



# Smart**QUIZ**

An open-source intelligent evaluation tool  
for any language, subject or ability.

## Background

Kenya suffers from a lack of adequate health education materials for the Deaf. While there are many materials designed for the hearing in English, Kiswahili and other spoken languages, materials using sign language have not been created at a scale necessary to serve Kenya's roughly 300,000 Deaf. Many people mistakenly assume that English or Kiswahili materials can also serve the Deaf community. This is an inadequate solution. Kenyan Sign Language (KSL) is the "native tongue" of Deaf Kenyans. Other languages are acquired slowly (and often poorly) in Kenya's few schools for the Deaf.

As any Health professional knows, matters of life and death should always be discussed in the native tongue to avoid miscommunication. Similarly, effective communication of reproductive health messages is essential for raising awareness about serious health threats like HIV/AIDS. Though the government and aid organizations have begun to better serve the Deaf, most of Kenya's Deaf have not received proper reproductive health education. The United States Peace Corps has stated that while HIV infection rates are dropping among Kenya's hearing population, rates are increasing among the Deaf. Educating the Deaf on reproductive health matters using their native tongue is desperately needed.

## **How the Deaf Learn**

As of 2007, Kenya has more than 70 schools dedicated to educating the Deaf. It is on these campuses that Deaf children are exposed to the Deaf world. A Deaf child that can barely communicate with their family in the village is surrounded with other Deaf youth and teachers. Here is where the Deaf student learns KSL and, most importantly, can share lessons learned from other Deaf. Deaf Kenyan teachers quickly learn how best to teach a classroom of Deaf children. The teacher explains the lesson in KSL as clearly as he or she can several times until one or two students show an understanding of the material. Quickly the classroom erupts into multiple conversations. These students are not misbehaving, they are illustrating how the Deaf of Kenya learn: by sharing their understanding. Once a few students understand something, the information is quickly spread through the classroom of Deaf students. In minutes, all students understand the lesson thanks to this unique system of learning and sharing. To put it simply, the Deaf learn best from their fellow Deaf in their native language.

## **Utilizing What We Know**

If the Deaf are the best at teaching the Deaf, how can health materials be created utilizing this understanding? Though KSL can be written, many Deaf do not have the skills to acquire knowledge in this manner. But showing video of a Deaf person signing something can be understood by any Deaf person. By using video two advantages can be attained. First, a Deaf peer can instruct a fellow Deaf viewer. Peers are often the most trusted when discussing important topics. Second, video allows the instructor to communicate in the viewers' native tongue so that the message can be better understood. Not only will the message be understood, but the idea of watching a fellow Deaf Kenyan sign on the screen is quite an exciting thing for a Deaf youth!

## **The SmartQuiz**

The Kenyan Sign Language (KSL) HIV/AIDS SmartQuiz game is designed to allow Deaf Kenyans to instruct their Deaf peers about HIV/AIDS and related reproductive health issues. The SmartQuiz game first presents users with a video clip of a Deaf youth using KSL to communicate a common statement about HIV/AIDS. The statement may be true or false information. Next, the SmartQuiz game prompts users to agree or disagree with the statement. Finally, a video clip of a Deaf youth signing in KSL delivers appropriate feedback depending on the users' answer. As groups of students move through the game, the SmartQuiz game encourages users to share their understanding with other students. In the background, the system monitors which questions are answered incorrectly and builds new sets of questions to strengthen the users' weak areas of understanding. A back-end tool allows instructors to see the progress of the students. This vital information can tell the instructor which areas of health education should be concentrated upon in the future.



We developed SmartQuiz with several things in mind:

1. Appropriate use of technology. The game is geared towards Deaf Kenyan students who have very low computer skills. The interface was kept simple with minimal visual distractions. Buttons are big to assist students with poor mouse skills.
2. Developed for variety of mediums. While internet access is available in Kenya, it's not readily available to students who live in rural areas of Kenya. We developed several versions of this game including: a DVD version for TV-only schools, a stand alone version for schools that have computers but not Internet, and a web-based version for schools that have access to the internet.
3. Developed with a modular architecture. While we had an idea for what type of content could be developed, we knew that other people would have other ideas of ways they could use the software. With that in mind, we developed the game so that new content could be added easily. Beyond HIV/AIDS education in KSL, quizzes in other local languages could be developed about various topics: civic education, health issues, entrepreneurial skills, even standard educational topics such as math, history, etc.
4. Content delivery utilizing an AI engine. The stand alone version monitors the number of correct and wrong answers it receives. Based upon the answers, it weights certain questions to be presented to students more often. Questions that students answer wrong the most will be seen by the students more often.
5. Capacity for monitoring and feedback. We also wanted to provide a way to give teachers and educators feedback. With this in mind, we chose to show the total number of correct answers in a graph and trends in the answers over time. This will allow educators to see which questions or issues need to be addressed and allow them to change instructional content based on that. With appropriate use of this

SmartQuiz feature, teachers could potentially see results of change in their curriculum manifested in the classroom.

