

Nuts and Bolts

Enhancing Accessibility by Crowdsourcing an Exhibit App

by Beth Ziebarth and Nancy Proctor

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It's Kermit the Frog," intones a young boy. A woman prompts him to describe Kermit. "He's a frog and he jumps around. He sings on a log. He's green!"

In another recording, a man talks about Bob Dylan's leather jacket:

Bob Dylan's leather jacket about 1965, worn during a performance at the 1965 Newport Folk Festival. This is a very dark brown jacket, has lapels, single breasted design, with a single button quite low down toward the waist, two pockets that you could slide your hands into, and a breast pocket on the left side. It is not the kind of leather jacket you might think of with zippers and buckles and chains and other ironmongery on it, but it's a rather subdued, elegant style. Could have been worn by someone with relatively average shoulder width and slender build. It looks comfortable.

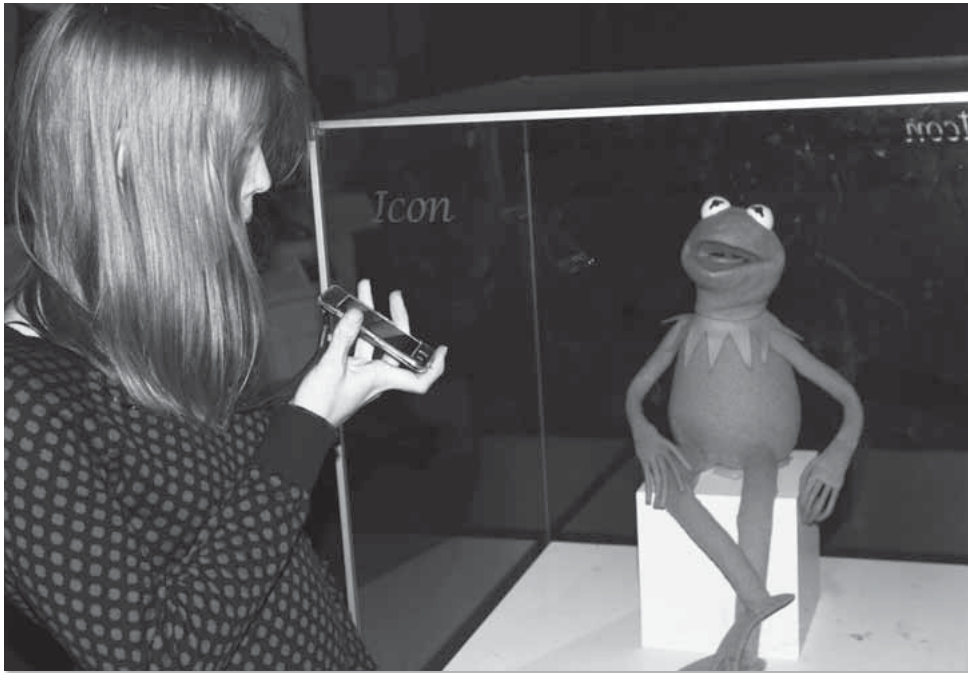
These are just some of the comments from visitors to the National Museum of American History's *American Stories* exhibition who are participating in the first phase of a pilot project, launched in April 2012. The project crowdsources verbal descriptions of iconic collection objects through visitors' smartphones in order to make them more accessible to visitors who are blind or have low vision. By downloading the free Access American Stories app to their Android or iOS device, visitors can listen to and record their own descriptions of the objects on display. They can also leave their own stories and impressions of the collection and exhibition. Their recordings are available immediately in the app for members of

their party and other visitors to hear. This instant feedback demonstrates that visitors' contributions are making a difference to the Smithsonian, in real time: they are helping us do important work while adding an engaging and inspiring personal touch to the experience of some of the Smithsonian's most famous collection objects.

A Collaborative Effort Within the Smithsonian

The project, a collaboration among the Smithsonian's Accessibility Program Office, the National Museum of American History, and the Office of the Chief Information Officer, was undertaken in the belief that all Smithsonian Institution (SI) visitors and staff are valued, and that access should be integrated, dignified, and allow for visitor independence. Currently, access to the Smithsonian's museums is most often provided by docents, staff members, or contractual service providers such as sign-language interpreters—a mode that requires human resources and planning, and lacks consistency in information delivery. Seeking new means of increasing accessibility to the Institution, the SI Accessibility Program Office approached the Institution's Head of Mobile Strategy and Initiatives about creating a smartphone accessibility app that would ultimately be used in each of the Smithsonian's 19 museums and the National Zoo, serving visitors with hearing and vision loss as well as non-English speakers.

