya can get wildlife early warnings, mitigating against livelihood- and life-threatening human-elephant conflict.

It turns out that mobile phones can be useful for much more than just ordering pizza, looking up the football scores or arranging a Friday night out. In short, the impact and uses of mobile technology in the developing world is nothing short of staggering. But it wasn't always that way. In one of the earliest attempts to capture the potential of mobile phones in conservation and development work, a colleague and I authored a 2004 report in which we struggled to find much evidence of the revolution that was about to take place. It was a time of hope and excitement, but much of the work was still to be done.



Over the past few years, mobile phones have found their way into the hands of millions of people across the African continent.

Photo credit: Ken Banks, kiwanja.net

The earliest problem I identified back in 2003 wasn't the lack of mobile phone ownership among rural communities, but a lack of workable technologies that enabled non-profit organisations working in the more remote, needy places to take advantage of them. Systems did exist which allowed the sending of hundreds of text messages at a time — these could contain agriculture information, or advice on HIV testing, for example — but none of these systems was particularly affordable, none was easy to use, none worked without the Internet, and none made it easy for recipients to reply. In short, very little worked for the very NGOs that I felt needed the most help.

And so began a mission which continues to this day. My response to the challenge was the development and release of FrontlineSMS back in 2005. Simply put, FrontlineSMS is a piece of free software which turns a laptop computer and a mobile phone into a text messaging communication system. It works without the Internet, is easy to use, and it allows true two-way communication with anyone with a mobile phone. Since

launch the software has been downloaded by over 11,000 non-profit organisations and is in use in over 60 countries around the world.



A typical FrontlineSMS set-up — a laptop, a phone and a cable.

Photo credit: Ken Banks, kiwanja.net

Exactly eight years ago this month I started working in the "mobile phones for development" field, and over that time I've learnt three key things: the importance of building appropriate technologies, the importance of local ownership, and the need to focus some of our technology solutions on smaller grassroots users.

These are some of the themes we will explore in the "Mobile Message." Over the next few months we will delve into the human stories behind the growth of mobile technology in the developing world. We'll take a closer look at the background and thinking behind FrontlineSMS, and hear from a number of users applying it to very real social and environmental problems in their communities. We will also hear thoughts and insights from other key mobile innovators in the field, from anthropologists to technologists to local innovators.

Let us take you on a journey. I hope you enjoy it as much as we have.



ABOUT THE AUTHOR

Ken Banks, founder of kiwanja.net, devotes himself to the application of mobile technology for positive social and environmental change in the developing world. He has spent the last 17 years working on projects in Africa. Recently, his research resulted in the development of FrontlineSMS, an award-winning text messaging-based field communication system designed to empower grassroots non-profit organisations. Ken graduated from Sussex University with honors in Social Anthropology with Development Studies, and was awarded a Stanford University Reuters Digital Vision Fellowship in 2006, and named a Pop!Tech Social Innovation Fellow in 2008. In 2009 he was named a Laureate of the Tech Awards, an international awards program which honours innovators from around the world who are applying technology to benefit humanity. He was also named a National Geographic Emerging Explorer in May 2010. Ken's work was initially supported by the MacArthur Foundation, and he is the current recipient of grants from the Open Society Institute, Rockefeller Foundation, HIVOS, the Omidyar Network and the Hewlett Foundation.

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English in Action: Mobile Learning in Bangladesh

By Amy Benziger · 29 March 2011
Series produced by Ken Banks, kiwanja.net

In her role as the Content Producer for the SOCAP conference series, Amy Benziger has the opportunity to interview innovators from around the world on how they are changing the landscape of social enterprise.

For this installment of Mobile Message, she interviews Sara Chamberlain, project director for BBC Janala, an initiative based in Bangladesh that incorporates on-screen English tutoring through a television drama and a game show combined with English lessons via the mobile phone that build on the content in the programs.

Most people know of the BBC as a source of reputable news from around the globe. Most don't know about the action arm called the BBC World Service Trust, which uses the "creative power of media to reduce poverty and promote human rights." I was first introduced to and amazed by the BBC World Service Trust through The 2010 Tech Awards where BBC *Janala* was honored as one of the winners of the Microsoft Education Awards.



BBC Janala educational fair in Chittagong, Bangladesh. Copyright BBC World Service Trust. (Used with permission).

Janala is part of the *English in Action* campaign, which launched in November 2009. The initiative based in Bangladesh incorporates on-screen English tutoring through a television drama and a game show combined with English lessons via the mobile phone that build on the content in the programs. *Janala*'s three-minute mobile English lessons are equivalent to the cost of a cup of tea and accessible to those living on less than two dollars a day.

In my role as the Content Producer for the SOCAP conference series, I have the opportunity to interview innovators from around the world on how they are changing the landscape of social enterprise. I spoke to Sara Chamberlain, project director for BBC *Janala,* to learn more.

How did the BBC *Janala* program come about?

The Bangladeshi government was concerned about falling behind their neighbors, specifically India, because of a lack of English. The BBC World Service Trust was commissioned along with two other organizations to implement the "English in Action" program with a mandate to teach 25 million people English. I flew over to Bangladesh in 2007 to start the initial research.

The *Janala* program specifically targets adult education outside of the classroom. The goal is mass media saturation. We link the new lessons on the television show to written quizzes in the largest Bangladeshi newspaper to audio mobile lessons three times per week. Visual, writing, auditory learning create a fantastic package so that whether you are picking up a newspaper, turning on the TV or using your phone, there is engaging content available.

Mohammad Noor-e-Alam Siddiqui – 26 years old/Ghoshnogora, Tangail:

Siddiqui's father used to be a primary school teacher and always aspired for his son to be well-educated. However, due to financial constraints, Mohammad wasn't able to pursue higher education. "Since my father always encouraged me to become highly educated, I still regret that I couldn't achieve the optimum level although I had strong desire to. As a result I still consider myself as a learner and try to educate myself utilizing every opportunity I get." Siddiqui has been using BBC Janala 3 times a week. He added, "In addition to 'Essential English,' I like the lesson of 'How to Tell a Story.' I can actually relate the stories to my real life and later tell my own stories in similar way."

Why make English lessons available via mobile phone?

What is quite historic about BBC *Janala* is that we negotiated contracts with all 6 mobile operators in the country, so the service can be utilized on any handset, at any location and at any time. It opens up access that didn't exist before for millions of people because once they left primary or secondary school, they've had no educational opportunities available.

There are English courses available from private tutors, but they are prohibitively expensive. On average each course costs 1500-6000 taka which is roughly $20-$80. Our service is 1.5 taka per lesson. The total cost of our course is 240 taka, which is under 5 dollars. It's much more affordable and the quality is high. Having that flexibility to provide access to education at a very low cost is groundbreaking.

How do you measure success?



BBC Janala educational fair in Chittagong, Bangladesh. Copyright BBC World Service Trust. (Used with permission).

We have reached 4 million people in last 15 months via the mobile phone. You have to remember; we are targeting people who only very recently got access to mobile phones. Only 8-9% had received or sent SMS texts, so the quick uptake is amazing.

We are now a third of the way through the program, and we've started doing surveys of 8000 people in 4 out of 7 districts in Bangladesh. We are running a mobile specific panel giving participants oral tests every six weeks. We've been really pleased by their ability to reproduce the language and have conversations. They are scoring at 70% so there's no doubt that the mobile service is teaching English.

Shafiqul Islam – 30 yrs old/Living in Mirpur:

"When I was in school English seemed very difficult to me and the village schools did not have teachers who were experts in English. They would just teach for the sake of teaching. Then BBC Janala came along and I saw the advertisements in TV. That's when I started dialing 3000 and now I am a regular user. My willingness to learn English has led me to BBC Janala…English is always necessary; it doesn't depend on past or future. We always need it. Now is the Internet time and in the future, the Internet will be used even more widely. If I want to pursue a teaching profession, I would want to use the Internet to collect all the latest information relevant to this field and to help my students. How will I do that if I don't know English?"

How do you see mobile phones changing the learning landscape the developing world?

Many Bangladeshis have had a negative experience with education. Although the government is working towards the Millennium Development Goals of getting kids into the classroom, the challenge is that the quality is poor so they are dropping out as quickly as they're going in. There is a very authoritarian approach to education so the fact that they can learn in private on a device that's always with them when they're waiting for a bus, walking home or for the few minutes at the end of the day is revolutionary.



ABOUT THE AUTHOR

Amy Benziger is the Producer focusing on content development for the SOCAP conference series. She is responsible for researching the social enterprise landscape, tracking trends and identifying thought-leaders to present at the annual event. For three years, SOCAP has brought thousands of individuals from over 40 countries to San Francisco to explore innovation in impact investing, venture philanthropy, design thinking, mobile technology, international development, public-private partnerships and food systems. Amy is a founding team member and strategic advisor to the Hub Bay Area, an incubator for social entrepreneurs dedicated to building solutions for social, economic and environmental sustainability as part of a global Hub community with 22 international locations. A lifelong traveler, she has lived and worked in Mexico, Spain, Argentina and Thailand. She currently lives in San Francisco, CA.

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Nigerians Mobilize for Free and Fair Elections

By Florence Scialom, Community Support Coordinator, FrontlineSMS · 12 April 2011
Series produced by Ken Banks, kiwanja.net

In today's installment of the special series Mobile Message, Florence Scialom shares news of how Nigerian grassroots organizations and agencies have joined together to encourage citizens from communities all over the country to use mobile technology to amplify the voice of Nigerian citizens, making their opinions impossible to ignore.

A group of Nigerian grassroots organizations and agencies have joined together to form ReclaimNaija, in an effort to provide the Nigerian electorate a way to report on the elections as they happen. ReclaimNaija documents how citizens are experiencing the elections by using FrontlineSMS to receive and send text message reports, and Ushahidi to visually map the election reports received. It is very exciting to see FrontlineSMS being used in this way, especially because one of the first public use cases of the software was during the last Nigerian elections in 2007. As Community Support Coordinator at FrontlineSMS I have had the privilege of speaking to Ngozi Iwere from Community Life Project, one of the promoters of ReclaimNaija, as well as others who have been involved in helping with and using the platform. I have learned about how Community Life Project are encouraging citizens from grassroots communities all over the country to use mobile technology to amplify the voice of Nigerian citizens, making their opinions impossible to ignore.

Amidst the confusion of date changes surrounding the Nigerian elections one thing remains clear; the people of Nigeria are ready to vote. The 2011 Nigerian elections got off to an uncertain start; with the National Assembly elections due on April 2nd 2011 having to be pushed back as a result of many problems, leading to the rescheduling of the whole two week election process. Amongst the commotion of date changes it is more important than ever for the Nigerian public to feel they have a way to speak out about any election problems they experience, and know they are being heard.



ReclaimNaija advert message. Copyright: Community Life Project

Over the years, elections in Nigeria have been surrounded by controversy. "Since the return to civil rule in 1999, all the elections conducted in Nigeria have been marred by massive fraud and violence," says Ngozi Iwere.

It is clear speaking with Nigerian citizens about ReclaimNaija that people are keen to actively challenge the problems previously accompanying their elections. "On election days, citizens have been frustrated by a number of things; missing names, seeing ballot boxes stuffed or even stolen and other electoral fraud and yet being unable to do anything about this. This time however, is the time to speak out" says Femi Taiwo, a member of INITS Limited, a Nigerian company that helped set up the technical side of ReclaimNaija's monitoring system.


Audience at a ReclaimNaija public presentation. (Copyright: Community Life Project)

ReclaimNaija was established to "enhance the participation of grassroots people, organizations and local institutions in promoting electoral transparency, accountability and democratic governance in Nigeria" Ngozi Iwere tells me. ReclaimNaija achieved this participation in large part through voter education forums for community and grassroots leaders spread across the 36 States of the country and the Federal Capital Territory. As Ngozi explains "engaging the leaders of community-based social networks ensured that information got across to a large segment of society, as we trained leaders to pass on the message to their membership and constituencies." Thus popular participation has been central to ReclaimNaija's monitoring platform.

During the January 2011 Voters Registration Exercise, ReclaimNaija received 15,000 reports from the public over two weeks. It is important "to have an election monitoring service that aids troubleshooting to expose and document fraud" says Ngozi Iwere. The election registration process proved this; on receiving messages about problems such as lack of registration cards ReclaimNaija was often able to communicate with the electoral body, thus helping improve the efficiency of the registration process.

Providing the option to make election reports via text message has improved the scope of ReclaimNaija's work, helping them to target grassroots communities more effectively. "It is very important to have an election monitoring service that utilises tools that the average citizen is very familiar with" says Ngozi, explaining ReclaimNaija's choice to provide the option for citizens to make reports via mobile phone.

Reflecting on the penetration levels that have made SMS such a powerful communications platform, Ngozi adds, "According to the Nigerian Communications Commission (NCC), Nigeria has 83 million active GSM lines." Although the platform offered citizens other means of reporting, such as email, voice calls, Twitter, Facebook and direct reporting on the website, Ngozi explains they've found that "SMS was the most utilised medium both during the voter registration exercise and the aborted National Assembly Elections on Saturday 2nd April."

The system clearly continues to be a powerful way for Nigerians to communicate throughout the recent date changes. The National Assembly elections, originally due on April 2nd 2011 were pushed back twice as a result of many problems, including lack of voting materials and staff absences at polling stations. The whole election process has now been re-scheduled. The National Assembly elections went ahead on 9th April, and they are due to be followed by the presidential poll on April 16th and the governorship election on April 26th. Confusion over the election dates left some Nigerians suspicious about the validity of the elections.

"There has been a lot of scepticism surrounding the 2011 elections, even more so with the recent postponement," points out Nosarieme Garrick, a Nigerian who has made use of the ReclaimNaija reporting system and also works for VoteorQuench.org, a social media effort to get young Nigerians engaged in the elections. Nosarieme has observed that some people are assuming that the problems are orchestrated attempts to facilitate rigging.

In line with this, one message received through ReclaimNaija during the first attempt at the National Assembly election said "more than half of registered voters here [in my voting station] couldn't find their

names… Is this an attempt to reduce the number of voters in Lagos?"

However, Nosarieme suggests that having a service like ReclaimNaija has meant people are able to act on their concerns. "Reclaim Naija is allowing eyewitness accounts from average citizens to be collected on the actual happenings during elections, and people understand that their reports are not falling on deaf ears." Furthermore, although Nigerians were unhappy at the postponement, there is also hope around improving the voting process. Nigerian Femi Taiwo explains "if shifting the date was what it was going to take to get it right this time around… then the postponement was the right thing to do."

Citizens have been able to report a wide variety of issues – including electoral malpractices, corruption and incidences confusion and unrest. One would-be voter, for example, sent a message on the day National Assembly elections were due to start, stating, "here at Umudagu boot, no staff or material or any sign there will be election. Hundreds of voters are loitering without accreditation and it is 9.00am."



Professor Wole Soyinka (Nobel Laurette) arriving for the public launch of the reclaimnaija.net platform. (Copyright: Community Life Project)

These citizen reports have become a valuable source of information for the Independent National Electoral Commission (INEC), who are responsible for running the elections, thus representing the voice of the people to the authorities. ReclaimNaija collate reports and send directly on to the INEC in real time.

"If the INEC hadn't seen these reports they would not have known about the level of problems being experienced by Nigerians; there would not have been this kind of proof" says Linda Kamau, an Ushahidi developer was in Nigeria to see the launch of ReclaimNaija system. There is clearly great power in ensuring the voices of the Nigerian people reach the authorities running the elections.

ReclaimNaija has been a great success so far, and in no small part due to the power of using SMS. As Ngozi Iwere explains, using mobile phones "puts the power of effective monitoring in the hands of the people." Yet it is the Nigerian people themselves who are central to the process, and the technology is a facilitator for their participation. Ngozi makes clear "there is a deep yearning for change among the populace and citizens see this election as an opportunity to make that change happen."



ABOUT THE AUTHOR

Florence Scialom *joined the FrontlineSMS team in late 2010. After studying international relations and development at the University of Sussex, Florence worked for an international development network called the Humanitarian Centre. Whilst with the Centre she helped to establish an ICT4D network, enabling NGOs, academics and private companies to work more effectively together in this space. She is now working on helping the FrontlineSMS community connect and grow. In her spare time Florence enjoys learning to play the guitar and dancing whenever she gets a chance.*

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"Farming Out" Agricultural Advice Through Radio and SMS

By Amy O'Donnell, Project Manager, FrontlineSMS:Radio · 26 April 2011
Series produced by Ken Banks, kiwanja.net

In today's installment of the special series Mobile Message, Amy O'Donnell takes a look at how radio is being combined with mobile phone text messaging to better connect smallholder farmers with local agricultural programmes in Kenya.

The Organic Farmer, a Kenyan magazine about ecologically friendly farming practices, recently launched two radio shows aimed at smallholder farmers. John Cheburet is spearheading the use of FrontlineSMS on the radio shows, and, as Project Manager of FrontlineSMS:Radio, I was keen to speak with him. Radio represents the dominant media source for many people worldwide and it offers a vital tool for outreach, particularly to rural communities. FrontlineSMS:Radio works with community stations to discover how combining mobile phone technology with radio can engage listening audiences.

John Cheburet is a radio producer and a pioneer, offering a farmer information service for small-scale farmers and actively seeking new technologies to improve outreach. He is seen by the farming community as a friendly source of information which is vital for their livelihoods. While The Organic Farmer (TOF) was born as a print medium, John sees radio as a way to increase awareness and reach more farmers.


John Cheburet is the radio producer for The Organic Farmer (Photo: J Cheburet)

"An important thing about radio is that farmers can listen to other farmers. It's one thing for me to tell them about growing mushrooms, but when a fellow farmer tells them how to grow mushrooms, the impact is much greater. It is effective when farmers relive their story; how they started out and what made them adopt certain farming practices."

John's listeners own an average of 2.5 acres. Many farm for subsistence and sell surplus to cover household needs and also pay school fees for their children. They may not have received training or know about the latest technologies, and they seek access to solutions and advice.


Agriculture is the mainstay of the economy in Kenya (Photo: J Cheburet)

"In Kenya, agriculture is the mainstay of the economy and the population depends on the land both directly and indirectly. The country is a major exporter of tea and coffee, and 70% of the workforce is in agriculture and areas that service this sector."

John prerecords programmes for two radio stations a week, one for Milele FM and the other for shared-airtime on the government run Kenya Broadcasting Corporation (KBC). He often records the shows while sitting in a car, "For the acoustics!" he says.

The shows are appropriately aired in the evenings when farmers are indoors and can listen in their homes. Content varies from soil fertility management and preparation of lands for planting, to the number of female goats with which one male can comfortably mate.

John remembers listening to agricultural radio programs when he was in primary school in the 1980s, "Back then, farmers could only take part by writing a letter, which could take two weeks to reach the station because of the slow postal system."


John plans a radio show. He connects a mobile to his computer and uses FrontlineSMS to send and manage text messages (Photo: J Cheburet)

Now, approximately 20 million Kenyans have access to mobile phones, and John has started using text messaging to transform his radio show from a one-way broadcast medium to a two-way dialogue between members of the farming community. John receives about 20 texts per week. While he does text back individuals with a unique answer, radio offers a platform to elaborate and share information with the greater community.

Up to 90% of households in Africa own a radio, and it still represents the predominant media source for many. "In my village of 40 families we have no electricity," John says, "Only 20% have television sets and those are powered by car batteries. One of the reasons why mobile phones are accessible is that they don't need to be charged very often and can be taken to local trading centres to be charged for KShs 10 ($0.25)."

A popular topic on The Organic Farmer show has been about care of the popular 'indigenous chickens,' which are prized for their sweeter taste. In a recent radio show, John responded to farmer questions received via SMS on the topic.

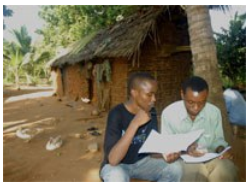
One listener wrote, "I started keeping indigenous poultry and I have heard that there is equipment called an 'incubator.' Is there such an equipment that uses other energy apart from electricity? And is there similar equipment that can give the chick warmth after hatching or what other ways can be used to keep the chicks warm?" Others asked about livestock mating habits and the benefits of commercial feeds.


Care of indigenous chickens has been a popular topic on The Organic Farmer show (Photo: J Cheburet)

Another farmer identified a common problem with an SMS saying, "My chicks keep dying even after giving them medicine. I want more information from you so that I don't continue losing my chicks."

Despite being renowned as a hardy breed which can withstand harsh conditions, farmers have been reporting an unknown disease wiping out entire flocks of indigenous chickens. Working together, the community has discovered the cause is Newcastle Disease. Now, The Organic Farmer offers information about vaccination schedules.

The Organic Farmer also made a significant difference when a number of farmers complained about a supposed high quality dairy goat. They were paying a high price, but the livestock were not producing the expected volume of milk. From sharing experiences through The Organic Farmer, it was revealed that suppliers were falsifying records about goat characteristics, leaving farmers in the dark about livestock they were investing in. As a result, farmers and stakeholders are taking corrective measures.



Kenyan farmers texting (Photo: Nathan Eagle/MIT, 2006. Published on kiwanja.net)

John's ambition is to work with community radio stations to expand the reach of farming programmes. He wants to build the capacity of community broadcasters to produce their own shows, with live-on-air discussions enriched by incoming messages from farmers.

The Organic Farmer shows the value of using SMS and radio together. While text messaging offers a method of interaction with listeners, John says, "We can't rely on SMS alone, since we can't send a whole paragraph, only the basic information." Radio provides a platform to explore topics in depth, but John suggests, "Radio is not a stand-alone medium – radio must be supported by other tools. SMS allows us to do that."



ABOUT THE AUTHOR

Amy O'Donnell *is the Project Manager for FrontlineSMS:Radio. Her role is to maintain communication to ensure that the needs of users are translated into the software development process. She joined FrontlineSMS at the beginning of 2011 from the Unrepresented Nations and Peoples Organisation, where she supported minority groups and indigenous communities to develop human rights campaigns. While studying Human Rights at University College London, she developed an interest in migration and the rights of the internally displaced. Previously, Amy has also worked at Action Against Hunger and Amnesty International.*

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Safe Motherhood: Mobile healthcare in the Philippines

By Irma F. Saligumba · 10 May 2011
Series produced by Ken Banks, kiwanja.net

In today's installment of our special "Mobile Message" series, Irma F. Saligumba – Health Research and Projects Coordinator at Molave Development Foundation – talks about a project in the Philippines which aims to reduce mother and infant mortality rates, and provide education and support to expectant mothers, all through their mobile phones.

The Mobile e-health System for Safe Motherhood Program is a research project of Molave Development Foundation, Inc. (MDFI), a not-for-profit organization based in the Philippines. The program aims to reduce maternal mortality by using text messaging to inform and educate pregnant mothers.

It is funded by International Development Research Center (IDRC) Canada under Pan-Asian Collaboration for e-Health Adoption and Application (PANACeA) Network Research Initiative. Irma F. Saligumba is MDFI's Health Research and Projects Coordinator and PANACeA Network Lead Researcher.

"Ma'am, I already gave birth. Thank you for the messages you sent". This was the SMS message I received from Meriam. She is one of the 100 pregnant women who registered in November 2010 for the pilot implementation of the Mobile e-health System for Safe Motherhood Program, run by Molave Development Foundation Inc.

This program aims to support the Philippine Government in reaching towards the United Nation's Millennium Development Goals to reduce maternal mortality ratio by three quarters by 2015.

As the Health Research and Projects Coordinator of Molave Development Foundation, Inc., I spearheaded a study on the effectiveness of using mobile phones to reach out to pregnant women to improve their maternal health.


One of the participants in the "Mobile e-Health System for Safe Motherhood Project". Photo credit: MDFI

We chose the town of Roxas, located on Mindoro Island about 400 kilometers south of Manila, for the research. Its population is about 50,000 spread across 20 villages; its Health Center has 2 physicians, 1 nurse and 8 midwives. To supplement the lack of health staff, there are 140 village health volunteers (VHV) who are trained to do most of the legwork for the midwives, and disseminate information on primary health care, maternal and child health, family planning and nutrition.

I was introduced to Meriam during a visit to her upland village. Like most of the mothers in our program, Meriam is in her mid-20′s, has some years of high school education, is unemployed, and her husband doesn't have a regular job. Subsistence farming provides additional income, and their average monthly salary is about $150. The only means of telecommunication in their area is through mobile phones. She shares one with her husband.

In the Philippines, where nearly 40% of the population lives below the poverty line, the equity gap is stark and wide. However, the ownership of a mobile phone is one of the few things that has crossed the income divide, making telecommunication relatively affordable and more accessible in this country of 7,100 islands. There are 70 million Filipinos who have mobile phones, compared to only 7 million installed fixed phone lines.

This is the basis for developing a program that uses text messaging to inform and educate pregnant mothers on safe motherhood. Aside from its mass appeal, mobile phones provide the advantage of two-way communication. Mothers are not just passive participants receiving information, but can also ask questions or communicate their concerns if they need to.

We are using FrontlineSMS as our communications platform because it is easy to use for health workers' with low technical know-how, it works without an Internet connection and provides a way to send SMS through pre-paid SIM cards, thus making it a low cost option. It is also vitally important that the software allows for data storage, and we have created a database of the mothers and the health workers on our on-site computer.

Prior to implementing our pilot project, we conducted various training sessions for the Health Center staff. First we provided a Basic PC Literacy Course which covered use of mouse and keyboard, familiarization with computer symbols and commands, basic computing using word processing and spreadsheets, and how to use the Internet. When they gained sufficient confidence, we then moved on to training basic FrontlineSMS skills (for the PC and mobile phone) to show staff how to use key functionality. Five health personnel were also trained on advanced FrontlineSMS, including administration, management and troubleshooting.

Meanwhile, village health volunteers were trained on how to use the mobile phone for data entry of pre- and post-natal registration, in order to register pregnant women and new mothers in the program.


Rural Health Midwives getting trained in advanced FrontlineSMS administration. Photo credit: MDFI

With the system in place, we started sending out the messages to participants who had already registered during pre-natal checkups at the Health Center. We also worked to reach out to new pregnant women. Posters and brochures were distributed giving instructions on how to register, by sending in an SMS.

Every day for three months, these women received messages on introduction to safe pregnancy and delivery, baby's phases of development, tips on preparing for labor, common pregnancy problems, benefits of facility-based childbirth, breastfeeding, neonatal care, and child immunization. Through this program we sent a total number of 11,100 text messages or 111 for each of the 100 women registered.

As we hoped, we received messages back from the mothers. Some expressed appreciation for the messages. Others raised serious questions regarding their pregnancy. An expectant mother named Jane inquired if using the computer is bad for the baby. Jocelyn asked what she should be feeling if the baby is due for birth. At 7-months pregnant, Rebecca wanted to know if it is normal to have swollen and painful vagina.

These questions were forwarded to their respective midwives for advice because they were better aware of their patients' pregnancy status. The midwife's response was sent by the system to the mother. In the case of Rebecca, she was advised to go to the hospital for evaluation. She even went as far as Manila to have better care, and she ended up staying there until she gave birth because her condition was too serious for traveling.

We are now looking into expanding the Safe Motherhood Program in other parts of the country. Our initial assessment shows that the program has influenced the parent's decision to use a health facility instead of their home for childbirth. The system also facilitated the prompt recording of new pregnant women and post-natal reporting. This data helps midwives prepare and plan for the pre- and post-natal care activities in the village. This more efficient and interactive information management system can ultimately contribute to improved maternal care, and thus decreased mortality levels.

Mothers involved say they will recommend the Safe Motherhood Program to others. They feel assured that someone is concerned about their welfare and that there is someone they can go to if they have questions. This gives them a feeling that they are important because someone cares, and that feeling of being important strengthens their desire to take care of not only their health, but also their babies.



ABOUT THE AUTHOR

Irma F. Saligumba has been the Health Research and Projects Coordinator of Molave Development Foundation, Inc. since 2007, and is Lead Researcher of Pan-Asian Collaboration for evidence-based e-Health Adoption and Application (PANACeA) Network with member countries in Central, South and Southeast Asia.

Prior to her involvement at MDFI, she spent 4 years in Attapeu, Laos as provincial health trainer of Health Unlimited. She also served as Training Specialist for 4 years at Philippine Rural Reconstruction Movement focusing on leadership-building, gender and development, and advocacy. She is a registered nurse and earned her masters in Public Health at the University of the Philippines.

Mobile Message is a series of blog posts about how mobile phones are being used throughout the world to improve, enrich, and empower billions of lives. Mobile Message is produced by **Ken Banks**, innovator, anthropologist and National Geographic Emerging Explorer. Founder of kiwanja.net, Ken devotes himself to the application of mobile technology for positive social and environmental change in the developing world. His research resulted in the development of FrontlineSMS back in 2005, an award-winning text messaging-based field communication system designed to empower grassroots non-profit organizations. He shares exciting stories in Mobile Message about how mobile phones are being used throughout the world to improve, enrich, and empower billions of lives. Read all the posts in this series.

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Emerging Explorer project makes Buckminster Fuller finalists

By Sarah George, Florence Scialom and Nsonje Siame · 12 May 2011
Series produced by Ken Banks, kiwanja.net

FrontlineSMS, a project of 2010 National Geographic Emerging Explorer Ken Banks, has been selected as one of only four Finalists in the Buckminster Fuller Challenge, the prestigious annual design science competition. Named "Socially-Responsible Design's Highest Award" by Metropolis Magazine, the Challenge awards $100,000 to support the development and implementation of a whole systems-based solution that has significant potential to solve humanity's most pressing problems.



FrontlineSMS has been recognized for bringing the communication revolution to poor and remote regions, through harnessing the power and reach of mobile phones. The software works without the Internet, is easy to implement, simple to operate, and free to download.

Results from a FrontlineSMS user survey, held at the end of 2010, help to illustrate efforts to design software to work for "100% of humanity." In the survey 84% of users said they found our software easy to use.* Results also demonstrated that FrontlineSMS is being used in over 70 countries, and is particularly useful in areas of the world where other forms of communication can be difficult to access. One FrontlineSMS user said:

> *I was using FrontlineSMS to communicate with administrators, principals, and teachers in 50 secondary schools. In the area I was working landlines and faxes were largely unheard of, postal services unreliable, and even road access was poor. FrontlineSMS allowed me to coordinate communication between these schools to organize various school events and programs*

At its core, FrontlineSMS software turns a laptop or desktop computer and a mobile phone or modem into a mass messaging platform, empowering users to gather and share information of any kind, in any place. The software forms part of a strategy that grassroots organizations around the world can adopt to leverage mobile technology for the greater good. FrontlineSMS focuses on reaching the "last mile" by designing the platform to take advantage of basic mobile phones already in the hands of billions of people throughout the developing world.

While the core platform is use-agnostic, the FrontlineSMS team is committed to incubating sector specific solutions. For example, sister projects work with FrontlineSMS to confront challenges in access to healthcare, education, financial credit, legal representation, and media. There are clearly many other sectors in which FrontlineSMS can be utilized, too. In the recent user survey examples emerged from over 15 sectors, including conservation, human rights, and agriculture, amongst others.



Rural Health Midwives in the Philippines getting trained in advanced FrontlineSMS administration. (Photo credit: Molave Development Foundation Inc.)

For FrontlineSMS, winning the $100,000 Buckminster Fuller prize would provide critical support for developing Version 2 of the software; an upgrade that will improve and extend core functionalities, making the software even more user friendly and interactive. Version 2 will help users of FrontlineSMS do more with the software than ever before.

Finalists were chosen by BFI's *multi-disciplinary review team*, made up of 11 distinguished jurors. These include Valerie Casey, founder of Design Accord; David Orr, writer and professor of Environmental Studies and Politics at Oberlin College; Andrew Zolli, producer of PopTech and Danielle Nierenberg, Project Director of State of World 2011; and Sim Vanderyn, visionary ecological design pioneer.

On Wednesday, June 8th FrontlineSMS will be presented to jury members and an audience in New York City. On Friday, June 10th the Winner will be revealed at a conferring ceremony. Both events will take place at The Graduate Center, CUNY. More information about the event is available here.

About the Buckminster Fuller Challenge

The Buckminster Fuller Challenge is the premier international competition recognizing initiatives which take a comprehensive, anticipatory, design approach to radically advance human well being and the health of our planet's ecosystems. The 2011 Semi-finalists are providing workable solutions to some of the world's most significant challenges including water scarcity, food supply, health, energy consumption and shelter. The Challenge is a program of The Buckminster Fuller Institute which aims to deeply influence the ascendance of a new generation of design-science pioneers who are leading the creation of an abundant and restorative world economy that benefits all humanity. For more information on the 2011 Finalists visit the Challenge website. You can visit the FrontlineSMS page here.

> **NOTE**
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> ** The FrontlineSMS user survey received responses from 174 people*

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Thinking outside the phone

By Eric Blantz and Richard Anderson · 1 June 2011
Series produced by Ken Banks, kiwanja.net

In today's installment of our special "Mobile Message" series, Eric Blantz from Inveneo and Richard Anderson from the University of Washington explain how they apply a mix of mobile phones and other technologies to help solve a critical yet common drug supply problem throughout the developing world.

The first SMS, or "text" message, was sent over Vodafone's network in December 1992. By most accounts, it read simply "Merry Christmas." Using just fifteen of the permitted 160 characters, it was an appropriately succinct beginning to what is today *by far* the most widely used data service worldwide. By one estimate as many as 7 *trillion* SMS messages will be sent globally in 2011.

SMS's reach and reliability, combined with its popularity among users, make it particularly attractive to those working on applications for the developing world, where Internet and smart phones are not yet widely available or affordable.

Open source SMS messaging platforms – RapidSMS, FrontlineSMS and others – and rapidly falling prices are fueling an SMS innovation explosion and fostering new thinking about how SMS can be leveraged for *non-mobile* applications.

Enter Smart Connect, a "communication appliance" developed by PATH and Inveneo which uses SMS to improve the reliability and performance of one of the most important systems in all of global health: the medical "cold chain." First, though, a little bit on why the cold chain matters.


Smart Connect v2
(Photo: Eric Blantz)

The Cold Chain

Few if any interventions compare with vaccination as a way to improve human health.

Famously, in the decade from 1967 to 1977, the World Health Organization (WHO) lead a global vaccination campaign against smallpox and, in 1979, officially declared that the disease had been eradicated. The Polio vaccine has come close to this mark, reducing the global incidence of this scourge by over 99% worldwide, and new vaccines for Malaria, HIV and more obscure diseases are in the works.

All told, the WHO estimates that, in 2003 alone, global immunization initiatives saved 2 million lives and UNICEF concludes that by 2015, immunization *could* be preventing 4 to 5 million child deaths each year.

Yet none of this would have been possible without the cold chain: the logistical processes and refrigeration systems that keep vaccines within strict temperature parameters from manufacture through administration. But with over 200,000 vaccine refrigerators in use in the developing world alone (according to PATH), most of them in harsh and remote environments, keeping the cold chain up and running is a major challenge.


Yolaina Health Post, Nicaragua (Photo: Richard Anderson)

Smart Connect

We developed the Smart Connect device to confront communication barriers and address the cold chain challenge by bringing a "digital dial tone" to remote health posts in the developing world.

We started in Nicaragua. During our research we visited rural health clinics in places like Yolaina, El Serrano, and La Fonseca bordering the remote Caribbean lowlands and Pueblo Nuevo, Las Cruces, and Zompopera in the Central Highlands. Each clinic serves a population of about 1,000 people with a staff of one to three.


Doctor with Assistant at El Serrano Health Post, Nicaragua (Photo: Richard Anderson)

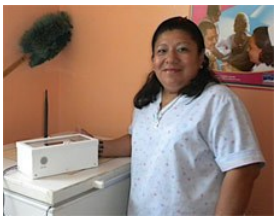
During visits to these remote posts, we learned that it often takes many hours of travel by foot, horse or bus to reach the nearest town. As a result, health workers face long delays in picking up diagnostic test results and submitting reports. Also, problems such as running out of supplies or trouble with equipment go unreported.

It turns out that much of the necessary communication requires just a small amount of data. For example, a nurse in Nicaragua said she would like to know when the clinic lost power, so that she could check the vaccines, and she would like to know when pay was available so she could plan her visit to town. Based on these and other examples, we determined that SMS messages could be used by Smart Connect to send information.

In Nicaragua, we also discovered that – even though cell phones were widespread – health care workers would not consistently have cell phones. Cell phone coverage is often marginal – so some phones would work and others wouldn't, or one had to find a very special place to stand to make a call. With most cell phone users relying on prepaid usage, it is common to have phones run out of credit.

