

Designing Sanitation Technology with an Informal Settlement in Namibia using a Community-driven Approach

Abstract

In this paper we summarize our experiences of co-designing novel sanitation technology solutions with residents of an informal settlement in Windhoek, Namibia. Over the course of one week, we used a community-driven approach to develop an understanding of the nuances of the sanitation challenges faced by the settlement residents and explored different co-design methods to do so. We report on the design process used to develop an interactive radio show to engage the community to participate in relevant phases of the product life cycle of a personal, sustainable, home-use sanitation solution called the PeePoo Bag. We also discuss the problems we faced in the process as well as the methodology used and give recommendations for future interventions.

Introduction

Havana is an informal community in Windhoek, Namibia. In Havana, water sanitation and hygiene (WASH) is one of the major issues among members of the community. Shared flush toilets have been constructed by government authorities to provide basic toilet facilities for households [5]. In average, four to six households share one toilet (see Figure 1). Restricted access to toilets has also leads to unhygienic behaviours such as the use of buckets at night especially for female residents. Consequently, the community had experienced a Hepatitis E (a liver disease caused by infection with a virus known as Hepatitis E Virus (HEV)) outbreak in December 2017. As of January 5th, 2018, the Health Ministry recorded cumulative 214 cases in Namibia with over 39% of the cases from the Havana [2]. The virus is largely spread through poor sanitation and contamination of drinking water [6].



Figure 1: Public toilet building in Havana.

Design Methodology

We used both a user-centered and co-design approaches [7] to understand the underlying sanitation challenges in Havana community. Initially, we engaged with a community leader who shared major sanitation issues in the community. To develop a clear understanding of the problem, we visited the Havana community. We conducted extensive semi-structured interviews with male and female residents to understand the toilet situation. During the visit, we observed several community members who were urinating on the streets.



Figure 2: Thematic analysis based on field information

Co-design Activities in the Field

After a thematic analysis of the observations and interview data, we revisited the Havana community where we conducted co-design activities with community members to verify the information previously collected.. We interviewed three participants and later developed personas and generated six themes based on their feedback. . We asked each participant to

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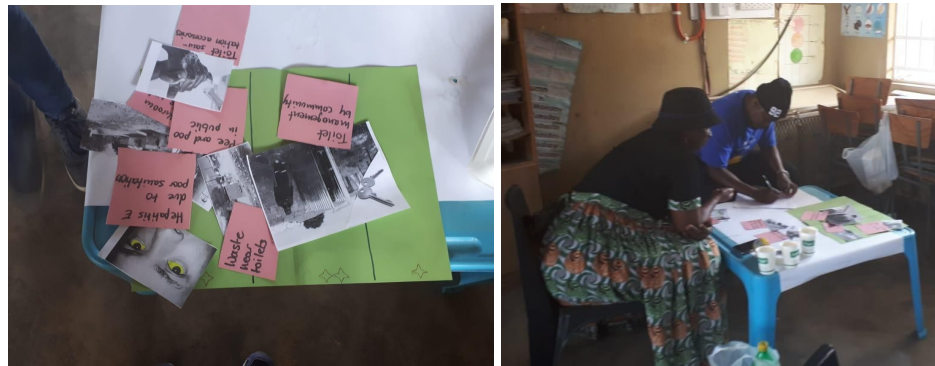


Figure 3. Participants using card sorting to rank the themes.

Second Thematic Analysis

We analyzed the data collected, then conducted a second level thematic analysis. We generated new themes but focus on *access to toilet* theme which had sub-themes such as insecurity in accessing toilets at night, use of buckets at night, etc. We used “what if” and “how might we” questions to develop research questions that focused on the possible solutions.

Results

Overall, the co-design activities led to findings that informed our proposed solutions. First, we concluded that provision of public toilets alone may not solve sanitation problems in Havana. Public toilets provision is not likely to match demand in the long run since government is only able to provide about 20% of that need in 2018 [6]. Coping behaviour like using buckets will continue because it is related to the lack of security and inadequate toilet facilities. Also, the economic status of Havana community members is a growing concern among the community.

Second, we think the use of radio would be useful, since it is a major communication tool for Havana community members. We thus propose an Interactive Voice Response (IVR) based

community radio station, similar to the work of Talhouk et al. [3]. A radio show called “Future Waste” will be hosted, managed and received by the community to discuss solutions to the sanitation problems. One promising project that could be incorporated is the Peepoo Bag [4]. The Peepoo Bag is a personalised self-sustainable, home-use toilet bag that transforms toilet waste to fertilizer and has been deployed in Kenya with an estimated cost of >US\$10 per person/year. This tackles the problems of safe and sustainable access to a toilet which we identified previously. The “Future Waste” radio show has its emphasis on solutions that will build capacity in sales, marketing and education of the population with other benefits like security and economic empowerment. We scripted and recorded a part of the show in *Oshiwambo* (the local language) which will be the basis for further iterations.

Discussion

In the course of this project, we faced multiple challenges. First, our method of recruiting more volunteers from the community was ineffective. We had an interpreter in our midst, but this did not help very significantly in the ‘street’ recruitment that we embarked on. Educational level, interest and ‘sense of value’ seems to contribute to the failure of recruiting from the streets. Recruiting participants using existing social structures seem to work better in this setting. We also observed that there seems to be some misconceptions among community members on the method of transmission of HEV. While one of our participants thought Hepatitis E is airborne, another believed that the disease was not transmitted through physical contact. The biggest limitation of our work is the continuity of this project. There are two options. Either there will be funding for us to continue the work in Windhoek or local researchers and students take over the project.

Future Work

The next step will be to find out how to further engage the community in the program, to increase the sense of ownership. The PeePoo Bag has shown to be an effective product elsewhere and may be well received by the Havana community if the needs of the local community members is considered.

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