## **Future Directions**

- Statistical Dashboard to capture and display student performance data. The SmartQuiz game application currently saves the answers of the students to a file on the computer on which is installed. A back-end tool for educators could be added that reads this information and provides graphs of the answers giving educators feedback on student performance. Educators would then be able to adjust their curriculum based upon deficiencies in knowledge of material. As the tool is used over time, trending graphs would allow educators to see how student proficiency progresses.
- New content development based on local need. As educators use the tool, new content can be developed with no programming skills. Our hope is that educators on the ground would be able to use their first hand knowledge of the subject matter they are delivering together with the statistical dashboard to identify areas in which their student knowledge could be improved. Educators would only need basic computer tools to film and deploy new content in subject areas beyond HIV/AIDS and for audiences other than the Deaf. Our goal is to provide as many of the tools as necessary to help facilitate this.
- New content could be shared by CD/DVD or internet. Once new content is developed, our hope is that educators would then share their content with other educators in the region, country, and the world. New content could be deployed either via CD/DVD media or download via the internet.
- Back-end admin tool to facilitate content creation. While creating new content is relatively easy, we know that this process could be made even simpler through additional tools. If more and more educators are developing content, we would hope to develop these content creation tools to make the process easier. For example, as it is currently a user must create text files in a specific computer readable format called XML files. While these are easy for computers to read, they aren't as easy for humans to read. To make the process easier, we could create a tool that would allow a user to type in the questions and answers, and then the tool would create the XML file.
- Statistics could be uploaded and aggregated from field. We hope that organizations working on the ground could use this tool to help them gather statistics. Once installed and put to use, SmartQuiz collects valuable statistics about the user population. This information could be gathered either via Internet by uploading statistics to a central location, or through more manual means such as copying the file to a CD, DVD, USB drive, etc.
- Open source standards to allow world wide collaboration. Our goal is to license SmartQuiz under an open source license that would allow developers around the

world to leverage the work that we have already done and build new ideas and make new additions.

## **Who is Involved**

All of us met as Peace Corps Volunteers in 2006 in Kenya. Frank, Miranda, and Sam were all in the same Behavior Change Communicator (BCC) program. Bebeth and Mark were in the Small Business program as Information Technology and Communication volunteers. While the five of us are the primary principles in this project, there were many (too many to name here) other Peace Corps Volunteers, Kenyan Peace Corps Staff, Kenyan interpreters and educators, and Deaf Kenyan students and adults that provided essential feedback and support.

**Frank Lester** - With a BA and Masters in Social Work, Frank has spent a long time involved in HIV/AIDS issues in the Deaf Community. He has worked for C.A.R.E, Lighthouse, and California School for the Deaf. In 2006 Frank joined the United States Peace Corps and was sent to Kenya to be a part of the Behavior Change Communicator program. He spent over one and a half years in Kenya until the political unrest forced an evacuation. In 2008 he was asked to help jump start a Deaf program with Peace Corps Zambia. He is currently still serving in Zambia.

**Miranda Roberts** - Miranda has written for as long as she can remember and holds a Masters degree in English with a concentration in publishing and editing. Having written on a wide variety of subjects and for diverse audiences, she prides herself in massaging words into easy-flowing content that appeals to readers of all kinds. Miranda served in the US Peace Corps in Malawi and Kenya.

**Sam Roberts** - Sam has been creating digital artwork since he got his first computer in 1985, a Macintosh 512k. Sam studied film and video production and later cultural anthropology. Today, Sam is an award-winning UI designer and 3d Animator with more than 12 years of professional experience working for hundreds of organizations including Apple, BBC, Ebay, EA, Panasonic, the University of North Carolina and many NGOs around the world. In 2006, Sam returned to Africa as a Peace Corps volunteer to create visual communication materials for the Deaf. In Kenya he blended his cultural anthropology and graphic design skills to help create the world's first Easy-to-Learn Kenyan Sign Language poster which was distributed to more than 10,000 Deaf children. Sam and his wife Miranda teamed up to Mark and Bebeth Steudel to pursue cutting edge interactive development as Mindful Interactive.

**Bebeth Steudel** - Bebeth has been interested in software development since finding herself in a Computer Science 101 course her freshman year of college. There she found a great outlet for her love of puzzles and problem solving. After college she combined her computer background with her passion for teaching and taught computer science in high schools across the country. Her understanding of educational theory paired with programming skills evolved into working in the educational software field as a curriculum designer and software developer for a digital textbook company.

In 2006, Bebeth followed her passion to help others and joined the US Peace Corps, ICT program. She was placed in Kenya where she spent a year working on an ICT system aimed at providing banking and contractual markets to poor rural farmers. Then in 2007 she co-founded Mindful Interactive, an interactive web and media company focused on making a difference.

**Mark Steudel** - Mark has a diverse background in the Information Communication Technology field. He has worked as a Linux System Engineer supporting huge web server farms for companies like Daimler Chrysler and General Motors, an IT Manager at a privacy software company, and a developer creating custom tailored web applications for small and large businesses.

After working in the corporate ICT world for 10 years, Mark decided that "selling widgets" wasn't fulfilling enough. Mark and his wife decided to join the Peace Corps ICT program through which they were stationed in Kenya to develop a supply chain management software platform connecting small rural farmers to contractual markets via mobile telephones. During his time as a Peace Corps volunteer, he was able to focus his vision and in 2007, along with three other Peace Corps volunteers, co-founded Mindful Interactive, an interactive web and media company focused on making a difference.

### **How to Get Involved**

1. Be an implementer. We are always looking for organizations to partner with that would be willing to use SmartQuiz in their organization. Example implementers include: schools, HIV/AIDS testing clinics, internet cafes, resource centers, libraries, just to name a few.
2. Create content. If you have a series of questions that you would like to see implemented, please contact us. We'd be happy to help make your ideas come to life.
3. Fund development. Please consider funding to help us continue development and testing of SmartQuiz and its future directions.

### **How to Get SmartQuiz**

To get the current download, go to <http://smartquiz.mindfulinteractive.com>

### **Contact Us**

If you have any questions feel free to contact us at: [contact@mindfulinteractive.com](mailto:contact@mindfulinteractive.com)