We decided to make Smart Connect a facility based device. Even though it has many parts in common with a cell phone, it is constructed to be secured in place. We did this to improve security of the device, to ensure that the device was associated with the health facility, to allow it to connect with external sensors and to make it possible to connect to an external antenna for improved reception.

One of the first applications for Smart Connect is temperature monitoring of vaccine refrigerators. Refrigerators which regularly drop below freezing are quite common – so it is important to bring these to the attention of cold chain managers. Temporary power disruptions and breakdowns are also a problem since they lead to vaccines getting too hot.


Nurse with Smart Connect device at Pacayita Health Post, Nicaragua (Photo: Eleanor O'Rourke)

Previously, refrigerator temperatures were tracked and recorded by hand with long delays in collecting the records. Now Smart Connect records the refrigerator temperature and sends out alert messages when there is a problem. Messages are

sent to a web site and then automatically relayed to service technicians. A daily summary of refrigerator temperatures is also sent to the web site so that the manager can understand how well the equipment is functioning.



Typical paper-based temperature record. Nicaragua, 2010 (Photo: Richard Anderson)

Beyond temperature monitoring, Smart Connect has the capacity to run a range of additional applications. For example, the Smart Connect deployment in Vietnam includes an application to track the use of vaccines so that that "stock outs" can be avoided. In the future, we plan for Smart Connect to be used with a bar code scanner to be able to read tags on vaccines when they arrive, and a printer to be able to provide receipts of test results to patients.

With Smart Connect we have seen that a small amount of communication delivered by SMS can have a big impact. By "thinking outside of the phone" we have created a custom communication device that meets the specific needs of rural health facilities and improves healthcare services in communities in Nicaragua, Vietnam and beyond.





ABOUT THE AUTHORS

Eric Blantz serves as the Senior Director for Healthcare Solutions at Inveneo. He is responsible for overall approach to this rapidly changing problem area, including strategy, select project management and development of health-specific ICT solutions in collaboration with Inveneo's strategic partners in the health sector.

Richard Anderson is a professor of Computer Science and Engineering at University of Washington and a consultant with the Health Management and Information Systems group at PATH. His professional interests include Computing and Global Health and Educational Technology.

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Texting Home from the Summit

By Laura Hartstone · 28 June 2011
Series produced by Ken Banks, kiwanja.net

Not only has mobile technology spread to all corners of the globe, it's also reaching some of the highest places, too. Mobile phones can today help keep climbers connected with the outside world in places where they would previously have been well out-of-reach.

In this installment of Mobile Message, Laura Hartstone, Co-Founder and Executive Director of the Peaks Foundation, discusses the potential of mobile technology in their work, and how they use it to connect volunteer climbers with their families back home.

Ever wondered what cell phone reception is like from the top of the world? In 2007, Rod Baber, a British mountaineer, became the first to find out. *"Hi, this is Rod. Making the world's highest phone call on the 21st of May,"* he began, and after taking a few breaths continued, *"It's 5:37. It's about minus 30. It's cold. It's fantastic. The Himalayas are everywhere. I can't feel my toes. Everyone's in good spirits. We got here in record time. It is amazing. I cannot wait to get back."*

Mobile phones are an explorer's essential item today, just as common as carrying a Swiss army knife. While we often thrive for the opportunity to "disconnect from the world", there is no doubt we can also be thankful for the amazing capabilities technology presents us today. But Rod is not the only one utilizing these advantages. Peaks Foundation sends teams of women to tackle some of the world's most beautiful mountains and they too, are adventure seekers, but yearn to have their smartphone in reach in the most remote locations – mountain tops.


Photo: (c) Peaks Foundation

In an effort to raise funds for grassroots organizations working to better the lives of women and girls across the globe, the Peaks Foundation recruits teams of women to do the dirty work. The women must climb mountains, literally, in order to generate awareness and funds for the cause. They choose between 1 Peak 1 Week Challenges and 3 Peaks 3 Weeks Challenges. As the names imply, teams have only one week to make it to the summit, or those seeking an even larger challenge, climb 3 back-to-back.

A Call to Climb

In 2007, I chose to take on the very first 3 Peaks 3 Weeks challenge Africa. To say these climbs are a challenge might be an understatement. For me it was an excruciating task to keep myself from exhaustion on Mount Kenya (5199m – 15,057ft), from drowning in tears on Mount Meru (4566m – 14980ft), and from vomiting on Mount Kilimanjaro (5985m – 19360ft).

By reminding myself of the organizations we were helping to benefit – the climb became a cakewalk! Before each climb we visited one of our beneficiaries. In Kenya, we supported the community conservation efforts of the Laikipia Wildlife Forum. We boated across a river to visit a small lodge that was run by a group of

women. Their initiative and drive was inspirational and their profits reached all in their community.

At the base of Mount Meru in Tanzania, we visited the School of St Jude, and their effort to provide the most underprivileged and impoverished children, especially girls, with an education. And before climbing Kilimanjaro we met with Support for International Change to see how they are addressing one of the continent's most pressing health issues, HIV/AIDS.

A Buzz from Basecamp

In the lead up to the climb, our team of ten women was successful at raising over US$360,000. By the time we reached base camp, endless supporters, donors, family and friends were cheering us along. But this was no marathon. Our family and friends stayed home eagerly awaiting news of our journey. In an effort to keep them tied into the cause and the adventure, we kept them updated. And not with postcards.


Photo: (c) Peaks Foundation

With the use of FrontlineSMS we needed very little technology to let the world know where we were and how we were doing. Prior to climbing we asked all supporters to "subscribe" to our LIVE updates, and in return, we promised to send an SMS to them daily, whether we were descending a steep ridge line or standing on the summit. At times the SMS's are very sincere, and every once in a while it is clear that slight altitude sickness causes a bit of funny chatter.

"Team was greeted by a beautiful sunrise on the summit of Mount Kenya yesterday morning. Also a monkey ate our soap." – SMS from 2010 3 Peaks Africa team

"We ROCK! All 11 of us summited Kili this morning at 7:15am. Delighted, excited and exhausted!" – SMS from 2010 3 Peaks Africa team on summit of Kilimanjaro

With smartphones, it is now possible to not only send text updates, but also to send pictures. Now rather than telling friends and family what it looks like from the summit – it's possible to show them in just an instant!

Mobile Women


Picture messages from the mountain. Photo: Peaks Foundation

For Peaks Foundation teams one of the most rewarding aspects of using FrontlineSMS is that they have the ability first-hand to demonstrate its capabilities to our grassroots organizations working on the ground in India, Kenya, Morocco, Nepal, Peru, Rwanda and Tanzania – who have the ability to use the platform to help save lives and protect parks, among many other things.

As a group of women, Peaks Foundation climbers hope that disadvantaged women will be given the opportunity to utilize benefits from mobile technology. The GSMA is spearheading an initiative, mWomen, to enable women the opportunity to utilize phones for health services, banking, employment opportunities and educational tools. They surveyed women in disadvantaged areas and found that 41% have reported an increased income and professional opportunities once they owned a mobile phone and 93% feel safe because of their mobile phone. However, worldwide, a woman is 21% less likely to own a mobile phone than a man. Peaks, too, aims to encourage its partner organizations to recognize this importance.

So while there is a certain beauty in leaving home and traveling to some far off remote place, where the internet is unplugged and mobile phone towers are out of reach, there is a fantastic feeling to stand on top of

a mountain and phone home to share your success.

Full details on the work of the Peaks Foundation – including information on how to get involved in a challenge – are available on our website.



ABOUT THE AUTHOR

Laura is based in East Africa where she writes for several conservation and travel publications. Together with Chloe Chick, Laura helped to launch the 3 Peaks 3 Weeks Challenge and was part of the original 2007 team. Prior to moving to East Africa, Laura worked with the Grameen Foundation Technology Center based in Seattle, WA. Laura holds a B.A. in International Studies from the University of Arizona and received the Honor's College award for an Outstanding Commitment to Social Responsibility. She is undertaking a Masters of Science in Wildlife, Biodiversity and Ecosystem Health with the University of Edinburgh.

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Climate Information Alerts for Poor Farmers

By Riedner Mumbi and Polly Ghazi · 18 August 2011
Series produced by Ken Banks, kiwanja.net

There are few greater challenges facing rural farmers in the developing world today than climate change, as the current drought in the Horn of Africa demonstrates so clearly.

In this installment of Mobile Message, Riedner Mumbi and Polly Ghazi explain how mobile technology is being increasingly used to get crucial information out to poor farmers in Zambia, helping mitigate against climate risks and improving food security.

A herder shepherding his animals in Zambia's Eastern Province winds up a solar-powered radio and crouches down to listen to a local FM station. The news broadcast includes a warning that a severe storm is approaching his village. The herder reacts instantly, finding shelter nearby for his animals, which later emerge from the storm unscathed.

Such a scene may be played out increasingly in the future across Africa, where the livelihoods of rural inhabitants are critically dependent on weather and climate. Most are peasant farmers who depend solely on rain for their crop production. A single extreme event such as a major flood or prolonged drought can not only cause loss of life, but also economic setbacks equivalent to years' worth of development.

As climate change intensifies, bringing more extreme weather, as well as seasonal and longer-term changes, effective adaptation for rural regions of Africa will depend on timely and accurate advance information. Early warnings will enable farmers to shelter their animals and protect their income and families. In addition, the collection and distribution of local rainfall information can help smallholder farmers to adjust their crop production methods to changing seasonal precipitation patterns.

The Zambian government has been one of the first in Africa to recognize this need. Through its RANET (Radio and Internet for the Communication of Hydro-Meteorological Information) Project, the Zambia Meteorological Department is tapping remote communities across several provinces to collect climate information. In the past four years, some 3,060 farmers have been provided with rain gauges to take rainfall measurements which are then fed back to the meteorological service's local weather stations through mobile phones. Farmers are also encouraged to report other local weather observations. To motivate farmers taking part, RANET periodically recharges their phones with free airtime, and project managers are now testing the FrontlineSMS software to help minimize the service cost. This would enable rural participants to send SMS – text messages – to the RANET centre free of charge.



Text messages are a crucial source of information for many people in the developing world. Photo: Ken Banks, kiwanja.net

The results have been so encouraging that the Zambian Met Office is now considering providing automatic weather stations and rudimentary meteorological training to rural farmer cooperatives across the country.

In order to help remote rural areas receive (as well as collect) timely weather and climate information, the RANET Project sends weather alerts via SMS text and has also been assisting rural areas to establish community FM broadcasting stations. These pick up regional climate information from satellites, translate relevant weather information into local languages and are then used to broadcast timely warnings over extreme weather, such as storms, as well as seasonal climate information.

So far the project has helped launch five stations, with two more in the pipeline, and is cooperating with another nine. Each station can broadcast information to farming communities within a radius of 40-60km. RANET has also installed 49 digital radio satellite receivers to enable the FM stations to access satellite-based weather and climate information.

The project provides communities with solar wind-up radio receivers to access the broadcasts, 3,000 of which have been distributed across rural regions to date. The stations also host programs that help educate citizens on the effects of weather on their crops. Reinforcing these messages, RANET also provides climate information to agricultural extension workers who can interpret it for farmers and help them apply what they learn in their daily farming activities. In Mali, similar weather forecast bulletins, broadcast every 10 days, have helped low income smallholder farmers to increase yields by providing vital information on when and what to plant, depending on the climatic conditions.

While community radio broadcasting struggles to survive commercially, and therefore depends on government and non-governmental organizations to sponsor their programs, this is worthwhile investment. Quite simply, radio broadcasting is the most cost-effective and cheapest way for information dissemination and education, and can play a valuable role in societies facing climatic extremes.



FrontlineSMS software is used to disseminate bulk text messages to the farmers from a single computer. Photo: Ken Banks, kiwanja.net

Not content with radio and cell phone networks, RANET, with support from the USAID Office of U.S. Foreign Disaster Assistance, is also piloting the deployment of an innovative communication device called Chatty Beetle. The device is both a terminal and a system designed to provide emergency weather alerts and instructions to remote locations with limited means of communication with the outside world. It sends messages and short status reports (of 160 characters or less) via a small screen between emergency managers and warning authorities, as well as notifying communities of potential hazards. Since speed is critical when warning vulnerable communities of the onset of disasters such as cyclones or major floods, the Chatty Beetle, which transmits even faster than the Internet, shows much promise.

With more than three quarters of the world's population now served by mobile networks, and additional efforts underway to reach the rest, the RANET approach to climate and emergency preparedness information has huge potential for scale up.

Current RANET funding and technical partners include the National Oceanic and Atmospheric Administration (NOAA), National Meteorological Services, First Voice International (formerly World Space Corporation), Free Play Foundation, UNDP, SNV, GTZ, DFID, World Vision, Africare, the Red Cross, and many others.

> **NOTE**
>
> *The World Resources Report 2010-2011 will be published in August and can be read here.*

Riedner Mumbi is a consultant on the RANET system. Polly Ghazi is a writer and editor at the World Resources Institute (WRI). This article was originally published on allAfrica.com and is reposted with permission.

Mobile Message is a series of blog posts about how mobile phones are being used throughout the world to improve, enrich, and empower billions of lives. Mobile Message is produced by **Ken Banks**, innovator, anthropologist, National Geographic Emerging Explorer and Founder of kiwanja.net / FrontlineSMS. He shares exciting stories in Mobile Message about how mobile phones are being used throughout the world to improve, enrich, and empower billions of lives. You can read all the posts in this series, visit his website, or follow him on Twitter.

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Appropriate technology: Lessons from nature

By Ken Banks · 31 August 2011

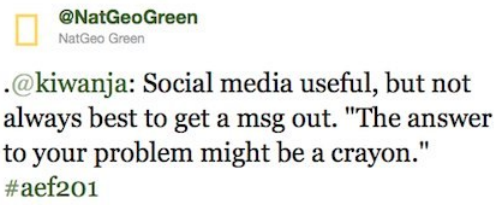
In this installment of Digital Diversity we take a temporary departure from mobile phones to look at how nature can be used to inspire some of our own modern day technological solutions. Digital Diversity is a series of blog posts about how mobile phones – and technology more broadly – can be used throughout the world to improve, enrich, and empower billions of lives.

"Our life is half natural and half technological. Half-and-half is good. You cannot deny that high-tech is progress. We need it for jobs. Yet if you make only high-tech, you make war. So we must have a strong human element to keep modesty and natural life"

Nam June Paik, Artist (1932 – 2006)

There's a saying in the technology world which asks "What would Google do?". When I'm confronted with a problem, I'd rather ask "What would nature do?". Why? Well, if you believe Google have the answer then you're immediately assuming that modern technology – in some shape or form – is the solution. More often than not that's the wrong place to start.

I recently sat on a panel at the Aspen Environment Forum which focused on the use of social media in the environmental movement. (You can watch the video here, or read my summary of whole the event here). Many people had already made their minds up that Facebook, Twitter, YouTube and so on were 'the' answer, before really thinking through what they were really trying to do, what their message was, or who the different audiences would be. That's also the wrong place to start.



Asking what nature might do immediately pulls us away from looking for a modern, high-tech solution and more towards a simpler, low-tech (and potentially more appropriate and sustainable) one. It also encourages us to think entirely out-of-the-box.

So, if you were to ask "What might nature do?", what kind of solutions might you come up with which you otherwise might not have?

1. Elephants

Some of my earliest mobile work back in 2003 was in Southern Africa where I was asked to help understand and apply modern communications technology to local conservation efforts. One of the bigger problems people were trying to tackle back then was human-elephant conflict – elephants 'encroaching' on farmland and destroying livelihoods literally overnight. In response, some farmers resorted to poisoning or shooting elephants. Not a good conservation outcome.

All kinds of modern technology solutions were proposed, and many trialled, to try and solve the problem. Electric fences, RFID tagging, sensors and live-GSM-tracking among them. Few proved as successful as hoped, or particularly replicable or affordable.

So, what might nature do?


Keepers protect the hives. Photo credit: Save the Elephants

It turns out that elephants run a mile when they encounter bees. According to this BBC article, early research in Kenya indicates hives can be a very effective barrier, so much so that 97% of attempted elephant raids were aborted. Where satellites, RFID tags and mobile phones failed, humble honey bees might just be the answer.

2. Pigeons

Each summer, as tennis players battle it out on the lawn courts at Wimbledon, the authorities do battle trying to stop pigeons interfering with play. All manner of modern technology is available to deter birds – lasers and radio controlled aircraft to gas guns and ultrasound emitters. Again, each have varying degrees of success and many can be expensive.

What would nature do?

Wimbledon's answer doesn't involve anything more high-tech than a bird of prey. A few laps by Rufus around the tennis courts are enough to scare the hardiest of pigeons away. No batteries – or lasers, or sound emitters – required. Simple, sustainable and replicable.

3. Wasps


Image credit: Waspinator

You'd be forgiven for thinking that the grandly-named "Waspinator" was a little black box with wires, buttons and flashing lights. No doubt there have been attempts to develop high-tech wasp deterrents in the past, but the Waspinator isn't one of them. In fact, if you saw one you'd likely be a little disappointed. This particular solution looks like nothing more than a brown paper bag. *But don't be fooled – nature has very much influenced its development.*

According to the website:

> *The Waspinator is a fake wasps nest. Wasps are very territorial and will aggressively defend their nest against wasps from another colony. When a foraging wasp sees another wasps nest it will rapidly leave the area for fear of being attacked by the nest's defenders.*
>
> *Wasps have a very long range of vision and when they see a Waspinator they think it's an enemy wasps nest and quickly leave the area for somewhere safer, leaving the area around the Waspinator completely free of wasps*

It couldn't be simpler. And no moving parts (if you exclude the wasps).

So, drawing on these examples, what five lessons does nature teach us?

1. Understand the context of your target audience/user.
2. Use locally available materials wherever possible.
3. Low-tech is not poor-tech.

4. Keep it simple.
5. The answer is likely already out there.

> **NOTE**
>
> *Next time we look to develop a technology solution to a problem, we might be best asking what nature might do before turning to the likes of Google, or any high-tech solution provider for that matter. Mother Nature usually knows best.*

Digital Diversity is produced by **Ken Banks**, innovator, anthropologist, National Geographic Emerging Explorer and Founder of kiwanja.net / FrontlineSMS. He shares exciting stories in Mobile Message about how mobile phones – and technology more broadly – is being used throughout the world to improve, enrich, and empower billions of lives. You can read all the posts in this series, visit his website, or follow him on Twitter.

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In African agriculture, information is power

By Sarah Bartlett · 5 September 2011
Series produced by Ken Banks, kiwanja.net

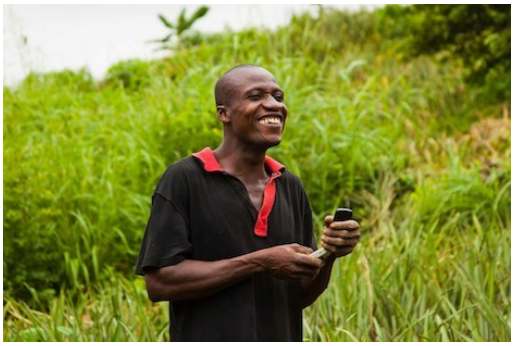
You don't have to spend long in many African agricultural markets to realise the need for better information. Farmers lack prices, traders need transport and new contacts, projects and governments need a better way to reach out to people, businesses lack real-time updates on their stock and the value of their harvests. The list goes on.

In this installment of Mobile Message, Sarah Bartlett – Director of Communications and Research at Esoko - explains how African technology is being used to power agricultural markets across Africa, filling an 'information void' for local farmers in the process.

Standing in the heart of his pineapple farm in the Central Region of Ghana, Ali Morrison, gripping two mobile phones, tells the story of his most recent sale. Traders came to him offering just .20 Ghana cedis for each pineapple. That's about 13 US cents. This time around he and his business partner, Isaac Assan, had their mobiles on hand and did a quick SMS price request to Esoko. He sent in the word "pineapple". He received a list of prices covering the major markets in Ghana.

In the past farmers like Ali and Isaac have had no choice but to blindly accept the prices offered by traders. But the recent and sudden ability to refer to current prices across the country disrupts that whole dynamic. It gives farmers confidence that they didn't have before, and it takes away the opportunity for traders to lie about prices in faraway markets. Knowing the trader would resell in the capital city's market for .80 cedis each, Ali wouldn't budge until he got .40 cedis. He doubled his profits that week, making 400 Ghana cedis instead of 200. That's US$165 more. And just for the price of a text message.

It's only until you hear these stories that you can actually wrap your head around the information deficit in rural areas across Africa. Just think for a moment about the amount of information you have at your fingertips everyday. Now slowly take sources out of the mix. Newspapers, magazines, out. Email? Gone. TV vanishes. Both Internet and smartphones disappear. You're basically left with your neighbors, the radio, and that simple phone. Now imagine trying to make a sale.



Ali Morrison at work on his pineapple farm in the Central Region of Ghana. Photo credit: Sarah Bartlett, ©Esoko

Seeing Ali access current prices – like a stock trader accessing Reuters – shows just how powerful information itself can be. Farmers are business people too. But they can't do good business if they don't have information. Ali's story about using Esoko's SMS prices to increase revenues is not the only one we've heard recently. Mobile technology is just beginning to take center stage here, and it's remarkable to watch.

Back in Accra, the team at Esoko is busy building the technology platform that makes all of this possible. The

company itself had very humble beginnings. Just three technicians trying to figure out why no-one had quite cracked what they saw as the biggest riddle out there. With mobile coverage rates in Africa around 60% and at least 60% of the African population making a living through agriculture, why had the two not been addressed together? There seemed to be such an opportunity in that gap.

Esoko's first steps came then, and it's been growing ever since. The entire platform revolves around text messaging – using SMS to share information like prices, farming advice, and pick-up points as well as using SMS to gather information like offers, harvest data, and stock levels. All of these tools are managed on Esoko's web platform, though most users only interact with the system using their mobile phones. The idea is that when individuals and businesses have access to the right kinds of information, supply chains will tighten up. Waste will be reduced. Revenues will increase.

The mobile phone is the key factor that makes Esoko different than other market information systems or services of the past. With mobile, Esoko can tailor specific content to each user. That makes a change from radio. Mobile phones also end up acting as mini-databases – farmers have been saving their SMS messages, trending prices and deciding when to sell. They can save farming advice on their phones for future reference. People in the field are finally given a voice too. They can text in to their association or business partners about a pest infestation or about how much they want to sell. Businesses and projects in turn can actually make decisions based on real-time field data. And being able to track activities throughout an entire supply chain will reduce the risk for factories and mills to invest.



Members of Esoko's technical team at work in Accra, Ghana. Photo credit: ©Louis Jouve Photography

Of course it's not the mobile phone or the text messages alone that will make the service a success. Esoko simply built a tool using the most appropriate channel (SMS) to move information from one place to the next in rural areas. It's the information itself that holds the power, and everyone is hungry for more. One huge realization that came along the way was that this tool wouldn't just be for individuals, but also for businesses and projects to improve communication and efficiencies inside their organizations. So in an interesting twist, Esoko chose a for-profit model. That's what will make it sustainable, and that's the best way to ensure the company continue responding to the needs of the market. Charging larger projects and businesses to use the technology also allows Esoko to offer the more simple prices over SMS service to individuals for the cost of a regular text.

Today there are over 60 developers and support staff in Esoko's Accra office. They write and test software code, design the product, train users, and conduct research on how Esoko is changing market dynamics. There's great pride in knowing that Ghanaian software has been outsourced to fifteen other countries so far and counting. There's also a sense of awe and exhilaration knowing that what's being built here can double the profit of a rural pineapple farmer across town, across the country, or even across the continent. And all through a simple SMS.



ABOUT THE AUTHOR

Sarah Bartlett is the Director of Communications and Research at Esoko. Her work focuses on the intersection between culture, technology and development.

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Information as aid in East Africa's famine

By Airlie Taylor · 19 September 2011
Series produced by Ken Banks, kiwanja.net

In any emergency, be it natural disaster or man-made, long- or short-term, people's lives are turned upside down. Knowing what's happening, where to go for assistance and who to call for help is crucial to their survival and recovery.

As famine is declared in six regions of neighbouring Somalia, this edition of Digital Diversity highlights the work of ActionAid in improving vital communication with drought-affected populations in northern Kenya.

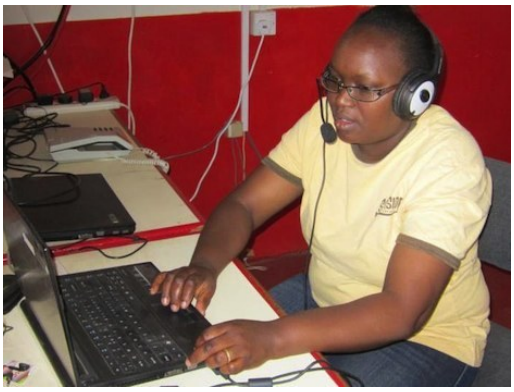
In partnership with "infoasaid", a collaboration between the BBC World Service Trust and Internews, ActionAid is rolling out a project in Isiolo district, Kenya which aims to help combat food insecurity amongst communities affected by the ongoing drought.

The project uses innovative technology – FrontlineSMS and Freedom Fone – to transmit information simultaneously to multiple recipients from a laptop computer.

Basic mobile phones and solar chargers were provided to 250 Relief Committee members who live within the communities we are working with, and who are themselves recipients of food supplies provided by ActionAid.

ActionAid's Data Officer in Isiolo, Rahab Mburunga, explains how the project works.

"I'm in charge of the communications hub in Isiolo which coordinates communications with the communities we are working with on drought response in Isiolo district. Every Monday I receive a list of livestock prices from the Ministry of Livestock and input them in shorthand into the FrontlineSMS system. The information is then sent out via text message to Relief Committee members and ActionAid's Food Monitors, who are based within communities. The Food Monitors then transcribe the livestock prices, in the local language, onto a bulletin and post it on a noticeboard in their community. They then organise a community gathering to alert people to the fact that new information is available and talk through the prices. I follow the same process to provide information on staple food commodity prices in Isiolo market, using information sourced from the Ministry of Agriculture".



ActionAid's Rahab Muburunga records a voice message using Freedom Fone software. Photo: ActionAid

The livestock market information empowers drought-hit pastoralists to achieve better prices for animals that they sell to traders – boosting their cash income. The food price information allows them to keep tabs on the price of staple foods such as maize, beans and vegetable oil, on which they increasingly depend in times of drought.

Illiteracy rates in the area are high, so the project has set up a recorded message service to complement information sent out by SMS. It allows members of the public to hear the same market information spoken in Kiswahili by calling a special information line.

"Using Freedom Fone software, I record and upload messages on livestock and food prices," continues Rahab. "Relief Committee members and members of the communities we work with can call if they want to hear the information directly. I record two new messages a week – one on a Monday and one on a Friday. We are also looking into providing additional information on the recorded information line – mainly on weather conditions with information from the Meteorological Department, and other humanitarian information such as on healthcare, from the Department of Health. It's important that the messages we record and send out, either through Freedom Fone or FrontlineSMS, have a legitimate source so that people trust the information we are providing".



Sara, a Relief Committee member from Kenya, with the system she uses to receive humanitarian information from ActionAid via FrontlineSMS. Photo: ActionAid

"The Freedom Fone line also allows community members and Relief Committee members to leave messages with information direct from their communities. It's particularly useful for illiterate members of the community, who may be unable to write text messages. Recently we received text messages from Relief Committee members reporting outbreaks of disease amongst livestock in Garba Tula. When we receive such information we pass it on to the relevant government department, in this case the Ministry of Livestock".

Together, the two channels of mobile information allow pastoralists living in isolated communities to access reliable and up to date market information. They also allow ActionAid to keep in closer touch with the village relief committees that handle food distribution to individual families.

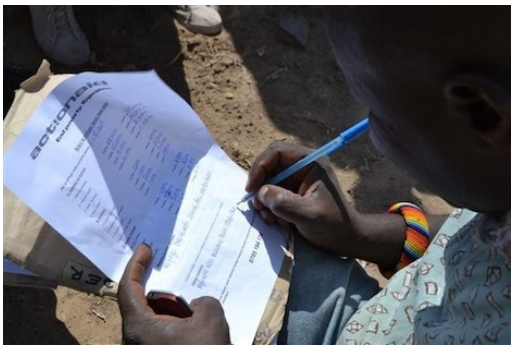
Faster data gathering from the field

An additional aim of the Isiolo communications project is to speed up collection of vital data from the field.

Using FrontlineSMS, ActionAid is able to send electronic forms to the mobile phones of our field staff in Isiolo County. These forms can be filled in electronically and returned immediately to our office in Isiolo in the form of SMS messages.

These forms are now being used to transmit time-sensitive reports on activities such as food distributions and food for work programmes, as well as information on malnutrition rates and local food prices between the

Food Monitors and our staff in our Isiolo office.



Romano Nasur, Food Monitor with ActionAid in Kenya, transcribes information on livestock and food prices received via SMS to a community bulletin. Photo: ActionAid

"We use the FrontlineSMS forms to inform Food Monitors about when the next consignment of food supplies will be delivered to their community, whether any supplies are missing from the pipeline on any given week, and if there are any delays in dispatching the supplies," explains Rahab. "At the same time, the Food Monitors text us information reporting back on how food distributions have gone – whether all community members attended a distribution, and whether they received the correct rations".

"This project is important for ActionAid because we can get feedback directly from the communities, whereas previously information came only through the Relief Committee members. It also helps establish a better relationship between the communities we are working with and ActionAid. I enjoy this work – it is very quick and easy to do, and makes a big difference to both ActionAid and the communities we are working with".

This communications project in Kenya is part of a wider ongoing partnership between ActionAid and infoasaid, aimed at integrating two-way communications with disaster-affected communities in our emergency preparedness and response programming. This in turn improves the effectiveness of aid delivery.



ABOUT THE AUTHOR

Airlie Taylor is Communications Officer for ActionAid's International Emergencies and Conflict Team, responsible for promoting understanding of ActionAid's human rights based approach to emergencies and conflict. She is also leading ActionAid's engagement with the infoasaid consortium to integrate communications with disaster-affected communities in ActionAid's emergency preparedness and response programming, and is an active member of the Communicating with Disaster Affected Communities Network.

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A powerful combination: Radio and SMS promote open dialogue in Chad and Niger

By Prairie Summer and Lucy Lyon · 5 October 2011
Series produced by Ken Banks, kiwanja.net

In the age of Twitter, the blogosphere, iPhones and Androids, it is often difficult for people in more developed nations to imagine what it is like to have no voice. Yet for populations not served by broadband Internet and Wi-Fi connections, exclusion from national dialogue and debate continues, leaving many communities and people out of the conversation on social and political issues.

*In this edition of **Mobile Message**, Prairie Summer and Lucy Lyon – both from Equal Access International – explain how their organisation helps bridge this divide by using mobile phone text messaging (SMS) and radio to engage with their listening audiences.*

Equal Access International (EA) works to include communities in matters of national dialogue with the help of FrontlineSMS' groundbreaking technology. EA specializes in educating and empowering people in some of the world's most remote regions through media and community mobilization. With millions of regular listeners, our media programs leverage radio dramas and chat shows, mobile theatre, television shows, listening discussion groups, leadership training and community actions to foster positive change.

Linking our innovative methodology with technology like FrontlineSMS, we have been able to convert a traditionally one-way information flow into an open dialogue, allowing listeners to express their ideas, perspectives, questions and feedback, sometimes for the first time in their lives.

EA has been using FrontlineSMS in Chad and Niger since late 2009. We produce six radio programs in these two countries and, for each show, listeners can send text messages to a dedicated telephone number, which is toll-free in Niger. The radio stations receive messages from thousands of listeners, some in response to questions posed on the radio program and others sharing their views and commentary on the programs. During an 18-month period 1,119 messages were received in Chad and 2,330 messages were received in Niger.


A Community Reporter interviews a villager in Niger. Photo: Equal Access

In Chad, Equal Access produces a youth radio show titled "Chabab Al Haye" (Youth Alive) which uses a presenter-led chat show format to discuss peaceful ways of addressing grievances, tolerance, livelihoods information and problem solving. Listeners can send in feedback through our FrontlineSMS system asking questions, such as this young listener who texted:

"I lived for a little while in the North, and I noticed that tribalism still exists there. The young people from the North and South avoid relating to one another. How do we get past this behavior?"

Questions and comments like this one can be featured on our radio programs and discussed, helping youth from all reaches of the country feel included in the conversation.

Perhaps most importantly, we use FrontlineSMS to create interaction with the radio programs and include listener feedback in the programs, to show listeners that they are being heard. In closed communities, or those struggling with violence or intolerance, the act of engaging in an interactive dialogue via a mass communications platform such as a radio can help people feel engaged and included. As one young listener in Niger texted:

"[EA's youth show] Gwadaben should be congratulated because it is an essential environment for young people, where we can discuss and address the questions that concern us"

In Niger during the pre-election period running up to the peaceful and democratic transition from a military junta to an elected civilian administration, radio listeners around the country were able to express their views about positions and candidates through SMS messages in response to our radio programs. The messages contributed to a more open and inclusive debate because audiences were able to connect to program producers directly through a toll-free SMS message line.



Inside the Equal Access recording studio in Niger. Photo: Equal Access

We also noted a measurable increase in the number of responses we received when radio stations began reading out the text messages received from listeners on the radio programs. We have learned that audiences like responding to questions posed on the radio program and this was verified through audience research conducted by InterMedia in Chad and Niger in 2011. That research also showed us that producers should remind audiences of the phone numbers after asking questions on the radio program, allowing audiences to respond in real time. In addition to engaging the listeners in the conversation, FrontlineSMS allows EA radio producers to increase their responsiveness to listener preferences and needs.

Since life in capital cities, where our production hubs are generally based, is far removed from the rural communities of many of our listeners, the feedback on SMS also provides a window into cultures and customs of remote tribes and communities. In this sense, FrontlineSMS has proved to be a vital data collection tool and link between increasingly disconnected urban and rural communities.

EA has also integrated FrontlineSMS into our programs in Cambodia and Nepal and plans to do so in several of our other projects around the world, building on our experiences and lessons learned so far.


A Community Reporter in Cambodia recording for our "We Can Do It" youth show. Photo: Equal Access

With our popular programming and the increasing reach of mobile phones, the volume of SMS interactions with our shows continues to rise and we look forward to the future versions of FrontlineSMS which will be able to handle this increased traffic. Although the FrontlineSMS software is not as robust as commercial applications equipped to handle thousands of messages per minute for advertisement campaigns and commercial contests, the simple interface and availability in Arabic and French makes FrontlineSMS a great choice for our projects.

In the future, we plan to continue innovating with FrontlineSMS, including using the keywords feature of the SMS system and allowing listeners to join groups by texting in specific words. For example, users could text in the name of their favorite drama character, which would place them in a contact group to receive regular updates or a special mobile drama mini-series about the character. We are also implementing FrontlineSMS to enable radio presenters to ask multiple-choice quiz or poll questions that test audience message retention and to send out 'flashes' – an SMS sent to an audience contact list that informs listeners about the next radio broadcast time on their preferred station.

We are keen to continue exploring the many potentials of making our radio shows more interactive using FrontlineSMS.

English versions of our radio programs in Chad and Niger can be heard here:

"Chabab Al Haye" (Youth Alive):

[Audio clip not available in this PDF]

Gwadaben Matasa (Youth Boulevard):

[Audio clip not available in this PDF]

You can also watch a **short video** on how we use FrontlineSMS in our Peace through Development (PDEV) program – *"Ideas come from the community and what is produced goes back to society again"* – available on the FrontlineSMS community pages.

Finally, if you're interested in the combination of SMS and radio, check out the FrontlineSMS:Radio website



ABOUT THE AUTHORS

Prairie Summer is the Director of Communications and Development for Equal Access International (EA). She is responsible for grantwriting, building partnerships and sharing the impact of EA's work. Equal Access International's mission is to create positive social change for millions of underserved people in the developing world by providing critically needed information and education through innovative media, appropriate technology and direct community engagement. Combining the power of media with direct community engagement, EA addresses the most critical challenges affecting people in the developing world in the areas of youth life skills & livelihoods, women's and girls' empowerment, human rights, health, and civic participation & governance. An avid reader and traveler with extensive international development and communications experience, Prairie has lived and worked in Jordan, Lebanon, and Nepal and is now based in San Francisco, CA.

Lucy Lyon is a London-based documentary-maker who worked with Equal Access International for two years in Afghanistan, and latterly in Chad and Niger for the start-up and implementation of the Peace Through Development (PDEV) program between 2008 and 2011. She produced and co-directed "This is my Destiny" a ground-breaking film about the impact of drug use on Afghan men, women and their families which is currently being distributed for broadcast throughout Europe. She also filmed, produced and directed a short film, "The Leaders of Change" showing the impact of the PDEV program through the testimonies of local radio producers, community reporters and Islamic leaders.

