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SUSTAINABLE WATER AND SANITATION SERVICES
FOR ALL IN A FAST CHANGING WORLD

Evaluation of education and training in water and sanitation technology: case studies in Nepal and Peru

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A significant constraint to effective and sustainable water and sanitation provision is the "lack of capacity at the local level" (WHO, 2010), however there is uncertainty in how the efforts of capacity builders should be measured, and improved (Brown, et al., 2001). The Centre for Affordable Water and Sanitation Technology (CAWST) and the Institute of Non-profit Studies at Mount Royal University (MRU) has collaborated to address this issue. An evaluative framework, based on the Kirkpatrick model (Kirkpatrick, D.L. & Kirkpatrick, J.D., 2006) was developed to assist capacity builders in the water and sanitation sector to capture and interpret the results of their education and training activities. The framework was applied to evaluate CAWST's training activities in Peru and Nepal. The findings provide new perspectives on the impacts of CAWST's work, and provide insight into how the framework can be valuable to other capacity building organizations.

Research problem

One of the most significant constraints to effective and sustainable water and sanitation provision is the "lack of capacity at the local level" (WHO, 2010). Many countries do not have adequate human resources to skillfully plan and implement the delivery of water and sanitation services, especially to the most vulnerable populations (WHO, 2010). Infrastructure built, quickly becomes non-functional (Montgomery, et al., 2009). A recent study which investigated human resources capacity gaps in the water and sanitation sector in fifteen countries, showed significant overall shortages in technically qualified staff including engineering and social development professions (IWA, 2013). Recognizing this challenge, universities, vocational schools, private consultants, and experienced NGOs are offering education and training activities (i.e. capacity building activities) to upgrade the technical and management capacities of governments and non-governmental organizations (NGOs) responsible for water and sanitation provision.

However, questions are increasingly raised on the effectiveness of these efforts, with evidence that many governments and NGOs aren't getting the education and skills needed (IWA, 2011). A global review of more than 100 leading capacity builders in the water and sanitation sector found that only one third measure their results (Ngai et al, 2013). Among these, the methods used are often ad-hoc and deploy prescriptive criteria to assess only whether outputs are achieved (e.g. the number of people trained), rather than outcomes or impacts. It is often unclear whether the capacities of governments and NGOs have actually increased, whether communities received clean water and sanitation, and whether health and well-being has indeed improved (Broughton & Hampshire, 1997; Cracknell, 2000).

The Centre for Affordable Water and Sanitation Technology (CAWST) and the Institute of Non-profit Studies at Mount Royal University (MRU) has collaborated to address this research problem.

Objectives

The objective of this study was to design and trial an evaluative framework to assist capacity builders in the water and sanitation sector in capturing and interpreting their results, and in understanding how to maximise their positive impacts. CAWST is a non-profit organization that provides training and consulting to

organizations that work directly with populations in developing countries who lack access to clean water and basic sanitation (CAWST, 2013). CAWST provides education, technical training and consulting services to hundreds of organizations, improving their capacities to deliver water and sanitation programs locally. CAWST doesn't implement any water, sanitation or hygiene (WASH) projects or construct infrastructure in the field. Instead, we engage, educate, and empower organizations operating locally to implement projects. These client organizations may including governments, UN-agencies, INGOs, local NGOs, community groups, and individuals. CAWST's services include training workshops, education materials, consulting support and visits and experience exchanges. Since CAWST's inception in 2001, CAWST has conducted approximately 870 education and training visits to clients in 46 countries.

Methodology

A review of over 20 different evaluation methodologies was undertaken to develop an appropriate framework for evaluating the impacts of education and training activities in the water and sanitation sector. The framework that was developed is a customization of the Kirkpatrick's four levels of learning evaluation (Kirkpatrick, D.L. & Kirkpatrick, J.D. 2006). Kirkpatrick's evaluation tool was selected as it was considered simple, easy to understand, easy to apply, and relevant to the way CAWST and its worldwide partner organizations provide education and training services. Kirkpatrick's methodology consists of four sections; (1) Reaction: How did participants respond to the training? (2) Learning: To what extent did the participants experience changes in knowledge, skills, attitudes as a result of the training? (3) Behavior: Can changes be observed in the participant's behaviour as a result of training? (4) Results: How have organizational outcomes changed as a result of the training program?

