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## **World Librarians: A Peer-to-Peer Commons for Closing the Global Digital Divide**

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# World Librarians: A Peer-to-Peer Commons for Closing the Global Digital Divide

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**INTRODUCTION** An estimated 53% of the world's population do not have Internet access. As a consequence, they lack information capital that could be key to bettering their lives. In this practice article, we introduce a sociotechnical system called "World Librarians." This system, facilitated by a knowledge commons, provides educators, librarians, students, and medical professionals in remote Internet-poor areas of Malawi with access to digital content that they request. **OBJECTIVE** We describe the social and technical methods by which a team of educators, librarians, students, and information technology specialists in information-privileged environments share educational content to information-disadvantaged communities. **METHODS** After briefly discussing key foundational components and partnerships, we explain the mechanics of the sociotechnical system. We follow this with two proof-of-concept cases where offline requesters in remote school and library contexts in rural Malawi are assisted by an online librarian searcher team at the University of Massachusetts Amherst. **RESULTS** The proof of concept cases demonstrate that the relatively low-cost sociotechnical system accomplishes the goal of sharing open access educational content in remote areas with limited or no access to networked information. Moreover, the cases demonstrate that the content shared can be content global southerners offline want and need, rather than information global northerners think they should have. **CONCLUSIONS** The World Librarians system is ready to be scaled and replicated at other institutions with ready access to high-speed networked information. The authors welcome contact from readers who might be interested in establishing their library as a new "searcher node" in the growing World Librarians network.

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## INTRODUCTION

Access to information is critical to the development of well-functioning democratic societies. For example, Neuman (2002) argues that “democracy depends on a knowledgeable citizenry whose access to a broad range of information enables them to participate fully in public life, help determine priorities for public spending, receive equal access to justice, and hold their public officials accountable.” And Calland (2002) emphasizes that unequal access to information is a form of poverty: “Without knowledge, you cannot act.”

In this practice article, we describe the World Librarians program: a sociotechnical system and workflow that complements efforts to close the digital divide. But rather than focusing on the issue of getting the Internet to people who are currently “bit-less,” World Librarians facilitates access to the knowledge commons via library search services. World Librarians is a partnership between the nonprofit organization World Possible in California, USA (2018), the nonprofit ShiftIT in Malawi (ShiftIT, 2018), and our team of students, librarians, and faculty at the University of Massachusetts Amherst. It is operational and serving remote off-line schools and libraries in Malawi, and is beginning to expand into Cameroon. To situate this project in the scholarly communication landscape and justify its uniqueness, we first look at existing efforts to address global information inequality and provide a theoretical foundation for our work.

## LITERATURE REVIEW

The phrase digital divide describes the gap between people who have access to information via Information and Communication Technology (ICT) and those who do not (Compaine, 2001). Undoubtedly, the rapid and global diffusion of ICT—and more specifically mobile cell phone technology—is providing many more people with access to information via the Internet in remote regions of the world. However, despite this growth, the International Telecommunication Union reports that households in developed countries are five times as likely to have Internet access compared to their counterparts in less-developed countries (ITU, 2017a). On the African continent, nearly nine out of ten youth between the ages of 15 and 24 lack Internet access, and the proportion of women with Internet access is twenty-five percent lower compared to men (ITU, 2017b). The argument made by Richard Heeks (2010, p. 626) years earlier is still relevant:

Access inequalities of location, age, gender, education, and—often underpinning all four others—income, have not gone away. The kids growing up as digital natives’ in suburban Bangalore are far removed from their counterparts in the ‘bit-less deserts’ of remote rural Africa.

Bit-less deserts should be of concern to those working in the scholarly communication community because of an agreed-upon commitment to disseminating high-quality, scholarly research that is not hindered by paywalls, embargoes, or publishing contracts. Librarians in particular have stated their commitment to providing access to “scholarly resources needed for the research, teaching and learning activities of faculty, researchers and students” (ACRL, n.d.) and to remove barriers to information through the sharing and dissemination of openly licensed digital materials that lead to the creation of knowledge (Lynch & Carleton, 2009). Although these bit-less deserts in the developing world or global south are not explicitly part of the “scholarly community,” they are part of the larger global community of learners that should also benefit from the vast amount of scholarship being produced in academia, some of which (like this paper) is about these very same communities.