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Mobile meets farmer: Stories from Kenya

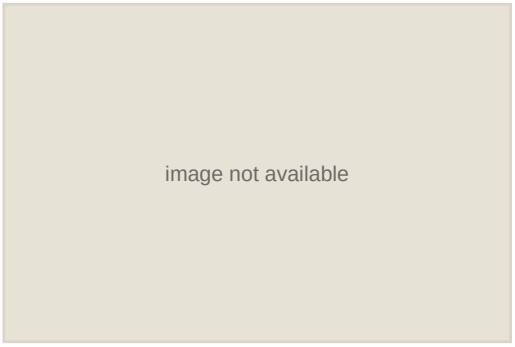
By Clare Salisbury · 3 November 2011
Series produced by Ken Banks, kiwanja.net

As modern communication becomes more ubiquitous in the developing world, increasingly working its way into the lives of rural communities, opportunities to use mobile phones to connect people with each other and the outside world continue to grow.

*In this edition of **Mobile Message**, Clare Salisbury – a recent MA in Multimedia Broadcast Journalism at the University College Falmouth – shares her interest in how mobile and Internet technologies are influencing small scale farmers, food producers and NGOs in the developing world. Clare is making a radio documentary on the impact technology is having on administering aid in Africa, and she recently visited Kenya as part of her research.*

In the summer of 2011, I traveled to Kenya to make a multimedia documentary about the impact of mobile phone technology on farmers and NGOs that support them. Although I was prepared to see mobiles everywhere, driving from the airport into the city, I couldn't believe the enormous billboards advertising mobile operators which lined the motorway. The next morning, I sat in a shopping mall in Nairobi and watched as people literally battled for space inside the nearest mobile phone store. People were even queuing to get in the door.

This is, of course, just another day in the capital. During my week in Kenya I would see that the real changes are happening in the hands of people based in rural areas. For these people, the possibilities opened up by access to a mobile handset are life changing.



A small village shopfront offers mobile banking services to the community. Photo: Clare Salisbury

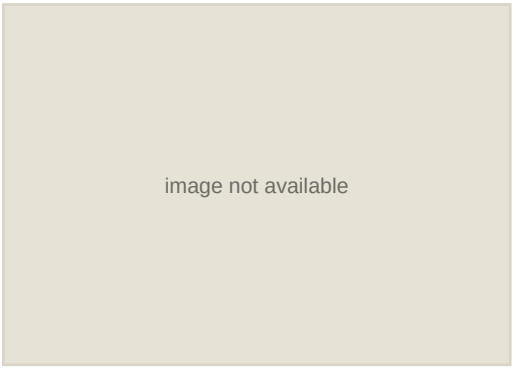
Whilst in Nairobi I met John Cheburet who founded a radio programme in 2008 to complement the work of The Organic Farmer's magazine and other outreach work. His programme focuses on agricultural techniques in a programme aired on two national radio stations.
John uses FrontlineSMS to manage the growing number of text messages he receives from the farmers who tune in every week. It's a great tool as far as production goes; especially because he can send reminders to his listeners about upcoming programmes. John also admits that it's a great way to think up content, for example – if he wants to make a programme on successful chicken farming techniques, he can easily find a farmer who's working with chickens to interview by flicking through his SMS message inbox.

Moreover, this feedback ensures his programmes are reactive to the opinions of the listeners which enriches his programme. 'Farmers know things', he told me, 'for a radio programme to be interesting, there has to be a two way communication.'

But as I found out later in my trip, this conversation facilitated by FrontlineSMS is happening in more than just two directions. In Busia, a border town between Uganda and Kenya in the western region of the country,

I met Emmanuel: a small scale dairy farmer who trains his peers and neighbors as part of the Send A Cow project.

He was carrying a copy of The Organic Farmer magazine. It turned out he never misses an installment of John's radio programme on the Kenyan Broadcasting Corporation (KBC). I asked him whether he ever texts into the show. He said he does, and that through the programme, he has made contact with other small scale farmers across the country and exchanged many ideas and techniques.



Florence is a dairy farmer from Busia. She can receive information and veterinary help via her phone. Photo: Clare Salisbury

Emmanuel had clearly been motivated by the success and potential of text messaging. He told me how he encourages all the farmers and he helps to train them to use SMS effectively. This encounter was fascinating and it showed me that whilst the concept of text messaging is a simple two way dialogue, combined with a powerful radio presence, the two way conversation is only the beginning. As John said to me back in Nairobi; when he is producing, he likes to imagine that as well as disseminating information on The Organic Farmer, he is really only contributing to a much bigger knowledge exchange throughout the farming community.

I learned during my trip that mobile phones are changing the future for the small scale farmers in Kenya. And the many potential benefits of mobile technology continue to be explored. Spending a day in Nairobi's sophisticated iHub innovation space for the tech community offered me an enormously exciting insight into what mobile technology tools could be to come for farmers in Kenya and across Africa, too. As international infrastructure accelerates to accommodate the technology being developed, farmers in Africa are increasingly able to benefit.

Further information on the powerful combination of mobile and radio can be found on the FrontlineSMS:Radio website.

ABOUT THE AUTHOR

Clare Salisbury is a freelance broadcast journalist based in the UK. In July 2011, she travelled to east Africa to produce and present a multimedia documentary, Aid20 on the impact mobile phones are having on aid and agriculture. Clare has recently graduated from University College Falmouth with an MA in Multimedia Broadcast Journalism, and pursues an interest in technology for international development in her ongoing blog. Aid20 was partially funded by One World Media. You can find Clare's full radio documentary, as well as more audio and photos from her trip, on her website.

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Mobile phones and the power of data collection

By Joel Selanikio · 17 November 2011
Series produced by Ken Banks, kiwanja.net

As modern communication technologies become more ubiquitous in the developing world, increasingly working their way into once disconnected rural communities, opportunities to use mobile phones to collect and share valuable (and often critical) information grow.

*In this edition of **Mobile Message**, Joel Selanikio – a practicing pediatrician, former Wall Street computer consultant and former Center for Disease Control epidemiologist – explains why mobile and Internet technologies are transforming health, conservation, and research around the world.*

In 1995, I was working as a health officer for the US Centers for Disease Control and Prevention (CDC). One evening found me kneeling on the concrete floor of a small hostel in rural Western Kenya, pocket knife in hand, laptop on the floor in front of me. With the hostel manager's permission, I was hand-splicing the one telephone landline embedded in the wall to the port on my laptop – in order to connect to the Internet via a phone number in Nairobi.

The hostel had electricity a few hours a day, that one landline phone, and water for bathing provided by an older man leaving a large bucket of steaming water outside my door every morning sometime between 6 AM and 8 AM.

After I had twisted the four colored wires sprouting from the wall cable, and connected them with the corresponding port in my laptop, I hit the return key and heard a sweet sound: the raucous squawks of the dial-up model. That meant that I was connected to the Internet, even in this little hostel, even in rural East Africa.

Moments later, I was checking my email and my bank accounts, submitting a report to my supervisor back in Atlanta, reading the front page of the New York Times – and in the back of my mind I knew that this would change everything, and that the information famine in large parts of the world was about to become an information glut.

Of course, this was just the first sound of thunder. In 1995 few Kenyans could afford a desktop or laptop computer to connect to the Internet, much less the exorbitant charges for Internet access. In 1995, Internet access was reserved for foreigners and the rich.

In the last five to ten years, though, lightning has truly struck as the mobile phone companies, like Nokia, and the mobile providers, like Vodafone, have figured out a way to be commercially successful selling handheld computers – which we call mobile phones – at very low prices. And these devices are increasingly capable of connecting to the Internet.

Today in Kenya, mobile phone penetration is about 50% (50 mobile phones for each 100 people in the population), and 100% in the cities. Twenty-dollar mobile phones are commonplace, and it is increasingly assumed that any adult can use these little computers to do everything from talking with family back in the home village, to transferring money, to sharing photos. Distance communications and access to the Internet

increasingly lets ordinary Kenyans coordinate everything they do more efficiently than ever before.



Henry SInkala of the Zambia Anglican Council, teaches village "malaria control agents" to track malaria test results on mobile phones. Photo: Joel Selanikio

In global health, we, too, are using mobile phones to do a lot of things more efficiently that ever before. At DataDyne, our own EpiSurveyor software lets people collect data on mobile phones that they might previously have collected using paper forms on clipboards. On a phone it's faster and easier, and once collected the information can be automatically processed and analyzed – that lets organizations respond faster to changing circumstances.

In Kenya, where EpiSurveyor has been developed, ministry of health workers like Titus Kolongei and Yusuf Ibrahim use it for all sorts of life-saving data. In a polio outbreak, they understand if you can find out who may be exposed to the crippling virus in three days instead of seven days you have a much better chance of vaccinating those at risk. Or if you can manage vaccine supplies electronically instead of on paper that means that when a mother brings her child to the clinic to be vaccinated, the clinic is more likely to have the vaccine ready for her.


Kenya ministry of health workers interview a mother, recording the information on a mobile phone. Photo: Joel Selanikio

Wonderfully, use of this simple data gathering tool has spread by word of mouth. In Kenya, famous for its wildlife, it wasn't long before groups like the African Conservation Centre learned about EpiSurveyor and began using it to track endangered animal populations. When I first learned of this, I went to the ACC's Nairobi office to learn more. I understood what a doctor might need to collect, but didn't imagine what conservationists could do with such a tool. The good people at the ACC assured me that *"we collect the same information about animals that you collect about people! We track their births and deaths, and the outbreaks of disease. It's just the same thing"*.

Point well taken. Everyone has information they need to manage, or could manage better. And because of the Internet word of mouth doesn't just mean in the same town or country any more – now it means that useful ideas and technologies can jump from country to country, all over the globe:

- America's **Smithsonian Institution** learns from conservation colleagues in Kenya, and uses EpiSurveyor for monitoring mountain gorillas in neighboring Uganda
- The **World Bank**, based like the Smithsonian in Washington DC, learns about EpiSurveyor and uses it to collect information about the effects of the economic recession on poor families in Central America
- **TulaSalud**, a Guatemalan organization working to keep mothers and children healthy, uses the same tool to monitor their programs better
- **Camfed** learns about EpiSurveyor use by these other organizations and, back in Africa, harnesses common mobile phones with this simple software to make sure children stay in school, and are well-supplied with books, pencils, and other low tech but still essential tools for learning

And this isn't just something for poorer countries. Children's National Medical Center in Washington DC is now planning to use EpiSurveyor for community-based surveys. Kenya to Washington, Guatemala to Zambia – the cycle of communication and sharing and collaboration crosses borders, oceans and mountain ranges.



Researchers in Peru using EpiSurveyor to interview indigenous women about their health. Photo: Joel Selanikio

For too long, the world's information (and the world's tools for collecting and understanding and using that information) was limited to the richer countries. Now the world has changed so much that a tool created in Kenya can benefit gorillas in Uganda, mothers in Central America, school children in Zambia, and a hospital in Washington DC. And all because of these common miracles – the Internet and the mobile phone that are binding us together as never before.



ABOUT THE AUTHOR

A practicing pediatrician, former Wall Street computer consultant, and former CDC epidemiologist with a passion for combining technology and public health to address inequities in developing countries, Dr. Selanikio leads DataDyne's pioneering efforts to develop and promote new technologies for health and international development, including the award-winning EpiSurveyor mobile data collection project, and is also a leader in developing social business models for international development. Recently chosen as an Ashoka Affiliate, Dr. Selanikio was named by Forbes magazine as one of the most powerful innovators of 2009, and is a winner of both the Lemelson-MIT Award for Sustainability and the Wall Street Journal Technology Innovation Award for Healthcare IT. He continues to practice pediatrics as an Assistant Professor at Georgetown University near his home in Washington, DC.

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From smart phones to smart farming: Indigenous knowledge sharing in Tanzania

By Eugenio Tisselli · 30 November 2011
Series produced by Ken Banks, kiwanja.net

Many people believe communications technology helps the developing world by allowing people to link up with the 'West' and be given information and knowledge. It is often people in the developing world with the knowledge, and what technology can instead do is help them unlock that knowledge and share it with one another.

Eugenio Tisselli is a PhD student, teacher, artist and mobile technology project developer. In this latest "Mobile Message" he explains how mobile communications can help isolated communities create self-supporting knowledge-sharing networks. This is what ***Sauti ya wakulima****, a group he initiated, have been doing in rural Tanzania. Whether it's figuring out the best way to grow maize or tracking changing rain patterns, mobile phones and the Internet can help those who, in one of the farmer's words, "have a lot of things to say, but no means where to talk about them".*

On January 2011, my colleagues and I traveled to Tanzania to conduct a series of interviews with farmers living near Bagamoyo, with the purpose of engaging them in the creation of a collaborative knowledge base about the effects of climate change, using smartphones as tools for observation and a web page to gather the recorded images and sounds. My mind was full of questions at that time. Was it technically possible? Did the farmers know about smartphones and the Internet? And, most importantly, would they be willing to get involved?

Answers arrived quickly. Accompanied by Mr. Hamza, the local extension officer, we spent three days visiting farmers in the area. We found out that cell phone connectivity was robust enough to access the Internet from the farms. Most of the farmers owned not one, but two or even three cell phones. However, they were not familiar with the Internet. They had heard about it, but had never opened a browser to look at a web page.

After our visits, Mr. Hamza gathered the farmers at the nearby Chambezi agricultural station so we could explain the project to everyone and ask whether they were interested in participating. Despite the fact that none of them had accessed the Internet, they quickly understood that the images and sounds uploaded from the smartphones would not only be visible to them, but to anyone who visited the project's web page. After deliberating, the farmers voted unanimously in favour of trying out the new tools. We gave the project a name: "Sauti ya wakulima" – "**The voice of the farmers**" in Swahili.

This is how Sauti ya wakulima works. A group of five men and five women gather every Monday at Chambezi. There, they use a laptop with a mobile Internet connection to view the images and listen to the sound recordings they uploaded during the week. They also hand out the two available smartphones to other participants, turning the phones into shared broadcasting tools. The smartphones are equipped with GPS modules and an application that makes it easy to upload content. So far the farmers have used them to record geographically localised observations about changes in the climate, and to interview other farmers.



Mr. Hamza (far right) and the farmers looking at their online knowledge base in Chambezi. Photo: Sauti ya wakulima

As soon as the farmers became familiar with the phones and the web page, they began to use them to learn from one another. One of the farmers, Mr. Haeshi Shabani, was having trouble growing maize. He didn't know why his yields were so poor until he saw a picture of a maize field, uploaded by one of his colleagues. He realized that he was planting it in the wrong season, and that he was not growing it in terraces in order to prevent water logging. So, with this new knowledge, he tried again and, a few months later, Mr. Shabani got his first successful maize harvest.



Mr. Haeshi Shabani in his maize field. Photo: Sauti ya wakulima

When his turn to use a smartphone comes, Mr. Ally Issa uses it to mostly do interviews. He visits nearby farmers and asks them about their problems with crops, pests or water, and what they do to overcome them. After taking a picture of the interviewee and recording his or her voice, he adds the keyword "mahojiano" ("interview") and uploads the interview to the web. On the first days of August, the Chambezi group travelled to Morogoro to attend an agricultural show. Mr. Ally Issa took the smartphone with him and interviewed almost a hundred farmers from different regions in Tanzania, making this a valuable contribution to the online base of farming knowledge.

The farmers at Chambezi not only struggle because of insufficient infrastructure and unreliable markets for their products, but also face challenges such as changing rain patterns, drought, scarcity of underground water and new pests and plant diseases. However, they know that by sharing their knowledge on how to cope with these problems they can find ways to overcome them. They also hope that, by communicating their observations to extension officers and researchers, they can participate in the design of new strategies for adaptation.

On my latest visit to Chambezi, I asked the farmers what they thought about Sauti ya wakulima, and how it could be improved. Here are some of the things they said:

"The project has brought more cohesion to our group here at Chambezi."

"The project helped me learn that phones can be used for other things besides calling people, and that computers can also be used to solve problems. They are not just a fancy thing for the rich people in towns."

"We have to include people from different areas, so that we can also learn from those who are far away, doing different things."

"Very few farmers know about the Internet, and there is a need to provide more training and resources."

"Farmers have a lot of things to say, but no means where to talk about them."



Mama Rehema Maganga using a smartphone to interview Mr. Hamisi Rajabu. Photo: Sauti ya wakulima

We are working to find a sustainable way of shaping Sauti ya wakulima based on what the farmers would like the project to be. There is still a lot to do but, so far, an encouraging lesson has been learned. Sometimes the knowledge needed to solve a problem lies dormant within the community. It just takes a spark to bring it to light. The images and voice recordings gathered by the farmers who participate in Sauti ya wakulima may just be that spark.

Sauti ya wakulima was founded by the North-South Center of the Swiss Federal Institute of Technology, and has received support from the Department of Botany of the University of Dar es Salaam.



ABOUT THE AUTHOR

Eugenio Tisselli is the initiator and developer of Sauti ya wakulima. He is a computer scientist, artist and teacher. Since 2004 he has collaborated in mobile communication projects for communities at risk of social exclusion in different parts of the world. He was an Associate Researcher at Sony Computer Science Lab in Paris, and a teacher and co-director in the Masters program in Digital Arts at the Pompeu Fabra University in Barcelona. He is currently studying a PhD at Z-Node, the Zurich Node of the Planetary Collegium.

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A Voice for the Voiceless: Interactive Radio in Afghanistan and Pakistan

By Zydrone Krasauskiene · 13 December 2011
Series produced by Ken Banks, kiwanja.net

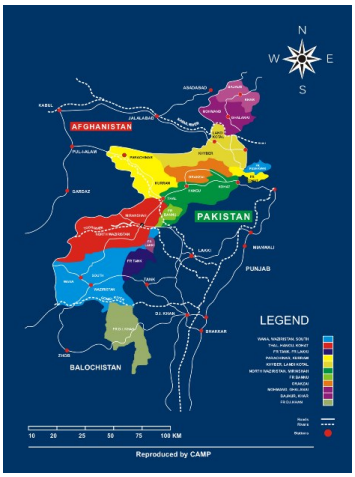
Insecurity and poverty don't just mean being deprived of material things – they can also deprive people of a voice. Conflict and scarcity make access to information difficult in many regions of the world. Where media are available, it is often the most extreme, dangerous groups who dominate and who falsely represent these regions to the rest of the world.

*In this edition of **Mobile Message**, Zydrone Krasauskiene, Editorial Manager of Radio Free Europe/Radio Liberty, explains how they try to prevent those extremists from robbing the people of the Federally Administrated Tribal Areas (FATA) of Pakistan and Afghanistan of their voice. By broadcasting in Pashto to the people of the FATA through their station, Radio Mashaal, they have taken back the airwaves, making a place where listeners can finally have the chance to articulate and discuss the real problems, debates and events that make up their everyday lives.*

But the station doesn't just provide information. FrontlineSMS software has opened up new frontiers for Radio Mashaal – literally – by creating a completely new and unorthodox way of making interactivity possible for the people of the FATA. By enabling listeners to talk back to the radio, they can counter the voice of the extremists and draw attention to issues that really affect them. In some cases, this citizen journalism has embarrassed the government into acting to resolve problems affecting the people of the FATA. Using mobile technology, Radio Mashaal has opened up a space for debate, advocacy, music and joking in one of the most isolated places in the world.

Radio Free Europe/Radio Liberty (RFE/RL) reports the news where a free press does not exist or is not allowed by the government. RFE/RL reaches nearly 25 million people in 28 languages and 21 countries in Russia, the Middle East, and Central and South Asia. In 2010, RFE/RFL began broadcasting in Pashto in Pakistan's Khyber-Pakhtunkhwa Province, the Federally Administered Tribal Areas (FATA), and part of Balochistan, with its new station, Radio Mashaal. The station is so important because, with no print media and no TV, these geographically different tribal border areas are effectively under an information blackout. Radio is the only feasible and available medium.

However, even this vital channel has been dominated by extremists, with the illegal FM Mullah Radio spreading extremist propaganda and militant groups even discouraging music. Hence the primary mission of Radio Mashaal – to reach out and inform local people, especially the younger ones. *"We wanted to reach these most vulnerable people to counter extremists who want to dominate peoples' minds"* says Amin Mudaqiq, Director of Radio Mashaal. According to the latest audience research carried out in July 2011, the average Radio Mashaal listener tends to be male (69%), young (39% are under 30 and 28% under 44), has no formal education at all (33%) or has only primary education (27%), and is rural (97%).



The Federally Administered Tribal Areas. Photo: FATA.gov.

Radio Mashaal strives to be a community radio which helps these people to contact the authorities, discuss problems with each other and share stories – to be the voice of the voiceless.

But to be successful in fulfilling this mission, Radio Mashaal had to establish interaction with their listeners. Until recently, however, the huge cost of calling RFE/RL headquarters in Prague prevented our listeners in Afghanistan and Pakistan from contributing to our programming. So an SMS service looked like a promising solution.

I first heard about the FrontlineSMS open source software, which can turn any computer into an SMS hub, at the Online News Association conference in Washington DC last September. When I was in London in April, I visited the FrontlineSMS office and during a chat with Amy O'Donnell, the Radio Project Manager, I asked whether we could try it out here at RFE/RL.

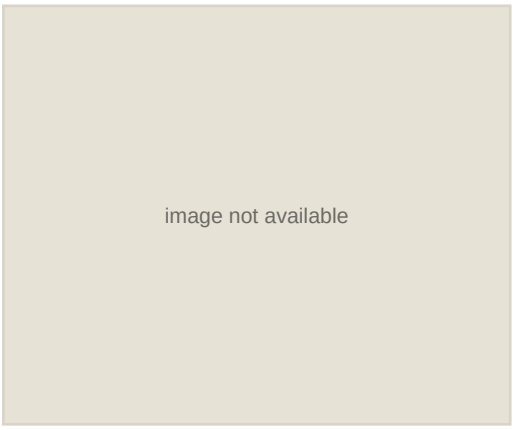
After consulting with my colleagues, we installed FrontlineSMS software in our bureau in Islamabad and connected it to a GSM modem. Colleagues in Islamabad arranged to use a local SIM card and negotiated an extremely reasonable package with the local network provider – the subscription cost $1.75 per month including 10,000 SMS messages.


Muhammad Sami, 22, texting in the streets of Peshawar. Photo: Radio Mashaal.

All was set, and on May 11, 2011 Radio Mashaal announced its phone number and invited listeners to contact moderators and programme makers.

The response was overwhelming. On the first day, over 130 text messages were received containing political comments, pieces of poetry and praise for Mashaal programmes. They even received some jokes. While we currently broadcast 9 hours daily, some of the listeners asked for an increase of Mashaal daily programming to 24 hours. In just six months, we received over 20,000 messages.

As a colleague from Radio Mashaal, Shaheen Buneeri explained, *"The SMS facility has created an excellent opportunity for Radio Mashaal listeners to express their thoughts and feelings on social, political, cultural and security issues in the region. Through these messages, which are an important part of our news bulletins, listeners connect to their dear ones in foreign lands, and the Pashto diaspora shares messages of peace and goodwill with their friends and families at home."*



Text messages flood into the Islamabad Bureau. Photo: Radio Mashaal.

Radio Mashaal programmes are designed to address issues relevant to the local community. For example, 'Problems and Government response' covers a particular issue affecting the area, explores its impact, and then seeks out government response to find a solution. So incoming text messages don't just give the audience a chance to respond – they initiate reports and investigations too. For example, about two months ago someone sent an SMS to Radio Mashaal from the Kacaha Panga area near Hango, complaining that although they lived very close to a gas distribution station, they had been disconnected from the main gas supply.

The issue was taken up by producer Stonzi Aow Sarkar of Radio Mashaal, who challenged the relevant authorities to find a solution. The authorities promised to solve the problem. Similarly, Radio Mashaal received messages in August 2011 about the shortage of water and electricity in Pakistan's Balochistan province. Radio Mashaal correspondents checked the situation on the ground and found that it was true. A local reporter was tasked to take the issue to the relevant authorities. He did so and filed a report on it, creating widespread interest in the issue.

Music plays a prominent role in Radio Mashaal's programming. Since music is restricted by militant groups, local people are eager to hear popular songs which are not locally available. Radio Mashaal's 'Music Hour' is a very popular live show, where listeners can now send in an SMS and request a favourite song.

This SMS project has established an extremely effective communication channel for Radio Mashaal listeners. The only drawback is that the huge number of incoming SMSs means we are unable to send replies to all of our listeners. But as Amin Mudaqiq, Radio Mashaal director says, *"The most important thing is that the SMS service enabled our listeners, even the poorest of them, to contact us."*

More than 3 million Pashtuns live in the FATA region. According to this year's audience research, Radio Mashaal's weekly reach in this region is 8.4 percent of the Pashto population. This demonstrates the power of radio in communicating with this community and the increasing need to offer platforms to allow listeners to engage with the station.

To quote just one SMS that came in recently, in English: "Mashaal Radio is 1 of the best radio [stations] in the world!" Isn't that rewarding?



ABOUT THE AUTHOR

Zydrone Krasauskiene worked from 1996 – 2004 for RFE/RL Lithuanian service, first as a freelancer then as a broadcaster. She ran her own daily programme on post-communist development in Central and Eastern Europe, monitoring those countries' progress towards EU membership. As Editorial Manager, she has been intensively involved in identifying and applying best practice solutions which are relevant to RFE/RL's language services.

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Shine a Light: The Suitcase That's Saving Women's Lives

By Laura Stachel · 12 January 2012
Series produced by Ken Banks, kiwanja.net

What if your carry-on suitcase could save a woman's life? In the fight against maternal mortality in the developing world, a rugged, portable "Solar Suitcase" is providing reliable electricity to clinics in 17 countries where healthcare workers previously struggled to provide emergency obstetric care by the light of candles, flashlights and mobile phones. The Solar Suitcase powers medical LED lights, headlamps, mobile phones, computers and medical devices.

In this installment of "Mobile Message", obstetrician Laura Stachel, Co-Founder and Executive Director of the non-profit WE CARE Solar, talks about the impact of a simple solar solution on emergency obstetrics.

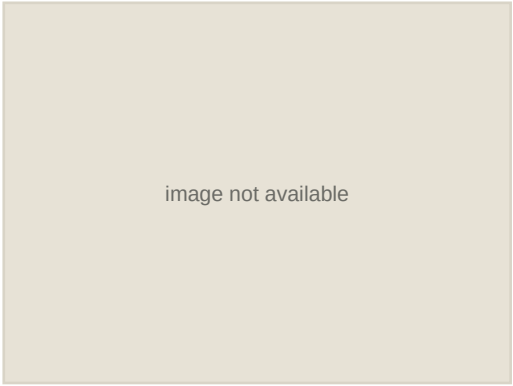
November 2011. It's our ninth day delivering Solar Suitcases to maternal health facilities in Kano and Kaduna states in Nigeria. As we make our way from clinic to hospital, we have been overwhelmed by stories about the consequences of inadequate lighting on childbirth. It has been heartbreaking to hear midwives describe the needless loss of life that has resulted from a simple lack of electricity.

One midwife described her grief at losing a patient who bled to death after a vaginal delivery. The delivery had been challenging, but successful. She had informed the family the joyous news that mother and baby were fine. After covering the mother with a blanket, she went back to caring for the newborn using her flashlight. When she turned to the mother with her light, she realized the woman was in a pool of blood.

"With a torchlight, I can only see one patient at a time," the midwife lamented. She said that without lighting for the whole room, she hadn't recognized what was happening. "I would have looked for the source of bleeding, arranged for a blood transfusion…she didn't have to die."

When I first traveled to Northern Nigeria in 2008 to study the high rate of maternal mortality in state hospitals, I thought I'd encounter clinicians in need of medical advice. Instead, I found deplorable hospital conditions that impaired obstetric care. Among the challenges were the lack of clean water, equipment and supplies. But most glaring was the lack of reliable electricity. Without adequate power, health workers struggled to provide care. Nighttime deliveries were attended in near darkness, cesarean sections were cancelled or conducted by flashlight, and critically ill patients were sometimes turned away.

My solar educator husband, Hal Aronson, set about designing a stand-alone solar electric system that was easy to deploy, simple to use, and effective for medical settings. The result was a "Solar Suitcase," a portable, rugged, complete solar electric kit packed with solar panels, a charge controller, batteries, medical LED lights, phone chargers, headlamps, and a fetal monitor.

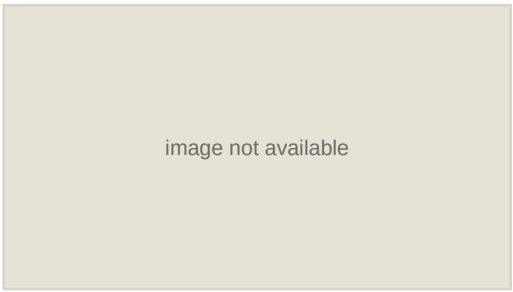


The Solar Suitcase. Photo: WE CARE Solar

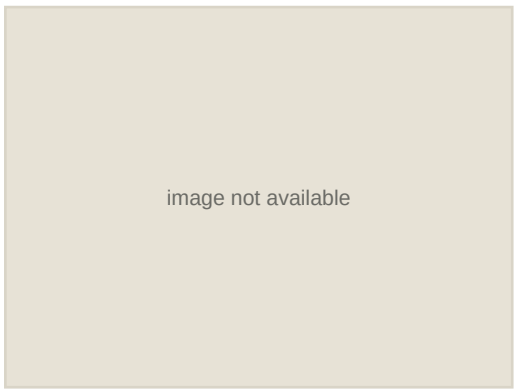
Healthcare workers using the Solar Suitcase report greater facility and ease in conducting nighttime procedures. Improved lighting allows health workers to identify and treat complications such as obstetric lacerations and hemorrhage, nurses to locate and administer intravenous medication, and emergency Caesarean sections to be performed 24 hours a day. Solar-powered mobile phones allow on-call doctors to be alerted when obstetric emergencies require surgery. With augmentation, the solar suitcase powers blood bank refrigeration, permitting life-saving transfusions to occur without delay.

An estimated 358,000 maternal deaths occur worldwide. "The majority of maternal deaths occur during or immediately after childbirth," states the 2011 United Nations Millennium Development Goals Report. Common medical causes include bleeding, high blood pressure, prolonged and obstructed labour, and infections. Although most obstetric complications are not predictable, the majority can be treated by skilled health providers. Reducing childbirth deaths depends, in part, on providing adequate emergency obstetric care. However, a lack of health facility power translates to an inability to perform life-saving care.

At Makarfi hospital in Nigeria, I interviewed another midwife who told me that a few days before my arrival the hospital had referred out a mother with obstructed labour. The woman needed a c/section and, as medical conditions go in Nigeria, the health care odds seemed to be in her favor – a surgical team was available and the operating room had equipment and supplies. But the public power supply was down, the generator was without fuel, and it was 8pm – too dark to operate. The midwife was forced to prepare the patient for a transfer to another hospital, 40 kilometers away. On the way to the hospital, the patient died.



The Solar Suitcase at work in a primary health care centre in Liberia. Photo: WE CARE Solar



Grandmother and grandchild in Nigeria. Photo: WE CARE Solar

When we installed two Solar Suitcases in her delivery room and operating theatre, she was elated. "We will never refer patients out of the hospital for c/sections," she exclaimed. "Now I won't have to work by candlelight," another midwife said with relief. The Solar Suitcase provides hope for these health workers, and a chance to provide better care.

While so many of us take for granted that light is always available, it is painfully clear that much of the world does not have this luxury. "You have given us the greatest gift possible," an operating room nurse explains, "and with this we will save many lives."



ABOUT THE AUTHOR

Laura Stachel is an obstetrician-gynecologist and the Co-Founder and Executive Director of WE CARE Solar, a non-profit working to save maternal and newborn lives utilizing solar powered solutions. She holds an M.D. from University of California, San Francisco and an M.P.H. in Maternal and Child Health from University of California, Berkeley. Since 2008, she has been conducting research on maternal mortality in the developing world. Laura is the Associate Director of Emergency Obstetric Research in West Africa for the Bixby Center for Population Health and Sustainability and is conducting research in northern Nigeria. Laura co-chairs an international working group on Energy and Health for the UN Foundation.

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The Cellphone that Keeps the Water, and Data, Flowing

By Keri Kugler · 24 January 2012
Series produced by Ken Banks, kiwanja.net

NGOs don't always have the best reputation in the developing world. Sometimes they come into a community, install complex systems to fix a problem, and then leave – abandoning technology that can break down, become unsustainable or simply not help the people it's supposed to. Water for People is different. They're an NGO committed to their own accountability – to working with communities to find creative, collaborative solutions to the problem of clean water and sanitation access.

*In this edition of **Mobile Message**, Water for People's Senior Manager of Programmatic Data, Keri Kugler, explains how they use a mobile phone-based technology called FLOW – Field Level Operations Watch, that is – to maintain this accountability and allow communities to monitor their own water and sanitation. By providing an easy way to collect data and photos, conduct surveys and communicate information, FLOW keeps track of water access in the most simple, adaptable ways.*

This isn't just useful for involving the whole community in monitoring and contributing to Water for People's work. When you have information, you can challenge what you're being told. Records on the state of water and sanitation access provide "proof that cannot be ignored" to governments and agencies who otherwise might be unaccountable for their people's wellbeing. It's an instant feedback tool, for people who need it most. This way it's a critical part of Water for People's mission – to provide clean water and sanitation for everyone, forever.

Tiraque is a remote region in the mountains of central Bolivia about two hours drive from the nearest major city, Cochabamba. Villages in Tiraque are small communities – a few dozen homes nestled in the high desert where families are supported largely by subsistence farming. Many of these villages have no safe reliable water systems and very few families have latrines. Such small communities are often overlooked by NGOs because of the high investment needed to reach just a few families.


A typical community in the Tiraque region. Photo: Water for People

In May of 2011, I was visiting Kayarani, a small village in Tiraque where Water For People is building a water system and latrines in collaboration with the community and the local government. Kayarani had just recently broken ground on a gravity-fed water system that would serve all 50 families in the community. At the time the village was getting its water from two unprotected springs, including one that was often unavailable because it was on land that belongs to a neighboring community. The water from the springs made its way to the community over several kilometres through patched sections of a plastic hose and the springs are open to the elements and not protected from contamination.

In Kayarani, I met Mariel Lazcano, who works for the Tirarque Department of Sanitation and plays a critical role in providing latrines and hygiene education. Part of her role involves meeting regularly with every household in the community and collecting data throughout the different phases of the water and sanitation project. I was in Tiraque to show our partners FLOW, a mobile phone-based system designed by Water For People that collects data, photos and GPS coordinates and then transforms that information into visual data that makes it easier to digest.



Women digging a trench for a community water system. Photo: Water for People

FLOW supports our efforts to monitor water and sanitation projects for ten years to ensure that **everyone** in the areas where we work have water and adequate sanitation **forever**. FLOW allows us to collect data using any Android cell phone, and the results can be accessed in near real time by people everywhere. This facilitates better collaboration between many partners and allows stakeholders to quickly react to data and make programmatic changes. It also supports long term project monitoring, which Water For People values above all else.

When I showed Mariel a phone with the FLOW program she was ecstatic. She explained to me that she currently has to drive to Cochabamba three times a week, two hours in each direction, to submit the data she collects on an ongoing basis. “I am supposed to be in the field everyday but I have to travel to Cochabamba three days a week to fill out paperwork. With a FLOW phone I can be in the field every day,” she told me. FLOW was designed to be easy to use, and within minutes Mariel was using it to interview a family in the community. She thinks this will encourage more accountability in the government and within NGOs, providing “proof that could not be ignored” about the state of water and sanitation projects. She immediately started to think about different kinds of data she could collect.



Mariel using FLOW to interview a community member. Photo: Water for People

FLOW was designed to let users create surveys on any topic, and the diversity of the surveys is endless – they can be simple or complex; they can include photos, videos and audio clips – giving the user total flexibility to collect the information that will make an impact on their project. Phones can store hundreds of surveys and data can be collected in areas where there is no mobile connection – it automatically transmits the data once a connection is detected, so the system can be used anywhere in the world.