In each of the Kirkpatrick sections, a number of questions and discussion points relevant to CAWST's activities were developed, and they formed the basis of an interview protocol. The interview protocol was approved by the Mount Royal University Human Research Ethics Board on 1st March 2013.

Each interviewee was asked about what training or consulting experiences they have had with CAWST, their reaction to their experiences, what they have learned, how they have applied learning to their work, and what CAWST can do to better support them. For example, for Kirkpatrick level 1 the interviewees were asked questions on the theme of "What did you think of the training?". For level 2 the participants were asked "Did you learn anything about the training, and if so, what did you learn?". For Kirkpatrick level 3, questions "Has anything changed in your behavior since receiving the education services?" were asked, and for Level 4, the interviewees were asked "Are there any changes in your organization as a result of the changes, and if so, please explain them?". The interview questions were purposely open ended to gain an understanding of the interviewee's perception of the reaction, learning, behavior change, and results without introducing pre-conceived notions from the interviewer. The interviews were conducted in a semi-structured manner. An interview outline and example questions were developed but the interview questions were adapted to each individual discussion.

The framework was applied to evaluate the impact of CAWST's education and training activities in Peru and Nepal. The following sections provide details of each of the case studies.

Case Study 1: Peru: CAWST first visited Peru in 2005, and has since delivered around 40 training workshops and consulting support services to over 100 local individuals over a total of 12 visits. In September 2013, CAWST and MRU researchers travelled to Peru to conduct semi-structured interviews with 12 individuals who had participated in CAWST's training and consulting support activities 5 years ago. The 12 interviewees comprised staff members from a range of organizations, including local NGOs, international NGOs, community groups, community health promoters and local leaders. Following the interviews in Peru, the evaluation team made some modifications to the way in which interview questions were asked and how interviewees were selected, in order to gain more comprehensive results for the second case study in Nepal. For example, in Peru, for some interviews, not all of the 4 levels in the Kirkpatrick model were covered thoroughly. For Nepal, questions were asked in a more open ended style, and a greater effort was made to cover all four levels of the Kirkpatrick framework.

Case Study 2: Nepal: CAWST have been conducting training activities in Nepal on water, sanitation and hygiene knowledge since 2004. Over the past 9 years, there were more than 30 visits by 15 CAWST staff (CAWST, 2013), conducting over 50 training workshops and consulting support activities, to over 140 individuals from various organizations. In September 2013, the evaluation team travelled to Nepal to conduct semi-structured interviews with 18 individuals who had participated in CAWST's training and consulting support activities. The 18 interviewees comprised staff members from a range of organizations,

including local NGOs, international NGOs, governments, technical college, community groups, community health promoters, newspaper journalists and local entrepreneurs.

Many of the interviewees had first received training from CAWST over five years ago. The findings for each case study were compiled and discussed with CAWST and MRU staff. Results were then compared to develop recommendations for CAWST to improve its education and training activities, as well as to identify the strengths and weaknesses of the evaluation methodology.

Results

The interview results from each case study were aggregated and summarized to show major findings for each of the four Kirkpatrick levels (reaction, learning, behavior, results). As well as aggregated results, individual stories and comments were compiled to reflect diversity in the responses. The results of the two case studies, as well as a comparison of the major findings are shown below.

The intention of the following discussion is to indicate the type of data that was captured for the two case studies, in order to analyze how useful the evaluation framework was in assisting a capacity building organization (CAWST) in understanding their impacts and improving. From this, improvements to the evaluation framework are identified.

Case Study 1: Peru: Figures 1 – 4 show the results summarized for each of the four levels of the Kirkpatrick model for Peru. Accompanying each table are quotes from interview transcripts of the 12 interviewees, which have been selected as they demonstrate an interesting or different perspective on the impacts of CAWST's education and training activities. For organizational learning, there is value in both the aggregated results, as well as the specific examples of impacts provided by the quotes. The graphs represent topics that were brought up by the interviewees, rather than yes/no responses to particular questions.

