

CLEAN WATER SAFETY TRAINING EVALUATION PLAN:

Dream Children's Home



Project Name:

Clean Water Safety Training: Dream Children's Home

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Purpose of Evaluating the Learning Solution

The Purpose of evaluating the learning solution for the Clean Water Safety Training is to discover how much the volunteers have learned from the training based on assessment quizzes and interview data. The efficacy of our training will be evaluated by collecting data from the quizzes and from qualitative analysis based on exit interview data from the Subject Matter Experts (SME). The volunteers and encouraged to build the carbon filter at home prior to leaving for Cameroon. Based on the data collected the design team can and will make updated to the content to areas that are shown to be topics there improved is needed.

Data Collection and Analysis

The data for this course will be collected in four ways. First is a multiple choice quiz testing the knowledge of the learner. The second is an open ended short answer test that will gauge their level of comprehension using scenarios and delving into their ability to make decisions based knowledge gained in the training. The third level of data collection will be a live interview with a subject matter expert (SME) where the learner will answer open ended questions, display their homemade water filter and any other lingering questions they may have about water safety in Cameroon. The fourth data collection point is an exit survey for quantitative analysis and how the course should be improved.

Bloom’s Level 1: Knowledge

The first level of assessment will be the multiple-choice quiz. This quiz tests a level 1 comprehension of the content based on Bloom's Taxonomy. This level of knowledge is defined by Bloom as, “Knowledge is defined as remembering of previously learned material. This may involve the recall of a wide range of material, from specific facts to complete theories, but all that is required is the bringing to mind of the appropriate information. Knowledge represents the lowest level of learning outcomes in the cognitive domain” (Bloom, 1956). This level is aligned with our course level learning objectives.

The multiple-choice questions are below:

Text	
1. What is the mission for Clean Water Safety Training? a) To teach volunteers how to be safe from disease, b) To inform volunteers of waterborne diseases in the area,	<ul style="list-style-type: none"> ● All questions on one page, with the option to only choose one answer. ● Bottom of the page, “submit” button. ● After assessment is graded,



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<p>c) To help volunteers recognise symptoms of waterborne diseases, d) All of the above. *</p> <p>2. Approximately how many people die each year as a result of water-related disease? a) 500,000 b) 1.5 million c) 2 million d) 3.5 million*</p> <p>3. What are major contributors for unsafe water? a) Lack of medical care b) Poverty and economics c) Dirty water d) All of the above. *</p> <p>4. The four major waterborne illnesses that are most common in North Western Cameroon are: a) Amoebiasis, Cryptosporidiosis, Giardiasis, and b) Amebic dysentery, Cholera, Hepatitis A, and Typhoid* c) E Coli, Marimum infection, Salmonellosis and Vibrio Illness d) SARS, Hepatitis B, Poliomyelitis (Polio), Desmodesmus</p> <p>5. What are the most common symptoms for waterborne diseases? a) Dehydration b) Acute respiratory infection c) Fever d) Abdominal pain, nausea e) All of the above*</p> <p>6. How do you assess the safety of the water? a) Sanitation b) Filtering system c) Distribution d) All of the above*</p>	<p>correct answers are highlighted on the screen.</p>
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7. According to drinking water quality standards what factors specify the acceptable microbial, chemical, and radiological characteristics of safe drinking water?
 - a) Excessive amounts of microbes or chemicals derived from human and animal wastes, agricultural runoff, industrial chemicals, and even natural pollutants,
 - b) Sources not protected, or are unexpectedly contaminated for any reason,
 - c) Contamination at the source of the water both at the surface and in the ground,
 - d) All of the above*

8. Waterborne diseases are caused by infections through:
 - a) Human contact
 - b) Kissing
 - c) Sex
 - d) Fecal polluted water*

9. Carbon water filters will filter out:
 - a) All Bateria
 - b) Chemical contamination
 - c) Parasite ridden water*
 - d) Viruses

11. Filtering of water from 2000 BC to the present include:
 - a) sand
 - a) Large scale use of carbon water filter*
 - b) Brita and Pur
 - c) All of the above