Water For People uses FLOW in eleven countries in Latin America, Africa and Asia, and it’s operated by a diverse group of users. Independent volunteers use FLOW to verify that our projects are sustainable long after we have completed them. Water For People staff in the countries where we work use FLOW to monitor their work and use the data from FLOW to make nimble programmatic changes in response to what works and what doesn’t work. Our partners, like Mariel, use FLOW to support construction of water and sanitation systems and in hygiene education. FLOW is also being used by other NGOs in Africa and Asia including the Water and Sanitation Programme of the World Bank, A Child’s Right, and Water and Sanitation for Africa. In 2012, Water For People will be partnering with the Dutch organization Akvo, with the goal of making FLOW accessible to many other development organisations.

To continue following FLOW projects, visit Water for People's website.

ABOUT THE AUTHOR

Keri Kugler is the Senior Manager of Programmatic Data at Water For People. She has been with Water For People for four years and supports the development, use and dissemination of FLOW (Field Level Operations Watch), Water For People's on-the-ground remote technology to record data, monitor their work, and evaluate their programs. Keri functions as the research manager for all the programmatic data Water For People collects and supports other organisations in their use of FLOW. Prior to working at Water For People she supported a variety of local non-profits in research and data management.

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Talking with Texts: How Cellphones Empower Deaf Children in Uganda

By Sacha DeVelle · 7 February 2012
Series produced by Ken Banks, kiwanja.net

Kids text all the time – at school, on the bus, even when you're trying to talk to them. It can be annoying. But imagine if a child couldn't communicate at all – that's when a mobile can become a lifeline. In some developing countries, children who are deaf don't have access to special education, technology or even sign language teaching.

In this edition of "Mobile Message", Cambridge to Africa's Sacha DeVelle, explains how her organisation has been using mobile phones in specially designed education programmes to help deaf children in Uganda communicate. By getting everyone in their schools to help out, the projects also happen to be making them the coolest kids in school.

Kato and Kakuru are deaf twins. They have just arrived at the Child Africa International School in Kabale, Uganda. I am running a teacher training course at the school, and spend my lunch hours in the playground with all the children. But I am perplexed by the twins. They have fallen asleep in a far corner of the grounds, lying uncomfortably on some old wheat pallets, joined at the hip but completely isolated from the other children. This is a self-imposed exile, one they have lived in for years. For a week I watch them. They do not move from the pallets. Their clothes are dirty and ripped. They have no shoes and have not washed for a long time. Kakuru cries a lot, however the look on her face says she's not someone who cries for attention, but out of frustration.


Kato and Kakuru (Photo: Cambridge to Africa)

The girls are very different heights. It's hard to believe they are twins. I ask the other teachers why they are so difficult to reach psychologically, why they are crying. "They have lice, they can't sign, have no language skills, they have come down from the mountains and don't understand this environment. They only have each other" explains one teacher.

There are nine other deaf children at the school, although they have had time to adapt and integrate. Dodi is a real character – he has a mother, loves to dance and has some sign language skills. The one deaf teacher working at the school provides a lifeline to these children. By the time I leave, the twins have joined the class, they are starry eyed and excited about their new uniforms.

Back in the UK I think a lot about Kato and Kakuru. What it's like to be deaf in East Africa.

Without a voice deaf females face a triple stigma: gender, poverty and disability. Many girls are violated because they cannot speak out. They may learn to use a pidgin signing system from the village, but are not fluent in any language (tribal, signed or English). Deaf girls are often abandoned. Their disability is seen as a curse on the family. Others are locked up in back rooms to hide the family shame. Those that make it to a school setting are the lucky ones.



Deaf teacher Flavia, and friend, taking a class for the children (Photo: Cambridge to Africa)

One of our trustees tells me about a presentation she has just seen, using FrontlineSMS in developing contexts. It was this conversation that gave me the idea to run a mobile phone social inclusion project in Kabale: integrating deaf children into the mainstream environment.

We launched our pilot study in 2010. The wider challenges of carrying out such a scheme are complex. The management of existing prejudice and communication barriers must be factored into the design.



Kakuru and 'hearing buddy' train together (Photo: Cambridge to Africa)

We have a methodology. Six deaf children have a hearing buddy, with a total of 12 students contributing to the study. We provide separate training to both groups for three days. Then they are brought together, with the hearing children playing a buddy role. We learn that the hearing children's sign language skills and patience are far superior than we realised. We also learn that deaf children do not have much patience with their deaf counterparts! Our six pairs are given written instructions on scraps of paper. They must text messages to another pair somewhere in the playground, and wait for a response. They love this game. The deaf children are very vocal, a lot of frantic signing and suggestions for written responses.

Kakuru is one of the deaf participants. She is in awe of her new mobile phone, how messages fly in from nowhere. She likes to receive them, but is not too keen on writing – it's hard for her. We learn that their written skills are very low – they are used to rote learning, straight from the blackboard. Now they must produce authentic, instantaneous text on a range of different topics.

Our preliminary findings are very exciting. The SMS social inclusion project has united the school, developed the children's confidence, and highlighted the need for more communicative literacy skills in the classroom. Most importantly, it has raised the status of the deaf children as Caroline explains:

> *I can now visualise a bright future because I am far better than what I was when I was still shabby in the village four years ago. Those who used to laugh at me in the village now see me as a star because most of the rural community members do not know how to use sign language or mobile phone SMS facility*

Phase 3 of our SMS social inclusion project will be launched in 2012. We will work with new schools in Kampala that integrate deaf children into the Ugandan primary school curriculum. Self empowerment, social cohesion and improved literacy skills were all key outcomes from our previous phases. However, there is still much work to be done to further integrate deaf girls into the community. As Docus clearly states: "All my village mates used to laugh at me because I could not hear what they could say and also I did not have any way to speak to them. Can you imagine an orphan like me using a mobile phone SMS facility at the age of ten to communicate to educated people like you? God is great".



ABOUT THE AUTHOR

Sacha DeVelle is the founder and managing director of Cambridge to Africa, a UK registered charity that provides funding and educational expertise for projects in East Africa. Sacha has a PhD in Linguistics from the University of Queensland, Australia and currently lives in London where she works as an international education consultant.

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Let a Billion Readers Bloom: How Bollywood Teaches Literacy in India

By Brij Kothari · 22 February 2012
Series produced by Ken Banks, kiwanja.net

We don't always need shiny new technology to do amazing things around the world. As this edition of Mobile Message shows, with some imagination everyday technology can be re-purposed to do extraordinary things. Brij Kothari of Planet Read shares how he got Bollywood to marry karaoke, and how it doubled the number of readers in Indian primary schools.

"My teacher comes to class, writes something on the board, goes to her office and snacks," explained Kavita, a resident of a slum in Ahmedabad, when I asked her why she couldn't read despite being in seventh grade. But here's the irony: she is one of the growing number of so-called 'literates' in India. According to the latest Census in 2011, 74% Indians, aged 7 and above, are "literate". So how many "literates" in India can actually read a simple text?

The numbers are disturbing. The education NGO Pratham's Annual Status of Education Report for 2011 found that in Class 5, a shocking 51.8% cannot read a Class 2 level text. Our own studies at the Indian Institute of Management, Ahmedabad, further confirm that over 50% of 'literates' in India cannot read the headline of a newspaper.

Although, officially, India is home to 778 million "literates" and 273 million illiterates, what is glossed over is the fact that an estimated 389 million "literates" are, at best early-literate. How will the early-literate transition from basic alphabetic familiarity to functional reading ability?



The film Kyun! Ho Gaya Na with Same Language Subtitling (Photo: Planet Read)

In 1996, I was watching a DVD of Pedro Almodóvar's classic film, *Women on the Verge of a Nervous Breakdown*, with some student friends in Ithaca, New York. The dialogue was in Spanish and the subtitles in English. An idea popped out of the idiot box. As a Spanish language learner, I wished the subtitles were also in Spanish. Then I said something casually – maybe India would become literate if Bollywood Hindi film songs on TV were shown with the lyrics subtitled in Hindi.

Same Language Subtitling – or 'SLS' – is simply the idea of subtitling audio-visual content in the 'same' language as the audio. What you hear is what you read. SLS suggests subtitling the lyrics of existing film songs and music-videos on television, in the language they are sung in. Hindi songs subtitled in Hindi. Tamil songs subtitled in Tamil, and so on in every language (India has 22 official languages). In other words, Bollywood film songs marry karaoke to produce mass literacy.

The idea of SLS builds on some key observations:

1. Indians have a lifelong passion for Bollywood film songs
2. Bollywood produces a 1000 films, and therefore, 5000 film songs a year in a variety of languages
3. 740 million people already watch television where Bollywood content dominates

How does SLS work? SLS switches on lifelong and inescapable reading practice for millions of television viewers. The science underlying SLS is strong. Eye-tracking research from around the world has established that SLS causes an automatic and inescapable read-along response. Early-readers when exposed to SLS, try to read along, and in the process, find their reading skills improving. As viewers like to sing along to songs and are curious to know the song lyrics, reading skills are practiced subconsciously. Typically, a weak-reader faces a high motivational barrier to keep on reading when confronted with print. In the context of songs – marked by repetition, lyrics that can be anticipated, and subtitles that are sounded in the audio – the entry barrier to reading practice is significantly lowered.

For the nearly 200 million children in India's primary schools, the rudimentary alphabetic skills they pick up in school are practiced the same day at home while watching their favourite TV programmes. No additional effort or behavioural change is required. This constant and synchronous reinforcement of reading skills makes it difficult for a child to remain functionally illiterate by Class 5.


Children follow along with SLS (Photo: Planet Read)

Independently collected data has shown that even 30 minutes of weekly SLS exposure over 3-5 years, as part of Bollywood film songs, more than doubles the number of functional readers in primary schools. Of course, SLS would be limited if the only reading it invites is song lyrics. As it turns out, the first thing that youth and adult functional literates tend to pick up in India are newspapers. To be seen reading a newspaper is infused with positive symbolism and status. Interestingly, newspaper reading among regular SLS-viewers shot up from 34% to 70% in five years. Furthermore, SLS makes a meaningful contribution to female literacy because Bollywood on TV has a higher female viewership.

SLS was first implemented on Gujarat state TV in 1999. That successful pilot led to another ongoing pilot on a nationally telecast Hindi film song programme, from 2002 to the present. Since 2006, SLS has also been piloted on one weekly programme each in 8 major languages, giving regular reading practice to an estimated 200 million early-readers. Today SLS seems on the verge of being scaled up nationally in collaboration with the Broadcasting Corporation of India, Prasar Bharati and the state TV network, Doordarshan.


SLS has proved hugely popular (Photo: Planet Read)

On average, every dollar spent on SLS in India delivers 30 minutes of weekly reading practice to 5,000 weak-readers, for one year. With India on board, the cost-effectiveness of SLS established and none other than Bill Clinton calling SLS "A small thing that has a staggering impact on people's lives", I believe the time has come for our idea to travel all over the world.

If you'd like to learn more, visit PlanetRead or BookBox.



ABOUT THE AUTHOR

Brij Kothari co-founded PlanetRead and BookBox. He is a Schwab Social Entrepreneur, Ashoka Fellow, and Faculty, Indian Institute of Management in Ahmedabad.

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Global Health, Farming, Education or Climate Change: What Would Apple Do?

By Ken Banks · 6 March 2012

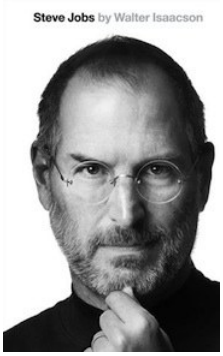
*What if we took an Apple approach to solving the world's environment and development problems? The California-based technology company have had phenomenal success of late by intuitively unpicking the needs of their users, using innovative design and keeping their systems simple and integrated. In today's **Mobile Message**, Ken Banks takes a look at what might happen if we took a "Steve Jobs approach" to conservation and development.*

"Two weeks ago, I was staying at a working dairy farm sixty kilometers north of Bogotá, Colombia. I was fiddling around with my iPad when one of the kids that worked in the stables came up to me and started staring at it. He couldn't have been more than six years old, and I'd bet dollars to donuts that he had never used a computer or even a cellular telephone before (Colombia has many attractions. The vast pool of illiterate poor is not one of them)

Curious, I handed him the device and a very small miracle happened. He started using it. I mean, really using it. Almost instantly, he was sliding around, opening and closing applications, playing a pinball game I had downloaded. All without a single word of instruction from me"

Michael Noer, The Stable Boy and the iPad

Two questions scream out at me when I read this. Firstly, what would happen if Apple turned a fraction of its attention to solving conservation or development problems? And secondly, why ***don't*** Apple work in conservation or development? They're both sectors where technology has become such an important tool they've even given it its own name (development practitioners refer to it as ICT4D – Information and Communications Technology for Development). Over the years many ICT4D tools and solutions have failed because they're either too complex, poorly designed, unusable or inappropriate. Who better to show us how it should be done than Apple, the masters of usability and design?



The answer to the second question – the *why* – is a little easier to answer than the first. As Walter Isaacson pointed out in his recent biography, Steve Jobs felt he could contribute more to the world by 'simply' making brilliant products. He seemed to have little time for philanthropy, at least publicly, and his laser focus meant he saw almost everything other than Apple's mission as a distraction. Ironically, had he decided to give away some of his ballooning wealth, he'd most likely have funded programmes which worked in nutrition and vegetarianism, not technology, according to Mark Vermilion (who Steve Jobs hired back in 1986 to run the Steven P. Jobs Foundation, which he was destined to shut down a year later).

Had Steve Jobs decided to pursue his Foundation, and had he decided to fund technology-based initiatives in the developing world, how well might he have done, and what might Apple have been able to contribute to our discipline?

Here's five initial thoughts on where an Apple approach to ICT4D might be different – or problematic.

1. Consult the user

One of the central tenets of using information and communications technology to solve conservation or development problems is to consult the user before designing or building anything. In business, at least, Apple don't do this. They certainly didn't speak to Colombian farm children, yet they managed to intuitively build something that worked for the six year old Michael Noer met. As Steve Jobs famously said:

> *Our job is to figure out what users are going to want before they do. People don't know what they want until you show it to them. That's why I never rely on market research. Our task is to read things that are not yet on the page.*

An Apple ICT4D project would unlikely spend much time, if any, speaking with the target audience, an approach entirely at odds with the one we all champion right now.

2. Customer vs. beneficiary

Part of the problem with the largely subsidised ICT4D "give away technology" model is that no-one is ultimately accountable if things don't work out, and regular business rules do not apply. Would an Apple approach help with this? Apple would see people as customers, and they'd be carrying out what they'd see as a commercial transaction with them. This approach would mean they'd **have** to build something the customer wanted, and that worked (and worked well). Since it would have to sell, if successful it would by default be financially sustainable, something many 'traditional' ICT4D projects struggle with.

3. Open vs. closed

Most ICT4D projects are 'open-source' – meaning users can access and develop the code behind the technology themselves. Steve Jobs was against this approach. He was a strong believer in controlling all aspects of the user experience, all the way from hardware through to software, and would see an open source product as one open to interference. To him, closed systems were better "integrated" and open systems "fragmented":

> *What is best for the customer – integrated versus fragmented? We think this is a huge strength of our system versus Google's. When selling to people who want their devices to just work, we think integrated wins every time. We are committed to the integrated approach. We are confident it will triumph over Google's fragmented approach*

There is no evidence in ICT4D, I don't believe, which points towards more success for open solutions vs. closed (however you define *success*), yet "open" remains dominant. An early Apple success might give us pause for thought.

4. Time for the field

Although Paul Polak doesn't work in ICT4D, he is one the biggest proponents of "getting out into the field to understand the needs of your customer". In his long career he's interviewed over 3,000 people earning a dollar or less a day to better understand their needs – and the market opportunity.


Listening to your users is key. Or is it? (Photo: Ken Banks)

The Apple we know today wouldn't see the need to do this. They wouldn't consider the needs of dollar-a-day customers as being any different to anyone else. They'd consider their intuitive design and user interface to be non-culturally specific. People, everywhere, want simple-to-use technologies that just work, regardless of who they are.

5. Appropriate technology

Apple's product line hardly fits into the appropriate technology model – many are expensive, power-hungry and in most configurations the devices are reliant on a computer (via iTunes) as their central controlling "hub". The systems are also closed, blocking any chance of local innovation around the platform. How Apple tackle this – yet maintain their standards of excellence in design and usability – would probably turn out to be their biggest challenge.



Although it hasn't happened yet, a post-Steve Jobs Apple might yet develop a philanthropic streak. If they did they could easily turn to their friends at frog design (now branded Frog) for help. Frog, who worked closely with them in the early days of the Macintosh range, have recently worked with a number of ICT4D initiatives and organisations, including Project Masiluleke and UNICEF.

Apple have already reinvented the music and publishing industries. With the capital (a whopping US$100 billion in reserves), talent and resources available I'd bet my bottom dollar on them reinventing ICT4D if they chose to. Steve Jobs liked to "live at the intersection of the humanities and technology", and that's exactly the place where ICT4D needs to be.

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A Practical Vision: Simple Technology that Transforms Lives

By Simon Trace · 20 March 2012
Series produced by Ken Banks, kiwanja.net

Using technology for development and social change is not just a question of clever gadgets, but of a vision for the future. In today's Mobile Message, Simon Trace of the NGO Practical Action explains how giving people access to technology that is safe, simple and sustainable has transformative effects not just on individual lives but on whole societies.

I work for Practical Action, the international development charity that helps poor people in the developing world use technology to transform their lives. The phrase 'Technology Justice' is not in common usage, but for Practical Action it represents a vision of the future; a future where everyone has access to technologies that assist them in leading the kind of life they value without compromising the ability of others and future generations to do the same.

Today the world exists in a state that is far from that vision. 20% of the world's population exists on less than US $2 a day and the technologies necessary to attain even a fairly basic standard of living remain outside of their grasp.


A child collects wood for fuel in Zimbabwe. (Photo: Practical Action.)

Access to basic energy supplies is a good case in point. Here's a simple thought experiment to try. Run through in your mind all the different things you do during the first two hours of your day, after getting out of bed on a dark and cold winter's morning. Done? Now try to imagine going through that list of activities again, only this time without the help of electricity, gas or oil in your home, your neighbourhood or your place of work. For most of us who live in the so called 'developed' world, that's probably the closest we'll come to appreciating what it must be like living without access to modern energy supplies. But for around 40% of the world's population it's a daily reality: 1.4 billion people are still living in the dark, without electricity and 2.7 billion are still cooking over open fires.

This lack of access has profound effects on people's lives. Collection of firewood can take several hours a day and the respiratory diseases brought on from the smoke from cooking fires are responsible for more deaths in the world each year than malaria. Both of these burdens fall disproportionately on women and children. Lack of electricity means no way to cool and preserve food, no TV, no phones, no light for children to study by, no refrigeration for vaccines in health posts and no light by which to provide maternity services after dark.


The power house at the Chipendeke micro hydro scheme, Zimbabwe. (Photo: Practical Action.)

A different world is possible. I was in the village of Chipendeke in Mutare District in Zimbabwe, close to the Mozambique border a few months ago. Although grid electricity is unlikely to reach this rural location in the foreseeable future, I saw lives being transformed by a simple micro-hydroelectric scheme. The project uses a local stream to power a turbine, providing electricity to around 100 households, a school, a health post and several small businesses. The technology used is well established, robust and straightforward to maintain. This enables it to be operated and managed by the community using it, reducing costs and ensuring local accountability. On another continent I visited our programme in Nepal a couple of weeks ago. There, working in partnership with the German company Bosch Siemens Household Appliances, we have been developing a new design of smoke hood and chimney to remove indoor air pollution from cook stoves. The hood allows World Health Organisation (WHO) standards of air quality to be achieved even from an open cooking fire. When combined with an improved wood burning cookstove, the hood can significantly reduce the time and effort spent collecting fuel and the death toll from smoke pollution in the home.


A simple smoke hood in use in a house in the hills of Nepal. (Photo: Practical Action.)

Over the past century, living conditions for the majority of the population in the UK have been transformed. One hundred years ago electricity was still too expensive for all but the wealthy (in fact even by 1933 only 1 in 3 houses in the UK had electricity). Most houses would only have had one tap for water, in the kitchen, and if you lived in one of the northern industrial cities, you were likely to still likely to be defecating into a bucket – only 750 of Rochdale's 10,000 houses had toilets at the time. Infectious diseases were prevalent amongst children across the country with 50% of 5 to 9 year-olds dying from such causes between 1911 and 1915. Life expectancy at birth was just 45 years for boys and 49 years for girls.

We have witnessed huge improvements in our standards of living, underpinned by improvements in access to basic technologies, over the past 100 years. But that pace of change has not been achieved in the developing world. Moreover, our attention has moved on to the wants of the consumer rather than the needs of those left behind. The bulk of technology innovation today occurs around issues that are irrelevant to tackling the problems of the poor. The Global Health Forum estimated in 1990 that only about 5% of the world's resources for health research were being applied to the health problems of low and middle-income countries, where 93% of the world's preventable deaths occurred for example. We live in a world where, according to Bill Gates, more money is spent on researching a cure to male baldness than on finding a vaccine for malaria. A world where the gap between those who have access to the technologies they need to live a decent quality of life and those who don't is growing into a yawning chasm and where, 132 years after Edison introduced the first commercially viable incandescent light bulb, a fifth of humanity still lives in the dark.

Technology Justice is an achievable vision. But we have to reprioritise and focus our efforts in the places that really matter.



ABOUT THE AUTHOR

Simon Trace took up his appointment as CEO of Practical Action in October 2005. During his time with Practical Action the organisation has received growing recognition and has won a number of international awards, including the United Nations Environment Programme's Sasakawa Prize for its work on renewable energy in Peru in 2008. Prior to this appointment at Practical Action, Simon was Strategic Development Director for the UK NGO WaterAid. A civil engineer by training, Simon also studied anthropology. Simon's career has principally been in community development, in the fields of soil and water conservation or water and sanitation, and he has spent time with a number of agencies, including periods of secondment to CARE and Unicef. He also spent a total of 10 years in Zambia and Nepal prior to moving to London to take up a series of positions with WaterAid, including Asia Regional Manager and Head of International Operations.

Mobile Message is a series of blog posts from FrontlineSMS about how mobile phones and other appropriate technologies are being used throughout the world to improve, enrich, and empower billions of lives. This article was curated by Olivia O'Sullivan, our Media and Research Assistant. Mobile Message is produced by **Ken Banks**, innovator, anthropologist, National Geographic Emerging Explorer and Founder of kiwanja.net / FrontlineSMS. He shares exciting stories in Mobile Message about how mobile phones and appropriate technologies are being used throughout the world to improve, enrich, and empower billions of lives. You can read all the posts in this series, visit his website, or follow him on Twitter.

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Where There Is No Doctor: Delivering Healthcare in Hard-to-Reach Places

By Sarah Shannon · 10 April 2012
Series produced by Ken Banks, kiwanja.net

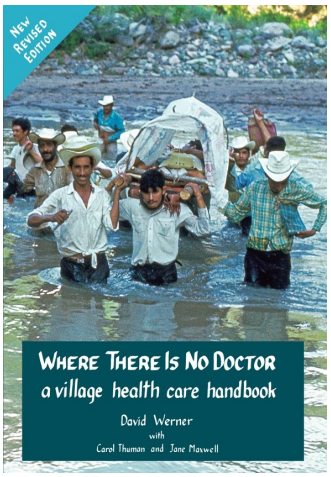
Medicine and technology advance at astonishing rates. But these advances don't always reach everywhere. Often it is indigenous knowledge and creative solutions that fill the gap. In today's Mobile Message, Sarah Shannon explains how one organisation, Hesperian Health Guides, provides appropriate and effective advice for people living in regions where there is no doctor.

I was only 22 when I arrived in the Salvadoran refugee camp in rural Honduras. Refugees were streaming over the border, running for their lives in the midst of a civil war. They were malnourished, terrified, wounded, and carried nothing but the clothes on their backs. For my part, I had a suitcase full of clothes, and a copy of the book *Where There Is No Doctor* given to me by a mentor as I was packing.


Salvadoran refugees cross the border into Honduras. (Photo: Ed Scholl.)

Shortly after I arrived, I was awakened in the middle of the night by a girl who said I had to come help deliver a baby. Although I knew nothing about delivering babies, I stumbled across camp where I was relieved to find the mother-to-be well attended by an experienced community midwife. As she let me stay and watch, and as I followed along in *Where There Is No Doctor*, I recognized that "untrained" people have a lot of skills and knowledge and that "trained" health workers — like me — have a lot to learn.

In the weeks and months that followed, I found that *Where There Is No Doctor* was very useful in helping me — and a crew of refugees — set up nutrition programs, water and sanitation systems, and provide extra training to people who had always taken care of their own health. Despite the alien environment of the refugee camp, all of us were learning the basic skills and knowledge to become effective health workers. The accessible presentation of information and self-reliant focus made the book an incredibly useful tool.



'Where There Is No Doctor', "the most widely used public health manual in the world", according to the World Health Organization. (Photo: Hesperian Health Guides.)

Many years later I returned to the States to work for the non-profit Hesperian Health Guides, which publishes *Where There Is No Doctor*. I have heard countless stories similar to mine, from people who rely on Hesperian books to work alongside or train community health workers, and from those who have translated these resources into over 80 languages — from Arabic to Zulu.

Now when I go back to visit Honduras, the refugee camp where I lived is gone and the sleepy little village near it boasts several Internet cafes. Campesinos walk down cobblestone streets talking on their mobile phones. Electricity and running water may still be scarce, but cell phones are everywhere (more people in the world today have access to a cell phone than to a toilet.) Exciting advances in technology have enabled the world to address incredibly complex challenges, yet in the next 90 minutes 1,200 children and 60 young women will die of easily preventable health problems — problems that could be solved with simple and inexpensive care, and the knowledge needed to provide it.

Over the past few years, Hesperian has been working to respond to this paradox — taking advantage of new technologies to make the kind of clear, accessible health information that many years ago showed me how to train health workers available to more people in more places. Our first cell phone app on Safe Pregnancy and Birth, released in January as part of the new Hesperian Digital Commons, has so far been used in 70 countries. Our health manuals, including *Where There Is No Doctor*, are now available online for free download online in 26 languages.


Women in Orocuina, Honduras use the new Hesperian Digital Commons to develop health education materials. (Photo: AMDV, Honduras.)

Last year, in the rural, rugged, and deforested Honduran town of Orocuina, 15 women came together to learn how to use computers by designing hand-outs on various health topics. Some of the women walked several hours to attend the trainings, motivated by a desire to access information and help their communities. Only a month after they learned to manipulate a mouse to move a cursor around a screen, they used the tools in the Digital Commons to produce flyers on dehydration, nutrition, and breastfeeding. Designed for people with limited computer experience or formal education, these tools are helping health workers solve some of the world's simplest, yet most intractable, health issues. While new developments in technology offer exciting possibilities for increasing access to information we need to ensure that they don't further marginalize the people who need it the most.

As technology and the world we live in continue to evolve, we at Hesperian will evolve with it, and do our best to provide lifesaving health information through every channel that has a chance of reaching one more person, one more village, one more urban slum *Where There is No Doctor*.



ABOUT THE AUTHOR

As Executive Director of Hesperian Health Guides for the past 15 years, Sarah Shannon has led the development of several books, coordinated projects involving field partners in over 40 countries, and most recently oversaw the launch of the Digital Commons. Prior to joining Hesperian in 1996, Sarah worked for 15 years in Central America, training community health workers, developing training materials for low literacy audiences, and administering health and community development programs.

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Pay As You Go Sunshine: How Solar Energy and Mobile Phones are Powering the Developing World

17 April 2012

Every night, something unusual happens in Samuel Kimani's home on the outskirts of Nairobi, Kenya. Samuel, 48, lives with his wife Mary and their three children. Their family supports itself day-to-day through their main source of income, their cow Baraka, whose milk is collected daily and sold directly to customers for about $1.80 a day. Their township has few amenities and grid electricity is available only to the few who can afford it. But at Samuel's house, two bright lights shine all through the evening.



Samuel Kimani in Kenya. (Photo: Eight19 Ltd)

Samuel used to light his home with a single kerosene lamp, which filled the rooms with smoke and poor-quality light and cost $3 a week. With his low income, Samuel could support his family, but he wasn't able to make long-term investments in other systems to light his home. That is, until he became the first person in the world to use the IndiGo pay-as-you-go solar energy system. Samuel purchased the system for an affordable $10 and now activates it automatically with a $1 scratch-card each week. Through IndiGo, Samuel's small home now has two bright lights providing eight hours of light each evening, which enables the kids to study in the living room whilst Mary prepares food in the kitchen. Instead of spending $0.20 to charge each of their three mobile phones at one of the many local kiosks he simply charges them at home, saving $1.50 per week in the process.

"With kerosene I couldn't read comfortably, always straining. But it was the children who suffered most; we used to run out of kerosene four or five times a month, and with no light they couldn't complete their studies. Now we have clean permanent light, we are saving money, and I am so happy for me and my family."

In today's special edition of "Digital Diversity", Olivia O'Sullivan, our Media and Research Assistant, interviews Simon Bransfield-Garth, the CEO of Eight19, the company providing pay-as-you-go solar energy to people like Samuel. Eight19 takes its name from the time it takes sunlight to reach the earth – eight minutes and nineteen seconds.

Interview by Olivia O'Sullivan

Hi Simon. Can you tell us exactly what Eight19 does?

What we're trying to do is find novel ways to bring solar power to emerging markets, trying to get over some of the problems that have occurred in the last ten years when people have tried to take solar into those markets.

What we did was to combine mobile phone technology and solar technology. This allows us to create what we call "pay-as-you-go solar." So just in the same way as you buy a scratch-card for your mobile phone every so often, you buy a scratch-card which enables your solar power to work for a period of time – for example a week or month, whatever it may be.

How does the system work in developing countries? How does solar power change people's lives?



An Eight19 IndiGo unit. (Photo: Eight19 Ltd)

The solar-as-a-service model plays very well in emerging countries partly because the pay as you go model is well understood; people have pay as you go mobile phones. But also because we've eliminated the upfront cost of buying a solar light, so we can give people an economic return on a day by day basis. Where people don't have electric light their options are kerosene or in some cases candles – about 80% of Zambia uses candles – and in South Sudan, for instance some people even just use grass as a way of lighting their houses. The amount of money people spend on kerosene for lighting is huge – about 38 billion dollars. When you compare the cost of that kerosene light for light with mains electric lighting, the light out of a typical kerosene lamp costs between a hundred and a thousand times as much – just because it's a very inefficient lamp and kerosene's expensive. So you end up with a situation where the people who have the least income in the world are paying not just a bit more for their energy but *vastly* more for their energy.


Light provided by a kerosene lamp. (Photo: Eight19 Ltd)

By providing solar we can eliminate that cost and replace it with something more modern and up to date. For example, in Kenya people are spending the equivalent of about 12 dollars a month for kerosene and for charging their mobile phone. We're providing the *IndiGo* solar energy system for just over a dollar a week, so effectively for five dollars a month the user is getting light for two rooms and also power to charge a mobile. So we've roughly halved people's energy spend and we've given them the benefit of solar power instead of kerosene.

What we find is that once people have solar power then it has a very dramatic effect on their daily lives. The light doesn't just allow them to cook but it allows things like children to do their homework. Over time users can upgrade the system to progressively more powerful solar units. As you provide more power, you enable other things – such as access to a radio or a television – and so what the electricity is doing is providing key things that we've come to value in the more developed world like access to information and access to media; both of which have an important social impact, including the ability to participate in the political process. It's much more than just providing light.


Mwiki, Kenya. (Photo: Eight19 Ltd)

The fact that the weekly fee actually reduces users' spend, by eliminating the cost of kerosene and charging phones, makes it much easier for us to sell into the market because we sell from the point of view of an economic proposition rather than just 'solar-power is good' – if you speak to someone who's been living with kerosene for fifty years, sometimes it's quite difficult to persuade them kerosene fumes are harmful things they don't want to have. But if you say to someone who spends a quarter of their income on energy that they can halve their energy bill, then all of a sudden that has a direct impact – then after that they see the benefits of solar.

Approaching this as an economic proposition seems quite important to this project – it's not charity – do you think this is the best way to approach alternative energy and development?

There's been a shift in mindset in the last ten years or so on how to support people who are at the lower end of the income scale. There was a tendency years ago to dive in with the grand gesture –provide a tractor in Africa and so on – and the problem with that is it comes out of context, it doesn't come with all the infrastructure that's needed to support it and we saw many examples where the equipment breaks down and that's the end of it because there isn't anybody to maintain it and no spare parts. We have a firm belief that sustainable technology needs to have a sustainable business model – so as far as possible what we try to do is to build a local economy around the technology. Where we're rolling out lights, we have local maintenance, local distribution, local marketing, and so on. A really simple example of that is we now manufacture our scratch-cards in Kenya as opposed to shipping them in because we've got a market for them in Kenya and we have found a local printer.

So why has it been so difficult to sell solar power?


David (SolarAid technician) installing a unit in Kenya. (Photo: Eight19 Ltd)

The question we asked ourselves was, "if solar power is so obviously beneficial, how come the world isn't awash with it?" One of the problems with solar and characteristic of a problem with renewables in general is the need for the end user to buy the equipment up front. Normally, to use electricity I don't expect to have to buy my own small power station – but with renewables that's exactly what we expect. So there is a challenge. Fundamentally, people are being asked to change their business model. Instead of using something as you go along, now they've got to find their own capital. In Africa if someone wants a reasonable home lighting system, the cost starts at about fifty dollars – in terms of proportion of salary, that's roughly the equivalent of buying a car in the West. The IndiGo system addresses that by providing solar as a service with a very small initial cost. This is readily understood – people just seem to intrinsically get what we're trying to do.

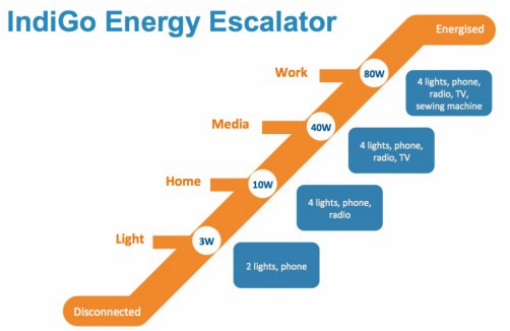
One of the things that's attractive about this approach is that once somebody transitions to solar you can be pretty certain that they're never going back to kerosene. Solar gives a completely different class of light, it eliminates the fumes – kerosene fumes are believed to be responsible for the deaths of about 1.6 million people a year, which is more than the number of people that die from malaria, from a combination of chronic respiratory illnesses and from fire. On top of that, the carbon footprint of the kerosene is about 190 million tonnes, which in context is about the same as the carbon footprint of Argentina, or about 30 million cars on European roads.



Happy customers in Mwiki, Kenya. (Photo: Eight19 Ltd)

You said people, once they get their lamps they start to think about getting radios and TVs and the like – how does that work? How is it affordable?

Off-grid rural customers in emerging markets have the same aspirations as everybody else. They'd like to have TV, radio, internet and a computer, fridges – all the other things that everybody else would like to have. We wanted to create a kind of a journey to help people extend their use of electricity, so we came up with this idea of the "energy escalator." If you imagine a rural family in, say, Malawi – we provide a couple of lights and the ability to charge a phone. Over time the customer uses that and saves money at the same time. So after a period of time, their solar unit has been paid off. Then we offer an upgrade to that system. We can afford to charge a little bit more because the customer has just saved 100 dollars or so over the previous 18 months compared with what they would have spent on energy. So now that customer, say, has four lights and a radio. And then that pays off after a period of time, so you go onto the next step, maybe powering a television. And so, over a period of time a rural customer transitions in steps from no electricity to still being a rural farmer, but now having many of the benefits of electricity.



The Energy Escalator. (Picture: Eight19 Ltd)

We have found that people view electricity very differently to the way that we do in the developed world. In the West, we've been brought up with the idea that electricity is relatively cheap so we use it in pretty inefficient ways – a great example is if I want to make a cup of coffee in the morning, then somebody over in a power station takes some fossil fuel which they burn to heat water, to drive a turbine, to generate electricity, to go a long way down a cable to warm up water to make my cup of coffee. There are great chunks of that chain which are inefficient. Whereas for off-grid customers, nobody would dream of using electricity to boil water, electricity's far too valuable to use for that; you use electricity because it gives you information, it gives you communication, it gives you light – it's a very valuable commodity.

Do you think that if this does scale up widely, we'll ultimately have an off-grid, more efficient energy system in the developing world than the one that exists here? And in a sense these countries will just skip the grid?