The graphs were created from the interview transcripts. Responses from the open ended questions were compiled, and common themes were grouped together. The graphs represent common responses, rather than whether an interviewee agreed or disagreed to certain aspects of the training. For example, for Figure 1 the interviewees were asked questions similar to, "What did you think of the training?". Eight people responded with comments that reflected that they were generally satisfied with the training, such as "the training was good", "I liked the training", "I enjoyed the training". Only one person mentioned that they though the training was too long as part of their answer.

The graphs also reflect the most common topics raised by participants and whether those topics were positive or negative. In Figure 1, the most commonly raised topics were positive, indicating high level of participant satisfaction with the training.

Within the figures, HWTS is used to abbreviate Household Water Treatment and Safe storage, and BSF is used to abbreviate BSF.

Case Study 2: Nepal: Figures 5 – 8 show the results summarized for each of the four levels of the Kirkpatrick model for Nepal as well as relevant quotes from the 18 interviewees. As discussed in the methodology section, the interview process was refined between the case study in Peru and Nepal, resulting in more comprehensive results for the Nepal case study.

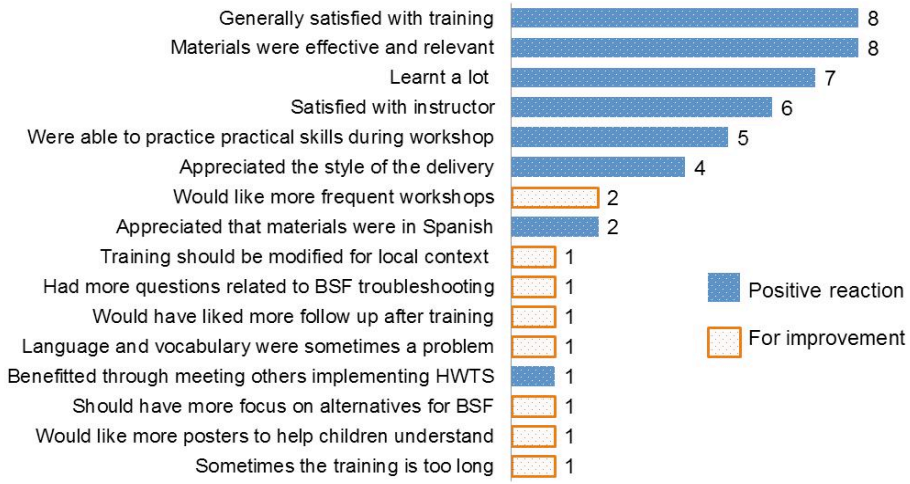


Figure 1: Reaction to training activities

"I appreciated the style of the delivery; we could later communicate the things we learned to other people the same way that we were trained."

"Whenever we wanted to communicate with CAWST, they replied promptly. The level of information was useful and helped us with specific problems."

Figure 2: Learning

"At the beginning, I was afraid of leading workshops. In time I overcame this fear and my performance improved."

"Many times the recipients have a different socio-cultural background from a technician, so we need to know how to speak to them in a way they understand."

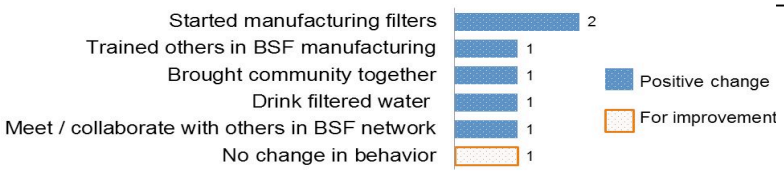


Figure 3: Behaviour

"We've met lots of CAWST people. We appreciate it, but nothing's changed."

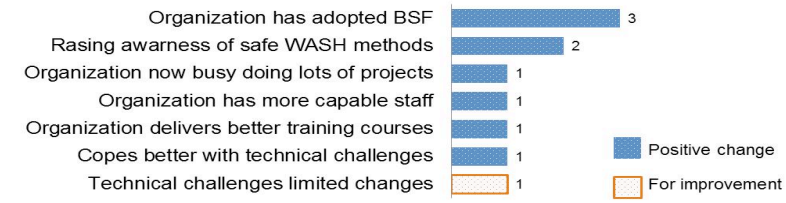


Figure 4: Results

"It would be good to have more workshops in order to update the community and remind them to use the filters, because in some cases they started using them but now they are not."