12. The filter used in this lesson uses:
 - a) Charcoal, sand and rocks *
 - b) Distilled Water
 - c) Netting
 - d) Paper



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<p>13. What are some water filtration and other methods used to ensure that the water you are drinking is potable.</p> <ul style="list-style-type: none">a) A pumpb) Boiling waterc) UV lightd) Water purifiere) Chlorine Dioxide Tabletsd) All of the above* <p>14. How do carbon filters work?</p> <ul style="list-style-type: none">a) By trapping particulate matter and pollutants in the pore structure of the carbon substrate*b) Using chemicals to treat the waterc) Using Heatd) All of the above <p>15. What is the most important material in the construction of the carbon water filter?</p> <ul style="list-style-type: none">a) Fireb) Waterc) Charcoal*d) Rocks	
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Since the initial design document, open ended questions have been added to better assess the depth of knowledge.

Bloom's Level 2: Comprehension

After answer 20 questions from multiple choice quiz the learner will also have to answer 5 open ended short answer question that test a higher level of comprehension by writing about the application of the information in scenario based situations. Bloom defines level 2 comprehension as, "Comprehension is defined as the ability to grasp the meaning of material. This may be shown by translating material from one form to another (words to numbers), by interpreting material (explaining or summarizing), and by estimating future trends (predicting consequences or effects). These learning outcomes go one step beyond the simple remembering of material, and represent the lowest level of understanding" (Bloom's, 1956).



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Below are example of open ended questions that the learners will be asked at the end of their training:

1. Five orphans have come down with symptoms aligned with Amoebic Dysentery after drinking from the main well. What steps could you take to help insure that the water is properly purified or filtered? Which option would you recommend to the orphanage and why?
2. What are some long term solutions for the orphanage to insure clean water is available to the staff and students of the facility? Justify your answer keeping in my different filtration options, filtration v. purification, costs and volume. Remember the average person needs the minimum 5 liters of water a day for drinking, washing and food prep.
3. You are walking outside the orphanage and come across this scene: You are traveling with locals in Cameroon on a short vacation to the wild animal park, the group stop next to a river and begins to drink water directly out of the river. What could you tell them about the risks of drinking river water. What filtration option would you take to minimize the risk of waterborne illness.
4. You find that some of the kitchen staff are not washing their hands before handling the filtered water at the orphanage. What might you tell them about the risks of contamination? What types of illnesses can you and the people living at the orphanage contract through unwashed hands? What filtration steps would you take to minimize your own risk of waterborne illness?





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5. You see the scene above in the photograph. What are you going to do and why? Think about culture, language, your own ability to educate and offer your services. While in Cameroon you will likely encounter poverty and health related issues that are both troubling and new.

Bloom's Level 3: Applying & Exit Interview

Based on Bloom's 3rd level of evaluating learning objectives we will conduct a live virtual conference where the learner has the opportunity to speak directly with a subject matter expert (SME). In this exit interview the learner will display their homemade carbon water filter to the SME. The student will apply what they have learned into a real world situation in this case filtering water using a device that they built based on the training received in module 3 of the course.

Prior to ending the session the learners are invited to participate in a verbal reflection of the course and their learning. During this reflection instructors can make certain all learners completely understand the dangers of drinking contaminated water and the remedies. Learners can feel more confident after the verbal reflection of their ability to stay safe and how to treat water against contaminants if needed. The verbal reflection will be done either in person (if course is taken before going to Cameroon) or via Zoom. Learners are free to ask as many questions as they want and the session will last as long as necessary to ensure the confidence of the learner.

After the virtual conference has concluded the instructors will send out a Google form survey to get feedback from the volunteers on their experience with the training. The information provided will provide another level of assessment to evaluate how well the volunteers are retaining the information. This information can be used to address any gaps in learning and instruction.