I think that's exactly what will happen. When we look at the off-grid market, the numbers are actually very substantial – there's somewhere between 1.4 and 1.6 billion people, around 22 % of the world's population without electricity. One of the assumptions prevalent about ten years ago was that the grid would eventually reach everyone. But the cost of extending the grid to rural areas is very high and today power can be delivered more cost-effectively using renewables, generated locally. This is directly analogous to mobile phones which have removed the need to extend landlines into rural areas. IndiGo enables the end user to fund the infrastructure, using the premium they were previously paying for kerosene, in order to get their own power generation without the up-front cost.

How do you plan to expand and scale up and how do you think energy use is going to expand in the developing world in the future?

At the moment have products in Kenya, Zambia, Malawi and South Sudan. And our vision is that these products will grow with the dynamics of consumer electronics, rather than the dynamics of alternative energies. It seems just to be something that works. And people really like it. When we did our first trial of 30 units in South Sudan, a queue formed of people standing there with their ten dollars saying 'I want my light please' and we had to say 'sorry, we've only brought 30 this time' and they were quite upset because they wanted their light! It's just about providing a mix of technology and business model that enables things to move forward.

If you think of the rate at which mobile phones for instance penetrated developing markets, that's the sort of dynamic that we would like to get. So our goal is to have tens of thousands of customers this year, hundreds of thousands of customers next year and millions of customers the year after.


A Panel in South Sudan. (Photo: Eight19 Ltd)

Ambitious?

It is, but there are three hundred million households which don't have access to electricity so unless you get into the millions you're not making a dent in the problem. One of the things that we see is the transformational change that you get when people have access to this power, it's not just a case of saving money but it enables people to do things that they previously couldn't, because they have access to information, to media and to light. So a really simple example of one of the things that people do with mobile phones – people can move from just growing subsistence crops to having market information, market prices so they can grow more in the way of cash crops, and get involved in much more energetic economic activity. In a sense it's a way of helping people get into the information age without having to go through the industrial revolution.



Kitale, Kenya. (Photo: Eight19 Ltd)

ABOUT THE AUTHOR

Simon Bransfield-Garth has 25 years global experience building rapid growth, technology-based businesses in sectors including semiconductor, automotive and mobile phones. His career includes 7 years at Symbian, the phone OS maker, where he was a member of the Leadership Team and VP Global Marketing. Simon was founder of Myriad Solutions Ltd and was previously a Fellow at Cambridge University. He holds a BA and Ph.D in Engineering from St John's College, Cambridge UK.

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Uganda Speaks: Technology and the Right to Reply

By Olivia O'Sullivan · 2 May 2012
Series produced by Ken Banks, kiwanja.net

The developing world often gets poor representation in the western media. From well-meaning but simplistic representations by charities and advocates to enduring stereotypes of dark continents and poverty, developing countries are frequently denied the right to be seen as the complex, varied and human places they are.

While academics, advocates and commentators debate this problem all the time, the actual people being discussed have historically lacked a voice. But new forms and innovative uses of technology mean this is finally changing. People in developing countries are increasingly able to access platforms that allow them to represent themselves, challenging simple generalisations about their lives and homes. In today's Digital Diversity, Olivia O'Sullivan examines the heated response to the Kony2012 campaign and spotlights the work of Al Jazeera and FrontlineSMS in trying to get Ugandan voices heard above the noise of the debate.

The Kony 2012 viral video campaign provoked a huge response when it was released in March this year. The video, produced by the NGO Invisible Children, called for the Ugandan warlord Joseph Kony to become a globally notorious figure, and argued for worldwide support of his arrest and capture. There has been an energetic and often heated debate in the human rights and advocacy community, as well as in the wider media, about the representation of Ugandans in the film, the value of 'awareness-raising' as a tactic, and the issue of whether a complex conflict can be boiled down to a simple moral clarion call.



A still image from the Kony2012 campaign. (Photo: Invisible Children).

The campaign undoubtedly did much to publicise and promote concern for the children kidnapped and abused by the Lord's Resistance Army. Supporters had a point when they argued a simple video had done more to engage people on the issue of the LRA's atrocities than years of work by diplomats, NGOs and aid workers, and that complexity is often an excuse for inaction in the face of terrible conflict. But critics suggested the campaign was somewhat wide of the mark – is mere 'awareness' and the support of large populations in the West for simple moral outcomes always productive? Some, such as ICC chief prosecutor Louis Moreno Ocampo, credited the campaign with prompting the launch of an international brigade of 5000 troops to combat the LRA and search for Kony on March 23rd 2012. Others argued such a force had been planned and in the works for years, supported by the dogged and informed work of advocates and international institutions, before the issue became such a famous cause in the West. The debate frequently gets stuck in two modes – those who prioritise contextualising problems and resisting colonial stereotypes versus those who prioritise the constancy of moral principles in any context.


African Union forces in Somalia. (Photo: PressTV).

The Kony2012 campaign elicited some fantastic and thoughtful critical responses in the west – such as this piece in The Atlantic on the 'White-Saviour Industrial Complex' by Teju Cole. The article makes the point that such advocacy campaigns can inadvertently portray the developing world as a place of simple moral choices where westerners can access meaning. Campaigns which are well-intentioned and compassionate nonetheless make the developing world a cipher, a place which offers those with more predictable and comfortable lives the opportunity to be a hero and a saviour.

But developing countries are real places. And while the argument among NGOs and advocates produced good discussion, the critical missing element has been the voices of people from the countries being represented. This is part of a broader problem: developing countries have long been portrayed as places of undifferentiated darkness and suffering in western advocacy campaigns. As the writer Chimamanda Ngozi Adichie argues in the talk below, no place can be summed up by a single story.

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What is encouraging is that new media and technology increasingly provide people in the developing world with the ability to challenge and add texture to the single story often portrayed in the western media. Take, for example, Rosebell Kagumire, a young Ugandan journalist who took the opportunity of the Kony debate to upload a video to Youtube explaining her response.

[Embedded video not available in this PDF: http://www.youtube.com/embed/KLVY5jBnD-E]

Such a move would never have gained such a wide audience before the web and open access sites like Youtube provided a more democratised use of media. But not everyone is on the internet – Africa still has the lowest levels of internet penetration in relation to population in the world. Africa is, however, the world's second-largest mobile phone market. Responding to the Kony campaign, Al Jazeera, Ushahidi and FrontlineSMS teamed up just two days after the Kony2012 video was released, to provide an opportunity for Ugandans to respond. 'Uganda Speaks', is a project which allows ordinary Ugandans to post their text messages on an Ushahidi map on the Al Jazeera site – via local SMS numbers – to let the world know what their country is really like. In this way, mobile users without internet access and online users alike can have their responses heard.

The stream of responses, under the #ugandaspeaks hashtag, has been revealing and interesting – while many were based on hearsay and distorted views of the campaign, other contributors had strong and specific critiques of the Kony campaign. Users were less than enthused by the portrayal of LRA victims as 'invisible', however well-meaning the idea was. Additionally, the human rights abuses and atrocities committed by government forces in the conflict with the LRA was an issue the campaign seemed to elide. The notion that Uganda needed a western rescuer came in for particular criticism, as one message argued, "Americans… are scratching our healing wounds again and acting the saviour in a crisis". Other contributors supported the campaign and its focus on the victims of the LRA's reign of terror, for example this message, "It has done a great job telling the whole world that Kony was real, many died, more living the trauma". The importance of enabling many voices to enter the debate was summed up by one message, "#Kony2012 has put Uganda on twitter map + is making it cooler for ev'1 to think critically (and hopefully progressively)

about Africa".

Al Jazeera launched a similar 'Somalia Speaks' project in February to enable Somalians to post messages they wanted to communicate to the Somalia London conference this year. The aim of such initiatives is summed up by Al Jazeera journalist Riyaad Minty, "it's time for Africa to be heard". With the help of flexible, accessible technology, the hope is that the hold of a single narrative about the developing world in the media can be broken. Africa as the dark, silent continent where others project their desires to be heroes can be replaced by a rambunctious, varied and bold debate, in which people can finally challenge their own portrayal. The developing world not as a place where westerners find meaning, but as a place that talks back – that represents itself.

> "#Kony2012 has put Uganda on twitter map + is making it cooler for ev'1 to think critically (and hopefully progressively) about Africa."



ABOUT THE AUTHOR

Olivia O'Sullivan has worked for the Guardian newspaper, the Sudan team of the UN Peacekeeping Department and with the London NGO Waging Peace. She is an MPhil in International Relations at Cambridge University. She previously studied History at Cambridge University and Diplomacy and World Affairs at Occidental College, California. She is currently the Research and Media Assistant for kiwanja.net

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Hidden Truth: Women Filmmakers Share Stories in Zambia

By Kimberley Sevcik · 16 May 2012
Series produced by Ken Banks, kiwanja.net

The ability – and courage – to tell our own stories is one of the most powerful tools we possess. But in some of the world's poorest communities, men and women – but especially women — can struggle to make their voices heard. To amend this power imbalance and to help amplify their voices, Camfed – a charity that provides education for young girls in rural Africa – began training some as filmmakers.

It was a process that showed how this kind of storytelling can help individuals to flourish, can galvanise communities, and drive change. All of the women Camfed worked with came from backgrounds of deep poverty: many had never had the opportunity to learn outside the household. Today, their films are capturing international awards and being screened at film festivals and institutions from Brazil to Poland to Zimbabwe. The filmmakers are taking places on the world stage.

In 2006, filmmakers Abibata Mahama and Dominique Chadwick traveled to Samfya, a poor fishing community in northern Zambia, to lead a group of 23 women in a course that covered the fundamentals of filmmaking. A ten-hour drive from the capital, Samfya is a region of wetlands and lakes, with a fragile economy. Hampered by poor roads and infrastructure, it has historically been cut off from vital information and economic opportunities.

Although mobile phones are now ubiquitous in Samfya, when the training began technology was still a novelty, and the prospect of using video cameras and boom mikes was intimidating to the women in the group. They handled the equipment with trepidation, gingerly pressing buttons and fingering lenses. By day two, anxiety turned to curiosity and then to excitement, as they learned to frame a shot, use the zoom lens, and record each other's voices. Determining what they wanted to say on film was equally challenging. Asked to come up with a story to share with their entire community, the women went silent until a young woman named Doreen landed on the idea of her friend Penelop's story.

By the age of 12, Penelop had lost both of her parents, and everything her family owned. She was forced to drop out of school to care for herself and her siblings. Her aunt, concerned that Penelop's tremendous potential would be squandered, appealed to the headmaster at a local high school, who recommended her for support from Camfed so that she could resume her education and graduate from high school.

Penelop agreed to share her story on camera, and it became the group's first film, "I've Found My Way", with Penelop as director. In chronicling Penelop's story, the filmmakers illuminated critical issues that had long been considered unmentionable in a public forum – among them property grabbing and AIDS.


Penelop directing her film. (Photo: Camfed)

The premiere of the film was held in Penelop's school, a decision that she made, and an act of courage. On the day of the event the women called at homes and businesses and paraded through the streets with a megaphone to rally an audience. When the film was screened that evening it was for a standing-room-only crowd.

The women practically held their breath as they awaited the audience's reaction. When it came, it was overwhelmingly positive. Moved by the response, the Samfya Women Filmmakers spontaneously took to the stage to answer questions. One young woman asked, in a voice tinged with anxiety, if it were true that young people, too, could get HIV. A male high school teacher congratulated the women on their courage, and asked whether there would be more films in the future.

The film was then brought to a fishing camp on the shores of Lake Bangweulu, home of many of the filmmakers. A TV, a table, and a generator were carried down to the lake to set up for the screening. Women from the camp arrived at the screening carrying all of the family valuables in flimsy bags and suitcases to guard against theft from their unsecured straw huts while they were watching the film. Afterward, a young man with a wool cap pulled low on his forehead rose to tell the filmmakers that the film had made him feel less lonely as an orphan.


Penelop and colleagues at work. (Photo: Camfed)

Branding themselves the Samfya Women Filmmakers, the women went on to screen their film for thousands of people across northern Zambia. Everywhere they went, the film was received with enthusiasm – and provoked debate – as communities took a hard look at the challenges they were facing, and began considering solutions.

The Samfya Women Filmmakers' film also inspired behavioral change. A year after "I've Found My Way" was first screened in 2006, the health clinic in their district of Samfya reported a 65 per cent increase in young people seeking HIV/AIDS tests – a testament to the power of film as a tool for social change. "It isn't easy to share your personal story," Penelop says of the experience of making a film about her life, "but I did it so that others would learn."

Penelop and her fellow filmmakers have experienced great personal growth since their journey as filmmakers began. In addition to her film work, Penelop manages an IT center in Samfya, where she teaches computer skills to hundreds of young people every year. She has also emerged as a leader on the world stage. In 2010, she was invited to speak about the value of education at the opening session of the World Economic Forum in Dar es Salaam, Tanzania.

Extraordinary opportunities have opened up for her filmmaking colleagues as well. Filmmaker Abigail Kaindu was invited to meet with President Obama as part of an elite delegation of young Africans asked to present innovative solutions to Africa's greatest challenges. Mwelwa Kamanda was selected to attend the prestigious Video Advocacy Institute in Montreal, Canada, run by Witness. Others are studying at university, attending literacy classes, or starting new careers in fields such as social work and teaching.


Filmmaker Josephine learning how to use a camera. (Photo: Camfed)

In recognition of the courage it took to turn her story into a learning tool, *Fortune* and Goldman Sachs honored Penelop with the Global Women Leaders Award in 2009. She used the prize to make a second film with the Samfya Women Filmmakers, "Hidden Truth". An intimate, candid portrayal of the effects of domestic violence on women and children in Samfya, the film has put the Samfya Women Filmmakers on the world map. Since its premiere in March 2011, it has been selected to screen at film festivals across the U.S., Europe, and Africa, and it captured the Best Documentary award at the Zanzibar International Film Festival. It has also been screened for more than 100,000 community members in Zambia and Zimbabwe, stimulating dialogue about this once-taboo topic.

"With each film we make, my colleagues and I learn more about what we can achieve with filmmaking," says Penelop. "Filmmaking isn't just for entertainment. It's one of the most powerful tools we have to connect with people all over the world so we can work together to create change."



ABOUT THE AUTHOR

Kimberley Sevcik *is Camfed's Head of Special Projects. Prior to joining the nonprofit sector, she was an award-winning social issues journalist. She is the author of Angels in Africa (Vendome Press), which was named a Best Book of 2006 by the Guardian and praised in Bill Clinton's book Giving.She is also a former contributing editor on international women's issues for Marie Claire; a former contributing writer for Rolling Stone; and she has written for the New York Times Magazine, the Guardian, the Times of London, the Asian Wall Street Journal, Salon.com, Mother Jones, Glamour, and Good.*

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Mobile Learning: How Smartphones Help Illiterate Farmers in Rural India

By Hendrik Knoche · 5 June 2012
Series produced by Ken Banks, kiwanja.net

Small farmers are some of the most important people in the world – as Hendrik Knoche explains in today's 'Digital Diversity', they provide over half of the world's food supply. Helping such farmers improve their methods through innovative and efficient agriculture has long been an aim of development projects and an important part of the fight against global hunger. But many small farmers are illiterate, meaning it is difficult for them to share and learn about new farming practices. In addition, such development projects often fail to listen to small farmers' own local knowledge and ideas about agriculture, causing schemes to fail.

Computer scientist Hendrik, at the Swiss Federal Institute of Technology in Lausanne, is aiming to change that. He has designed a new smart-phone interface for farmers especially so that both illiterate and literate can share ideas and vital information about agriculture, helping them, and 62% of the world's food supply, to stay in business.

Rain-fed farming provides 62% of the world food supply. In India, small farmers cultivate 50% of the land. However, these farmers are often held back by inefficient, unproductive methods. Rain-fed farming productivity could improve greatly if individual farmers picked up more innovative methods – improving production, business, and helping to fight hunger. The goal of the development project I work on is to boost the dissemination of information on agriculture and its practices among marginal farmers through information communication technology (ICT).

In 2009 I travelled to Devarahati, a small village three hours north of India's prolific IT hub Bangalore for the first time, to better understand how to implement this project. At first glance Devarahati's residents seem to use little advanced technology. In fact few things in this poor community remind me of life in the 21st century. No sanitation is available but for a foot-wide groove in the ground. Drinking water comes from a government sponsored bore-well that required drilling 300ft down to reach the ever dropping water table. However, the pump for the well is only operational during the six-hour period each day when electricity is available. Those who can afford to build concrete cisterns to collect the monsoonal rain from their homes' roofs for later consumption.


A view of Devarahati. (Photo: Hendrik Knoche)

When one looks again, however, one sees signs of 20th century developments. A few homes that look like they were constructed a thousand years ago sport satellite dishes. Plastic rubbish is strewn all over the ground. And in the distance two cell phone towers clearly mark the age of mobile communication.

Mobile phones have proven transformative in allowing residents of rural India to communicate more easily and frequently with city-based family members or obtain information on market prices. They also provide unexpected side benefits. Walking around the village my translator Suma points out farmers wearing earphones – according to her, they are "*poorly educated people who don't even have a SIM card but just use their phones as music players*". One of them, Fakruddin, a 58-year old illiterate farmer, remembers that when GSM coverage arrived in the area five years ago only rich farmers and traders could afford to buy phones and make calls. Now even poor farmers like him can afford mobile technology. He feels that prepaid card call charges are still expensive but Suma counters that providers throw in 150 free text messages per day. However, like most marginal farmers in this area Fakruddin cannot benefit from texting as he cannot read or write the script of his mother tongue, Kannada.


Wiring up in rural India. (Photo: Hendrik Knoche)

Suma seems dismayed that many people in her home community appropriate technology for such mundane activities as entertainment. But I'm thrilled. It is clear that with the right incentives people are investing in individual ownership of technology, managing to charge their phones during the windows at which power is available, and mastering the user interfaces of phones not designed for illiterate people.

For our project the mobile phone is the most promising platform to disseminate relevant information throughout the farming community. A number of services already provide weather forecasts and market prices to farmers via text messages. But these don't help illiterate farmers. The application that we have been developing is based on a long term involvement with a local NGO and numerous interviews and meetings with farmers. The farming application is for touch screen smart phones, the cost of which has dramatically decreased in recent months.

The application lets literate and illiterate farmers share information about the inputs they use such as seeds, fertilizers and pesticides and learn about problems their peers are facing in terms of pests and diseases and what crop yield and prices they have achieved. The immediacy provided by touch screen technology in conjunction with audio-visual feedback can enable illiterate people to engage with digital information. In a side project we have built an application that allows illiterate users to 'read', i.e. listen to, and compose SMS based on previous messages, icons, and speech input.


A smartphone interface for illiterate users. (Photo: Hendrik Knoche)

In a field trial this summer we are hoping to better understand if and how the farmers in Devarahati will appropriate this novel technology into their decision-making processes. For the many farmers who do not own TVs the mobile phone will most likely become a second source of entertainment as well as a flashlight to be used during the frequent power cuts. But we hope that farmers will more readily adopt agricultural innovations if a trusted peer had a good experience with them. Our goal is essentially to use the word-of-mouth approach that locals trust, rather than coming into communities and telling them what to do. It's just that we're using technology to make word-of-mouth bigger and better.

ABOUT THE AUTHOR

Hendrik Knoche is a computer scientist working on user experience in mobile multimedia technology. He is a researcher at the Swiss Federal Institute of Technology, who works on ICT for Development in India as part of the Common Sense net 2.0 project in collaboration with IISc Bangalore and the CKPura trust. This joint effort is sponsored by the Swiss agency for development and cooperation (SDC).

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Hacking for Health: Working with Technology to Improve Healthcare in Malawi

By Isaac Holeman · 20 June 2012
Series produced by Ken Banks, kiwanja.net

Bringing medical support to isolated people often means working in difficult environments. A lack of continuous electricity, limited equipment and remote hospitals can mean health projects fall at the first hurdle. In these environments, people often think that cutting edge and complex technology is required, rather than working with what is already available. But in today's 'Digital Diversity', Isaac Holeman explains how MedicMobile, the NGO he works with, provides health support in the developing world using simple, locally appropriate communication technologies – the ubiquitous first generation mobiles found all over countries like Malawi, where Isaac has been working.

In this way, MedicMobile works not against the constraints in their environment, but with them, finding smart solutions that are calibrated to the developing world. MedicMobile uses apps that provide information and the ability to coordinate, so health workers can manage staff, mobilise communities for vaccination drives, set up satellite clinics and manage and map health services, logistics and supply chains. But they don't all need complex technology or even smart phones. Isaac explains how, below.

After driving south to the end of the pavement, we continued on gravel and dirt roads for a few hours, long enough for me to fall asleep and wake up several times before arriving at the district hospital. Temperatures can reach 125 degrees Fahrenheit near the Nsanje River in southern Malawi, so I was grateful to arrive in a milder season when midday temperatures hovered just under 100. For more than a year I had been using mobile phone technology to improve health services and I expected this project to follow the typical routine: discuss the plan with leaders at the local district hospital, install software on phones and computers, and train frontline health workers to deliver routine reports using a mobile phone-based data collection app called FrontlineForms.


Training health workers to use Frontlineforms. (Photo: Isaac Holeman)

In Malawi, government-employed community health workers (CHWs) treat children in rural villages for malaria, pneumonia and diarrhea. Although highly effective medicines exist, these three ancient afflictions remain leading causes of death among children in developing countries, often because medicines are out of stock or only available at distant locations. My goal in Malawi was to improve the flow of information from CHWs to the district hospital, so that these life saving medicines could be resupplied efficiently to remote communities.

Malawi has two major mobile network operators: Airtel and TNM. I had surveyed all 50 health workers about which mobile network had a stronger signal in each of their communities. When the training began, I was bewildered and frustrated to find that there was almost no signal for the network that 8 out of 10 had requested. I had offered to connect them to either network; why would so many choose the one with much

poorer coverage? Reluctantly, they explained that although Airtel had weaker signal locally, they sold airtime in units of 25 Malawi Kwacha, while the smallest increment for TNM was 50 Kwacha. These CHWs typically had 25 Kwacha on hand but may not have 50 in their pocket when they wanted to buy airtime for personal use (work related airtime was to be reimbursed). This experience was eye opening, almost unnerving. I was distributing $100 phones to people who considered 25 Kwacha (about 15 cents in US dollars) a greater barrier to access than walking or bicycling several kilometers to reach mobile signal.

Money on hand for airtime is one of several important considerations for rural health workers. A few weeks ago I spoke with a volunteer health worker who provides immunization and antenatal care services in coastal Kenya. Mary has a solar panel on the roof of her house and one other volunteer in her community group has grid electricity, but the other 38 volunteers must travel to the market to charge their phones. Charging a phone just once costs 30 to 80 cents. For a volunteer health worker whose cash income may average a few dollars a day, the financial burden of charging a phone this way is similar to filling a car with gasoline in North America or Europe. Walking or paying for public transit to the market are inconvenient, so many volunteers wait a day or two after their phone runs out of battery.



MedicMobile apps can be used to share information about when medicines are in or out of stock, saving long journeys and helping to fix the supply chain. (Photo: Isaac Holeman)

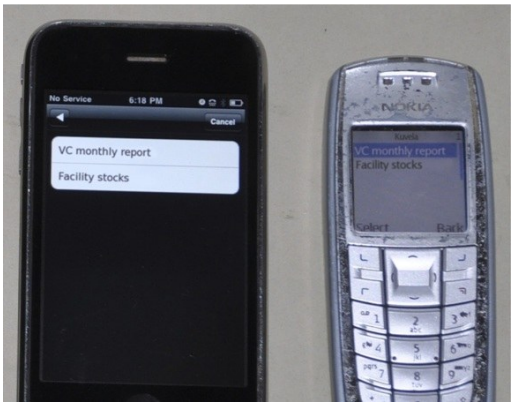
Working in these circumstances for the last three years, I've learned that the key to understanding how mobile health services can proliferate is in understanding what technologies these communities are already using. There is wisdom embedded in the observed preferences of ordinary villagers. The technologies that are driving change in society today are, as a rule, already being used at a massive scale. For the urgent change-maker, *cutting-edge* technologies are hardly relevant, *ubiquitous* technologies should be captivating.

One such captivating technology is the mobile phone that costs $15 and can last a week or even two on one charge. Clunky nine-button keypads and black and white screens the size of a half-dollar coin can make these phones look second-rate, but they fill an enormous gap in households surrounded by neglected rural roads, with ineffectual postal service, no car and no land-line telephones or internet. The first-generation phone is a quaint memory in developed markets but in Africa, everyman's phones are referred to with familiar terms such as Kabambe in Kenya and Mosewalelu in Malawi. They have become cultural icons of progress not unlike the early model T Ford, a cultural icon as the first everyman's car in America. The low cost, long battery life, familiarity and ease of use, being less prone to theft, better supply chains, sales and repair outlets and the promotions put on by mobile network operators all contribute to the statistic that in 2011 there were 32 non-smart phones for every smart phone on the African continent.



A cultural icon of progress - the new Ford Model T. (Photo: Isaac Holeman)

During my first design research trip to Kenya in early 2010 I learned something about $15 phones that most Kenyans already knew: every phone can have apps – you don't need a smartphone. I was talking with ordinary consumers about using mPesa, the wildly successful mobile banking service that lets users send money to and from any phone. I learned that mPesa is available and familiar on any kind of phone, from Android smart phones to ordinary $15 phones. This is possible because mPesa actually sits on the SIM card, not the phone itself. Many North Americans do not even realize that inside of their phone is a small chip called a SIM card that handles the phone's connections to the mobile network. Throughout Africa, however, people frequently change their phone's SIM card from one mobile network to another, to take advantage of evening calling rates or other sales promotions. SIM apps are viewed through the phone's native menu which means that if you know how to check your contacts list or text message inbox on a particular phone, a SIM app on that same phone will look familiar.



Different phones, same apps - with a little creativity. (Photo: Isaac Holeman)

The challenge with deploying health related SIM apps is that mobile network operators strictly control which apps are installed on their SIM cards. But I kept tinkering with SIM cards and after several months I discovered that some groups in the financial and security sectors, as well as hackers trying to jailbreak iPhones, use paper-thin *parallel SIM cards* that slide underneath the mobile network operator's SIM. Using any standard GSM phone, we're able to put our SIM apps on the parallel SIM and still use an ordinary SIM card to connect to any GSM mobile network in the world. About a year ago I announced that Medic Mobile would be the first mobile health organization to develop and deploy SIM apps, and since then the Medic Mobile team has started SIM app projects in several African countries.

As we take on larger SIM card projects, our goal is to work closely with mobile network operators so that the apps sit directly on the native SIM card and don't require parallel SIMs. This will be cheaper and it's true to the strategy that has served Medic Mobile well: no one understands the c ommunities where we work better than the people who live in them every day. Our best chance of deploying mobile health services that are locally appropriate and manageable at a large scale, is to leverage the phones and other technologies that are already in their hands.



The ingenious parallel SIM card, which sits under an ordinary SIM. (Photo: Dave Brown)



ABOUT THE AUTHOR

Isaac Holeman *hails from a great big outdoorsy Oregon family. He's a co-founder and the Chief Strategist at Medic Mobile, where he's focused on building a team that uses communication technologies to improve health services, human centered design and the organization's strategy for products and services. He was named one of the top 11 mHealth innovators of 2011 for his work with SIM apps. He studied Liberal Arts, Biochemistry & Molecular Biology at Lewis & Clark and will begin graduate study in sociology at the University of Cambridge this fall. You can follow him on Twitter.*

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The Invisible Bank: How Kenya Has Beaten the World in Mobile Money

By Olivia O'Sullivan · 4 July 2012
Series produced by Ken Banks, kiwanja.net

Click a few keys, exchange a few numbers, and it's done. With just a mobile phone and a registration with Safaricom, Kenya's mobile service giant, you can pay for anything in seconds – no cash, no long journeys to towns to reach a bank, and no long lines when you get there. This is m-Pesa, the revolutionary approach to banking which is changing economies across Africa. The service allows customers and businesses to pay for anything without needing cash, a bank account, or even a permanent address. In today's Digital Diversity, in honour of its recent fifth birthday, we present a beginner's guide to m-Pesa and examine its implications for financial access in developing economies.

In the developed world, we are used to the idea that we created the model of industrial and economic progress which other countries must follow. Many of our big ideas about development rest on the assumption that the West cracked the formula for economic progress sometime in the 19th century, and what we need now is for the developing world to 'catch up'. Even the language we use encapsulates this idea, in the division between 'developed' and 'developing'. But new innovations are challenging the idea that development requires handing ideas down from developed to developing. In banking and finance, the big ideas in cashless transfers and mobile, flexible exchanges are not to be found in Geneva or London or New York. A revolution in mobile money transfer has occurred, but not in these financial centres. Instead, it's happened in Kenya, with m-Pesa.

The service was developed between Safaricom and Vodafone, and launched in 2007. And it's not just something used in cities or by big commercial interests. By 2010, over 50% of Kenya's population had used it – this means rural villagers haggling over produce, then using their Nokias to make the final deal. It means Masai herdsmen bringing their phones to market along with their cattle, ready to stock up on essentials to bring back to their homes.



The widespread use of mobile phones in Africa provides huge potential for innovation. (Photo: Kiwanja)

For people who live in isolated areas, the service means no longer having to carry lots of cash to markets or towns, risking losing huge amounts to banditry and theft. For people without permanent addresses or bank accounts, the service means they can pay what cash they have to m-Pesa in exchange for mobile credit, making payments and transfers and building up savings – becoming participants in an economy from which they had previously been locked out. For migrants, the service allows them to send money home to their families and villages safely and simply. Safaricom's international money transfer service uses a similar system for international immigrants, coordinating great webs of

remittances and payments across the world. For Kenyan businesses, the service means payments for stock or repairs can happen almost instantaneously, wiping out the need to rely on bank clearances and flawed infrastructure which had clogged the economy with inefficiencies and delays.

So how does it work? m-Pesa relies on a network of small shop-front retailers, who register to be m-Pesa agents. Customers come to these retailers and pay them cash in exchange for loading virtual credit onto their phone, known as e-float. E-float can be swapped and transferred between mobile users with a simple text message and a system of codes. The recipient of e-float takes her mobile phone into her nearest retailer when she wants to cash in, and swaps her text message code back for physical money. There are already more m-Pesa agents in Kenya than there are bank branches.



An mPesa agent. (Photo: Laxman Rajagopalan)

Such a system also requires intermediaries, to get the cash to m-Pesa agents, and ensure cash movement keeps up with e-float exchanges. In this way, the system has created new jobs, with some intermediaries and retailers earning $1000 a month in commission from m-Pesa transactions.

As of m-Pesa's fifth birthday – March 6 2012 – it had been used by a staggering 15 million people. The system was employed by the 'Kenyans for Kenya' campaign to raise money for Kenyans suffering from the Horn of Africa drought – just one way in which it has contributed to independence and innovation in Kenya's economy.

In response to m-Pesa's success, the model has been imitated in other countries. Africa's biggest mobile operator MTN has rolled out schemes elsewhere, the most ambitious in Kenya's neighbour Uganda. Central banks in some countries, such as Brazil, have now created financial inclusion teams, with a vision for using similar systems to bring financial access to the poor and isolated. The Indian government has also shown determination to achieve this aim, and analysts predict, with its strong IT infrastructure and dense population, India too could be on the road to becoming a cash-light, financially inclusive economy in the near future.



m-Pesa is a triumph of thinking locally but dreaming big. (Photo: Kiwanja)

m-Pesa has big things to say about the future of African economies. It demonstrates the potential in the huge and rapid dissemination of mobile phones and other flexible, adaptable technologies on the continent. But it also shows the value of dreaming big but thinking locally. M-Pesa is not an attempt to recreate developed countries' banking systems in Africa. Instead, it's an idea which has been tailored to the Kenyan environment. Rather than giving up on poor, isolated communities as unbankable, it has extended financial services to their most apparently unlikely customers. Rather than giving up on sophisticated economic transactions in countries with poor infrastructure, it has found a way to circumvent that infrastructure, creating a virtual, mobile one of its own.



ABOUT THE AUTHOR

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Digital Diversity is a series of blog posts from kiwanja.net about the way mobile phones and other appropriate technologies are being used throughout the world to improve, enrich, and empower billions of lives. Digital Diversity is produced by **Ken Banks**, innovator, mentor, anthropologist, National Geographic Emerging Explorer and Founder of kiwanja.net / FrontlineSMS. He shares exciting stories in "Digital Diversity" about how mobile phones and appropriate technologies are being used throughout the world to improve, enrich, and empower billions of lives.

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Wireless Learning: How Mobile Technology is Transforming Classrooms and Empowering Young Women in Jordan

By Edith Saldivar, Staff Analyst, Qualcomm Wireless Reach · 18 July 2012
Series produced by Ken Banks, kiwanja.net

Technology in classrooms often seems like an add-on, an extra luxury for developed education systems. But, as Edith Saldivar explains in today's Digital Diversity, IT can help students all over the world learn in entirely new ways. The company Edith works for, Qualcomm, has been helping students in Jordan use IT to transform their education – in particular young women. This work is carried out through their Wireless Reach™ initiative, a program that brings wireless technology to underserved communities globally. To date, Wireless Reach has 64 projects in 27 countries. Edith explains the surprising effects it has had in Jordan's schools, below.

Aya, a 9th-grade student at the all-girls Um Abhara School in Baiader Wadi Al-Sier, a village nestled among olive trees in the hilly outskirts of Amman, Jordan, has the traits of a budding teacher. One of the school's 8th-10th graders who are using mobile technology as an essential tool to enhance their education, Aya shares the benefits of her Internet-connected netbook with younger students. In cooperation with 1st and 2nd grade teachers, she's creating digital lessons that help the younger children learn math, science and languages.

Good things are also happening through the use of mobile technology at the all-girls Balqees School in the Citadel neighborhood in Amman.7th, 8th and 9th graders are using netbooks, the Internet and online educational resources to research projects, develop PowerPoint presentations and create and share videos on YouTube.

It's all part of a pilot project providing 32 teachers and 223 students with a netbook and 24/7 Internet connectivity to demonstrate how students can use advanced mobile technology in and out of the classroom to gain valuable skills that will better prepare them for the future. Having access to online educational resources at all times nurtures and maximizes each student's opportunity for learning. It also makes school work more engaging by encouraging personalized, self-initiated learning. The overall objective of this project is to create a model for mobile learning programs throughout Jordan and the region.


Students in Jordan working with their new educational technology. (Photo: Qualcomm)

The project was launched in December 2011 by the Jordan Education Initiative (JEI), one of Her Majesty Queen Rania Al Abdullah's nonprofit educational organizations, and Qualcomm's Wireless Reach™ initiative, a program that brings wireless technology to underserved communities globally.

At first, parents were uneasy about the program. What if their child lost or broke their netbook? What if they went to inappropriate websites? JEI addressed everyone's questions and concerns during intensive training workshops and worked with teachers to help them understand how to integrate the technology into their curriculum. Skepticism gave way to excitement, particularly as parents realized how they too could use the technology to find employment, community resources and other helpful information.

The technology has transformed the educational model inside the participating classrooms. Gone are the lecture-based lesson plans – with their new ability to research, collaborate and communicate online anytime and anywhere, teachers now create project-based lessons that require students to use their new tools to complete assignments.

A 7th-grade religion teacher at Balquees School describes the change as such: "I'm no longer standing in front of a room, putting information on a blackboard and lecturing. Instead, I put a question on the board, and the students search several websites for the answer. Through this research approach, the learning process and its impact are more focused, impressive and interactive."


Edith with students. New forms of IT transform the classroom experience. (Photo: Qualcomm)

With students taking on so much responsibility for their own learning, more classroom time is given to mentoring, presentations and discussions. According to Mrs. Eman Hamdan, the science teacher at Balqees School, "Teachers' instructional styles have moved away from the 'sage on the stage' model and more towards the 'guide on the side' approach." This new way of teaching encourages the development of critical thinking skills.

Teachers and students now produce PowerPoint presentations and use social media for project-based work. Both schools created YouTube channels where teachers and students can upload videos.

The use of technology integration has been unexpectedly creative. Mrs. Ahed, an English teacher at Balqees School, had been using her netbook as a voice recorder for personal use when she had the idea that the students could use their devices to improve their English language skills. Once students were able to record and then hear themselves reading, they became more engaged, motivated and invested in their own learning. Soon after, students' progress exceeded twice the rate that used to be considered normal for that period of time.

For students with disabilities, the arrival of the netbook has improved their lives and prospects. Sulafa, a 7th-grader with a hearing impairment, felt isolated, finding it difficult to understand subjects, especially her

favorite, Arabic. Her teachers were frustrated by their inability to help her. With netbooks in hand, Sulafa's teachers are accessing educational software and resources online that help them teach Sulafa more effectively. And Sulafa now loves school, excels in class and no longer feels alone.