A variety of high-profile efforts are currently underway seeking to close the digital divide and to eradicate bit-less deserts. For example, in 2013, Google began an effort called Project Loon that would launch a network of solar-powered balloons to transmit broadband to Internet-less areas (Muoio, 2016). Rival company Facebook is developing an unmanned aerial system called Aquila that they eventually hope can fly for months at a time, powered by the sun, that would provide Internet access to areas without broadband (Metz, 2016). The company SpaceX is working on the design of a network of satellites which, if operational, could provide high-speed Internet to the globe (Gibbs, 2016). The company OneWeb has a similar satellite-based vision (Oneweb, 2017). Undoubtedly, it will be some time in the future before one of these efforts becomes successful. For example, SpaceX has estimated a five-year or more build period for its constellation, but as Kelleher (2017) describes, the idea of satellite-based Internet broadband—and attempts to implement it—have been around for more than twenty years and it is a challenging, and expensive proposition. For instance, R. Smith (2016) estimates the SpaceX project to cost nearly \$20 billion to get started, with additional funding needed for maintenance. This raises the question of who pays for all this investment, and what the cost will be to the end user, particularly in less-developed countries. After all, many people in the developing world have access to the Internet via mobile phone subscriptions, but the cost of unlimited data plans are financially out of reach for most.

Also central to the viability of this project are the ideas and principles associated with the knowledge commons. Hess and Ostrom (2007) have established a firm theoretical foundation for the idea that knowledge and information should be a shared resource, like water, air, and parks. Our project’s success is built on being able to access information that is not hindered by digital, physical, or legal borders. These principles of the knowledge commons and dissemination of open access (OA) / open educational resources material (OER) are foundational to the system we describe below.

## The World Librarians System

A World Librarian “instance” requires: (1) an in-country Information Technology support organization (in this case, ShiftIT ); (2) a Remote Area Hotspot for Education and Learning (RACHEL), an offline Wi-Fi hotspot device developed by partner World Possible (2018); and (3) an online searcher library service organization (in this case, the University of Massachusetts Amherst).

ShiftIT is a nonprofit organization in Malawi that enlists technology so that “youth in disadvantaged communities will have a chance to educate and empower themselves and help develop their nation” (ShiftIT, 2018). World Possible is a nonprofit organization based in California that is dedicated to providing open educational resources (OER) available on the Web to offline locations. They strive to provide “the best educational resources from the web anytime, anywhere, regardless of internet connection” (World Possible, 2018). They have accomplished this by developing and providing the RACHEL plug-and-play Wi-Fi hotspot and server (RACHEL, 2018), and OER2Go (OER2Go, 2018), a collection of openly licensed educational websites (e.g., Khan Academy, Wikipedia, and more than 100 others) repackaged for download and offline use. The team at the University of Massachusetts is led by a faculty member in collaboration with the library scholarly communication office (the authors), who help identify and locate subject-specific OER requested by RACHEL users.

The World Librarians idea begins in, and requires, an established computer lab and the power to run it, in a rural school or library in an offline setting. Our nonprofit partner, ShiftIT in Malawi, identifies and provides technical training, deployment, and support for such a lab. These labs typically use refurbished Wi-Fi-ready laptops with their hard drives removed and, funding permitting, complimentary solar power systems to power the labs.<sup>1</sup> ShiftIT also provides students in these schools with relatively cheap (~\$7 USD) USB Chrome-based operating systems called Keepods (Keepod, 2018). These flash drive systems enable each student who has one the ability to carry and maintain their own “USB computer” that, when used with the computer lab laptops, enables them to access the RACHEL device and save digital content that piques their interest or is assigned for classwork to their USB stick for later use.

Funding for these efforts in Malawi comes from a variety of sources. Local NGOs (non-governmental organizations) and businesses engaged in CSR (corporate social responsibility) support specific projects. Keepod (the company) also raises outside funds to donate their USB devices to nonprofit and educational projects such as these. Some of the schools and libraries raise their own funds through their own cadre of donors. ShiftIT has a for-profit

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<sup>1</sup> Malawi suffers from rolling blackouts and reliable power can sometimes be an issue.

arm, SourceIT, that supports some of these operations as well.

