Sangoshthi

In developing countries, particularly rural areas, there is a high rate of home deliveries and a lack of skilled care during the initial weeks after childbirth, leading to a significant number of neonatal deaths. The World Health Organization (WHO) recommends the use of Community Health Workers (CHWs) to provide home-based care in these countries. CHWs are local individuals who are selected and trained to improve basic healthcare access and educate the community. In India, under the Home Based Post Natal Care (HBPNC) program, Accredited Social Health Activists (ASHAs) are mandated to make regular home visits to new mothers and promote globally approved newborn care practices. These home visits have been proven effective in improving the health of newborns. However, studies have shown that ASHAs require regular refresher training and innovative strategies to enhance their skills. Technology-enabled health education is seen as a viable solution to train ASHAs and the community, but there are challenges in rural areas such as financial limitations, low literacy rates, poor infrastructure, and weak internet connectivity. To address these constraints, a low-cost training and learning platform called "Sangoshthi" in collaboration with Indraprastha Institute of Information Technology (IIIT) was proposed for CHWs in low-resource settings. Sangoshthi was built on the existing work of Sehat ki Vani, which has been revamped and renamed as Citizen Radio for better stability in low-bandwidth internet contexts. Sangoshthi programme was organised in 2 phases---- Sangoshthi 1.0 and Sangoshthi 2.0.

The main objectives of Sangoshthi 1.0 were to check the Feasibility, Efficacy and usability of the programme. Sangoshthi 2.0 was conducted to train 500 ASHAS on Home Based Postnatal care (HBPNC), to find out the gain in knowledge of ASHAs after training and to identify the strongest and weakest points of the training.

For Sangoshthi 1.0, SWACH identified ten topics on HBPNC which were aligned with the National Rural Health Mission (NHRM) training course material which focused on important elements of day to day care which are often missed in ASHA training. In total, 40 ASHAs were selected from two districts of Haryana for knowledge testing on these topics, with 20 ASHAs serving as a control group. All selected ASHAs were at least 10^{th} grade pass and between the ages of 26 to 50 years. Out of the 40 ASHAs, 11 owned smart-phones and 29 had low-end feature phones. Two female SWACH employees were chosen as hosts, while the head of SWACH (an expert pediatrician with 45 years of experience) acted as the expert for the training sessions. The selected ASHAs were randomly allocated into two groups--- the treatment group and the control group. The treatment group received a training intervention consisting of 12 shows on the 10 chosen topics, which were delivered over a period of 22 days. The shows were hosted three times a week, within a fixed time slot from 2 pm to 3:30 pm. This timing was chosen based on the preferences of the majority of the ASHAs. All shows were hosted from the SWACH office, with the expert and two hosts physically present together. Additionally, a dummy listener from the SWACH staff was recruited to indicate any voice-related problems during the live shows.

Sangoshthi utilized a client-server architecture, as shown in Figure 1. The client in figure 1 refers to an Android application based on a beta version of Citizen Radio, adapted for the Indian deployment. This application allows the host to create, prepare, and manage shows. The server is built upon Freeswitch, an open-source telephony platform, and is responsible for call-related functions. Communication between the Android app and the server requires an

internet connection, either through Wi-Fi or mobile internet, for exchanging request/ reply data packets.

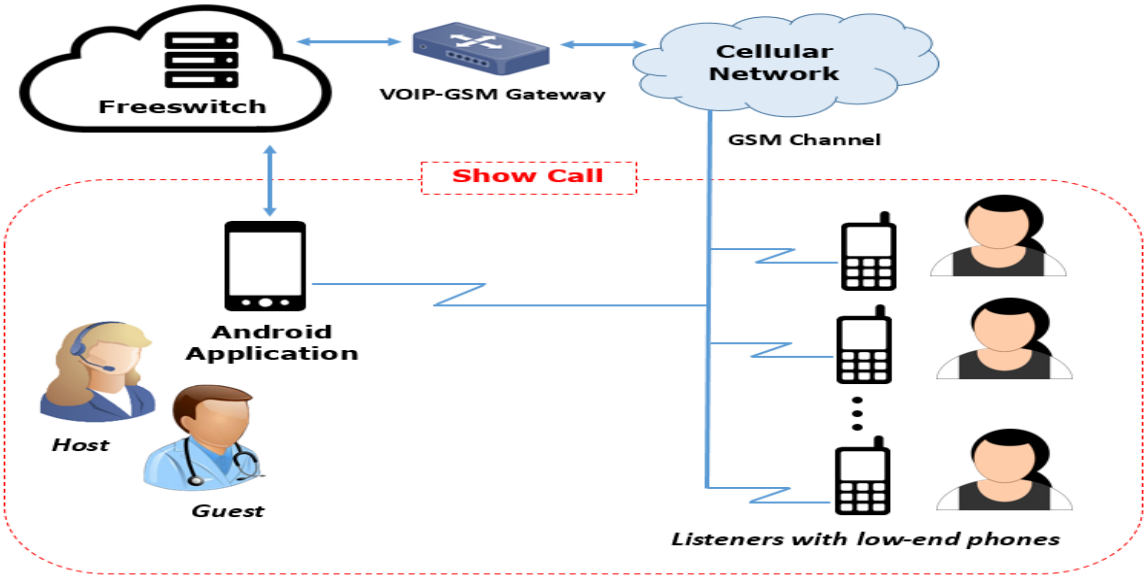

Figure 1: Client-server architecture

To host a show with the learners, the host through the app, first used to register the phone numbers of the interested listeners, creates a show id for the specific day and time and then broadcasts a trailer to inform the registered listeners for the upcoming show. The trailer, here was a phone call, the frequency of which could be set by the host depending on the number of trailers to be broadcasted. Thereafter, on the scheduled day and time of the created show, when the host sent a start show request, the Freeswitch based server used to connect all the listeners and the host in a conference call over the GSM cellular network. In this conference call, by default all the listeners were made to enter in mute mode and could only hear the host's voice. The host, after the delivery of the content used to invite listeners to interact with the expert by expressing their opinion. To be able to speak, the listeners had to press “1” in their phone keypads which generates a DTMF event. Sangoshthi also incorporates a feature which allows the presenter to use pre-recorded materials. This feature enabled the SWACH team to prepare the content of all the topics in advance.

