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An Online Space for Practitioners in the Water, Sanitation and Hygiene Sector

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***Abstract*—**The increasing availability and quality of internet access throughout the developing world provides an opportunity to utilize online spaces to disseminate water, sanitation and hygiene (WASH) knowledge to practitioners. Since 2001, CAWST has provided in-person education, training and consulting services to thousands of WASH practitioners all over the world, supporting them to start, troubleshoot, improve and expand their WASH projects. As CAWST continues to grow, the organization faces challenges in meeting demand from clients and in providing consistent, timely technical support. In 2012, CAWST began utilizing online spaces to expand its reach by developing a series of resources websites and webinars. CAWST has developed a WASH Education and Training resources website, a Biosand Filter (BSF) Knowledge Base, a Household Water Treatment and Safe Storage Knowledge Base, a mobile app for offline users, a live chat support tool, a WASH e-library, and a series of webinar-style online training sessions to complement its in-person capacity development services. In order to determine the preliminary outcomes of providing these online services, CAWST has monitored and analyzed registration to the online spaces, downloads of the educational materials, and webinar attendance; as well as conducted user surveys. The purpose of this analysis was to find out who was using the online spaces, where users came from, and how the resources were being used. CAWST's WASH Resources website has served over 5,800 registered users from 3,000 organizations in 183 countries. Additionally, the BSF Knowledge Base has served over 1000 registered users from 68 countries, and over 540 people from 73 countries have attended CAWST's online training sessions. This indicates that the online spaces are effectively reaching a large numbers of users, from a range of countries. A 2016 survey of the Biosand Filter Knowledge Base showed that approximately 61% of users are practitioners, and 39% are either researchers or students. Of the respondents, 46% reported using the BSF Knowledge Base to initiate a BSF project and 43% reported using the information to train BSF technicians. Finally, 61% indicated they would like even greater support from CAWST's Technical Advisors going forward. The analysis has provided an encouraging indication that CAWST's online spaces are contributing to its objective of engaging and supporting WASH practitioners to start, improve and expand their initiatives. CAWST has learned several lessons during the development of these online spaces, in particular related to the resources needed to create and maintain the spaces, and respond to the demand created. CAWST plans to continue expanding its online spaces, improving user experience of the sites, and involving new contributors and content types. Through the use of online spaces, CAWST has been able to increase its global reach and impact without significantly increasing its human resources by connecting WASH practitioners with the information they most need, in a practical and accessible manner. This paper presents on CAWST's use of online spaces through the CAWST-developed platforms discussed above and the analysis of the use of these platforms.

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I. Adapting to an Increasingly Connected World

THERE has been an 800% increase in global internet users from 2000 to 2015 with over 3.2 billion people now using the internet, of which 2 billion are from developing countries. Now, with over 7 billion mobile cellular subscriptions worldwide, there are increasing opportunities for various sectors to tap into not only telecommunications, but data and information exchange as it becomes increasingly accessible [1].

During the Ebola outbreak in West Africa, one of the main sources of information dissemination was social media, which led to a modification of community water, sanitation and hygiene (WASH) practices and effectively led to a reduction of the spread of the Ebola virus [2], [3].

During the Haiti Earthquake, a live crisis map was enabled by Ushahidi, a free and open source mapping technology. This mapping technology, developed in Kenya, allowed seemingly useless tweets and media reports to be amalgamated into one central location, a 'crisis map', providing critical information to the US Marine Corps, and American Search and Rescue Team in Port-au Prince. Creating a platform where information was collected and organized in a useful manner actually enabled coordination to save lives and allow journalists and development aid workers to target the response more effectively [4], [5].

Considering recent advances in communication technology, social media, and online mapping, great opportunities exist for improving co-ordination among NGOs. This is needed not only to avoid duplication of services, but to improve the use of limited resources. NGOs may be unaware of similar projects in a similar location, and may be duplicating services unnecessarily, where one organization may have spent time and energy perfecting a technique or service, only for another organization to come along and learn it over again.

In an effort to expand its global reach and overall impact in the water and sanitation sector, without significantly expanding its staff, the Centre for Affordable Water and Sanitation Technology (CAWST) has taken advantage of this expanding network of online practitioners to improve the availability and accessibility of WASH knowledge online. The objective of CAWST's online spaces is therefore to engage WASH practitioners through online tools and support them

day-to-day in building their knowledge and skills, overcoming technical challenges, and expanding their initiatives.

II. Sharing Online: Enabling 2-way Information Exchange

CAWST operates in over 78 countries, and has impacted over 11.4 million people who now have access to better water or sanitation as a result of CAWST clients' projects. Operating out of Calgary, Alberta, CAWST depends on its 12 International Technical Advisors and 3 International Education and Training Advisors to provide on the ground consulting support and education and training in water and sanitation.