Next, the offline rural school or library needs the RACHEL Wi-Fi hotspot and its associated OER2GO content database for their teachers, students, or library patrons to access via the computer labs described above. The RACHEL is a digital content storage device that is accessible wirelessly and looks and acts very much like a Wi-Fi router. RACHEL allows up to fifty Wi-Fi-enabled devices in its vicinity, like computers, smartphones, etc., to connect remotely and access available OER (PDFs, video, etc.) content provided in OER2Go. Importantly, while much of what is on OER2Go is selected by World Possible staff who reside in the global north, periodically, World Possible adds new content to OER2Go that is identified and requested by users throughout their deployed sites (see World Possible, 2018, Chapters tab). These additions typically are large(r) collections of digital material rather than selected, specific items on a particular topic. This is analogous to the idea of a library subscribing to a particular journal or book series on behalf of its users. Also, the RACHEL device allows local administrators to upload content directly onto it for their users to find, retrieve, and view. This is an especially important function for the World Librarians service.

### **Description of the Service**

The World Librarians searcher team steps into this service with specific, detailed, and fine-scale content requests similar to those of a typical reference librarian. This team provides educational material that a teacher, librarian, or patron in Malawi needs or wants. This workflow is motivated by an interest in establishing a digital information gathering and a transmission system driven by the local needs of the “information have-nots” in the global south rather than perceived needs on the part of the “information haves” (residents of the global north). Moreover, this requester/searcher workflow mirrors the traditional library reference interview in which librarians determine patron needs, ask clarifying questions, provide access to the information, and verify that the material is adequate (Straw, 2000). The current World Librarians search team is based at the University of Massachusetts Amherst, cofacilitated by a faculty member and professional librarian (the authors) who lead and train interested graduate and undergraduate students to help fulfill content requests.

### **The Components**

The system the World Librarians team has developed involves a combination of actors and technologies. It requires:

1. A requester: a representative from an end-user organization (e.g., an offline school or library) needing information, with one person who has limited access to the

Internet via a smartphone mobile data plan and can communicate with a searcher (in our case, several schools and remote libraries in Malawi);

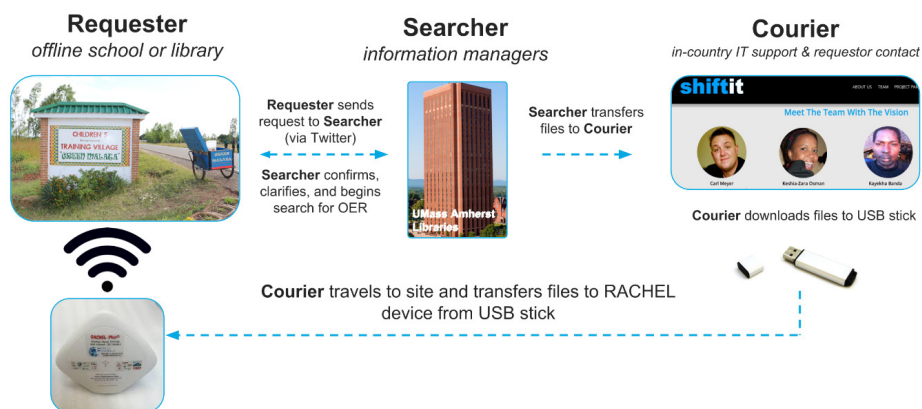
2. A searcher: an organization, group, or single individual, who has access to broadband Internet, time available for the project, and the ability to locate open access information on behalf of the requester (in our case, the University of Massachusetts Amherst);
3. An in-country intermediary courier: a technology support person or organization who has stable access to the Internet, the ability to receive content from the searcher via a cloud-based file sharing system, and the ability to physically transport files to the requester and upload them to the RACHEL device for end-user access (in our case, ShiftIT in Malawi).
4. A method for communicating between the requester and searcher that enables back and forth dialog (in our case, Twitter);
5. A RACHEL device deployed at the information requester’s site (described earlier); and
6. Wi-Fi enabled computers for students or library patrons to access the files stored on the RACHEL (described earlier);

The requester can be a librarian, teacher, or nonprofit employee of any other organization (e.g., a rural health clinic) that needs information on education or health-related topics, but has no reliable access to the Internet. They do, however, need to have a computer or Wi-Fi-enabled device to access the information served on the RACHEL server, as well as someone with access to a smartphone device and a cellular data plan. This cell-phone-enabled person (typically a librarian or teacher) acts as the contact person for the requester organization, and will communicate their information needs to their searcher node.