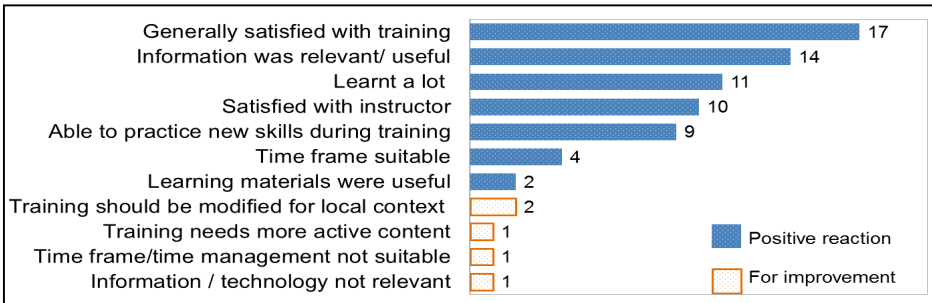
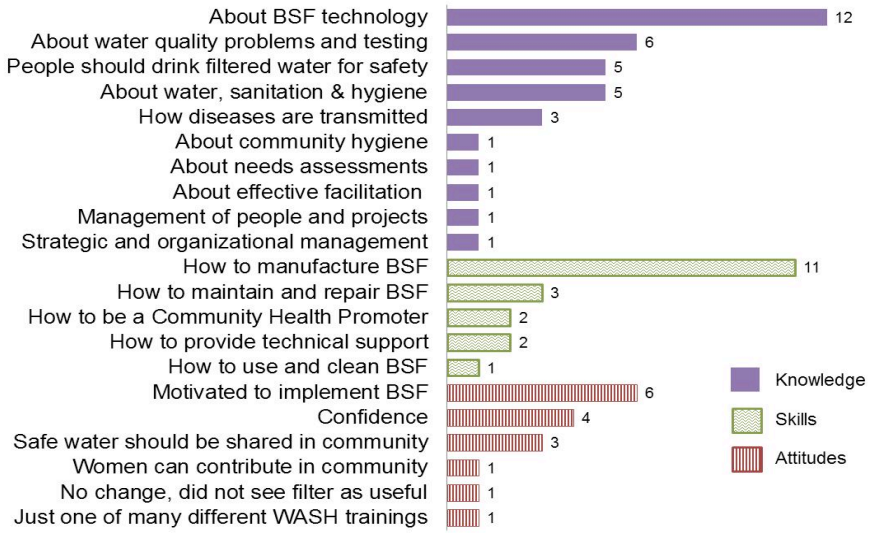


Figure 5: Reaction to training activities

"CAWST should be flexible; the approach that is working in Africa may not work in Nepal as there are several cultural differences."



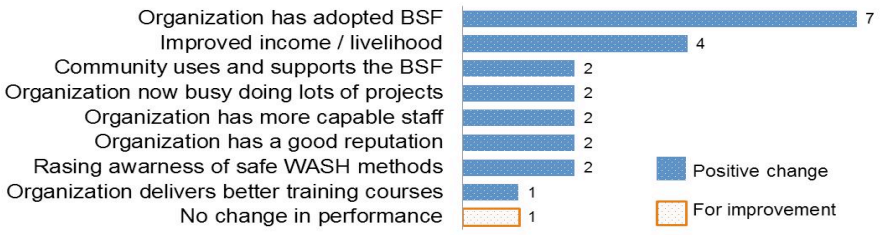
"I learnt that women can also do something for the community, not just men"

"Every time someone from CAWST visits us, my motivation goes up"

Figure 6: Learning

"I took the biosand filter concept and applied it to a gravity flow water supply scheme. I used sand and gravel to prevent leaves and dirt from clogging the system intake."

