WebEx Conference Series on Monitoring and Evaluation of HWTS

Topic: Technology Design and the “Three Cs” of HWTS

Date and Time: Thursday, March 5th, 2015 at 11:00-12:00 EST/New York Time

Purpose: Learn how technology design supports correct, consistent, and continued use (the “Three Cs”).

Presenters/Guest Panel:

Mimi Jenkins, University of California Davis
Water Environmental Engineer with a focus on public-health applications in developing countries.

Daniele Lantagne, Tufts University
Assistant Professor in Civil and Environmental Engineering with in-field experience in the evaluation of chlorination, filtration, and combined HWTS technologies in over 50 countries.

Hosted by: Triple Quest, Grzybowski, Megan, megan.grzybowski@triplequest.com

Presentation Summary: Mimi Jenkins

Focus of Presentation: Testing hand washing and IYC (infant and young children) Feces Management products in Cambodia using people-focused design thinking to identify what communities want and need in addition to their current practices Also using 'sacrificial' prototypes to test consumer adoption rates and device desirability, viability, and feasibility.

Key Points

- Three critical design questions:
  - Desirability: what do people want and need?
  - Viability: What is possible to produce and sell?
  - Feasibility: what is financial feasible for local businesses?
- Key steps in product design assessments:
  - Step 1: understand current user practices and needs through household surveys.
    - In parallel with step 1 it is helpful to complete a global inventory of products: identify key feature variations, screen them, and decide which are worth testing.
  - Step 2: use physical prototypes that help identify what people want and what they would actually buy and why? Understanding why is really important.
- Results from behavior trials in Cambodia showed users preferred: controllable tap, wastewater basin, sturdy and rigid container that could withstand rough handling, wide mouth for quick refilling, and minimum of 15 liters (preferred 20 to limit refills to 1x/day).

Key Conclusions

- Having two prototypes with contrasting features gave detailed product design information.
- Extended consumer testing helps evidence of behavior change potential and consumer value.
- Focus group discussions with a lot of sample projects were very effective in helping screen different categories of products.

Presentation Summary: Daniele Lantagne
Focus of Presentation: Conveying an example of where behavior change was already established but the engineering was wrong (i.e., safe water program in Kenya). Identified local product and put it through extensive design revisions in-conjunction with focus groups and field testing.

Key Points

- Product of interest was a tank of chlorine with a metal stand located near a well. Users go to the well, turn the device, and get a shot of chlorine.
- Engineering issues: High cost and chlorine causes metal to corrode. Inside of tank was low density polyethylene, which is not an approved chlorine storage device.
  - To address issues, worked with high density polyethylene approved for storage and reduced cost of tank from $30 to $2.
- What designs do users prefer?
  - Tested 5 design images in 3 countries.
  - Focus groups showed that users preferred rounder, more organic models that looked more approachable, as opposed to the sleeker, more tech-looking design.
  - The iterative design process is very important.

Question and Answer:

1. What is the form of chlorine in the dispenser? What are the pros and cons of using that type of chlorine?
   - Response from D. Lantagne: In the dispenser currently, it's sodium hypochlorite at 0.25% stabilized to a pH level of 0.9, and it's stable in the dispenser for about 3 months.
     - The discussion is whether or not to change to a powder form. This would allow for refills once every year.
       - There are benefits and drawbacks to behavior change, because you revisit the communities every year and not every month, so there are fewer touch-points, but the cost of distribution decreases.

2. How is the amount of chlorine dispense controlled and how are people educated?
   - Response from D. Lantagne: There is a modified ball valve that's made in the United States.
     - It has a 3mL depression in the ball-valve, so as you turn the ball valve around, it dispenses 3mL out of the ball valve (a controlled dosage).
     - There's a huge behavior change structure behind this; the behavior change structure is comprised of the community’s approach, their need/desire, the selection of a community Health Promoter, an introduction to the dispenser, and a local promoter that's responsible for refilling the dispenser and conducting community education.
       - In the initial 42 dispensers that were installed, ~70% adoption rates over a 2 ½ year period (which one can infer is a “sustained adoption”).
       - As they scaled up to about 11,000 dispensers, their adoption numbers dropped to ~42%, and that has to do with the fact that there are fewer touch-points.