One remarkable aspects of this project is how the students use their netbooks as a teaching or demonstration tool for their parents, younger siblings and others. The portability of the tools has allowed for impromptu training sessions by students as they share their technical knowledge beyond school walls.


Edith working with students in Jordan. (Photo: Qualcomm)

On my last visit to Jordan, as our car bumped along toward the Um Abhara School, past the olive trees dotting the hillsides and the villagers selling fruit by the side of the road, the rural setting took me back to the small farming community in Mexico where I spent part of my childhood.

I'm the daughter of migrant workers and the first in my family to have attended school in the United States. When I see the girls in Jordan, I see my family members who are still in Mexico and who I wish could have had the same opportunities that I had. These girls have the potential to do great things. I want them to have opportunities to excel, succeed and be independent. I hope that their exposure to technology is opening their minds and helping them form new aspirations that they can then go out and reach.



ABOUT THE AUTHOR

Edith Saldivar is a graduate of University of California, Santa Cruz, where she was awarded honors in the Global Economics/Latin American and Latino Studies major. In addition, she received her Master's degree in international affairs at the UCSD's School of International Relations and Pacific Studies. Prior to her work at Qualcomm, Saldivar was an economic development coordinator, responsible for creating and expanding programs to ensure the economic vitality of downtown El Cajon, California. She also worked at the Center for U.S.-Mexican Studies at the University of California, San Diego (UCSD), as a research assistant, where she helped advance wireless telecommunication capabilities in rural Oaxaca for a transnational project supported by UCSD, USAID and Qualcomm. She currently serves as Wireless Reach™ staff analyst within Qualcomm's Government Affairs department. She is also on the board of directors for Izcalli, a community-based non-profit with a focus on community and youth development.

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Mobile Data: How Phones Help Keep the Water Flowing

By Zarah Rahman · 13 February 2013
Series produced by Ken Banks, kiwanja.net

We often don't associate the problem of water scarcity with mobile phones but, as Zarah Rahman of the Aquaya Institute explains, water is about much more than turning on a tap. Helping people in the developing world access safe water requires not just H2O but information – in order to monitor cleanliness, distribution, infrastructure – in short, everything about the way we manage our most precious resource. And it's the humble mobile, as Zarah details below, which provides the network keeping the information, and the water, flowing.

Can mobile phones solve the world's water crisis? This is a big question that my colleagues and I are exploring at the Aquaya Institute, a non-profit research and consulting organization that specialises in innovative safe water solutions for the developing world. The global water crisis affects all countries, rich and poor, and spans many issues that range from the availability and sustainability of water resources to their safety for public health. At Aquaya we focus on water and public health: infants and children are especially vulnerable to waterborne diseases like diarrhea, and according to the World Health Organisation unsafe water is responsible for approximately two million child deaths a year, more than HIV/AIDS and malaria combined.

In March this year the United Nations announced that, at a global level, the Millennium Development Goal for access to improved drinking water had been met. 89% of the world's population, 6.1 billion people, now access improved drinking water sources. But thousands of these improved water systems don't deliver *safe* drinking water and many more break down each year.



A hand pump in a rural community in Malawi, a typical scene of rural water supply in Sub-Saharan Africa (Photo: Zarah Rahman)

How can we improve the reliability and safety of drinking water supplies? A lot of hard work and research by many people has taught us that more and better infrastructure is just not enough. Ongoing oversight of water systems by trained professionals is also important. But this support is hard to provide. Government institutions are often highly centralised, financially constrained and geographically overstretched. We need simple tools to improve communication between local community water managers and their support agencies in order to promote the efficient use of existing management resources.

This is where mobile phones come in to the picture. Mobile phones are cheap, easy to use and nearly ubiquitous in countries like Ecuador, Vietnam and Mozambique where we work. Most importantly, mobile phones can transmit multiple types of information – including images and GPS points – cheaply and quickly over long distances.

In October 2011 I traveled with colleagues from UNICEF to Chimoio, a mid-sized hill town in Southern Mozambique that is close to the border with Zimbabwe. UNICEF is collaborating with the Government of Mozambique to develop and maintain hand pumps, which are the primary water sources for rural villagers. We were there to show district health technicians how to use mobile phones to send information on pump status and water quality to their regional and national level supervisors. The mobile phone application (or "app") that we used for sending this information is called Water Quality Reporter, and it was developed by the iComms Group at the University of Cape Town in South Africa as a reporting tool that runs on very basic mobile phones.

The district health technicians are on the road constantly, so much so that we had to travel between towns to try and catch them on the road. Each week they travel for hours on unpaved roads to communities of under a hundred people to inspect drinking water sources, provide technical support to community water system managers and provide health education lessons to the community.

The district technicians have long had responsibility for monitoring drinking water sources, but the information they collect generally stays in their logbooks and is rarely reported to their superiors. However, the technicians need resources and technical support from their managers to fix broken pumps and treat contaminated water. We wanted to find out if instant reporting through the Water Quality Reporter would make everyone more responsive to water supply problems.



District Health Technicians in Mozambique learn to use the Water Quality Reporter mobile application (Photo: Zarah Rahman)

A few months after training the technicians to use the app we witnessed concrete changes. The Director of the Ministry of Health's national laboratory issued formal memos to the local Government, asking them to respond to the high levels of contamination reported in a number of the district's water supplies. In her letters, the Director noted that many rural supplies are 'improper for human consumption' and provided technical guidance on determining the source of the contaminants (mainly bacteria and nitrites) and how to take action. For local governments that are juggling competing priorities, this kind of guidance and accountability is critical.



A water treatment plant operator submits water quality data via the Water Quality Reporter mobile app (Photo: Zarah Rahman)

As in Mozambique, we have observed poor information flows between field staff and institutional managers in many other countries. For example, environmental health technicians in Ecuador regularly send water samples by bus to a Ministry of Health laboratory in Quito, but they rarely receive the test results. Without this feedback loop, the technicians can't use the data to inform their health promotion activities – things like hygiene education in schools and delivery of chlorine to water system operators. A mobile phone based data sharing system would allow these technicians to efficiently share field information with managers and receive water quality test results.

Fortunately, a number of groups working in the water sector have caught on to the potential of mobile phones for improving the reliability and safety of water supplies. Some NGOs are now incorporating mobile data collection into their project monitoring surveys and creating dynamic websites to share results with donors and other stakeholders.

But it is also important to remember that implementing mobile phone solutions in low-resource settings is not without challenges. Though mobile phone coverage is rapidly growing, the networks are generally weakest in the places where information flows are the most critical. In addition, management procedures must be in place for things like lost or broken phones, the topping up of phone credit, network configuration and new user training.

At Aquaya we're optimistic that although mobile phones may not address all aspects of the global water crisis, they will be important tools for managing the many challenges. We are exploring other exciting ways to use mobile technology to support safe water delivery including bulk SMS messages for public service announcements and customer alerts (like a boil alert when contamination is detected in a utility network), public submission of complaints and status reports, and automated, dynamic data analysis for managers.

Although the developing world is changing rapidly, particularly through urbanisation, much of the urban growth – especially in Africa – is in small and medium sized towns. As a result, strategies for linking geographically dispersed actors to support regulatory agencies remain critical. In his annual report last year, Engineer Robert Gakubia, the CEO of the Kenya Water Services Regulatory Board, summed it up when he said "There is no transparency without information, which means that information is key to good governance. Information helps water service providers and customers improve access to water services".



ABOUT THE AUTHOR

Zarah Rahman is the Director of Programs at the Aquaya Institute, a non-profit research and consulting organisation specialising in innovative solutions for safe drinking water worldwide. At Aquaya, Zarah leads programs that improve local stakeholders' ability to obtain and use data for better water and management. Though based in California, Zarah has traveled to over fifteen countries in Africa, Asia and Latin America for Aquaya's programs. Zarah studied International Development at Brown University.

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Reach for Your Pocket: Nicaraguans Turn to their Phones for Reproductive Health

By Chloe Lew · 19 June 2013
Series produced by Ken Banks, kiwanja.net

Access to the Internet is something often taken for granted in the Western world. For many of us it's a handy way to share our thoughts and lives over social media, or to keep in touch with friends, or to look up the latest sports scores. For many people in the developing world the Internet promises much more, if only they had access to it. In this installment of Digital Diversity, Chloe Lew, a Peace Corps Volunteer in Nicaragua, shares details of a project which bypasses the need for the Internet and focuses on girls' empowerment and teen pregnancy prevention through widely accessible text messaging.

Yesterday I googled "safer sex."

You've possibly done it too. Most people have. Perhaps you wanted to double check something that your friends were talking about or maybe you were simply curious about an aspect of your own health and didn't want to navigate a face-to-face discussion.

While sex permeates many aspects of our lives, including health, relationships, self-esteem and gender dynamics, it is still a sensitive and often uncomfortable subject. For topics such as sex, the Internet is particularly useful. One of its unappreciated beauties is that you don't need to endure the discomfort of an in-person conversation. Instead, you can investigate your concerns and questions in private. After all, your search engine can't judge you.

But how do you get the answers you need when you don't have Internet access?

In January 2012 I moved to Nicaragua to serve as a reproductive health educator with Peace Corps. During my training a fellow volunteer suggested that one of our roles as volunteers was to serve as Google for our communities. At first I found this idea slightly condescending – I don't have all of the answers. But then I understood his point. In more-developed countries people are used to finding answers to intimate questions independently. However, in a country like Nicaragua, where only 10.6% of the population have Internet access most people do not have the luxury of finding immediate answers to more embarrassing inquiries in an anonymous manner.

In smaller communities the reality is that the public health system is not easily accessible. This is due to a number of barriers, including geography, socioeconomics and culture. Additionally, generations of cultural beliefs have led to the perpetuation of false information. Getting correct answers to sensitive questions generally requires a face-to-face conversation, and in small communities this usually involves friends, family, or both – even in the medical center. Anonymity is rare and *pena,* meaning embarrassment, shame, or shyness, is abundant.

Pena is particularly extreme in Nicaragua where *machismo*, or macho culture, is rampant. *Machismo* helps to propagate the perception that a woman who inquires about her sexual reproductive health (SRH) or asks for

condoms is promiscuous or unchaste. As such, *pena*, along with other barriers, is one of the greatest impediments to the dissemination of and access to scientifically correct SRH information, and the consequences are quite evident.

Nicaragua has the highest teen pregnancy rate in Central America. Approximately 1 out of 4 adolescent girls will become pregnant before they reach the age of 19. Another frightful statistic is that nearly 48% of women who are married or in a union are affected by gender-based violence, which, according to World Health Organization, is 57 times higher than what is considered an epidemic (Nicaraguan Dispatch, 17 Oct. 2012). Although historically Nicaragua has had the lowest rate of HIV infections in Central America, the annual incidence of registered cases of HIV has tripled in the past six years.

Like everyone, Nicaraguans have questions about their SRH and want to make informed decisions. While Google is not an accessible or familiar resource to those living without the Internet, Peace Corps volunteers have identified a different tool that can help Nicaraguans bypass the "*pena* barrier" that needs no cultural adoption – the cell phone.



A young boy gets cell phone service out in the mountainous municipality of Rancho Grande, Matagalpa, Nicaragua. Photo: ChatSalud

Cell phones are one of the most ubiquitous and transformative agents of social change ever. The reality is that, in Nicaragua, more people have access to cell phones than to indoor plumbing or electricity. According to the International Telecommunications Union, in 2011 82% of the Nicaraguan population had a cell phone, with coverage in 151 out of the 153 municipalities – and these numbers have only been increasing. Nicaraguans rich and poor, from city centers and rural mountains, with and without access to running water, all have cell phones and use them daily.

If people can text "*amor*" to 3766 to discover who the love of their life will be, why can't we also harness the power of cell phones to disseminate vital SRH information and resources to those who need and want it most? After months of discussing various strategies for using cell phones to deliver health messages, Peace Corps volunteers and their Nicaraguan colleagues settled on a platform: **ChatSalud**.

ChatSalud, an SMS-based sexual and reproductive health hotline, is the first of its kind in Nicaragua. The goal is to empower Nicaraguans to lead healthier, safer, and more productive lives by providing correct SRH information and connecting them to local resources in a free, confidential, reliable, and accessible manner, directly to their cell phones.

Using FrontlineSMS, a free, open-source software, we have been able to leverage its auto-response function to create a platform that will deliver culturally sensitive and contextually correct information on five central themes – reproductive health, safer sex, HIV/AIDS, STIs and domestic violence. The system is entirely demand-driven and interactive, with users able to select which theme to explore and from there select the information he or she wants to receive.



The Peace Corps members of the ChatSalud team from left to right: Talia Langman (Peace Corps Volunteer 2012-2014), Danny Murphy (2007-2010), Jessica Bixby (2012-2014), Hannah Grow (2012-2014), Lauren Spigel (2011-2013), Gabe Goffman (2011 -2013), Nishant Kishore (2011-2014) and Chloe Lew (2012-2014) . Photo: ChatSalud

For example, a 16-year-old girl living in a rural community thinks she is ready to have sex with her boyfriend for the first time. She is too scared to ask her parents for advice and is uncomfortable broaching the subject with the doctor at the health center since he also lives in her community. She decides to text ChatSalud for information on safer sex and condom negotiation. She begins by texting "info" to ChatSalud and automatically receives a text in response that contains a menu of informational categories. The menu says "Text 1 for HIV", "2 for STIs", "3 for safer sex" and so on. She texts "3″ and educates herself about how to protect her health and avoid an unwanted pregnancy. After receiving the interactive automated messages, she feels more confident about negotiating condom use with her boyfriend and about protecting herself from an unhealthy relationship.

From teenage girls approaching their first sexual relationships to men wanting more information on STIs after noticing a potential symptom, to women concerned about the cycle of violence who are looking for domestic violence resources in their communities, ChatSalud is a resource for all Nicaraguans.

Since its inception, ChatSalud has grown substantially both in scope and in support. The project has received tremendous interest from the public and private sectors in Nicaragua. Almost entirely funded by local in-kind contributions, the project is low-cost and will be free to Nicaraguan users. The Nicaraguan Red Cross serves as the main project partner with Peace Corps, keeping the focus on sustainability and cultural application. With chapters in every department across Nicaragua, the Red Cross will be particularly vital in the promotion and marketing of the hotline.

However, much of the success depends on the strength and relevance of the content. The World Bank in Nicaragua has connected the ChatSalud team to NGOs and local actors across the country to develop the content and organisational structure, and to ensure the program's longevity. In addition, a local technology company is working to strengthen the back-end functionality and to provide the user with a seamless experience. We are extremely grateful for the advice and dedication from all of our project partners who are committed to ChatSalud, a service developed by Nicaraguans for Nicaraguans.


At the World Bank sponsored Central America Domestic Violence Hackathon, Nishant Kishore, Lauren Spigel, Gabe Goffman and Chloe Lew pose with our Nicaraguan IT-counterparts, who worked 48 hours without sleep on the ChatSalud project (Photo: ChatSalud)

ChatSalud is still in development. The Peace Corps and Nicaraguan partners are currently finalizing content, system and evaluation tools, but hope to begin the first phase of the project in the coming months. Stay tuned for more updates as we perfect and launch the service. For more information, please email us at chatsalud@gmail.com or follow us on Twitter.



ABOUT THE AUTHOR

Chloe Lew is a current Peace Corps Volunteer in Nicaragua and ChatSalud's public relations advisor. She has been living and working in a small community in Nueva Segovia since 2012. There, her service has been largely focused on girls empowerment and teen pregnancy prevention. Prior to joining Peace Corps she worked in Program Innovation and Policy at the Elizabeth Glaser Pediatric AIDS Foundation. She holds a Bachelor of Arts in International Affairs and Anthropology from George Washington University. Lauren Spigel and Nishant Kishore – both co-founders of ChatSalud – helped with the editing of this article.

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Aid Workers Turn to Text Messaging to Improve Food Aid Delivery to Refugees in the Western Sahara

By Rosa Akbari · 26 June 2013
Series produced by Ken Banks, kiwanja.net

Communication between beneficiaries and food aid providers in the Western Sahara refugee camps in Algeria suffers as the number of food distribution points increases. Rosa Akbari worked as an independent researcher funded by a grant from the United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) to explore better communication tools to be used within the camps. What she found was a society prepped for technological innovation. By using what was already in place – a mobile phone in each household – Rosa capitalized on existing flows of information as they worked without technology and used FrontlineSMS to ease the communication within the camps.

45˚C days and 0˚C nights – welcome to winter in the Sahara. In June 2012, I first visited the Western Sahara refugee camps in southwest Algeria to explore the potential for mobile technology to help improve humanitarian coordination within and around refugee camps. I returned in December 2012 to develop a system to connect beneficiaries and food aid providers using the lowest levels of technology possible.The camps house Sahrawi refugees fleeing from the conflict over the Western Sahara. There are five residential camps and one administrative camp called Rabouni. The Sahrawi people and expatriate authorities operate from Rabouni, while the actual organization of daily aid distribution occurs at local levels.



Charting out the flows of communication to help identify core information managers and their constituents. (Photo: Rosa Akbari)

In 2010, the Sahrawi Red Crescent (SRC) – the lead humanitarian coordination agency in the camps – managed 27 food distribution points for nearly 125,000 people. They have since expanded to 116 distribution points: one per neighborhood. This made distribution logistics and staff coordination complex. Internal communication was unreliable at best and non-existent at worst, and beneficiaries wanted to know more from humanitarian leaders. As a result, my efforts evolved from technological experimentation to practical implementation using a text messaging (SMS) platform called FrontlineSMS.

The basic pilot established direct lines of communication between aid providers and beneficiaries that were both practical and easy to explain. While I considered a few SMS platforms, FrontlineSMS was the easiest to install and the most intuitive to use for a grassroots pilot. This became more apparent once I introduced the software to Sahrawi partners.

The implementation process involved three steps: first, assess the need for technical innovation; second, build local trust in the innovation; and third, test the system's performance.



Agaila, Suleiman's assistant, teaches her counterpart in the Farsia district how FrontlineSMS works. Farsia became the live test bed in which we piloted a communication flow from the food warehouses to the families. (Photo: Rosa Akbari)

In this instance, the Sahrawi were ready for innovation. Each family owns at least one cellphone, maintains consistent access to electricity via solar panels, and has a history of adopting new ideas, even those introduced by external parties. Also, after watching their mobile habits, it was safe to assume that employing SMS for humanitarian coordination would not require huge behavioral shifts.

Once we confirmed operational relevance, the SRC and I focused on one district, which has four neighborhoods that house 1,305 families. I worked closely with a core group of eight humanitarian coordinators that were stationed at various points along the distribution chain. They helped to improve training and implementation procedures. My goal was to make the group comfortable with FrontlineSMS because their buy-in was crucial to creating a sustainable system. Within a day of introducing the software, they were playing with it on their own.

Setting up FrontlineSMS was easy. I outlined who was involved in the distribution flow, suggested message content and estimated times for when to send the SMS. However, FrontlineSMS was not an end all solution: people had to improve communication habits regardless of the technological aids at hand. FrontlineSMS became the catalyst for people to think of better ways to get the right information to the right people.

I was able to work directly with Sahrawi authorities because I was an independent actor. Also, I lived with a family in the district in which I worked. This gave me the chance to witness distribution routines from both ends of the spectrum: working alongside the staff by day and discussing observations with beneficiaries by night. Some of the most important information I gleaned came from casual conversations with the women in my host family.

These two vantage points kept me one step ahead of the flows of information. For example, I found out about truck malfunctions in Rabouni as they were happening and waited to see when that news reached the beneficiaries. As a result, I was able to ensure that the beneficiaries' perspectives were consistent with those at the SRC headquarters.



An incoming text, via FrontlineSMS, details the status of trucks leaving Rabouni. This was one of the first messages received from distribution managers without external prompting or assistance. (Photo: Rosa Akbari)

Technological innovation is rapid and unpredictable. It requires a great deal of adaptability and trust among the parties involved. The smaller the implementation group, the easier this is to manage.

The Western Sahara camps are unique in that they are wholly self-administered. The Sahrawi serve as both the aid administrators and the recipients. Organizationally, there is one agency responsible for distribution: the Sahrawi Red Crescent. For me, this meant working with one partner, which I found to be very helpful,

especially since I was a one-person team.

It is most important to make sure there is a problem to address before proposing a solution. Is it necessary to introduce new technology? Often, people are wrapped up in the novelty of technology without critically assessing the context in which it will be applied. From my experiences, technology is never an end all be all. It only improves human processes if the time and place are right.

Finding the right people to work with is also crucial. Suleiman, the distribution field manager, was my go-to man. Zorgan, my host and translator, was my link to the community. And Buhobeini, the president of the SRC, was my link to the logistics behind it all; his willingness to let me explore was invaluable. None of this would have worked without their cooperation. I was just some kid with tech tools, but they opened their doors and encouraged the concept.

The escalating conflicts in Mali and the Sahara prevent me from visiting. While I am still communicating with the SRC, it is difficult to watch progress from abroad. However, they have a working pilot and FrontlineSMS is accessible, which opens doors to platforms that use basic mobile phones.

Refugee camps and forgotten conflicts will always exist, but it is only a matter of time before innovative solutions from the field of Information and Communication Technologies for Development (ICT4D) are applied to these contexts to project the voices of those most vulnerable. With tools like FrontlineSMS, it's safe to say we're just getting started.



ABOUT THE AUTHOR

Rosa began her exploration of emergent humanitarian technologies while working as a research assistant for the US Department of Defense. In January 2010, she deployed to Haiti as part of a six-person civil-military unit tasked to augment basic communication networks after the earthquake. Upon return, she helped coordinate RELIEF, a quarterly field experimentation initiative focused on improving the technological field capabilities of first responders. In June 2010, Rosa visited the Western Sahara Refugee Camps to survey humanitarian logistics within a protracted crisis. She returned in December 2012 to run an SMS-based pilot in partnership with the Sahrawi Red Crescent. The project was funded through UNOCHA's Humanitarian Futures Grant Programme.

In March 2013, Rosa joined as the field manager for Dimagi, a company that uses open source technologies to improve healthcare in developing countries. She is currently based in Cape Town while she supports projects throughout southern Africa.

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SMS and Facebook Help Farmers Reduce Pollution in Resen

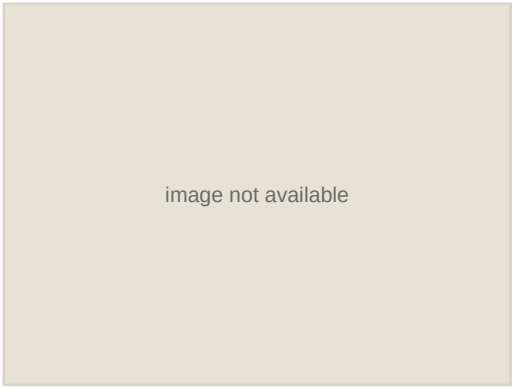
By staff at the UNDP office in Skopje · 18 July 2013
Series produced by Ken Banks, kiwanja.net

Pollution from the overuse of pesticides threatens humans and animal species in the region of the Prespa Lake Basin in Resen, Macedonia. In response, the United Nations Development Programme (UNDP) worked with farmers in the area to adopt environmentally-friendly practices by setting up a system to monitor pests and diseases, but a lack of local media made it hard to communicate quickly with farmers. In this installment of Digital Diversity, we learn how Facebook and mobile technology turned out to be the answer.

"This is the one everyone knows from cartoons – the little worm in the apple," says Eftim Petkovski, scooping the larva of a codling moth from an apple in his orchard in Resen. "But it's no joke, I can tell you – if we farmers don't spray for them early on, all our livelihoods are at risk."

"Timing is everything with these pests. You've got to predict their migrations – and that can be a matter of hours. Spraying too early or too late is much less effective and a lot more expensive because you need bigger amounts – often as much as three times the quantity. And you can guess what that does to the environment."

Overuse of pesticides amongst orchard farmers in Resen has been proven to be a major cause of pollution in the beautiful but environmentally vulnerable region of the Prespa Lake Basin, threatening the habitat of over 2,000 species of birds, fish and mammals, including many endangered animals unique to Prespa.



Pesticide use down by 30 percent thanks to new information system. Photo: UNDP

UNDP has been working in close cooperation with the Municipality of Resen in recent years (with funding from the Global Environment Facility and the Swiss Development Cooperation), on projects to raise awareness of the dangers of pesticides and to help local farmers adopt more environmentally-sustainable agricultural practices. These efforts have already led to a 30 percent reduction in the amount of pesticides used by local farmers each season – good news for the environment and savings for farmers. "The way we dealt with pests before was wasteful," says Mr. Petkovski. "And a lot of that could be put down to farmers' lack of awareness."

"But that's not the whole story – the problem of knowing the best time to spray is a problem faced by all farmers. It's about the speed of notification and that's in many ways a technical problem needing a technical solution."

In response, the Municipality of Resen and UNDP set up a system to monitor pests and diseases in 2005, installing six solar-powered agro-meteorological monitoring stations and a number of insect pheromone traps. The monitoring stations gathered all the necessary data, but the problem remained: How to get that data directly to farmers as quickly as possible. There's no local media in Resen, so for the past seven years all they had to rely on were paper flyers posted in the square – not an adequate system for updating farmers.



Mr. Petkovski proudly shows the messages on his mobile phone. Photo: UNDP

"To make the system sustainable, we knew we needed to find an inexpensive solution," said UNDP's Dimitrija Sekovski. "And that's what we came up with – an innovative way of notifying farmers that cost less than $1,000 to develop."

Walking between the apple trees in his orchard, Mr. Petkovski pulls up the messages on his mobile phone. "Here's the SMS we received about the codling moth on Friday," he says:

> *Apple trees in the area of the village of Rajca have been infected by the codling moth. The apple trees should be treated in the next 10 days. For more info, visit the Facebook page or call the Association of Farmers.*

"That message went out to every farmer in the village of Rajca whose name is registered with the local Association of Farmers," says Mr. Petkovski. "And that's how we were able to spray before the moths had a chance to spread. Just knowing that in time has saved a lot of our fruit."

The SMS system was developed by the Faculty of Computer Science at the University of Cyril & Methodius in Skopje, with UNDP support. The same pest control expert who sends SMS updates to farmers also updates a Farmers' Association page on Facebook, to help get the word out even further. The new system is part of a six-year project to restore and protect Prespa Lake, funded by the Swiss Development Cooperation.

Low costs and simplicity of implementation make this system highly suitable for replication in other municipalities across the country.

What's next? The team here are now thinking about adding another layer to the system. One of the ideas is to 'gamify' the notifications to farmers. Do you think this could work? Are there any similar examples out there? Do you have any other suggestions?

This post originally appeared on the UNDP website and has been republished by permission. You can read the original post here.

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Reconnecting the Disconnected: A Story of Technology, Refugees and Finding Lost Family

By David and Christopher Mikkelsen · 1 August 2013
Series produced by Ken Banks, kiwanja.net

In this installment of Digital Diversity, brothers David and Christopher Mikkelsen tell the story of how their organisation, Refugees United, was born. It all began with one man's search for his family after they were separated for five years because of the war in Afghanistan. The Mikkelsen's were struck by the frequency of families separating because of wars and conflicts, and decided that something had to be done to help them reconnect.

Every few seconds a family is separated because of conflicts or natural disasters. A mother might have been gathering firewood when a militia descended on her village, sending her family scattering for safety. A brother might have been sent hundreds of kilometers away to sell livestock at a market when a battle turns into an all-out war, forcing his family to flee.

Such separation might be momentary in the developed world because reconnection is possible through various means of communication. However, it is different for more than 45 million people in the developing world who are forcibly displaced. Separation only takes a moment, but leaves a lifetime of hurt.



Refugees registering with Refugees United in Eastleigh, Nairobi, Kenya. (Photo: Anna Mayumi Kerber)

Our organisation, Refugees United, uses mobile technology and the world's largest database to help reconnect separated refugee families. It grew from a deeply personal experience with a young Afghan man named Mansour who we met in 2005. Not only did he lose his past to the Taliban, but also all contact with his parents and five siblings during their escape.

A human trafficker operating out of Peshawar, Pakistan, offered to help Mansour's family to safety for a handsome sum, but ended up separating them all in the process. On the eve of their scheduled departure to Scandinavia, the trafficker arrived and told them that a bus was waiting outside with one vacant seat. Now the family had to make a choice no family should have to make – one person was to go first. One child was to travel through the war-torn devastation on his or her own, and the rest would follow in two weeks.

Mansour had been waiting for five years when we met him. Hope had been replaced with memories and a distant belief that he would be with his family again one day. We offered our help. Even though 2005 was not the year of social networks, how difficult could it be to find seven people separated across the globe? And so we trekked into unknown territory into the world of conflict, separation and refugee agencies.


A photograph of Mansour and his brother Parwan. (Photo: Refugees United)

My brother and I have traveled the globe and were intrepid travelers from an early age. We were no strangers to being in far away lands, experiencing rough beginnings and finding ourselves stranded in places so disconnected that we would sometimes doubt we would ever make it back. We used all of our experience in the proceeding months to help Mansour track down the trafficker in Peshawar. We followed his bribed information to find Parwan, Mansour's one younger brother, who was living as an enslaved and stateless person in a town south of Russia.

In October 2005 we had Parwan brought to Moscow – to where we had flown with Mansour – and the two brothers were reunited after nearly six years of silence. It was life changing for us to witness Mansour and Parwan falling into each other's arms.

We had enlisted the help of international aid organisations as part of our search for Parwan. It was clear to us early on that the system of pen and paper – without the power of technology – was not optimised to efficiently collect and distribute data on separated refugee families across conflicts, borders and organisations. Also, as unique as the brothers' story was to us, it was striking that it was only one of millions. It seemed that few people understood or were aware of the magnitude of this invisible tragedy.

We believed we could help organisations and refugees by creating a platform for sharing separated persons' data with organisations and refugees themselves. As a result, Refugees United was born. It was a rough start, but through tenacity and stubbornness, we built the organisation into what it is today – a technology non-profit which helps thousands of refugees in their quest to find missing loved ones.

In partnership with Ericsson, a provider of telecommunications equipment and services, we built an innovative mobile platform that allows refugees to take the search for missing loved ones into their own hands. It makes it easier for them to search, connect and communicate while working with aid organisations such as UNHCR and Kenya Red Cross, and refugees themselves. Our platform is accessible via toll-free lines and a multilingual mobile application often used across Africa for something quite different – mobile banking.


David and Christopher at a community forum held by Refugees United in Nairobi, Kenya. (Photo: Anna Prytz Schaldemose)

Refugees United's systems provide access to a simple SMS that can be a lifeline connecting a disconnected person with the rest of the world, and with their missing family. Millions of pieces of data – such as tribes and clans, places last seen and personal traits – are securely analysed and paired to create matches for more than 190,000 refugees who are already registered in our database.


An outreach volunteer for Refugees United helping to register families in Nairobi, Kenya. (Photo: Anna Mayumi Kerber)

In Dadaab, the world's largest refugee camp, Refugees United and Kenya Red Cross trained 50 refugee leaders to become family tracing volunteers who capture data about missing persons through a simple mobile phone. As a result, Kenya Red Cross went from helping to register 750 refugees a year to more than 750 people a week in Dadaab alone.

The mobile operators are key allies in our quest to help families reconnect. We rely on the support of Vodafone, Vodacom, Telesom, MTN and Safaricom in Kenya, Uganda, Tanzania, Somalia, the DRC and Egypt. They make access to our platform free of charge, essential support when you consider sending just two or three text messages can be prohibitively expensive for a refugee. Beyond free access, operators will be sending text messages to raise awareness of Refugees United to tens of millions of subscribers across sub-Saharan Africa.



With Ericsson, Refugees United has pledged to help one million refugees in search of missing families through our platform by 2015. It will be a daunting mission and one that will lead us further into some of the most disconnected places on this planet – all to help bring families out of their painful search.

ABOUT THE AUTHORS

Brothers and social entrepreneurs David and Christopher Mikkelsen founded Refugees United in 2008 based on a personal experience trying to reconnect a young Afghan refugee with his family. They realised the lack of any global, IT-based infrastructure to help refugees locate missing families and set out to change this.

They built Refugees United, the first global, web-based search tool for refugees. It's based on an open-source, collaborative approach to building an organisation through partnerships with large corporate players as well as other non-profit organisations such as Kenya Red Cross, UNHCR, Ericsson, Google, and others.

Christopher and David Mikkelsen are members of the Clinton Global Initiative (2010 and 2011). They have been named the "New World Heroes – People who deserve a bigger stage in 2009" by Monocle Magazine, nominated as "People of the Year 2009" by DAS Magazine, and nominated as PopTech Fellows in 2011.

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Kicking Conflict into Touch: How Sport and Technology Unite Community and Conservation in Kenya

By Njenga Kahiro · 15 August 2013
Series produced by Ken Banks, kiwanja.net

Football has long been recognised as a unifying sport, with the ability to bring sides together in some of the most trying of circumstances. In this installment of Digital Diversity, Njenga Kahiro shares his very personal experience of how a combination of football and text messaging have successfully brought together warring communities to promote conservation in Kenya.

I'm a mobile technology buff who loves efficiency, saving money and making our home on Earth a better place. I work in a remote and rural landscape in Laikipia County, Kenya where the population is around 500,000 and there are only 80 kilometers of paved roads. Because of this effective communications is essential, and makes all the difference to everyone in the area.

Luckily for us mobile phone coverage is better than the road network. There are mobile phones in many households, everyone from farmers and nomadic pastoralists to urban dwellers in either of the two main population centres of Laikipia County. There are increasing opportunities to use this phones for positive change, but having the tools to address the need and knowing how to effectively use them are two very different things.

In 2010 a perfect opportunity to marry the need and the tools presented itself in the form of the Laikipia Unity Cup, an innovative approach to environmental education using sports as organising and mobilising tools for conservation. The initiative, promoted by the Zeitz Foundation, brought together warring communities, promoted environmental education and tourism, and enhanced social cohesion.


Zeitz Foundation staff member teaches a young fan how to plant a tree. (Photo by Joe Mathai)

Around that time there was immense social pressure for young professionals from the area to do something for our people. It was simply not acceptable to sit back and continue to watch people fighting. Our response was to bring together teams from five regions for a competition to create a regional team with which everybody could identify.

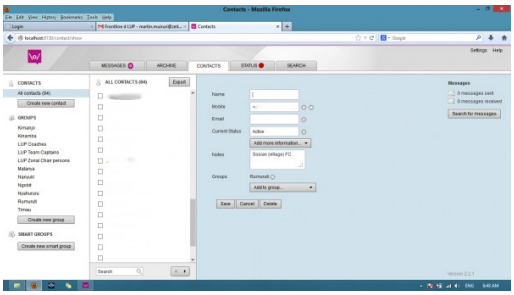
The teams competed hard and used their aggression positively, but because this was a league and not a knockout competition there was no winner takes all. A region had to establish a composite team of the best twenty players from all the eight teams, even if they came from warring sides. This brought everyone together and gave them little choice in who to support. The composite team became our team. It was refreshing to see the people who would have previously shot arrows or guns at each other now fighting together for their region to win.


Team members wrestle for the ball during the Laikipia Unity Cup regional tournament. (Photo by Joe Mathai)

The goal was to reach as many of the Laikipians as possible – to spread the word, silence the guns and encourage residents to become better stewards of the county's vast natural heritage. The 2010 edition was a success. Samuel Eto'o, who is the most decorated football player in Africa and a two-time UEFA Champions League winner attended and supported the event. After 2010 the challenge was to maintain the enthusiasm and continue sending out the message that we need to treat our planet better if we are to pass it on to future generations in good shape. To help with this, the Laikipia Unity Programme worked with FrontlineSMS to start communicating in a way that was cheaper, efficient and innovative.

The technology landscape was changing rapidly in 2010. In particular, the uptake of mobile phones and texting was phenomenal. Young people had cell phones, and the Internet was accessible through a USB dongle, a device that connects a computer to wireless broadband.

A requirement that all teams register their members' mobile phones meant we could immediately contact them to prepare them for the living conditions in the camps set up with the help of the British Army Training Unit in Kenya (BATUK). We used FrontlineSMS to conduct a survey on the environmental challenges from each region and how we could tailor solutions for specific areas within Laikipia. Using the data, we developed participatory theatre pieces that were relevant to the audience complete with real names taken from those who had answered the survey.