The searcher is an organization or individual somewhere in the world that has access to open access educational materials via the Internet. This searcher, much like a reference librarian:

1. Receives a content request (e.g., Twitter message) from their associated requester(s);
2. Clarifies the request with the requestor via the same communication tool by asking questions and determining the desired content;
3. Searches for requested content using their privileged access to the Internet and open access content repositories; and
4. Provides found open access digital content to the courier—in our case ShiftIT in Malawi—to download and physically carry the digital content to the requester library or school and upload this content to their RACHEL device.

A graphical depiction of the World Librarians workflow is shown in Figure 1.



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**Figure 1.** World Librarians workflow. This figure illustrates the searcher-requester-courier process.

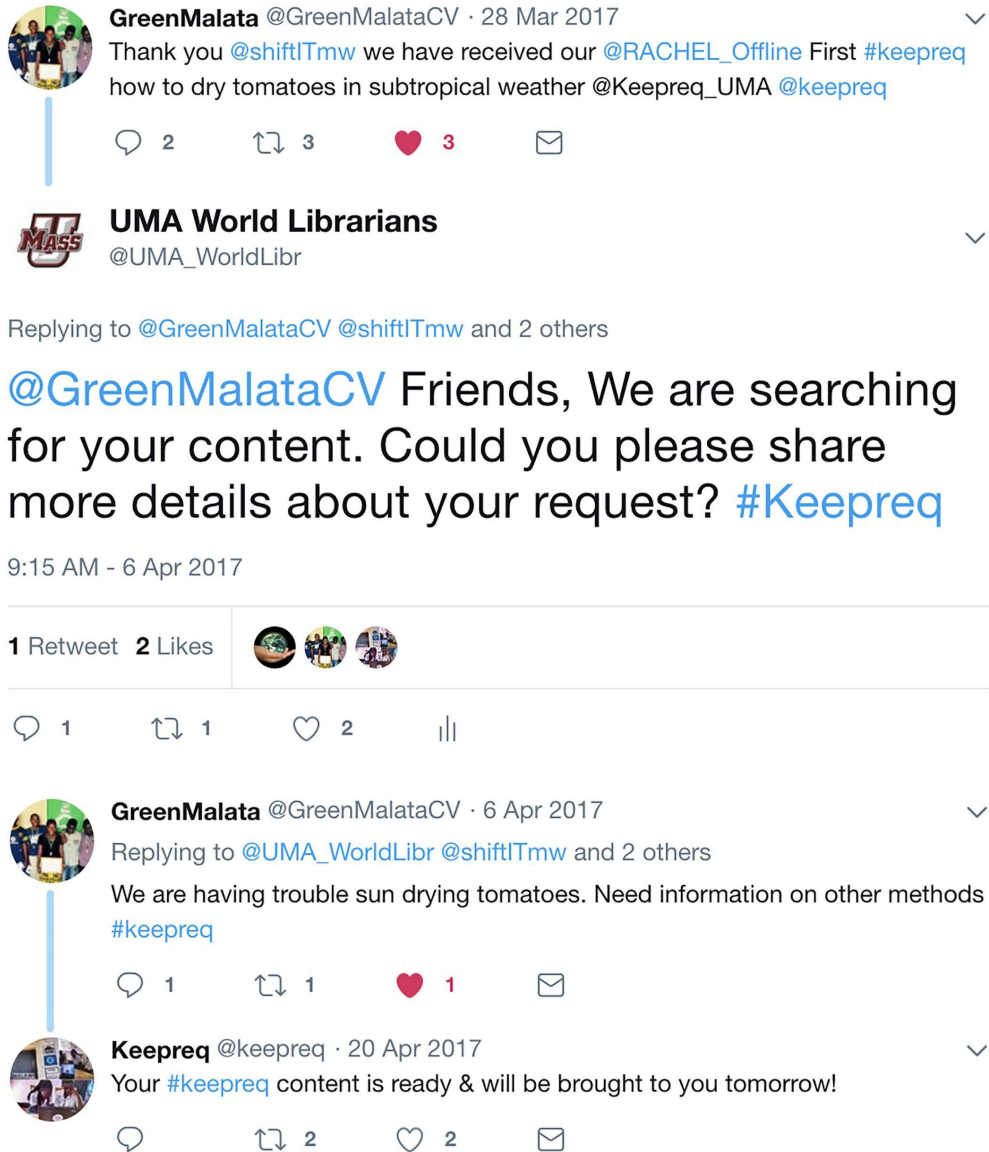
While the computer labs established in these offline Malawi schools and libraries are not ubiquitous, ShiftIT and other organizations like them are making progress getting them established. Moreover, library patrons, even in rural areas of Malawi, increasingly have smartphone devices that they could use to access the RACHEL and OER2Go content.