Using Zoom the learner will meet with the SME the following topics will be discussed:

- What questions remain about clean water safety?
- Please display your water filter to the SME and describe the process of how you made the filter.
- How many filtration media layers are there in your filter and why?
- What is the flow rate of the filter and how might that affect the water quality?
- How will you approach water safety upon arrival at the CDH?
- Given what you know now, what are the risks of getting a waterborne illness given that every filter has its limitations?



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- Please provide any live feedback to us now so we can improve the course and it's learning outcomes.

Exit Survey

The last point of data collection will be an exit survey built in Google. Upon ending the live virtual conference with the SME, these are the questions that will be asked.

1. On a scale of 1-10 (10 being the best), rate your level of confidence for completing the training.
2. On a scale of 1-10 (10 being the best), rate the quality of the training.
3. On a scale of 1-10 (10 being the best), rate how confident do you feel about your knowledge of the topic.
4. Did the training cover the content you were expecting? Why or why not?
5. Would you recommend this training to other volunteers? Why or why not?

Levels of Evaluation

This course will be using Kirkpatrick's levels of evaluation. The clean water safety course focuses on the first two levels but we may have an opportunity to hit the third level of evaluation after 3-6 months by following up with the learner to see if they have had behavioral changes at the orphanage.

Level 1 - Reaction

This level of evaluation will be assessed in the exit interview and in the Google survey. It is important that we do not over look this level of evaluation because if the learner did not enjoy the training it is likely that nothing will be learned or applied. We will also use this feedback to make improvements to the course for future iterations.

Level 2 - Learning

Kirkpatrick's second level of evaluation will be implemented through the use of our multiple choice quiz, short essay scenario based exam, the exit interview with the SME and the review of the homemade water filter. This level of evaluation will help us make changes to the curriculum based on the performance on these assessments. Observations by the SME in the exit interview will help gauge the level of comprehension of the learners. The quality of the homemade filter will also inform us on how effective video based instruction is for a hands on construction project. (Forest,2016)



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Level 3 - Behavior

Kirkpatrick's third level can be conducted if the orphanage will allow us to check back with the learner after 3-6 months post arrival in Cameroon. We would like to collect data on the number of waterborne illnesses that the volunteers have contracted after taking the training. Ideally we would have a control group that did not take the training and compare that data with the group who did do that training but that is unlikely and unsafe. If we are allowed to follow up with the learners after 3-6 month and perform another interview it can inform us on if there was a behavioral change. (Forest, 2016)

Plan for Revision Cycles

There will be three revision cycles within the first year of the project coinciding with the three application cycles at CDH. After each round of volunteers are trained we will make updates to the course based on the quiz results, exit interviews and surveys we will make one round or revisions after the initial release. The quiz results will inform us of areas that the content needs to be clearer or better explained. The quality of the filters built and displayed in the live virtual conference might also inform us is this module is too complex and we may have to remove it if that filter is of such poor quality that it becomes a danger to the learner or the orphans.

After the first round of changes we will re-release the course to the next round to volunteers entering CDH. We again will conduct exit interviews and use Kirkpatrick's levels of evaluation to improve the course. The level 1 would be important to make the course more enjoyable, maybe speed it up and add more animations. We hope that after the second iteration of the course we will be able to see improvements on the quizzes and quality of the filters. (Forest, 2016)

After the third round of revisions we will request that CDH allows us to follow up with the learners at the orphanage to test the third level of Kirkpatrick. Ideally we want to see the prevalence of waterborne illness go down over time with the volunteers as the quality of the training is improved. (Forest, 2016)

Communication Plan

After the inaugural training takes place we will communicate all results with the CDH. We would also like to request and anecdotal evidence of what was happening at the CDH in terms of volunteers contracting waterborne illnesses in the previous year. We will share with CDH some of our recommendations about water safety keeping in mind that their main priority is the operation of the orphanage not the safety of the volunteers.



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We would like to set up monthly meetings with the directors of the orphanage to discuss the health issues of the volunteers. These meetings can take place over Zoom. If the internet is too weak, a monthly check in with the directors and volunteers will also be valuable. The goals of these meetings will be to collect data about the health of the volunteers and also to see if health improvements of the training.

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