Due to the need to expand its services without significantly expanding its staff and operating expenses, CAWST has invested in a number of online tools designed to increase access to WASH information and to provide a space for practitioners to interact, learn, and share their experiences.

A. WASH Education and Training Resources

For a decade, CAWST shared its educational and training materials on an ad hoc basis through individual client interactions, personal emails and in person group distributions at the end of workshops. The number of CAWST clients with access to the internet has increased. As a response, CAWST developed an online resource sharing space containing over 1,300 of its resources including technical manuals, factsheets, posters, games, lesson plans and trainer guides designed for WASH practitioners to increase their own knowledge in WASH and to train others. The resources are available in 3 languages; English, French, and Spanish and are distributed under the Creative Commons "by attribution" license. A number of resources have also been translated into over 21 languages by CAWST's clients.

B. Biosand Filter Knowledge Base

The biosand filter is a low cost household water treatment technology which as of Fall 2015, is in use by 5 million people in 55 developing countries. This Biosand Filter Knowledge Base stores and organizes frequently asked questions of clients about the biosand filter and summarizes research papers and case studies, independent evaluations, action research, projects and experiences of CAWST's clients. Now serving 68 countries, over 1000 users have signed-up to the knowledge base. In an April 2016 user survey, 61% of users were practitioners and 41% were either researchers or students; 46% of users reported using the Biosand Filter Knowledge Base to help initiate a biosand filter project. Additionally, 43% used information in the Biosand Filter Knowledge Base to train biosand filter technicians, an average of 85 technicians per respondent. Finally, 61% of respondents indicated they would like more technical support from CAWST's Technical Advisors.

C. Webinars

Webinar-style trainings were first introduced in 2013 so that CAWST could re-connect with clients in a cost-effective manner on technical topics due to the difficulty and cost of consistently connecting in-person. Topics range from technical to non-technical, including virus removal capabilities of biosand filters, sand selection practices, maternal and child health, and household water treatment technology options. These webinars are offered in three languages; French, Spanish, English. CAWST webinars have been viewed in over 73 countries by over 540 participants, and previous feedback has shown clients are increasingly interested in receiving more webinars in the future, not only in English, but also in Spanish and French.

D. Live Chat

CAWST strives to provide technical support to clients in the WASH sector as efficiently as possible, enabling clients to take immediate action to avoid delays of projects or to continue without accurate advice or information. This service is available during CAWST business hours (MST) at cawst.org/services, on the knowledge base and education resources websites. CAWST live chat support staff respond to an average of 1.5 chat questions per 2-hour online session.

The key benefits to clients are region and culture specific answers to technical questions from experts, in a time sensitive manner.

E. Project Map

CAWST's broad and diverse network of clients has enabled the creation of a global 'project map' interface which effectively tags projects to a location, viewable for all users. This type of information is not typically available in a central repository, however CAWST has recognized its unique ability to play the role of providing links and connections between NGOs, communities, and governments who may benefit from being aware of similar projects taking place around the world. The initial launch was facilitated by CAWST's yearly client survey which has been collecting project information for over a decade to begin this map. CAWST now depends on organizations and individuals to submit projects to the project map to increase their profile or to aid in increasing their visibility online.

III. Newer Initiatives

A. Household Water Treatment Knowledge Base

With the increased number of organizations implementing household water treatment projects, CAWST intends to fill the information gap through this user platform. This will provide more effective coordination, more technical knowledge sharing and reduce duplication of efforts by providing a central source for practical information. This will serve as a central hub for practitioners, researchers, policy makers, and funders, who require not only technical information, but also practical information from CAWST Technical Advisors, and also from other practitioners.

B. Offline Mobile App

The development of a mobile app, will allow CAWST to take advantage of the increasing use of mobile phones in

developing countries to make technical knowledge and resources available both through mobile devices and offline. Although this app is still in the pre-development phase, 66% of respondents from the aforementioned biosand filter user survey indicated they would benefit from offline access to CAWST resources.

The offline functionality of this app provides 2 main benefits. The first is to expand the accessibility and coverage so that education and training resources are available in rural and low connectivity areas. The second is to provide information just in time, so that users in the field can get answers when they most need it.

In the future, additional features of the app will be introduced based on data analytics of app use, including capabilities such as visual learning tools (images, diagrams, videos) to increase the effectiveness of community-level education.

C. Wash e-Library

The CAWST WASH e-library will be the largest online repository of WASH-related documents, research and sector updates and will facilitate sharing and dissemination of knowledge in the WASH sector.