### **A Case Study: Malawi-based Requesters and Courier, and a Searcher Organization in the United States**

In this section, we describe two real-world examples of the World Librarians workflow we have described above. These cases, and others preceding them, started through a connection coauthor Schweik made with one of World Possible's employees who had also been working with ShiftIT in Malawi. With reliable access to the Internet in their city of Blantyre offices and established connections with rural schools and libraries, ShiftIT became the natural organization to set up the initial requester-searcher relationship between rural schools and libraries in Malawi and the University of Massachusetts Amherst. This dovetailed perfectly with ShiftIT's existing work: setting up Keepod-based computer labs with solar power in these same Malawian schools and libraries. World Librarians information cycles have been operating since 2016. The UMass searcher team currently supports five schools and three rural libraries, all with Keepod computer labs, RACHEL devices, and Twitter accounts. In the examples that follow, we show two dialogues between two Malawi organizations as



requesters, and our World Librarians Searcher team at the University of Massachusetts Amherst that provides librarian support to these requesters.



**Figure 2.** Request-searcher dialog. This illustrates an initial Twitter request from the Green Malata Children’s Training Village in Malawi and our UMass Amherst searcher receipt and request for clarification tweets.

### **Example: Dialogue with Green Malata Children Entrepreneurial Village, Luchenza, Malawi**

After a RACHEL-Plus deployment at this rural school by our partner ShiftIT, an initial request was submitted via Twitter by a staff person from their Twitter handle (@Green-MalataCV) to our UMass World Librarian team's account (@UMA\_WorldLibr). In the first Tweet they ask the team to search for “how to dry tomatoes in subtropical weather” (Figure 2). Our team then acknowledged the request, asked for further clarification, and attempted to find relevant openly licensed material and get it to the Intermediary Courier, ShiftIT, within a week.<sup>2</sup> We searched and found several OA documents and videos on the process of drying tomatoes in subtropical climates. This material was then loaded onto a Google Drive account that is shared with ShiftIT, who then physically brought the files on a USB stick to Green Malata and uploaded them to their RACHEL Plus device via the File Share function. In the final tweet, the Green Malata staff member confirms receipt of the content as well as additional content requested (see Figure 3).

We had a similar process with a remote, offline Malawian school named Nszwadi School. They requested content via the Twitter account of Africa Wild Truck, a safari tour operator who has partnered with ShiftIT. Nszwadi requested “first aid lesson for children in standard 1-2-3 in Chichewa or English.” This required some clarification, so we had a back-and-forth discussion via Twitter and were able to find some relevant OA material. In the last tweet, @africawildtruck confirmed and thanked us for the content (see Figure 4).

The above examples showcase the dialogue between two requester locations and the UMass Amherst searcher location for two complete World Librarian request, search, courier-to-RACHEL fulfillment cycles. There have been many additional cycles since our initial implementation beginning in 2016, and our World Librarians team at UMass now supports five Malawi schools and three libraries each having RACHEL deployment instances. This is the first time we have written about these developments.

### **Lessons Learned**

The primary lesson learned through the establishment of the World Librarians sociotechnical system is that this entire requester-searcher-courier workflow, coupled with Keepod computer labs and RACHEL devices, is a fairly low-cost way to get digital information to people in rural locations without Internet access in the developing world. Importantly,

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<sup>2</sup> Note: In Fig. 2, the hashtag #Keepreq is a search term we established meaning “keepod request” as we were working to develop communication standards or norms. We’ve since dropped that requirement.