A screenshot that displays how FrontlineSMS is used to contact team members who are divided into groups that are particular to their regions. (Image courtesy Njenga Kahiro)

There are 2,360 members that make up the teams and thousands of supporters who are in a central database that we use to get feedback. We put each of these members into user groups to help us do a better analysis of group feedback (groups for players, coaches, supporters, regional coordinators, boys' team or girls' team, and so on). Crucially, FrontlineSMS enables us to tailor our messages to specific audiences and conduct rapid surveys for the theatre outreach team, and this information is used to create a piece that is relevant to the local realities of the communities we are trying to impact.

The success of our earlier competition efforts created a demand for a year round environmental education program similar to the Laikipia Unity Cup. We improved the second run in 2012, and kicked off what is arguably Kenya's first conservation football league in 2013.



Actors in the participatory theatre performances use scripts that are written to reflect the views that are collected from feedback of athletes and supporters via Frontline SMS. Topics range from resource conflicts to anti-poaching. (Photo by Joe Mathai)

Our model is such that you cannot win the league by only scoring goals on the field. An equally crucial component is the sustainability challenge, which accounts for 50% of the Championship points. The challenge balances conservation, community, culture and commerce – or the four 'Cs' as we call them. This is also where FrontlineSMS comes in handy because of the different teams, regions and personnel involved.

Every week we use the platform to coordinate conservation activities that range from cleaning up a region to gathering materials for the next participatory environmental education theatre. We also receive match reports, send match statistics and receive criticism if the quality of our referees doesn't measure up to the fans expectations. Thankfully fans can take out their frustration on the anonymous guys behind the virtual window of their mobile phones instead of igniting a conflict in the middle of the playing field.

You may ask why a conservation organisation is involved in sports. Well, conservation cannot thrive in conflict, which is often a cover for the plundering of natural resources. We believe we will have done our job if we can use the near-universal language of football to bring people together to talk through their issues. It is only if people learn to communicate that we'll start to face up to, and solve, many of the challenges where we live.



ABOUT THE AUTHOR

Njenga Kahiro is a Kinship Conservation Fellow and manages the Laikipia Programme of the Zeitz Foundation. He began exploring the use of mobile phone platforms while working for Laikipia Elephant Project where he participated in piloting the use of push to talk technology for reporting human elephant conflict. From this work he co-authored a peer-reviewed article in the 2011 edition of Oryx on the use of cellphone technology in human elephant mitigation. Since 2010, his team have been using FrontlineSMS to run the communication elements of Laikipia Unity Cup, a sports for conservation initiative supported by UNEP, the British Army, Kenya Defence Forces, Laikipia Wildlife Forum and many diplomatic corps based in Nairobi.

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Shedding Light in the Night: How Solar Energy and Mobile Charging Improves Quality of Life in India

By Gwen Kidera · 27 August 2013
Series produced by Ken Banks, kiwanja.net

In this installment of Digital Diversity, Gwen Kidera – Project Associate at S3IDF (Small Scale Sustainable Infrastructure Development Fund) – explains how their non-profit organisation provides underserved communities with Integrated Energy Centre carts (IECs) equipped with reliable solar powered lamps and mobile charging stations. Access to light and mobile technology improves the quality of life in these communities by allowing them to continue working after dark.

Solar lights switch on in the tents of nomadic North Indian residents as the sun sets over the Thanisandra slum in Bangalore, India. Men pick up their tools to carve drums, which serve as the community's primary source of livelihood, and women crouch to cook supper as the smell of firewood permeates the thick night air.

Wahida, a resident in the camp, returns from the community-owned cart with a rented and freshly charged solar lamp. She hangs it in the centre of her tent above the heads of her six children and her husband who busily works on the ornate drum on his lap. She relaxes because the light allows her husband to work into the night carving drums that are sold to earn additional income, and her children keep safe from pests that would otherwise creep into the poorly lit area. Reliable and safe lighting was a luxury beyond the reach of most residents before the community-owned and operated Integrated Energy Centre (IEC) arrived.



Wahida stands in front of the IEC cart that provides solar powered lanterns and mobile charging facilities to 30 of the 80 households in the Thanisandra slum in India. Access could extend to over 60 households in the coming months. (Photo by SELCO Solar Pvt. Ltd.)

In March 2013, SELCO Solar Pvt. Ltd. (SELCO India), an organisation whose mission is to improve the quality of life in underdeveloped communities through sustainable methods, worked with S3IDF to establish a waterproof and durable solar-powered IEC cart to provide lamps and mobile charging to 30 of approximately 80 households in Thanisandra. The nomadic community, which has been moving as a unit across the country for generations, can take the cart with them wherever they go, ensuring many years of reliable lighting. Once they pay off the initial capital costs of the cart, they can own it and lend the lamps to community members without cost.

Before the IEC, families spent a large portion of their earnings on black market kerosene which posed health hazards such as increased risk of burns and the release of unhealthy fumes. Now, families spend less than US$2.50 a month for up to eight hours of solar light each evening. In addition to the cart, SELCO India

and S3IDF are exploring ways to connect the community's drum production to viable markets, thereby increasing residents' incomes.



A nomadic family sit in their tent and prepare dinner by the light of a rented solar lantern. (Photo by SELCO Solar Pvt. Ltd.)

The centre in Thanisandra is just one of 18 IECs under development across the state of Karnataka. Each centre is created based on a needs assessment and tailored to meet the community's specific circumstances. Although the centres vary in services and business models, at heart they are all solar-powered community centres that provide the underserved with resources to which they otherwise would not have.

IECs are built within communities which are off the grid and lack access to electricity. They not only provide much needed energy but they also have the ability to supply useful products, such as solar lanterns, small appliances and tools, mobile charging, larger productive-use technologies – grain mixers and grinders – community TVs, cooling/heating systems, as well as resources for education, health, awareness and livelihood training.

IECs offer educational services including audio-visual aids to books, and computers to DVD players, and other basic literacy programs. The IECs can also improve public health by providing solar charging points for ultrasound devices, vaccine boxes and refrigeration for medicines. Other resources include ticket booking and printing, Internet services for obtaining identity cards and sending bill payments, and access to agricultural and trade-related information. As if that weren't enough, IECS also offer community members the opportunity to enroll in vocational training programs, including classes on computers, sewing and fruit drying.

The people who benefit from the IECs run them, and they are designed to be operationally sustainable with revenue generated by the IECs covering all maintenance and operating costs.

The implementation of the IEC cart in Thanisandra improved the quality of life of the entire community. "Now we can easily make 20-30 more drums after dark, and I can even finish my quilting without letting my housework suffer", Wahida explains. "It feels different since it's the first time we have had the luxury to work like this."

Wahida is hopeful for her future and that of her family and community. She would like to see an increase in demand for their drums, which could become a reality with SELCO India and S3IDF's help.



The community's primary form of livelihood for generations is the production of intricately carved drums. All of the men are skilled in playing multiple instruments, which is an important marketing tool. (Photo by SELCO Solar Pvt. Ltd.)

When asked how the solar lights have changed her circumstances, she smiled and proudly stated, "With the light, even our tent starts looking like a palace, it makes us feel like our dreams can come true."



ABOUT THE AUTHOR

Gwen began exploring the field of social entrepreneurship in 2009 while in South Africa on a field study program through the Social Enterprise Institute at Northeastern University. She assisted in giving business development support to local entrepreneurs from the townships around Cape Town over the course of two trips. She went on to study microfinance in Belize and work with a group of students to determine the effectiveness of a microfinance institute's training programs and causes of default among Haitian borrowers in the Dominican Republic. She spent a summer working for the Clinton Health Access Initiative, and in 2011 worked in Meru, Kenya for the Miriam Kanana Mubichi Foundation where she taught health and art classes, advised a women's textile company, researched malnutrition at the local hospital, and arranged school feeding programs.

In 2013, Gwen became a Project Associate at the S3IDF, a nonprofit organisation based in Cambridge, Massachusetts. Members of the organisation work to reduce poverty in developing countries by supporting small scale enterprises that meet basic infrastructure needs and providing opportunities for economic advancement. She is an avid traveler and enjoys documenting her trips and getting to know the local culture through photography and blogging.

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The Invisible Borrowers: Opening the Door to Credit with the Mobile Phone

By Rachel Itwaru · 24 September 2013
Series produced by Ken Banks, kiwanja.net

Individuals living in less developed parts of the world often engage in an informal economy where financial identities and credit scores are not commonly used. Little is done to keep records of financial histories, unlike the measures taken in the formal economy. In this installment of Digital Diversity, Rachel Itwaru, an intern for InVenture, explains how their organisation is pioneering a standardised credit scoring system for the unbanked to help them qualify for financing.

Vijayalakshmi Ramamoorthi lives in a world entirely of cash. She operates a small kirana, a humble shop that sells groceries and other sundries in the Indian municipality of Vandavasi, Tamil Nadu. She has no home title or financial history; her only trail is paper. Her expenses, scribbled haphazardly on torn sheets of paper and organised in no particular fashion, provide no conclusive affirmation of her financial responsibility. What if she wanted more working capital to expand her small enterprise, or tuition money for her son's education? How can she realise her aspirations without significant upfront capital?


Vijayalakshmi and her husband stand inside their shop in Tamil Nadu, India. (Photo by Thomas Schumacher)

The absence of verifiable data thickens the line between the formal and informal economies, and prevents the population at the bottom of the pyramid (BoP) from any clear opportunities to prove creditworthiness.

For participants in the formal economy, individual financial activity is methodologically evaluated to develop a credit score. This simple numeric summary is the most critical part of our financial identity. It provides recipients with access to a variety of opportunities for affordable financial services, opportunities that are provided with dignity. However, for participants in the informal economy such as Vijayalakshmi, there are no opportunities to develop an accredited financial identity that would be recognised by any formal financial service institutions.

Although Vijayalakshmi lacks a traditional financial identity defined by the formal economy, her life *is* rich with data points. She completes frequent transactions and exercises simple but savvy financial management.

At InVenture we have developed a solution based on the belief that financial inclusion requires both a mechanism for borrowers to prove his or her creditworthiness, and the education necessary to prove it. Our mobile tool, InSight, uses text messages (SMS) and voice to help individuals and businesses in the informal economy perform daily accounting and cash management. Because of this ease of access it does not exclude the billions of people at the bottom of the pyramid who lack access to smartphones and the Internet.

InSight was developed in seven Indian languages. In 2013, we released a voice version of the software that allows users to input their data over the phone through the keypad, which makes it free and easier for individuals who are not accustomed to using SMS. InSight facilitates increased awareness of personal

financial activity and favorable modifications in spending behavior by encouraging users to report expenses by category.



Vijayalakshmi uses her mobile phone to access InSight, the tool created by InVenture that uses SMS and voice technology to help participants in the informal economy to manage their money and daily transactions. (Photo by Thomas Schumacher)

However, we also understand that building the bridge to financial inclusion requires more than a single tool and an impressive algorithm. Financial literacy classes are an integral part of the training for new users. The majority of micro-business owners in developing communities have very low levels of financial literacy and are ill-prepared in making informed business decisions that relate to borrowing money, investing responsibly, and participating in the formal financial system. The curriculum is tailored to the attendants specific needs and includes essential financial vocabulary, methods for differentiating between personal and business expenses, ways of categorising expenses, and how to calculate revenue, loss, and profit.

After financial literacy training and her own adoption of InSight, Vijayalakshmi was able to keep a verifiable record of her daily expenses – sales, food, rent, labor, transportation and inventory – through a simple text message or call to our system. After one month of use, her data was analysed and a credit score produced that reflected her capability and willingness to repay loans. Our system allowed us to turn Vijayalakshmi from someone who lacked a credit score – an individual often misperceived by formal financial institutions as an economically disenfranchised member of society – to someone who is a consumer with real buying power and a strong repayment ability.

InVenture uses the financial data captured by InSight to address a systemic difficulty faced by formal financial institutions. Often, imperfect due diligence and a lack of established credit histories for micro-borrowers means that lending to people at the bottom of the pyramid is a risk. InSight allows lenders to monitor their borrowers' spending patterns by logging into a special web dashboard.

The system helped Vijayalakshmi receive a US$2,000 loan for her store through a bank that accepts our calculated credit scores. She was able to buy bulk inventory – such as school supplies, drinks and bangles – rather than traveling 120 kilometers to Chennai every two weeks. As a result, she increased her sales by 35% and reinvests US$25 per month back into her business.

The ubiquity of simple feature phones in the developing world provides an exciting landscape for replication of our system and the opportunity to construct a financial identity for far more individuals. InSight is not just a tool but a voice. It is helping build a data platform for the base of the pyramid that allows us to see all of the little data points behind each person. We are able to quantify and aggregate InSight users' demands to create a real market-based economy that puts equal power into everyone's hands, and, ultimately, creates a fair and transparent marketplace.



ABOUT THE AUTHOR

Rachel has been an intern for InVenture since March 2013. She works full time at a middle-market private equity firm in Los Angeles. She graduated from Harvard in 2012 where she earned a degree in social anthropology, focusing on the qualitative effects of international development projects and economic inequity. She contributed to the Harvard Political Review and cultivated her interest in social enterprise through participation in the Harvard College Social Innovation Collaborative (HCSIC) – an organisation designed to facilitate student dialogue on social entrepreneurship and meaningful, sustainable social change. She also took part in HCSIC's two-week Social Innovator Incubator, which fostered experimentation with creating mixed-profit business models.

Digital Diversity is a series of blog posts from kiwanja.net featuring the many ways mobile phones and other appropriate technologies are being used throughout the world to improve, enrich, and empower billions of lives. This article was curated by Gabrielle LePore, our Media and Research Assistant. You can follow Gabrielle on Twitter at @GabrielleLePore and kiwanja.net at @kiwanja Digital Diversity is produced by **Ken Banks**, innovator, mentor, anthropologist, National Geographic Emerging Explorer and Founder of kiwanja.net, FrontlineSMS and Means of Exchange. He shares exciting stories in Digital Diversity about how mobile phones and appropriate technologies are being used throughout the world to improve, enrich, and empower billions of lives. You can follow him on Twitter @kiwanja

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Breaking the Silence: SMS Helps Liberian Schools to Improve Education

By Blair Glencorse · 3 December 2013
Series produced by Ken Banks, kiwanja.net

Students and academics in schools throughout Liberia are taking advantage of a system that allows them to gather information and discuss possible solutions to problems they face in the country's corrupt education system. In this edition of Digital Diversity, Blair Glencorse talks about "Tell-it-True", which uses text messages to allow users to share problems and concerns that would otherwise go unspoken.

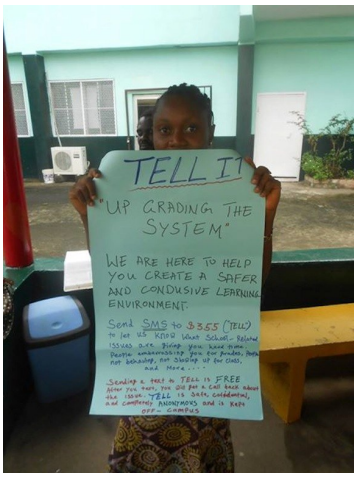
Dorcas Pewee is a young Liberian woman who has faced unimaginable challenges. She suffered severe hardship during the brutal 14-year civil war and has struggled to make ends meet during the subsequent decade of peace. Liberia has a female president, but is a deeply male-dominated society. As a result there are few opportunities for women to realise their full potential.

Dorcas is determined to overcome the legacies of the past by using education to change her life, and to create a better future for herself. However, the education system in Liberia has many problems including resource abuse, teacher absenteeism and sexual harassment. Through our Accountability Film School, Dorcas recently made a no-budget, award-winning film based on her own experience of a pervasive issue – having sex in return for scholarships.

Unfortunately, with problems like these, schools in Liberia often teach corruption and undermine capacity rather than building knowledge and a sense of civic responsibility. As a result, Liberia is 174th out of 187 countries on the UN's Human Development Index at a time when around 75% of the population is under the age of 35. This is a dangerous combination.

At the Accountability Lab, we talked to hundreds of students like Dorcas about the challenges within the education system, and brainstormed potential solutions. Students told us that there is a desire for change, but that a "culture of silence" exists around these problems because students cannot afford to speak out and risk failing classes. At the same time, we talked to professors who want to improve the system but do not have the evidence or support to do so. Traditional complaint mechanisms run by administrations are often mistrusted, abused and/or ignored.

Student Maria Fahnbulleh, a friend of Dorcas', used the information gathered during these discussions to kickstart a confidential, anonymous SMS suggestions box throughout academic campuses in Monrovia. It's called "Tell-it-True," which means "tell the truth" in Liberian vernacular. The system provides a free, confidential short-code – 8355 or "TELL" – to students, professors and administrators. Users can send a text message to the number when they face a problem. An operator calls back within 24 hours to gather details on the issue and to provide ideas for solutions.



Maria Fahnbulleh publicises the Tell-it-True project at a high school in Monrovia. (Photo by Blair Glencorse)

Information coming through the system is then discussed on a periodic basis with the academic administration, student government or Parent Teacher Associations. These groups collectively agree on relevant steps to be taken. A meeting is held with the larger student body to share the findings from the process, explain the actions that will be taken, and encourage further use of the system. This leads to a self-reinforcing loop of deterrence, reporting, discussion and action.

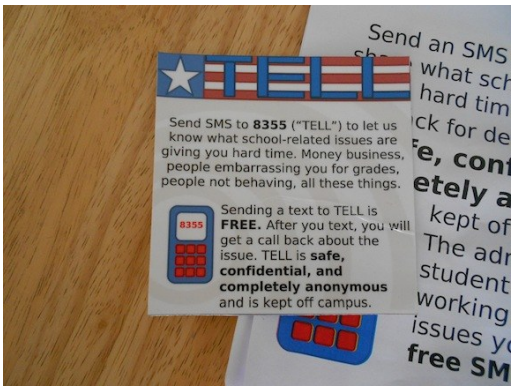

Students and professors listen to a briefing on how to use the Tell-it-True system in a school in Monrovia. (Photo by Blair Glencorse)

Tell-it-True has recently been piloted on one university campus. The system documented a range of issues across the board, which are being discussed and addressed by the administration. For example, attendance in class was an issue. As a result, attendance monitors are now in place. Also, students were unaware of certain regulations. So a handbook, which outlines rights and responsibilities, is given to all incoming pupils.

More broadly, the information gathered through the Tell-it-True system provides a useful and tangible platform for collectively generating ideas for change. Based on this experience, other university and college campuses have asked for the system to be used. The Monrovia Consolidated School System, which runs the 28 public schools in the capital city, has recently asked to deploy Tell-it-True across their campuses. Maria is now busy talking to many more school principals and students about Tell-it-True and the role it can play in improving accountability.

The idea has been carefully fitted to match the context, and the technology is simple and open source. We have used SMS to Text Pro and Auto SMS for SMS response and management. The information is recorded in a simple spreadsheet and the system is entirely offline because internet coverage can be difficult in Liberia. In addition, we persuaded the major mobile operators to provide the short codes for free. We tend to think of innovation as high-tech, but often the most effective solutions are relatively low-tech, especially in these kind of contexts.

There are potential hurdles of course, and Maria has certainly faced challenges. Building trust and reassuring users that their information will remain confidential has been a long process. The system is anonymous to avoid abuse, but there still might be incidents of false reporting or misunderstanding as to what problems can actually be addressed. At the same time, many administrators might not want to fix some of the issues on their campuses for various reasons, and building the political will for change can be tricky.



Stickers that explain the Tell-it-True system in Liberian English. (Photo by Blair Glencorse)

However, the progress is encouraging. Students and professors are using the system. And as Maria, Dorcas and others continue their outreach and advocacy efforts, noticeable shifts will take place. The Accountability Lab acts as an incubator for high-impact, low cost, creative ideas. We provide the support that is needed – such as training, networking and mentoring – to implement Tell-it-True across Monrovia and beyond. The youth of Liberia are using simple technologies to make their country a better, more accountable and more equal place. And we're excited to help them do it.



ABOUT THE AUTHOR

Blair Glencorse is the executive director of the Accountability Lab, an award-winning incubator for creative accountability ideas. He is also a leadership advisor to the Club de Madrid, the world's largest group of former presidents and prime ministers in the democratic world. You can follow Blair on Twitter @blairglencorse and the Accountability Lab @accountlab.

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Thinking Outside the Box Brings Cinema and Community Libraries to Refugees

By Michael Atkinson · 2 May 2014
Series produced by Ken Banks, kiwanja.net

People typically arrive in refugee camps fleeing from conflict with few or no possessions. Life can seem bleak with little hope and opportunity. In this installment of Digital Diversity, we look at how the Ideas Box project is starting to remedy this with some inspiring results, one box at a time.

If you close your eyes and imagine a refugee camp, you'll probably come up with thoughts of the sweet aroma of cooking and baking, mingled with the smell of dust and smoke. Shuffling people, the cry of a homesick infant. Raw exposure to the elements may include a hot wind in an arid, dusty desert, or humid tropics, or bitter cold. And it may include the sight of giggling children and smiling adults, eyes wide with wonder, surrounding brightly coloured crates from which they carefully take a treasure of books, tablets, puppets, movies and more.

In an age where technological miracles come compressed into ever-smaller containers, it should come as no surprise that there are now colourful boxes packed with resources to help alleviate heartache, boredom and a lack of access to learning among displaced people. Described as a both a cultural centre and library within a box, The Ideas Box project was unveiled to the public on March 25, 2014. The first two boxes are now in Burundi, Africa with more heading soon to Syrian refugees in Jordan and Lebanon. It is a partnership between Libraries Without Borders, the United Nations High Commissioner for Refugees (UNHCR) and internationally renowned French designer Philippe Starck.



The Ideas Box. (Photo courtesy Libraries Without Borders)

Mr. Starck speaks of the Ideas Box as fulfilling a dream. "The dream is all the more important when we have lost everything. That is why the approach of Libraries Without Borders moved me so much. This is the first and last thing we should give to people who have lost everything. All of a sudden there should be people coming out of nowhere, carrying colorful suitcases, raising up tents. And in each suitcase there is wonder".

Colorful boxes of hope and wonder

The wonders Mr. Starck speaks of meet the needs of both children and adults, with each Ideas Box containing:

- A satellite Internet connection
- 15 tablets, 4 laptops, 5 high definition (HD) cameras, 50 readers with 5,000 books and 250 paper books
- Offline learning resources including Massive Online Open Courses (MOOCs), Wikipedia, Khan Academy and TED
- Workshops for literacy, computer literacy, electronics, coding/programming, as well as non-formal education and activities for children

- A cinema module with built-in TV and projection screen, 100 films including documentaries and cartoons/animated features
- Board/video games and other recreational activities
- Arts and crafts, puppets and a built-in stage for theatre.

All of these resources are supplied in the local language of the camp's recipients. "For instance," says Eve Saumier, Head of Communications at Libraries Without Borders, "the Ideas Box that will be deployed in Jordan and Lebanon will mostly include content in Arabic, with some French and English to follow the Lebanese curriculum. They will be selected and approved by a dedicated, local scientific committee (made up of researchers, teachers and publishers, among others) that will ensure all content fits local needs."

Interestingly, because of a scarcity of materials like eBooks in languages such as Arabic, The Ideas Box project is becoming an opportunity to unite and encourage local publishers to work towards further digitisation of Arabic fiction and nonfiction. This then creates further opportunities to leverage technology to get literature and educational materials into the hands of impoverished populations who may not have otherwise had access to them.



Burundian refugees discovering the contents of an Ideas Box. (Photo courtesy Libraries Without Borders)

A focus on education and literacy

A common concern voiced by refugees, especially parents of children, is lack of access to education. This has also been an ongoing concern for governments and relief agencies. The Ideas Box not only addresses education by providing a large number of learning resources, but also by integrating with local school systems and resources.

"Of course, all contents embedded in the Ideas Box are highly customised to the linguistic, cultural and pedagogical characteristics of the area of deployment," Ms. Saumier says. "For example, all learning resources are identified consistently with the National Education Curriculum of the country in mind. So in the case of Burundi they follow the Congolese and Burundian curricula."

In addition, in the case of Burundi, Libraries Without Borders works closely with the International Rescue Committee (IRC). The IRC is in charge of all the schools within the UNHCR camps for Congolese refugees, to develop (together with teachers and trainers) workshops and activities that use the contents and materials of the Ideas Box.

Connecting with these types of learning resources can make a life-changing difference. Refugees tend to have little, and even less opportunity and hope. "I am separated from everything. We have no access to information or training. There is no Internet, there are not even computers," says Consolata, a Congolese refugee in Burundi.

It is unsurprising then, and heartening, to hear that all of the Ideas Box materials are seeing heavy usage in the short time they've been in the camps, and by all kinds of users. Many different workshops have started, including educational activities, information and communications technology mastery, play activities and more.

Joy in a box

The Ideas Box field co-ordinator in Burundi, who is in charge of the management of the Ideas Box within the Kavumu and Musasa camps, described a joyous scene after an Ideas Box arrived. While about 30 school-age children were happily bouncing and laughing in front of the "Kirikou" cartoon movie showing on the box, many others, outside of the shelter where the Ideas Box is located, were watching the movie as well, standing on the shoulders of the adults. Even the security guard in charge of the protection of the box kept his eyes on the screen, watching the movie.

Next to the kids, about a dozen teenagers were focused on using the tablets and the Internet with great attention. At the end of high school, other pupils were running as fast as they could to the Ideas Box to look for geography handbooks and study grammar. While they were doing their homework, a few older people sat next to the group to read books about the history of Congo. And while all this went on, about a hundred refugees came, looked and asked questions.

It's easy to imagine the difference in a camp before and after an Ideas Box arrives. The arrival of all of this is something of a return to normality, a moral boost, a great opportunity and an emotional and psychological shot in the arm. How does this project gain momentum then, to put more education and joy into the lives of men, women and children who have far too little of both?

"First through economies of scale," Ms. Saumier states pragmatically. "As more Idea Boxes are ordered, their individual price drops lower." But she also emphasises the value of partner relationships with suppliers of equipment and resources, such as electronics, publishing and so on, which Libraries Without Borders is steadily developing. She says the work is worth it. "One device alone can provide the service and content equivalent of a small town library, or up to 5,000 users. That's only several dollars per user."

Several dollars per user to connect a soul with life-changing education, literature, ideas, communication, theatre and more via technology is more than simple creative genius. It's thinking outside the box, and for many that looks and feels like a dream come true.



ABOUT THE AUTHOR

Michael Atkinson has been an instructor and distance education designer in the private sector for 10 years. He increasingly focuses on the intersection of educational technology and populations in the developing world. You can find Michael on Twitter @atkinsonmichael and Google+

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Introducing iCow: The Virtual Mobile Midwife for Cows

By Lexi Brown · 13 May 2014
Series produced by Ken Banks, kiwanja.net

Smallholder farmers in Kenya are traditionally conservative, and getting them to adopt new methods and technologies can often take time and effort. In this installment of Digital Diversity, we look at how mobile technology, and one application in particular, is successfully bucking the trend.

Historically, reaching out and communicating with Kenyan farmers has presented something of a challenge but, with an increase in the penetration of affordable mobile technologies, applications are being developed which utilise the simple and user-friendly platform to educate farmers on better use of their livestock and lands to increase yields. In 2013, the Communication Commission of Kenya reported over 30 million mobile phone subscribers today, up from 330,000 in 2001.

One particular mobile application that has been developed in Kenya is called iCow. iCow helps cow farmers maximise breeding potential by tracking the fertility cycle of their animals. Think of it as a virtual midwife for cows, giving farmers valuable tips on breeding, animal nutrition and milk production efficiency to help increase milk yields and ultimately their income.

Originally, farming tips will have been passed down from generation to generation, resulting in low levels of farmer education and the execution of inefficient farming methods. iCow has become the platform that enables modern techniques, technological solutions and increased know-how to be disseminated across the country to small-scale farmers who do not have access to large industrialised resources. What the smallholder farmers do have access to though, is land, farmyard manure and manpower. And now, through iCow they have access to better information, which can allow them to take their farming more seriously and increase their yields – which in turn maximises their returns.

The dairy industry in Kenya is a huge, made up of and supported by a large network of 1.6 million farmers. Most use rudimentary methods to manage their cows' estrus cycle and milk production and are estimated to sell an average of 3 to 5 litres per day. However, it has been calculated that 15 litres per day needs to be produced to bring a family over the poverty line. With low production comes low income, preventing investment in good animal feeds and disease prevention. Lack of investment leads to low production and this generates a poverty trap. It's not surprising that most smallholder farmers have viewed dairy as subsistence farming and not as a business.



Safaricom advertising: Informing Kenyans about iCow (Source: http://www.safaricom.co.ke)

In Africa, older-style feature phones vastly outnumber smartphones and the year-on-year increase in subscribers has helped smallholder farmers become businessmen – particularly through the use of applications developed specifically for them. iCow, developed specifically for a feature phone, can be accessed through calling a toll-based number. Once registered, each farmer can enter personalised information about their livestock. The service then sends tailored instructions about the breeding and production patterns of their livestock via text messages (SMS) and voice prompts within the 365-day cow cycle, which assists farmers in making informed decisions and to reduce risk.

Farmer Thuo started using iCow during the launch of the prototype in 2011. Since then he has been implementing his new knowledge and has seen substantial changes in his yields as well as the health of his animals. One cow now produces 31 litres of milk compared to only previously producing half that amount when at maximum production. Farmer Thuo has learnt a great deal since using iCow – such as fodder production, hygiene and animal diseases to help him manage his stock and manage challenges, such as food shortages faced in the past. He has also started keeping records of his farming activities and is selling his milk regularly to milk brokers in the area. Previously, Thuo lacked the knowledge or business skills to measure the cost per litre of milk produced by his animals. He is looking to expand into pig farming in the future, demonstrating the confidence that iCow has given him as a farmer and a businessman.


Farmer Thuo with iCow founder Su Kahumbu celebrating his success (Source: http://icow.co.ke/blog.html)

Farmer Langat has five cows and through using iCow has learnt about different nutrients that his cows need, and how to store feeds and prevent disease. He says that he implements all of the prompts he receives and has increased his yields from seven litres to ten litres. Langat would like more information on higher yielding cows, and how he can access milk markets in Kenya and connect directly with the feed manufacturers. iCow has transformed Langats small-scale cow farm and he is now eager to develop his knowledge and skills further.

But what is the future of mobile farming? Can an increased ‘know how’ in African agriculture simply be reduced into a series of short messages and pushed out through an SMS? While this is indeed a great and significant step forward, there are wider issues within the sector (which continues to be stereotyped as one synonymous with poverty and subsistence). Farming is seen as the only choice for those with nothing, and aspiring youth are rejecting farming for the bright lights of the city and the promise of a higher wage. Increasing funding in the industry and ensuring that the right conditions are in place for farmers to seize opportunities to make a good living are just some of the challenges that need to be addressed to unlock the rich potential of African farming, and to drive wider prosperity.



ABOUT THE AUTHOR

Lexi Brown is a media planner at Mindshare UK, specialising in new media and technology for communications. This, with her passion for geography after studying at the University of Bristol, has led her to write for "Digital Diversity" and showcase examples of how technology and new methods of communication are improving the developing world, and helping individuals escape the vicious cycle of poverty. You can follow Lexi on Twitter @lexie_brown

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The Secret to Surviving Surgery in a Little Yellow Box

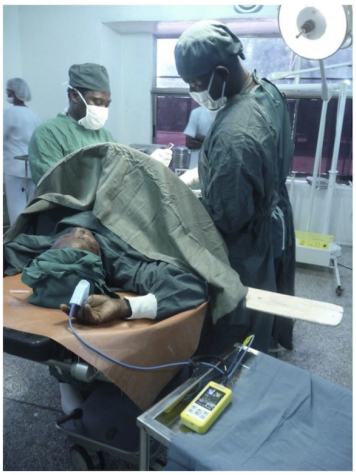
By Layla McCay · 28 May 2014
Series produced by Ken Banks, kiwanja.net

When philosophers muse upon the secret to life, they probably aren't imagining a little yellow box. And yet, when it comes to surgery, that box can hold the secret to life, and it turns out that the answer is simple: oxygen.

It's no mystery that oxygen keeps people alive. If we don't receive enough oxygen, it's not long before we sustain brain damage, and death. But during surgery, making sure we receive enough oxygen to keep us alive can be tricky. General anesthetics suppress the muscles in our body that make us breathe naturally, plus the gases used for anesthesia can dilute the oxygen in the air going into our lungs. It's the job of the anesthesiologist to make sure that we get enough oxygen to keep us healthy while the surgeons operate. Luckily in hospitals in high-income countries, there is all sorts of technology that keeps us safe.

If you have ever been in hospital or a doctor's office, and someone has stuck a plastic clip onto one of your fingers or your ear lobe, you have already experienced one of the most important technological advances in safe surgery. It's called a pulse oximeter and it measures the oxygen levels in your blood. It works by taking advantage of the fact that the precise colour of our blood is affected by how much oxygen it contains. Using a light, a light detector, and a microprocessor, the pulse oximeter can calculate just how much oxygen is in the blood – and if it starts falling below a safe level, the pulse oximeter sounds an alarm. By alerting doctors to the problem in good time, it helps reduce the risk of complications from surgery by an impressive 40%.

In West Africa, for every 133 people who have surgery one of them will die from largely avoidable complications of anesthesia. Nneka, a young anesthetist from Abiya State in rural Nigeria, knows this all too well. Her own cousin died on the operating table because the surgeons didn't have access to a way of monitoring the oxygen levels in his blood. "He couldn't breathe," she explained, "but the hospital didn't have a pulse oximeter – just a stethoscope to monitor his vital signs – and the surgical team didn't notice. If there was a pulse oximeter in his hand they would have noticed when he lost oxygen."


An operating room using a Lifebox pulse oximeter, Ghana. (Photo copyright Lifebox Foundation)

It is hardly surprising that there is an equipment gap between richer countries and those with fewer resources. Operating room pulse oximeters can be expensive, around $2,000. But it's not just a matter of affording them. As with lots of surgical equipment, they tend to be designed with a high resource setting in mind, which means they often need regular servicing, calibration, and reliable electricity to work, and their operation can require high levels of training – demands that may not be feasible for hospitals in low and middle income countries. This means that in around 77,000 operating rooms in these countries, the doctors and nurses have no reliable way of knowing whether their patient is receiving enough oxygen during surgery. This makes it up to a thousand times more dangerous to have surgery in many

countries compared to, for example, the USA.

Nneka now works with Lifebox, an international NGO that has seized on the issue of unsafe surgery and driven the development of a pulse oximeter that is nearly ten times cheaper than the alternative options, costing just $250. Their pulse oximeter is not only more affordable, it is also high quality, durable, and can operate on rechargeable battery power when the electricity cuts out. Lifebox not only provide the pulse oximeters, they train health workers to use it as part of the World Health Organization's safe surgery checklist.

Nneka has conducted a needs assessment in Nigeria, and is coordinating a training program. The operating rooms across Abiya State will not just receive this vital equipment, but receive high quality training in how to use it, and how to respond when the alarm goes off. This is one of the latest in Lifebox's projects, which have delivered pulse oximeters to hospitals in 90 countries around the world.



A young boy in hospital with Lifebox pulse oximeter monitoring his oxygen levels, Ethiopia (Copyright: Lifebox Foundation)

Lifebox's approach is bringing equity to surgery. If you should ever have the misfortune to be in hospital for surgery, as soon as the pulse oximeter is clipped to your finger know that across the world, others in countries like Nigeria are having very similar pulse oximeters clipped to their fingers, to keep them safe, just like you. Though not everyone is so lucky. Lifebox has so far managed to distribute 7,000 pulse oximeters, and no other NGOs are focused on increasing the availability of this equipment. If the secret of life is in this little yellow box, it is sad that there are another 70,000 operating rooms, full of patients every day, who are still waiting in vain for that clip on their finger.



ABOUT THE AUTHOR

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Digital Diversity is a series of blog posts from kiwanja.net featuring the many ways mobile phones and other appropriate technologies are being used throughout the world to improve, enrich, and empower billions of lives. This article was written by Layla McCay, a member of our Media and Research Team. Digital Diversity is produced by Ken Banks, innovator, mentor, anthropologist, National Geographic Emerging Explorer and Founder of kiwanja.net, FrontlineSMS and Means of Exchange. He shares exciting stories in Digital Diversity about how mobile phones and appropriate technologies are being used throughout the world to improve, enrich, and empower billions of lives. You can follow him on Twitter @kiwanja

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Mentoring Refugee Students from Across the World… via Facebook

By Michael Atkinson · 16 June 2014
Series produced by Ken Banks, kiwanja.net

Today, Facebook is more than just a platform to keep up with family and friends. It is also connecting people with valuable resources, including those willing to help others learn in places where schools don't exist. In this installment of Digital Diversity, we see how humanitarian organisations are using the power of social media to make this happen, one student at a time.