Figure 7: Behavior



"Because of the filters I am earning money and my life has changed. My previous house was in a slum but now I have built a new house, now I can afford my daughter's education"

Figure 8: Results

Discussion

Specific findings differed between the case studies in Peru and Nepal; however comparison of the two case studies enabled common themes to be identified. Generally, participants were satisfied with the education materials and training workshops delivered by CAWST and its local partner organizations. The education posters and training manuals are effective, contain plenty of illustrations, are easy to use, and are written at an appropriate technical level. However, many interviewees recommended that more follow-up visits and support from CAWST and its local partners is needed. They were also unaware of updated and new training and education materials available from CAWST. Some workshop participants had not implemented water and sanitation projects due to lack of funding, or stated that the technologies learned from the training were determined to be not appropriate for their project sites.

Table 1 summarizes the major findings and recommendations, showing which are relevant to Nepal, Peru or both. It is interesting to note the similar and different issues arising in each of the two case studies.

Table 1. Comparison of Findings from Case studies in Nepal and Peru

Finding	Recommendation	Nepal	Peru
Majority of interviewees reacted positively to CAWST training and consulting support.	CAWST should continue its general approach to training and consulting support.	✓	✓
Consulting support visits and feedback are irregular or not provided often enough.	CAWST should review its processes for providing ongoing assistance to clients.	✓	✓
Technology transfer can be improved through CAWST clients collaborating more locally.	CAWST should link organizations or community members together.	✓	
Knowledge transfer in technical skills was rated very highly, but challenges were reported in organizational capacity, business management & human resources.	CAWST should tailor services to better transfer knowledge in these areas to compliment the technical learning.	✓	
Clients would like assistance in methods of monitoring and evaluation.	CAWST should mentor clients in methods of monitoring and evaluation.	✓	
CAWST could reach more people by making more use of web technology.	CAWST should integrate online services to reach more clients, more often.		✓
Institutional arrangements between CAWST and their partner organizations are sometimes confusing.	Review process for selection of CAWST`s clients and partners, and formalize arrangements.		✓
Clients have challenges in communication with donors and community members.	CAWST should focus on developing client`s capacity in stakeholder communication.		✓

Analysis of evaluation methodology and opportunities for future research:
A key strength of the Kirkpatrick framework is that it filled a gap in CAWST's existing monitoring and evaluation processes, by providing rich, qualitative information on the impacts of CAWST's education and training work. In particular, the interview responses demonstrated changes in CAWST's client's competencies (such as learning about effective training techniques), in contrast to focusing on quantitative results only (such as the number of filters implemented). New impacts of CAWST's education and training activities and new opportunities for CAWST to improve were captured. These new findings provided ideas for future research and analysis of CAWST's work.

There is an opportunity to make the evaluation framework more robust and comprehensive by including additional sources of data for the evaluation, alongside the interviews. This could include analysis of post workshop evaluation questionnaires, analysis of historical client data records, baseline information about the organization to enable comparison of the behaviour and results from the technology transfer, and records of the CAWST competency validation process to show staff behaviour changes over time. This would add more rigour and systematic aspects to the assessment, reduce the reliance on interviewee 'self-reporting' and add completeness to the framework. There is also potential to scale up the study by integrating the Kirkpatrick methodology to other elements of CAWST's monitoring and evaluation systems (such as through CAWSTs annual client survey).

Use of the framework by other capacity building organizations: There is potential for other capacity building organizations to learn from this study and apply the proposed evaluation framework to evaluate their own education and training activities. Modifications to the framework would be required to ensure that it is relevant for different contexts, and to increase the resource efficiency of the evaluation. This has potential to foster more collaboration and communication amongst WASH capacity development organizations, and also improve how education and training activities are evaluated throughout the sector.

Conclusion

CAWST and the Institute of Non-profit Studies at MRU have designed an evaluative framework to assist capacity builders in the water and sanitation sector in capturing and interpreting their results, and understanding how to maximise their positive impacts. By applying the framework to case studies of CAWST's training activities in Peru and Nepal, the framework was found to capture new information on the impacts of CAWSTs training activities and fill a gap in CAWST's existing monitoring and evaluation processes. The findings demonstrate changes in CAWST's client's competencies (such as learning about effective training techniques), in contrast to focusing on quantitative results only (such as the number of

filters implemented). There is potential for the framework to be modified, scaled up and applied to assist other capacity building organizations in capturing and interpreting the impacts of their education and training activities.

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