**GreenMalata** @GreenMalataCV · 22 Apr 2017

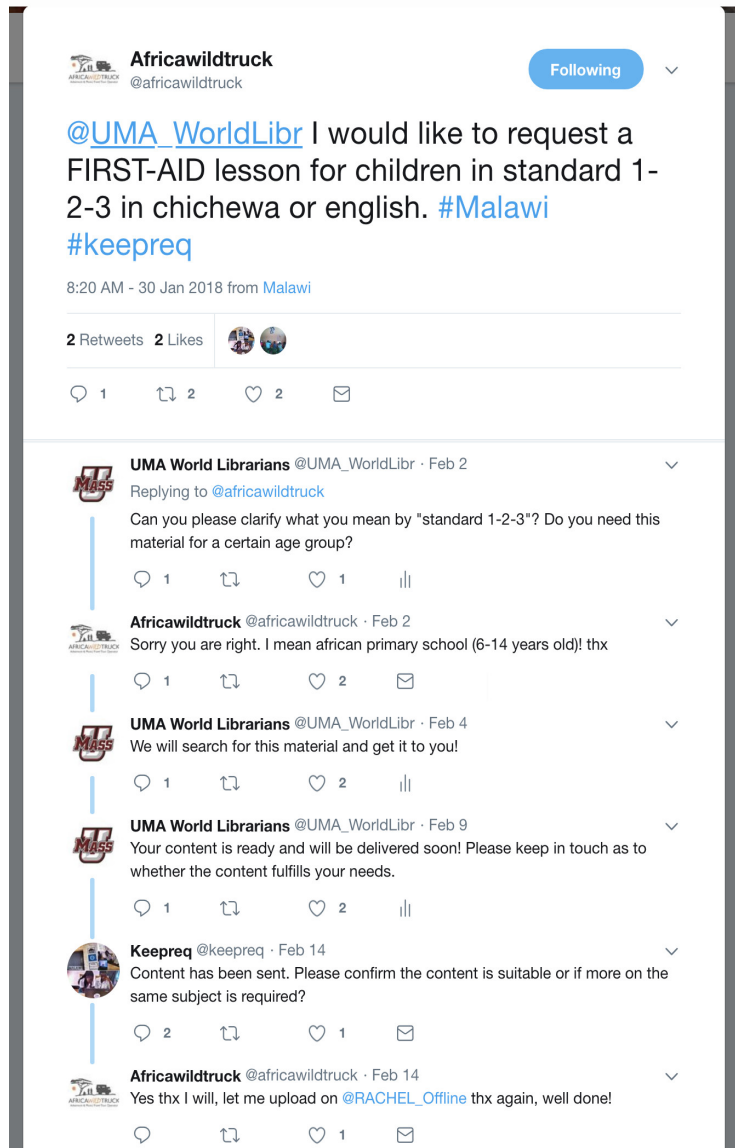
Replying to @UMA\_WorldLibr @keepreq

We have received our #Keepreq content on vegetable drying & carpentry on our @RACHEL\_Offline which users will explore on their @Keepod today

You, Sinthana Project, blessings kaliyawo and 7 others



**Figure 3.** Requester acknowledgement. This illustrates a response from the Green Malata School to the UMass Amherst searcher team confirming file receipt.



**Figure 4.** An example of a full dialogue with Africa Wild Truck.

this information can be information desired by the requesters at offline schools and libraries themselves, rather than what global northerners think they want. This democratic, grassroots-driven information requesting is what makes this project truly unique from other large-scale, top-down, efforts to solve the global digital divide. It also aligns with the mission of libraries to provide greater access to open access information to a global audience. We now are working to smooth out the process and develop a training program to allow expansion to other sites (see Next Steps).

One unexpected, but in retrospect perhaps obvious, discovery made across various World Librarian request-fulfilment cycles and through dialogs with our ShiftIT courier partner is the importance of transmitted video content over textual content due to the fact that many participants in schools or libraries in Malawi understand spoken English better than they can read English text. Audio or video helps to overcome potential language barriers. But this also teaches us the importance, as we hope searcher nodes will grow, of trying to identify searcher organizations who reside in-country who speak and understand the same language (see below Next Steps, Cameroon expansion).

We have also learned that as the World Librarians search services expand to support additional schools or libraries, the communication cycle management becomes unwieldy. As multiple Twitter request-search-courier communication cycles come into our feed, it becomes challenging to manage requests and keep track of the process for any particular request cycle. We considered the idea of developing simple syntax to help us with the management of these dialogs, such as using specific hashtags to categorize messages, but we quickly realized that asking requesters to follow a somewhat technical communication syntax would result in confusion, would likely be inconsistent, and would be difficult to enforce. We are now working on a solution to this issue through the development of a World Librarians communication management app, described below.

## **NEXT STEPS**

With nearly two years of experience and many World Librarians information service requests completed, the team is now ready to scale up the system. The intention is to create new, standalone, requester-courier-searcher instances with search teams outside of the University of Massachusetts Amherst. To achieve this expansion, there are both short and long-term next steps.