WASH content and knowledge will be collected and made available to users using a variety of sources such as educational resources, technical briefs, field notes, research papers, blog updates, news articles and forum discussions. It will also include electronic updates from major influencers in the WASH sector such as practitioners, researchers and policy makers. While content can be added individually, the majority of the content will be collected automatically using meta-data mapping and pre-organized using keyword identification. Additionally, search results can be prioritized based on most common uses of the user, for example, research based information versus project report information.

IV. Challenges and Lessons Learned

CAWST has been constantly expanding and adapting its online tools based on user-feedback and lessons learned from staff.

A. Online Knowledge to Offline Knowledge

It has been found that online knowledge alone does not result in capacity building, and is not always diffused through to the practitioners who need it most. For this reason, CAWST developed these online spaces to complement it's in person training and consulting support.

B. Live Web-based Technical Support

It has been frequently found that questions which arise in this capacity most often, are highly experienced based, and thus are much more efficiently handled by CAWST's field experts as opposed to manuals and technical materials available online.

One of the challenges with this system has been that although CAWST has 2 staff assigned to manage the support hub, this is generally secondary to other work tasks. This means that during times where there are competing priorities or high level clients require consulting support, response times to live chat questions can be reduced.

Although the live chat availability during Mountain Standard Time functions well for North American and Latin American clients, this is not convenient for clients located in Africa or Asia, who in some locations will not overlap regular office hours, and will lose the benefit of a live chat.

The main time savings feature of this tool is the initial chat introduction, where the real-time chat functionality allows CAWST staff to follow up with questions and clarify the initial technical problem or issue much quicker than an email chain which can add up to a week of lag time.

C. Household Water Treatment Knowledge Base

While CAWST maintains a primary role for content contribution, the success of the Household Water Treatment Knowledge Base will rely on the ability and willingness of practitioners to contribute their experience and knowledge.

D. WASH Education and Training Resources

In order to increase the global reach and impact of CAWST's services, CAWST provides its education and training materials free of charge online under the Creative Commons license "by attribution". This allows their dissemination and adaptation, requiring only that users create an online profile. CAWST reaches out to the users of its online space and to those downloading its materials to offer direct in-person or remote support to use or customize its training tools. CAWST relies on this user interaction to better understand how its education materials are being used and to ensure they remain relevant to the sector.

E. Webinars

Webinars are effective for providing a select group of individuals with a deep technical discussion and an opportunity for Question and Answer sessions on topics of interest. Webinars are less effective when the topic selected has been too broad, and the experience level of audience members varied broadly as well.

The most effective and valued webinars have been those where (1) the topic introductions are concise, clear and in simple language, and (2) Q&A style webinars with participation and live responses to questions from a panel of experts. In some cases, short and concise recorded videos are more appropriate than live webinars to communicate highly specific technical content relevant to a large proportion of clients.

F. Best Practices

1) Simplified Online User Experience

The target user base i.e. field-based practitioners, are not necessarily experienced with online tools. As a result of this and other factors, the keys to success of an online tool for any practitioner audience are; (1) a simple user interface; (2) easy to find specifically what the user is looking for; and (3) the information is packaged in ways that are accessible and

understandable by the user. For example, information stored as a Question and Answer can powerfully supplement a lengthy technical manual or document, or a map showing projects in a particular region and provides implementers the opportunity to connect with each other.

2) Central Access to Online Tools

CAWST information systems are separated into three separate online systems, namely the Biosand Filter Knowledge Base; WASH Education and Training resources; and Household Water Treatment Knowledge Base. Users needed to login separately to each platform which created a barrier for the many users who ended up using all three systems. CAWST will be providing a "single sign-on" allowing users to authenticate into all systems with the same account. They will also be able to search across all three systems simultaneously. This will allow CAWST to monitor how users navigate between these resources and improve the user experience over time.

3) In-house Design & Institutionalized Online Services

The WASH sector has seen numerous online knowledge management tools which were funded for a specific period of time, and were deprecated at project or funding end.

CAWST designed its online tools to be part of its suite of services to clients, and not as a one-off project. As a result, CAWST has invested in an in-house team of web developers and content managers versus external consultants to continually maintain, improve and adapt to the needs of users.

V. Conclusion

The increased online connectivity of WASH sector practitioners has created the opportunity to share technical information more efficient and effectively. In developing a variety of online tools, CAWST has been able to increase its impact without significantly increasing human resources. Making information available online still requires in-person support and will never replace CAWST's direct, field-level capacity building services, but rather supplement it. Clear, simple and multi-language website interfaces are required to facilitate user-contributed knowledge from WASH practitioners, and in-house resourcing is critical in order to provide continuous maintenance, expert knowledge contribution and to adapt the evolving user behaviour and online technologies.

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