Surveys by the Smithsonian's Office of Policy and Analysis in 2010 showed that over one-third of the American population and over 40% of Smithsonian visitors use smartphones—and that number is



Smithsonian Institution intern Adrienne Neher shown using Access American Stories App in front of Kermit the Frog at the National Museum of American History's exhibition American Stories.

growing daily.¹ Smartphone technology has become more accessible, leading to the widespread use of internet-connected mobile phones as a lower cost alternative to niche disability assistive technologies. This reality of “a powerful computer/ phone in everyone’s pocket” offers the Institution an unprecedented opportunity to “recruit the world” to help us tackle monumental tasks. Crowdsourcing from visitors both in person and online allows us to achieve goals that would be impossible for staff alone to realize. We are taking advantage of this reality with the accessibility app by asking visitors to create verbal and sign-language content for exhibits—thus increasing access to the Smithsonian’s 137 million collection objects for visitors who are blind or deaf. By helping us improve the quality of their visit and of information available from the Smithsonian, our visitors become true stakeholders and stewards of the success, relevance, and quality of the Institution and its programs.

Developing the Project in Phases

With its emphasis on storytelling, the National Museum of American History’s (NMAH) *American Stories* exhibition offered an ideal opportunity to prototype the various phases of the mobile application. *American Stories*,

which opened in March 2012, is a chronological presentation of American history that helps visitors recognize that objects and their stories are a means for understanding the American experience and the lives and thoughts of people at particular times in the past. The gallery includes robust and free public Wifi, so that visitors can download the application on-site and use it throughout the exhibition.

In order to get the maximum return on the Institution’s investment in the app, we are using the cross-platform (iOS and Android), open-source platform called Roundware.² Roundware was developed by sound artist Halsey Burgund and is used for a variety of museum purposes, including the *Scapes* installation at the deCordova Sculpture Park and Museum and crowdsourcing oral histories in the *Stories from Main Street* and *Stories of World Heritage* apps created by the Smithsonian. Because it is built on opensource code, the components of the app can be easily repurposed for future applications developed by the Smithsonian and others. Not only does this allow all of the Smithsonian museums to use the platform to easily and inexpensively create their own Accessibility apps, but the Smithsonian and others can also use

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The video content created through this application can also be shared on the NMAH website, in-gallery kiosks, and Smithsonian social media platforms to further extend the reach of the program and increase return on investment.



The home screen of the Access American Stories app offers two choices: hear the contributions of others (Listen), or add your own (Speak). Courtesy of the Smithsonian Institution.

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the platform to crowdsource other kinds of content in other kinds of apps. This enables developers to save time and money now while improving and sustaining the development of the platform in the future, to everyone's benefit.³

In Phase I of development, visitors anonymously record verbal descriptions of objects in English and Spanish in response to questions prompting them to describe exhibits in engaging ways within a brief recording time (45 sec). In addition to listening to recordings by both museum staff and the public, visitors can also "like" and "vote up" their favorite verbal descriptions or alternatively flag user-generated content that may be inappropriate. This helps the quality of the content in the app continually improve, as new users hear and respond to the tone and approach used by the most popular of earlier contributors.

In the eleven months that the app has been active, it has been downloaded over 1,000 times, and we have received more than 160 recordings, with no marketing other than very discrete signage in the galleries and a link from the Smithsonian website's mobile page (<http://si.edu/mobile>). Of the 164 recordings currently in the app, 87% are from visitors (with the remainder from staff), with 59% from men. Most are single voice recordings, but a few (under 2%) represent a dialogue between two or more visitors. Ninety per cent of the recordings are verbal descriptions of collection objects; the rest are responses to the other questions for more personal feedback in the app.

Before recording, visitors are prompted to agree to a simple release form, giving the Smithsonian the right to use their anonymously-contributed content. A staff member listens to new recordings regularly after they have gone live in the app, but no editing or other work with the content is required as the Roundware platform does all the work to record, control length, and play back the recordings. Our visitors are also making the work of administering the app easy: to date, no recordings have been inactivated because of objectionable content.

In Phase II of the "public" pilot project we plan to build on the verbal description features developed in Phase I to allow visitors who are deaf to video record sign language content about exhibits. Captions will be added to their recordings making them accessible to everyone, not just to those who understand sign language. Visitors who have hearing loss will be able to access exhibition videos through the app so they may amplify the sound on

their smartphones. To improve the social aspect of the app, we will add methods for users to share their recordings with friends via Facebook, Twitter, and email. The video content created through this application can also be shared on the NMAH website, in-gallery kiosks, and Smithsonian social media platforms to further extend the reach of the program and increase return on investment.

Planning for Infrastructure and Sustainability

In order for this application to scale up and mature, we have to plan for its behind-the-scenes needs as well as the outward facing features. To that end we will increase the robustness and automate key features of the back-end management so that we can have a reliable way of making high quality audio and video available to visitors without requiring additional staff or oversight. Another new feature will send an automated email to administrators when a new recording is created, increasing the efficiency and speed of reviews. Phase II will also involve creating a backup system for the recordings.

One of the most exciting additions to the app will be the tiered questions function. Visitors will be able to select an exhibition and will then get a list of filtered questions related to that exhibition that they can answer in their recordings. This is the first step toward expanding the app to cover all exhibitions in the museum and to support our ultimate goal of a completely accessible Smithsonian.