In the short-term—over the next year—the team is collaborating with a professional software developer with the company Salesforce to implement a free (as in cost) and open source licensed desktop and mobile cloud-based app to assist: (1) in-country couriers like

ShiftIT keep track of their RACHEL/Keepod/laptop computer lab technology deployments that they support in different schools and libraries; (2) searchers, like our team at UMass Amherst, to monitor Twitter-based request-search communication cycles in a more systematic and structured fashion; and (3) searchers and couriers to manage communication and information content (file) transfer between them.

With this kind of information technology system in place, searcher nodes like the UMass team can manage the full information request-search-transmission-to-courier cycle in support of multiple requester locations. For instance, as mentioned earlier, the UMass team supports five different offline Malawi schools and three Malawi national branch libraries. It is sometimes difficult to manage multiple search process for different requesters simultaneously. With the new app, the searcher node will be able to initiate a new “request case” with each new request. Then, all Twitter-based communication for that request will be managed through the app. This app will allow both in-country couriers and searchers to communicate about any given request and monitor the requester-searcher dialogs. Over the longer term, this app will allow expansion into communication platforms other than Twitter should a new World Librarians instance require it. For example, What’s App is a very popular messaging tool outside of the United States (Shambare, 2014) that could serve as an alternative to Twitter for requestor-searcher-courier communication. What’s App is appealing because it can be used via the Internet and does not incur costs like traditional SMS (short message services) (Montag et al. 2015). Of course, this would not be useful for locations without Internet.

An additional benefit of the new app, is that for any organization—searcher or courier—they will have a database of all individual transactions they have been a part of. For non-profit organizations like ShiftIT, this will provide hard data related to the information they have provided to local schools or libraries which will be beneficial for annual reports and funding opportunities.

Another short-term project the team is actively working on is an assessment of requestor satisfaction with the information they have received. Undoubtedly, the issue of how to ascertain the requester’s needs through a distributed system like World Librarians can be challenging. However, we should remind readers that the Twitter communication is between a librarian or teacher at the requester organization in the field, and not a direct communication with a student or a library patron. Consequently, requests the team tends to receive are driven by the desire of these librarians or teachers to supply their students or library patrons with educational material or information not available locally. In many of these cases, understanding the request is fairly straightforward or can be clarified through one or two back-and-forth tweets. With that said, the team has not received much to date in

the way of confirmation that the material sent matched the requester's needs. In any given request-search-courier cycle, typically the last response a searcher receives is a "content received" Tweet (see Figures 3 & 4). While those communications are appreciated, they do not provide much feedback to searchers on how well the material transmitted matched the requester's needs. Consequently, the UMass team is actively developing a survey of the requesters in Malawi, to be administered by ShiftIT staff, that will collect user satisfaction data for transmissions sent over the last year. The team intends to continue working on mechanisms to improve this aspect of the workflow. We will make these evaluation surveys OA and available for other searcher teams to utilize as this network grows.

Turning to longer-term vision and goals, the World Librarians program is an effort to help close the digital divide with an eye toward providing offline, bit-less requesters with open-licensed information they want, rather than providing information that others (e.g., information experts with ready access to the Internet from the global north) think they need. Consequently, our team is striving to develop a standardized World Librarians system (with training documentation) that will allow for the World Librarians service to be broadly replicated in other World Possible RACHEL Plus deployment instances. In other words, we are working to build the capabilities to assist other organizations to establish their own World Librarians collaborations between requester schools and libraries, and searcher and courier organizations of their own. For example, in partnership, the UMass and ShiftIT teams are actively training members of the Manengouba Foundation, an educational nonprofit based in Maryland that does educational programming to support rural, offline schools in Cameroon. Manengouba already has (1) a team on the ground in Cameroon who can act as the IT support and courier; (2) has identified two offline schools where we are providing RACHEL-plus devices; and (3) has a strong connection to the MBOG LIAA international association, an organization of Cameroonian expatriates who want to assist people who are in their home country. A subset of MBOG LIAA members could be a natural, and quite motivated to help, emerging searcher group. In short, the World Librarians' broad vision is to decentralize and expand and replicate this model with other organizations around the globe.