3. How is the taste adopted with chlorine dispensers?
   - Response from D. Lantagne: These areas in-particular (Uganda, Tanzania, and Kenya) where PSI has had a WaterGuard Program for over a decade are not seeing much taste resistance.
Mostly because (1) there is so much education surrounding this and (2) these communities have less taste resistance to chlorine than others.

The Bangladesh dispensers program had incredibly low adoption.

4. What were the costs associated with the Cambodia trials?
   - **Response from M. Jenkins:** The actual cost of doing the first two steps was actually quite cheap.
     - The studies are actually very easy to do without highly specialized people; can involve those who have qualititative experience.
     - The cost of the research, in the first step, is not that expensive. The hand-wash design work went through the technical feasibility and the business viability design process.
       a. Professional designers were brought in to take the inputs on the consumer side to actually develop products that could be produced through local supply chains.
     - The sacrificial prototypes (all except the commercial Coleman) cost about $3.50 each to produce, including the materials purchased in the market and the time it took a skilled, local craftsman to assemble.
     - The prototypes we used in Infant and Child Feces Management were actually all products available in the markets in Cambodia, but were not available in rural markets, so they were a range of prices.
       a. That's really critical to getting the price point down and to sustainably produce these.
       b. The hand-washing station is being produced in Vietnam. There was quite a bit of money involved for the injection molds (for the Happy Tap).
       c. It is important to design for shipping, packaging and retail also.
   - **Response from D. Lantagne:** From the dispenser experience, it was Gates funded research. We had a budget of about $250,000, with injections molds costing ~$100,000, with significant discount.
     - Also, consider salary time and paying the design company.
       - To create something, you need skilled people and hiring skilled people is one of our barriers.

5. Any evidence of preventing disease?
   - **Response from M. Jenkins:** In the hand-wash station work we are measuring sustained use and increased frequency of hand washing with these devices.
     - In the initial behavioral trial of 21 households that purchased the product, an impromptu follow-up visit was conducted at 8 months during drought season.
       - There was some concern surrounding sustained use when water is scarce.
       - Found that half of the devices were still being used with soap, and for other personal hygiene measures as well.
       - Didn’t measure disease prevention.
   - **Response from D. Lantagne:** Similar experience with the dispensers.
     - After scaled-up, measured the “Three Cs”.
6. For the biosand filter: how could we go about redesigning the bucket, and what is a good method to assess community acceptance of the new technology or purchase?
   - **Response from D. Lantagne:** There is nothing better than putting technologies into a household and then getting their feedback over time.
   - If you can get up to 50 prototypes to put into households for 8 weeks and then talk to them 1x/week and see what they think about it, that is always the first step in assessing acceptance.
   - **Response from M. Jenkins:** Found it helpful to give people two contrasting products.
     - Two (2) quite different products (for one week each) so they can articulate what they don’t like about the product or technology.

7. In any of the concepts you’ve tested, have any been attempted to put the consumer’s value on the service/product?
   - **Response from M. Jenkins:** Consumer value was assessed as part of the design process with initial desirability in Vietnam.
     - Consumers were asking what they would pay for something like this.
       - The price point with the middle group (target consumer), was about $6-7 USD to purchase it once.
       - Many households said they would buy two at that price if the product worked really well.
     - Getting a sense of their value for it is really important in creating sustainable supply chains.

8. Have you been able to establish what type of value they place on good health?
   - **Response from M. Jenkins:** Very little. Disease is a very uncertain, unpredictable outcome while saving time/cash is a very tangible, short-term outcome.

9. What types of distribution systems do you work with in rural locations?
   - **Response from M. Jenkins:** There are two (2) methods being used in Vietnam and Cambodia.
     - Direct sales: Sales show in a rural area (use sales agent and promoters).
     - Retail outlets: Retailers in local markets that are already selling plastic products and goods and procure from the plastics manufacturer.