Objectives and Benefits

The foremost objective and benefit of this project is to improve visitor experiences

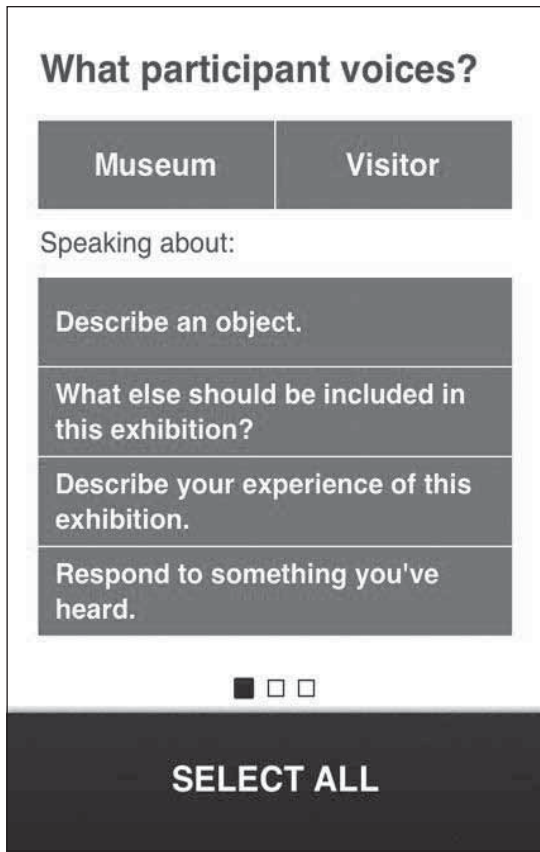


The click-thru release form users agree to before contributing verbal descriptions through the Access American Stories app. Courtesy of the Smithsonian Institution.

for persons with disabilities—creating a smartphone application that will make exhibition content accessible for visitors who are deaf or have hearing loss as well as those who are blind or have low vision. These same technologies will also enable the Institution to capture and include more content for non-English speaking audiences. Spanish speakers will be able to use this technology to record verbal descriptions of objects in exhibitions, and make videos using Spanish Sign Language descriptions of objects. It should be noted that the basic Roundware functionality can be used to crowdsource audio and video recordings in response to any set of requests—not just verbal descriptions and sign language content.

Another key objective and benefit of the Mobile Accessibility Project is to keep the Institution current with new technologies

Perhaps of greatest value to other cultural organizations, the opensource code of the Access American Stories app and Roundware is now freely available to other organizations to reuse.



Visitors have 45 seconds to record a verbal description or other comment. They can review and then upload their recording, which immediately becomes part of the app. Courtesy of the Smithsonian Institution.

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End Notes:

1. <http://www.si.edu/content/opanda/docs/Rpts2010/10.07>.
2. SmartPhoneServices.Final.pdf
Roundware is a flexible, distributed framework which collects, stores, organizes and represents audio content. Basically, it lets you collect audio from anyone with a smartphone or web access, upload it to a central repository along with its metadata and then filter it and play it back collectively in continuous audio streams. For more information, see <http://halseyburgund.com/>.
3. Links to all of the apps that have been built on the Roundware platform can be found at <http://www.roundware.org>.

and ongoing research, and to plan for the next generation of technology that will emerge. This effort to keep the Institution current will not be exclusive to those with smartphones, as visitors who do not have their own mobile device will be able to check out a security-enhanced device from the Smithsonian such as an iPad or iTouch. Helping pilot a loan program, young adults with disabilities are stationed in the exhibition to interact with visitors, promoting the app and answering questions. They also loan out iTouches to visitors who don't have a smartphone. The interns are learning competitive job skills through the Smithsonian's Access to Opportunities internship program sponsored by the HSC Foundation.

Perhaps of greatest value to other cultural organizations, the opensource code of the *Access American Stories* app and Roundware is now freely available to other organizations to reuse. As

an example, the first version of the *Stories from Main Street* app, which crowdsources oral histories about life in small town America as part of traveling exhibitions from the Smithsonian's *Museums on Main Street* program, was built on this platform for less than \$5,000—basically for just the design costs for the interface and technical help setting up the administrative backend. Museums interested in sharing both the findings and the technology of this project can contact us at SImobile@si.edu. We hope to create a community of organizations who are actively adding further enhancements to the Roundware platform and mobile accessibility services so that we can benefit from the investments of others, just as they will have from ours, in order to sustain these mobile accessibility tools across future generations of mobile devices.

Conclusion

When visitors who have disabilities come to our museums, they may feel marginalized, unable to fully immerse themselves in exhibitions with a multitude of visual, audio and participatory experiences requiring vision or hearing. This engaging and cost-effective technology not only makes our offerings more accessible to people who are blind or have low vision, sign language users and people who have hearing loss, it also forges communities and inspires conversations around the Smithsonian experience. It acts as a prototype application to create similar accessibility apps for other visitors with interpretation needs such as non-English speakers. And it brings us another step closer to making Smithsonian exhibitions accessible to all. ✨