This expansion to other World Librarians instances requires further thinking about the incentives that will drive participation, especially on the searcher or courier side. On the searcher side, we can easily see instances where incentives for participation will readily exist. In the UMass Amherst context, some of the motivation behind the creation of an undergraduate searcher team is due to the service learning and "worldly experience" UMass students take away from supporting information requests from people in Malawi. UMass students are motivated to help in part because they see the need and have a desire to help others who do not have the same information-access opportunities they have. They also

learn about the world through this active and direct exchange with other people in remote areas of the planet. These same “global service-learning” experiences, we believe, would easily transfer to other universities, as well as at the junior or senior high school level. For example, in a local middle school in Amherst, MA, there is a science teacher who has signaled her interest in creating a searcher team in her classroom that would support a school of a similar age level in Malawi. The benefit to middle-school students in the United States would be the direct interaction with other students of the same age in Malawi and a recognition of the kinds of challenges faced in a poorer offline environment. The UMass team is also actively working to train a librarian in a public library in suburban Chicago who works with youth in an afterschool program. She is motivated by the same service learning benefits described above.

Similarly—and critically important and of possible practicality to readers of this journal—we can easily envision a network of World Librarians searcher teams, like the one at UMass Amherst, established across the network of academic research libraries throughout the United States and elsewhere. In the UMass Amherst context, this is a collaboration between a faculty member (coauthor Schweik) who has a research interest in Internet-based “knowledge commons” (Schweik, 2014) and a professional librarian (coauthor Smith) who works in the scholarly communication department of the university research library. Both coauthors are motivated to participate and manage the UMass student teams because (1) it matches the teaching mission of the university to instruct and motivate students; and (2) it counts toward professional service and outreach that both coauthors are encouraged to do as members of the university community. And this incentive is clearly not unique to UMass Amherst; in many universities, university faculty and staff are encouraged to contribute to professional activities beyond their campus walls. It is easy to envision some contribution by subject expert librarians to assist other libraries or schools in other parts of the world. Consequently, we see one of two different future searcher scenarios: (1) a new standalone searcher node is established at a higher education institution and directly supports their own requester schools or libraries working with their own in-country courier organization; or (2) a global network of World Librarian subject specialists who would support subject-based requests from many searcher nodes. This would mimic the subject/liaison librarian model in place at many university campuses.

The incentives for establishing couriers in-country are perhaps harder to envision and establish. But driven only by word-of-mouth discussions between our courier organization in Malawi, ShiftIT, and the Manengouba Foundation in Maryland, we are in the early stages of training a new instance of World Librarians to support schools in Cameroon. Additionally, there are other ShiftIT-like organizations in other countries currently deploying RACHEL devices, working as “World Possible Chapters” (World Possible, 2018) whose



mission is to support educational development. The incentives embedded in their mission to provide social good enables their interest to act as World Librarians couriers already. A central question moving forward is how to financially support these key in-country organizations to act both as ICT support organizations, and as data couriers. The former is a challenging task that requires their efforts to find innovative ways to support their in-country activities. The latter issue—financial support for couriers who physically walk digital information to RACHELs in remote locations—we want to try and innovate and find ways to help. Currently, the team is investigating a new digital currency application called “bitwalking” with the idea that people connected to the searcher side of the relationship can earn “bitwalking dollars.” ShiftIT is working to establish relationships with businesses in Malawi, such as telecom providers, to accept bitwalking dollars as a form of payment. The theory is that for every data transmission from a searcher to a courier, there would also be a kind of digital postal stamp of bitwalking dollars to financially support the courier for their time and effort in physically walking the data to the requester site.

## CONCLUSION

In this practice article we describe the “World Librarians” sociotechnical system and workflow we have developed in partnership with the nonprofit World Possible and ShiftIT in Malawi. World Librarians works to provide people with no Internet access with information they want, rather than westerners or “global northerners” deciding what to send. As noted in the introduction, this access to the knowledge commons is fundamental to building and supporting citizens who participate in well-functioning, democratic societies.

Over the next few years, we will be working to expand and establish other self-sustaining requester-searcher-courier instances beyond our organizations and in other countries beyond Malawi. At its heart, World Librarians is a library and scholarly communication program. It mirrors the values of scholarly communication to remove barriers to educational information for all global citizens and builds on the idea of scholarly communication as a commons, spreading information and knowledge without hindrance.

We encourage JLSC readers who may be interested in joining as a World Librarians Searcher node or who have ideas for establishing new requester-searcher-courier instances to contact us.

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