Madiha Nasseem smiles as she hops onto Facebook, but she's not checking out what her friends are sharing on the social network. She's part of a group that provides mentoring to students… in the refugee camps of Dadaab in Kenya. Tonight she'll be working with her usual small group of girls who are working hard towards certificates and degrees in one of the world's most desperate places. "They're shy," she says, "but also very welcoming and nice to talk to."

Mentoring is one of several projects conducted by the University of Toronto Refugee Alliance (UTRA), founded by Madiha. UTRA supports the work of refugee organisations, actively involving University of Toronto students. Other projects include helping refugee shelters provide language and clothing assistance, advocating healthcare coverage for local refugees, and more. The mentoring via Facebook is a collaboration with Borderless Higher Education for Refugees (BHER), part of BHER's new refugee educational program.

Happy to help BHER with mentoring, members of UTRA say the work has been worth it. Despite a busy schedule as a third-year medical student, Madiha makes time to talk with her new friends in Dadaab almost every day. Because of differences in time zones and schedules, most communication is asynchronous and conversations can span days as some answer immediately and others (especially students without phones) are delayed in replying.


Mentoring students in Kenya over social networking site Facebook. (Photo courtesy Madiha Nasseem)

Currently the mentoring is organised as a large open group for all mentors and mentees, and smaller private groups such as Madiha's group of three refugee students. The large group discussions, open to all students and mentors, provide dialogue and advice about things such as how to do research, English language resources, and handling time pressures in post-secondary education. In addition, discussions turn to safety concerns for the students. "For example," Madiha says, "if there is a United Nations car that gets abducted, students discuss that out of fear and concern. Also, if there is a rise in rapes around the region, students voice that concern as well."

The smaller, private groups provide support that is often non-academic, but still important as the students tentatively begin school in a difficult environment. "Topics vary from information surrounding school, to politics and gender differences in the camps," Madiha says. The conversations are wide-ranging, and when

asked to elaborate on what they talk about, Madiha says:

> *Absolutely anything! The girls are really cool. For instance, today I talked about what people are up to for their holidays. We chat about informal things such as the weather, personal work/life balance etc., but also about more formal things such as school research assignments, how to study, political affairs, and violence in the camps. From students interested in medicine and healthcare, I get a lot of questions about medicine and how I study, what type of patients I see etc. My smaller group chat is more intimate, with a personal touch, and we talk about almost anything. Some of the girls are married, so I enjoy learning from their experiences as a wife and a student. It is however hard to get in touch with girls who do not have mobile phone access, so I can't engage them in our conversations as equally as I would like to.*

Learning for Half a Million With Little Access to Education

This type of varied mentoring support is needed because of the immense lack of education in the refugee camps. The camps of Dadaab, Kenya were built in the early 1990′s initially for civilians fleeing war in Somalia, and whole generations continue to grow up and live there today. Initially designed to accommodate 90,000 people, today the camps burst at the seams with almost 500,000 and growing, a situation which the United Nations describes as "dire" poverty. Refugees are banned from taking local jobs and can't leave the camp without a permit. Once a month they stand in lines for a small dole of food and necessities. Due to the shortage of resources, there are too many students and too few schools. Only 1 out of 3 of school aged children receive formal education, with only 20% of girls in primary school and barely 2% in secondary school. People live with dreams and aspirations they're unable to realise.

The need for education has spurred heroic action by parents, teachers and others. In 2008, local resident Shafec Abdullahi Abdi and other parents started their own school. They sold some of their food rations and went hungry in order to hire teachers and buy chalk with money they pooled. The space under a tree was their office. In 2010, a building was completed and named Waberi Secondary School. The United Nations High Commissioner for Refugees took note and began to fund it.


Students in class at the Daddab refugee camp. (Photo courtesy Peter Murphy)

BHER then began organising a training program for teachers (most of the few teachers in Dadaab's schools are untrained) and others to receive college credits, certificates and degrees locally in the camps. They wanted to see them remain and serve their own communities, instead of traveling to a foreign university to not return. This involves physical classes, but also, critically, remote instruction and mentoring to inject outside expertise and resources. Because the Kenyan system is primarily English language, the instruction and support does not encounter insurmountable language translation issues. Current funding supports 400 students, including Kenyan nationals who live in communities surrounding the refugee camps.

Satisfying learning and safety needs outside the classroom are also a concern for BHER's education. The camps are large, creating significant distances while traveling to class, and security resources (such as lighting) are sparse. BHER considers all of these issues. One official has said, "Women face additional

security concerns due to risk of sexual assault and other forms of gender based violence. We strive to minimise security risks to all our participants by offering our programs in safe and secure spaces and by carefully following all security guidelines for Dadaab set by the United Nations High Commissioner for Refugees."

Another way BHER is helping its students with the logistics to make attending class possible is by creating an Enabling Fund that sponsors individual students. This fund helps cover costs of transportation, food and hygienic products for a day of study. Additionally, a brilliant Indiegogo campaign is also underway to provide students solar lamps to study by. Because darkness falls at 6:00 pm in Dadaab, and most students do not have electricity in their homes, it's difficult to study and complete coursework. This especially affects women, as men may be more able to leave their homes in the evenings to gather and study at locations with electric light. Every little lamp empowers a student to study for the duration of their years of school when outside of the classroom.

Education Delivers Two-Way Inspiration

Increasingly, technology not only delivers help for developing world countries, but receives it back again in various ways. While Silicon Valley's Facebook enables help for students in Africa, creative Africans in turn make their own contributions back to other countries. "We're seeing remarkable reverse-innovation," says Wayan Vota, Technology Advisor at FHI 360′s TechLab. "Out of necessity they've really pioneered mobile banking in Africa, which is in many ways more convenient than a lot of what we see in North America. Ushahidi is another example: using mobile phones to crowd source local dangers (such as violence) that users are reporting, we now it for crises like natural disasters in the U.S."

Providing inspiration is one way that Dadaab's refugee students are giving back to those helping them learn. For Madiha, she emphasises, "The most exciting part for me as I participant in the online dialogue has been the privilege to simply interact and learn from students living in a refugee camp. Every conversation is eye-opening and humbling. It has also made me appreciate our technological advancements, as I can converse with and learn from these inspiring, intelligent students without ever physically visiting the camp myself. Basically, learning is a 'click away.'"

It is indeed amazing to see learning in action where previously it did not exist. A bright young student named Fatumo Ali Ahmed radiated inspiration when asked why she was pursuing her education. "I'm going to be a politician. We are refugees. What brought us here as refugees is we don't have political stability in Somalia. We are the young generation that can build our future and our country beyond. That's why I am trying to be a politician so that I can at least do something with the problems that are current in my motherland." For those supporting them, that sort of truly change-the-world attitude is worth crossing any border to mentor and support.



ABOUT THE AUTHOR

Michael Atkinson has been an instructor and distance education designer in the private sector for 10 years. He increasingly focuses on the intersection of educational technology and populations in the developing world. You can find Michael on Twitter @atkinsonmichael and Google+

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The ‘Eye-Phone’ That Helps Prevent Blindness

By Lexi Brown · 3 July 2014
Series produced by Ken Banks, kiwanja.net

In most developing countries the provision of basic healthcare, especially for those living in remote areas, is still a huge challenge for healthcare professionals. In this installment of Digital Diversity, we look at how mobile technology, and one mobile app in particular, is giving those in remote regions of the world access to essential eye care through a mobile portable eye examination kit called Peek.

According to Dr. Patricia Mechael, executive director of the mHealth Alliance, in developing countries the average doctor-to-patient ratio is one doctor to every 250,000 patients. Yet these same countries account for 80% of mobile subscriptions worldwide. It’s no surprise, then, that mobile health technology has substantial potential to improve access to healthcare in the developing world.

The core Peek team consists of Dr. Andrew Bastawrous and Stewart Jordan at the London School of Hygiene and Tropical Medicine, Dr. Mario Giardini at the University of Strathclyde, and Dr. Iain Livingstone at the Glasgow Centre for Ophthalmic Research. Together they share a vision of extending access to quality eye care throughout the world.

According to Dr. Bastawrous there are 39 million sufferers of blindness around the world. 80% are from low-income countries, and the majority are blind from diseases that are either curable or preventable. Dr. Bastawrous has been harnessing the power of mobile technology to deliver eye care in an innovative new way to these individuals.

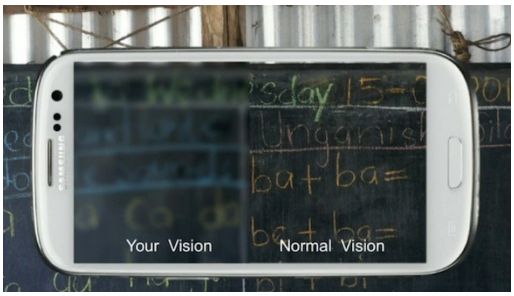


Cataract testing outside a patient’s home. Photo (c) Peek

Peek is a smartphone app aimed at community healthcare workers which allows them to deliver eye care everywhere. The app is able to scan the eye to check for diseases as well as other problems. It works by looking at visual acuity, visual field, colour vision and contrast sensitivity allowing Peek to diagnose blindness, visual impairment, cataracts, glaucoma, macular degeneration, diabetic retinopathy and other retinal and optic nerve diseases and crucial indicators of brain tumour and haemorrhage.

The app allows individuals with minimal training to conduct a comprehensive examination. By using a smartphone it replaces bulky traditional equipment which is expensive, fragile and often requires a continuous power source.

Dr. Bastawrous and his team are currently running multiple trials in Kenya within communities and schools. To ensure that everyone understands the benefits of the new technology, everything is being shared in simple, non-technical language.



The 'Sight Sim' functionality shows carers and teachers the visual world from the patient's perspective. Photo (c) Peek

Once the technology discovers that someone has low vision, the next step is to find out why – and this requires access to the inside of the eye. Traditionally, this would require expensive equipment to examine the retina, but Dr. Bastawrous and his team have developed 3D-printed, low-cost hardware that comes in at less than five dollars to produce which can then be clipped onto a smartphone, making it possible to get high quality views of the back of the eye.


Retinal imaging using the Peek app. Photo (c) Peek

This new hardware has reduced the cost of providing essential eye healthcare from over $125,000 to just $500. Instead of requiring a team of 15 trained personnel with expensive equipment, the examination can now be carried out by a single healthcare professional with a smartphone, on a bike. The issue of power supply is overcome by harnessing the power of solar. The healthcare workers travel with a solar-powered rucksack, which keeps the phone charged and backed up. This gives them the ability to go to the patient rather than waiting for the patient to come to them, which often never happens.

When examinations are carried out the results are archived. They can also be geo-tagged with the GPS location of the patient, allowing traveling eye care professionals to follow up with patients as necessary. Hospital directors can also search the database to locate individuals who need further treatment as well as send out SMS messages to arrange treatment:

> *"Peek will be sending a vehicle to collect you for eye treatment on Friday 20th June. Reply to confirm attendance."*

Now, many patients are just a text message away from regaining their sight after years of blindness.

Peek Vision is currently conducting extensive tests before making the system more widely available. There are currently patients in over a hundred locations across Nakuru County in Kenya participating in Peek Vision's trials. As part of the field testing phase, patients are undergoing tests with both professional equipment in hospitals and community health workers using the Peek app. This way, results can be compared to ensure that Peek's diagnosis is both accurate and effective. Similar tests are being carried out in Scotland through clinics associated with one of their partners from the Glasgow Centre for Ophthalmic Research work.



ABOUT THE AUTHOR

Lexi Brown is a media planner at Mindshare UK, specialising in new media and technology for communications. This, with her passion for geography after studying at the University of Bristol, has led her to write for "Digital Diversity" and showcase examples of how technology and new methods of communication are improving the developing world, and helping individuals escape the vicious cycle of poverty. You can follow Lexi on Twitter @lexie_brown

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Saving Lives at Birth

By Layla McCay · 7 August 2014
Series produced by Ken Banks, kiwanja.net

Every two minutes a woman dies in childbirth. In sub-Saharan Africa, women are 136 times more likely to die than in developed countries. In this latest issue of Digital Diversity, we look at how an annual challenge is helping turn the attention of the world's smartest innovators to solving one of the world's greatest problems – saving lives at birth.

Patricia Hibberd from Massachusetts General Hospital picks up a heat sensor device she bought from a local hardware store. Instead of pointing it at a building to identify where heat is escaping, its intended use, she points it at some of the people milling around her stand at the Saving Lives at Birth DevelopmentxChange event recently held in Washington, DC. The little screen lights up in multicolours. "We can use this device to diagnose pneumonia in children," she tells me.



Heat sensor pointed at people attending the Saving Lives at Birth event. (Photo: Layla McCay)

This is intriguing. Pneumonia is usually diagnosed with x-rays, and other diagnostic tests that can be expensive and require special equipment. In many developing countries, these tests are only available in specialist hospitals, and are out of reach to most of the population – a particular problem as pneumonia is one of the biggest causes of death for children under five.

It is just the sort of inventive solution to a global health challenge that is embraced by Saving Lives at Birth. Launched in 2011, this partnership and has put out an annual, global call for innovators to identify groundbreaking prevention and treatment approaches for pregnant women and newborns in poor, hard-to-reach communities. The partnership is an illustrious one: USAID, the Bill and Melinda Gates Foundation, the Government of Norway, Grand Challenges Canada, and the UK Department for International Development provide seed funds and transition grants to move bright ideas from a twinkle in their innovator's eye to practical use in healthcare facilities in low income countries. This is its final year. After thousands of hopefuls submitted their applications, they were whittled down to 52 finalists, who gathered in the Ronald Reagan building late last month to compete for the funds.

Digital solutions play an exciting role in some of the most inspiring innovations presented – and a big theme of the day was coming up with affordable versions of expensive, often unattainable medical devices, so they can be used to save lives in low-income settings, and a particularly popular target this year was how to help babies with breathing problems.

Often when newborn babies are in breathing distress, they require help from a machine called bubble Continuous Positive Airway Pressure (bCPAP). This machine is far too expensive for many hospitals in low income settings. Luckily several of the innovators focused on how to make the treatment more affordable. William Marshall Rice University in Houston, TX and PATH both came up with inventions that do the job while cutting the cost by up to fifteen times. William Marshall Rice University also came up with an exciting

$25 stretchy band that is placed around babies' chests and detects if the baby stops breathing – and automatically delivers a vibration that stimulates the baby to start breathing again. The inventors believe that this device could save the lives, and prevent damage caused by stopping breathing, of 2.9 million babies a year. All of these inventions seek investment for further development, to prove their worth, and to get them to the places they are needed most.



Low-cost bCPAP machine being showcased at Saving Lives at Birth. (Photo: Layla McCay)

Mobile phones, which are rapidly spreading throughout the world, provided particular inspiration for the Saving Lives at Birth innovators. The Inclen Trust International from India plan to develop a mobile health (mHealth) device to monitor mothers and fetuses in later pregnancy and during labour, to detect any problems. This usually requires an expensive piece of equipment called a cardiotocograph device, but the Inclen Trust plan to develop a far cheaper version that works though a mobile phone. SimPrints Technology Ltd proposed to use fingerprint technology that integrates with mHealth apps to help solve the challenge of accurate patient identification of mother and baby around the time of birth.

Mobile phone technology is also being harnessed by Massachusetts General Hospital with their heat detector to diagnose pneumonia. Hibbert explained to me that the device she bought at the hardware store works, but it is too expensive for many of the healthcare settings who need it most. Instead, her team have invented a little clip-on attachment that turns any smartphone into a heat sensor. Point it at babies' and young children's chests, and sure enough, the thermal images that pop up on the smartphone screen correspond to the x-ray patterns that diagnose pneumonia.

Ideas like the ones presented at Saving Lives At Birth are game changers for healthcare in poor, hard-to-reach communities. It is exciting to see so many of these ideas being funded and moving from good idea to a better reality.



Chest x-ray and thermal imaging both detecting the same pneumonia. (Photo: Linda Wang and Patricia L Hibberd at Massachusetts General Hospital, Boston)



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TEDMED: 50 ideas that might just change the face of health around the world

By Layla McCay · 22 September 2014
Series produced by Ken Banks, kiwanja.net

Hundreds of people surged up the steps of the Kennedy Center in Washington DC this month sporting the iconic oversized badges that only meant one thing – time for TEDMED. This famous – and exclusive – conference from the people behind TED Talks is attended by health innovators from all over the world. The aim is to share diverse, exciting ideas that may change the face of health and medicine across the globe. In this installment of Digital Diversity, Layla McCay – a member of our Media and Research Team – shares her thoughts on some of the most exciting health innovations featured at the event.

The most common overheard comment during TEDMED was "that could be a game-changer."

The question of what exactly makes a "game-changer" is open to interpretation. Which of the nearly fifty ideas presented on the TEDMED stage this year will turn out to change the face of health and healthcare depends on where they spread, who receives them, and what is done with them. Since the game in question is health, our lives could depend on the outcome.

Opening the mind is an essential theme for a conference like TEDMED. Physicians were challenged as being 'species snobs' for failing to harness the knowledge of veterinarians to better understand and treat diseases in humans – and were entreated to use the animal kingdom, and diverse industries, to inspire innovations – like re-appropriating porcupine quills to seal wounds, or air bags for elderly people whose falls put them at risk of breaking a hip.

TEDMED's speakers called for better detective skills to track down the true causes of ill health, from epidemics to drug abuse. Few threats to our health are new, so the typical question: 'Why has this invader come amongst us?' could perhaps become 'Why is this pre-existing threat causing problems specifically here, now, to these people?' That's why an outbreak of dengue fever in Florida could be superficially attributed to the influx of dengue-carrying mosquitos from elsewhere – or attributed to a side effect of the recession (stagnant water in swimming pools expanding dengue mosquito breeding grounds, for example).



Jeffrey Karp, TEDMED. Photo courtesy Layla McCay

Opening our minds is not the only route our brains can take to better health. There are unexploited opportunities to harness how our brains work to make us healthier, whether you want to call it trickery or sophisticated brain stimulation. It turns out that if we take a pill that contains nothing but sugar, known as a placebo, it can still help cure our diseases – even if we know it's a placebo. This effect could be harnessed to help heal our bodies from a range of illnesses. We can also try more sleep – there's a theory that this might just help to reduce the risk of Alzheimer's Disease, thanks to triggering

the brain's nightly bout of spring cleaning. And it seems we can heal better and feel better, just by adjusting our background light and the sounds we hear, especially in hospitals.

We can also use our brains to turn information into real life choices that promote health. For example, it is common knowledge that breastfeeding is healthy for babies, but less is made of the fact that breastfeeding is also healthier for mothers, reducing their risk of high cholesterol, diabetes, obesity and heart disease. On the other side of health promotion, rather than waiting for a resolution to the gun control debate, tech solutions could be adopted right now to reduce gun crime, like automatically stamping registered gun owner details onto bullets as they are fired. Technology can also help reduce ill health caused by healthcare – like a non-reusable syringe that helps prevent the many infections such as HIV caused by health workers all over the world reusing needles with different people, without sterilization in between patients. TEDMED Chairman, Jay Walker, explained that while the T in TEDMED stands for technology, "technology is not an answer – it's a tool."

But tools are needed in a health care delivery system that is driven by humanity. Doctors are not perfect machines: they have their own views and ethical values and skills and flaws, and are, by definition, fallible. Expecting homogeneity or perfection can be dangerous – recognizing the inevitability of error should be leading not to blame and shame, but to designing better safeguards.

But then again, the population is not perfect either. The requirement for legal organ donation to be entirely altruistic makes it a niche choice – and contributes to the huge organ shortage in places like the US. There are pros and cons, but perhaps there are lessons to be learned from Iran, where live organ donors are apparently honored, cared for and compensated, ensuring an influx of donors, meaning nobody who needs a new kidney has to die without one.

And as for patients, perhaps allowing themselves to be defined by an illness for too long may be a natural response to trauma, but it may also inhibit their recovery. And instead of trying to emulate 'normal', another, positive option is to boldly embrace differences, from the alternative thinking styles autism can bring, to festooning a prosthetic limb in chrome, glitter, or art.



Sophie de Oliveira-Barata, TEDMED. Photo courtesy Layla McCay

Finally, TEDMED reminds its delegates that knowledge is fleeting, not eternal – what is once believed to be true may be later disproved. So we should avoid rigidity in our beliefs and keep asking questions. It is, perhaps, this thought that drives all innovation – and making us all understand this may be the real game-changer at TEDMED.



ABOUT THE AUTHOR

Layla McCay is a medical doctor and global health specialist, with a special interest in global health technology and innovation. She has worked across health policy sectors, from the World Health Organization and the World Bank to International NGOs and the British Government. She teaches international health at Georgetown University. You can find her on Twitter @LaylaMcCay

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Project Daniel: 3D Printing Prosthetic Arms for Children in Sudan

By Lexi Brown · 6 October 2014
Series produced by Ken Banks, kiwanja.net

At age 14, Daniel Omar had both his arms blown off by a bomb dropped on his village, and considered his life not worth living. His story is not untypical. In this installment of Digital Diversity, we look at how the Not Impossible Team – after a trip to Sudan Nuba's Mountains – set up the what is probably the world's first 3D-printing prosthetic lab and training facility to build him a new arm.

The seemingly endless, widespread bombings that come with the conflict in South Kordofan is an everyday occurrence for those living in the Numba mountains. The locals constantly listen out for the distinctive drones in the sky, and when alerted they run to the nearest foxhole, climbing into the dark, deep and narrow holes designed so that villagers can escape the shrapnel from the "barrel bombs" dropped from Antonov aircraft by the Sudan Air Force. People wait silently, holding their breath, waiting for the explosions and the ensuing gunpowder smell. The villagers then creep out slowly to gasp the fresh air, but often find themselves shimmying back down as a new round of bombs are dropped. When it's all over, the villagers emerge and sweep the village to assess the damage. Family members accounted for? Livestock okay? Houses damaged? Crops destroyed?

While Daniel was attending to his family's goats one day, there were no foxholes nearby that he could reach in time. He used his initiative and sprinted to the largest tree he could find and wrapped his arms around the trunk. The shrapnel missed his head and body but embedded in his two arms, resulting in the need for a double amputation. Though he survived, he was emotionally devastated and felt a burden to all around him.

When Mick Ebling read about about this boy named Daniel in South Sudan who had lost both his arms in a bomb attack, he decided to do something about it. He assembled a team that included experts in prosthetics, physiology and physical therapy and, most importantly, Richard van As, the guy who invented the Robohand. In a region of the world where amputees number upward of 50,000 it was the story of just one – Daniel Omar – that started a movement.

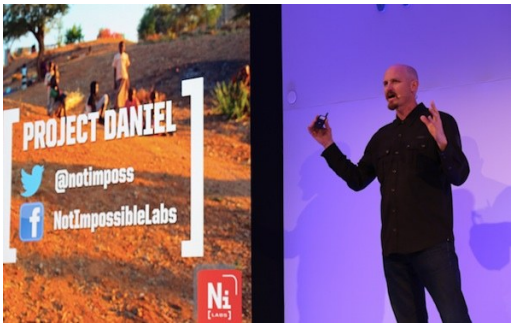
The Not Impossible team, led by Mick, travelled to Yida – an active war zone – to help not only Daniel, but to train the locals on how they too could create prosthetic limbs for those injured in the bombings. "Normal" hospital prosthetic arms usually cost between $10,000 to $15,000 (and higher), but the one that Mick created cost approximately $100 (not including labour and the cost of the printer).


The core components of a prosthetic arm. Photo courtesy Not Impossible

Because Daniel was a double amputee, he relied hugely on his 'caretaker'. Daniel's caretaker was an ~9 year-old boy (he didn't know exactly how old he was) named Shaki. Shaki had to do everything for Daniel. Feed him, bathe him, everything. Daniel proved reclusive at first, but once the prosthetic was correctly fitted, he not only developed the ability to care for himself but his personality changed as he became more enthusiastic about life.

After Daniel had been fitted with his prosthetic, and with the help of Dr. Tom Catena, an American doctor and the sole physician left working in the Nuba Mountains, Mick and the team set about teaching local clinicians and villagers how to assemble 3-D prostheses. By the time the team returned to their homes in the U.S., Mick had an email from Dr. Catena saying the local trainees had successfully printed and fitted another two arms on their own.


Daniel practicing by eating spoons of sugar. Photo courtesy Not Impossible



Mick Ebeling discussing Project Daniel at the Intel stage at CES 2014. Photo courtesy Not Impossible

"It's really about the concept of help one, help many" says Ebeling. "If I had read the article and thought, 'I gotta go help the amputees!' there's really no place to start. It's like Bill Gates trying to fight malaria or Bono fighting poverty. But it became achievable by breaking it down to, and starting with, one individual. 'I want to help Daniel' turns into an achievable end goal, one person helping one person."



ABOUT THE AUTHOR

Lexi Brown is a media planner at Mindshare UK, specialising in new media and technology for communications. This, with her passion for geography after studying at the University of Bristol, has led her to write for "Digital Diversity" and showcase examples of how technology and new methods of communication are improving the developing world, and helping individuals escape the vicious cycle of poverty. You can follow Lexi on Twitter @lexie_brown

Digital Diversity is a series of blog posts from kiwanja.net featuring the many ways mobile phones and other appropriate technologies are being used throughout the world to improve, enrich, and empower billions of lives. This article was curated by Lexi Brown, a member of our Media and Research Team. Digital Diversity is produced by Ken Banks, innovator, mentor, anthropologist, National Geographic Emerging Explorer and Founder of kiwanja.net, FrontlineSMS and Means of Exchange. He shares exciting stories in Digital Diversity about how mobile phones and appropriate technologies are being used throughout the world to improve, enrich, and empower billions of lives. You can follow him on Twitter @kiwanja

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Innovation in the air for one of the oldest public health interventions

By Layla McCay · 15 October 2014
Series produced by Ken Banks, kiwanja.net

When you walk up to a sink in a public restroom, there's a good chance that you'll be greeted by a poster reminding you to wash your hands. In this installment of Digital Diversity, Layla McCay – a member of our Media and Research Team – talks more about one of the oldest public health interventions as part of the celebrations on this, Global Handwashing Day.

No matter where you are in the world, the benefits of washing your hands with soap and water are impressive. Worldwide, handwashing with soap can cut the risk of diarrhea in half, and respiratory infections by a quarter. Globally, it can support good nutrition, keep children in school, promote equity, and boost the economy. And, as has become particularly relevant this year, it can help prevent the spread of Ebola. Handwashing is a major international development investment.

And yet, every year 1.7 million children under the age of five die due to diarrhea, pneumonia and other infections that could be prevented by handwashing with soap. There are many reasons people don't take advantage of the benefits of handwashing, including insufficient knowledge and understanding about its importance; lack of water and soap near the toilet, food preparation or dining areas; or just not getting into the handwashing habit.

A recent Global Handwashing Day event in Washington, D.C. focusing on *Exploring New Ideas in Hygiene Integration, Innovations in Handwashing and Insights into Behavioral Drivers* was packed full of people who work in international development. They had one question on their minds: Handwashing is one of the oldest public health interventions – so what's new in handwashing? It turned out we're slowly moving beyond those rest room posters. Innovation is underway.

The power and reach of mobile technology is being harnessed to educate women around the world that when they wash their hands with soap after using the toilet or changing diapers and before preparing or eating food, they help keep their children healthy. Unilever Lifebuoy showcased their effective pilot program where expectant and new mothers in India received phone calls with recorded, targeted hygiene messages. Recipients laughed over the 'baby's' voice being used to deliver information, but importantly, they listened – and the suggested behaviors were enacted.

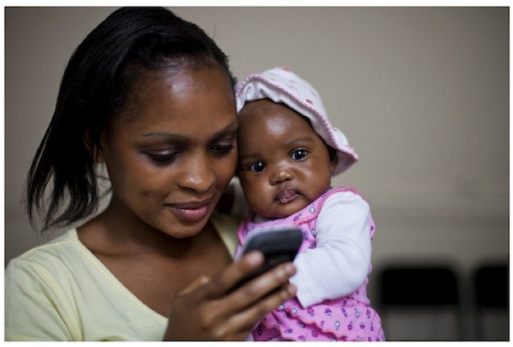
Photo courtesy MAMA, copyright © 2014 by Malherbe Pelser

"Whenever I come back from the fields, my wife doesn't serve food until I wash my hands," said one new father on the impact of his wife receiving these messages.

Mobile phones are also being harnessed by the Mobile Alliance for Maternal Action (MAMA) to improve handwashing knowledge and practices. MAMA's Senior Communications Manager, Stephanie Bowen, explained how integrating handwashing messages into health information delivered by mobile to mothers in Bangladesh, India and South Africa empowers them to make healthy decisions for themselves and their babies with practical suggestions delivered right into their hands, such as:

> *"You can help keep your whole family healthy by washing your hands. Set up a washing stand with soap and water near where you prepare food."*

But technology for communications isn't the only way to innovate in handwashing. People also need physical access to the 'hardware' of handwashing- running water and soap. Columbia University graduate student Prerna Seth described a new handwashing station she has designed, the 'CleanTap'.

"I was inspired to design the CleanTap after I caught typhoid from eating street food in India," laughed Seth. She found the key to motivating food vendors to acquire and use her product prototype was to prove it made good business sense, through creating customer demand for cleanliness. Her early results have been promising. And Cici Pandol from SoapBox Soaps described their innovative business model as the 'TOMS of Soap', donating a bar of soap to someone who needs it for every bar of soap they sell.



Street food vendor in India using the CleanTap. Photo courtesy Dimpy Dave

Innovation can also be undertaken by looking beyond the water, sanitation and hygiene sector for handwashing promotion. Given the wide and diverse benefits of good handwashing, a wide and diverse promotion strategy is needed around the world. We heard about integrating handwashing promotion with face washing to prevent trachoma, with menstrual hygiene management to empower girls to attend school and promote gender equality, and as part of a program to improve children's nutrition in schools.

As Chris Williams, Executive Director, Water Supply & Sanitation Collaborative Council put it, "It's one thing to get people to wash their hands; it's another thing for them to still do it years later." One approach to help make habits stick is being trialed by the SuperAmma campaign who are optimistic about the impact of changing handwashing messages from the old education messages – "protect yourself from germs" – to motivators that speak directly to people's emotions, moving them from *knowing* they ought to wash their hands and doing it a few times, to actually doing it routinely, over and over again.

The motivators they have tried included presenting handwashing as a way for parents to nurture children and teach them good manners; persuading children that unwashed hands are disgusting, and helping everyone see that everyone else is doing it. It will be interesting to see the results.

On Global Handwashing Day these innovations are a timely examples of the inspiring things happening right now to breathe new life into an old public health challenge – the simple but incredibly effective act of washing your hands with soap.



ABOUT THE AUTHOR

Layla McCay is a medical doctor and global health specialist, with a special interest in global health technology and innovation. She has worked across health policy sectors, from the World Health Organization and the World Bank to International NGOs and the British Government. She teaches international health at Georgetown University. You can find her on Twitter @LaylaMcCay

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National Geographic Explorer Ken Banks Awarded Public Interest Prize

17 March 2011

National Geographic Emerging Explorer **Ken Banks**, a UK software developer working to give grassroots groups the world over the capacity to interact, cheaply and simply, with constituents in remote communities, has won the 2011 Antonio Pizzigati Prize for Software in the Public Interest.



Ken Banks is the developer of FrontlineSMS, a simple yet powerful program that's speeding social change in over 60 nations. Banks produces **Mobile Message**, a series of blog posts for National Geographic News Watch, focusing on how his software innovation is impacting peoples' lives.

The Pizzigati Prize goes annually to an open source software developer who is adding significant value to the nonprofit sector and movements for social change.

This year's recipient was announced today by Tides, a San Francisco-based nonprofit founded in 1976 to provide services that amplify the efforts of forward-thinking individuals and organizations.

Photograph of Ken Banks by Karola Riegler

Explaining why Banks was selected for the 2011 Pizzigati Prize, Tides said:

The U.S.$10,000 Pizzigati Prize honors software developers who, in the spirit of open source computing, are fashioning exceptional applications that aid activists and nonprofits. Tides — a partner to philanthropists, foundations, activists, and organizations worldwide — hosts the prize selection process.

This year's Pizzigati Prize winner, Ken Banks, has created software that speaks directly to a harsh global communications reality: Millions of people in remote areas have no access whatsoever to the Internet. But many of these millions do have simple mobile phones.

> *"The software Banks created six years ago enables grassroots groups to reach these millions, using only a laptop computer, a USB cable, and a plain-vanilla mobile phone. And the constituents of these groups can use their own mobile phones to communicate back."*

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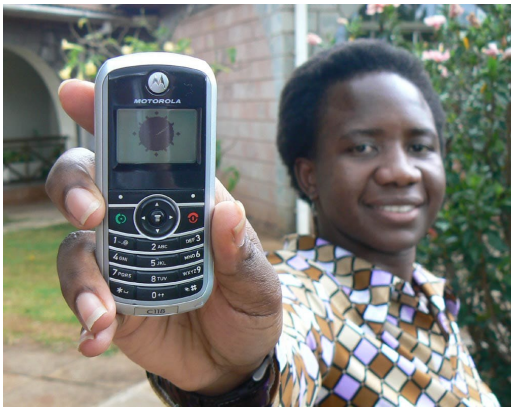
Since 2005, nonprofits have downloaded the totally free — and easy to use — FrontlineSMS software almost 13,000 times, for use in a strikingly varied assortment of projects across the globe. The first independent news agency in Iraq, for instance, is using the software to text message updates to readers in eight different countries.

Other users have a more targeted focus. Some groups are using FrontlineSMS to share fair market prices with local farmers, information that can help these farmers spot — and avoid — commodity traders out to cheat them.

In Azerbaijan, FrontlineSMS has helped mobilize the youth vote in national elections. In Zimbabwe, the software is enabling groups to monitor human rights violations. One group serving overseas Filipino workers is using FrontlineSMS as an emergency help line.



Over the past few years, mobile phones have found their way into the hands of millions of people in developing countries. The software developed by Ken Banks has empowered them to communicate with grassroots organizations in a strikingly varied assortment of projects.

Photo credit: Ken Banks, kiwanja.net

The 44-year-old Ken Banks has based the entire FrontlineSMS effort on basic open source principles. His kiwanja Foundation wants any organization working for grassroots social change to have "the ability to build on and take advantage of the code we've developed."

This devotion to the open source ethos goes beyond just working with software programmers.

"We're committed," says Banks, "to involving even non-developers among our users in the ongoing improvement of FrontlineSMS."

Banks, an anthropologist by training, has lived and worked all around Africa since the early 1990s. A long-time computer coder, he first started thinking about connecting computers and mobile phones while working on a conservation project in South Africa.

In 2005, Banks raised a small amount of money, bought some equipment and cables, and sat down, over five summer weeks, to write the first FrontlineSMS software. That October, Banks released his new code over the Web.

"What's happened since," he says, "has been pretty amazing."

A number of groups and organizations, ranging from National Geographic to the MacArthur Foundation, have noted the wide and positive impact that Banks has had with FrontlineSMS. Banks himself is hoping that his work will have an equally positive impact on the next generation of software developers.

> *"Stories like mine — developing FrontlineSMS with very limited resources over a five-week period — can inspire younger developers. They prove that anyone with an idea can make a real difference if they stick with it."*

"Stories like mine — developing FrontlineSMS with very limited resources over a five-week period — can inspire younger developers," he points out. "They prove that anyone with an idea can make a real difference if they stick with it."

Banks, currently based in Cambridge, UK, will receive this year's Pizzigati Prize in a presentation during the National Technology Network's 2011 Nonprofit Technology Conference, set to begin March 17 in Washington, D.C.

This year's Pizzigati Prize judging panel included three previous winners of the prize — Darius Jazayeri, Yaw Anokwa, and Barry Warsaw — and two veteran professionals who have each earned wide respect within the nonprofit computing world, Joseph Mouzon and Erika Bjune.

The applications forms, background information, and deadline for next year's Pizzigati Prize will be available later this year at the Pizzigati Prize website.

The prize honors the brief life of Tony Pizzigati, an early advocate of open source computing. Born in 1971, Pizzigati spent his college years at MIT, where he worked at the MIT Media Lab. He died in 1995, in an auto accident on his way to work in Silicon Valley.

ABOUT THE AUTHOR

Innovator, anthropologist and National Geographic Emerging Explorer, **Ken Banks** shares exciting stories in **Mobile Message** about how mobile phones are being used throughout the world to improve, enrich, and empower billions of lives. Read them here.

Adapted from a news release distributed by Tides.

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