The core idea of Sangoshthi was to support learning through interaction and experience sharing between ASHAs and the expert. Data was collected in the form of call logs, questionnaires and interview data.

The team was able to complete all the shows but some network related issues were observed. One of the main challenge while running the shows in rural area was frequent call drops of the listeners. This was mainly caused by poor network infrastructure in the villages of the listeners. To deal with the issue, the dropped listeners were called back immediately on detection of their hung-up event in an ongoing conference call. A maximum of four redial attempts were made in case of no successful response. Despite call drops occurring during the deployment (12 shows), only two incidences were experienced where call drops had a duration of more than five minutes. The questionnaire test scores were used as the primary metric for evaluating the knowledge level of the ASHAs. There were two types of scores---pre-treatment scores generated before the start of the training period and post-treatment scores

generated after the training period. The knowledge levels of the two groups at baseline were not comparable. The pre-treatment scores of the treatment and the control group calculated as 34% and 28% respectively and the difference was statistically significant ($p<0.05$). Following intervention, the treatment group showed an improvement of 16%. The control group on the other hand also showed some improvement (5%). Knowledge of both the groups was found to be increased statistically significant ($p < 0.05$). It was assumed that since many of the ASHAs knew each other, ASHAs in the treatment group might have shared their knowledge with those in the control group. This was also corroborated by some of the ASHAs. Finally, significant differences were found between the post-treatment scores of the treatment and the control group ($p<0.05$), with scores 50% and 33%, respectively.

Data analysis of the interaction between the ASHAs and the expert highlighted the importance of instructor-learner interaction component. Interaction score was defined as the total number of times one ASHA expressed her opinion in the shows. To understand better, ASHAs were segregated into two groups (size 10) of high and low pre-treatment scores (threshold test score = 35%), and then further categorized into two sub groups of high and low interaction score (threshold of interaction count was 12 in each group). Positive impact of actively contributing in the shows got reflected in the performance of ASHAs irrespective of their initial test scores. In addition, 3 ASHAs who had low pre-treatment scores managed to reach to the group of top 5 ASHAs who attained maximum improvements. The statement from one of the ASHA goes with the finding: “I used to enjoy the shows so much that I always wished them to extend beyond their duration so that I could ask more questions."

Both the expert and the host appreciated this functionality for maintaining synchronicity in the communication. The expert highlighted by saying: “The biggest advantage of this system was that we were able to converse systematically without any overlaps."

SWACH expressed the benefit of the system on two parameters: usefulness of content production activity and system's ability to facilitate training sessions remotely. A quote of the expert: “The system is very beneficial for us because it helped us in building the capacity of ASHAs on home based newborn care remotely which becomes difficult logistically in face to face training sessions. It also helped us to standardize the content which now can be used for reference purposes overcoming the problem of information loss due to the cascade model of training."

During Sangoshthi 2.0, six topics were identified and 2 moderators, 1 testing staff and 1 specialist were selected to train the 500 ASHAs including 20 facilitators by using Sangoshthi 1.0’s online platform and mobile phone application.

Out of 500, only 479 ASHAs were trained (over 3353 shows) and out of those, a total of 269 attended all 6 topics, which represents 53.8%. Out of 6, **t**wo of the topics where the gain percentage was highest, were Danger signs in mothers and Danger signs in newborns. Pre-and post-testing results were relevant to 1/3rd of ASHAs who attended all the 6 sessions. To further crystallize the learning presented in the sessions, group discussions were promoted at different points of the training. A total of 359 ASHAs were part of group discussions sessions and 141 didn’t get the chance to participate in group discussions. Gain in knowledge of ASHAs who attended all 6 sessions was 3% and ASHAs who attended any 5 sessions was 7%. Overall, most ‘successful’ topics were: Topic 2: Danger signs in the newborn, Topic 3:

Danger signs in the mother and Topic 1: Exclusive breastfeeding and as per results, ASHAs were most benefited on these topics from the training. Weakest point of the programme was that overall attendance and huge fluctuation in the training groups. Out of 20 groups, 8 groups have an average attendance of 70% or low and this was mainly due to some issues.

In this study, our evaluation of Sangoshthi, novel training and learning platform for ASHAs working in resource-constrained settings was illustrated. It demonstrated that Sangoshthi complements traditional face-to-face training methods for CHWs and has the potential to be used in rural areas without requiring additional infrastructure. While there have been tools to support individual learning or to improve the efficiency of CHW, no platform was available to train a number of ASHAs together. The field deployment of Sangoshthi showed its potential to support existing training mechanisms. Sangoshthi provided a lively environment of learning through structured interactions among CHWs and the expert. This interaction enriched the content created by the expert which was then further used for training. This system fully incorporates the four design principles, viz. locally relevant content, accessibility of content beyond the bound of literacy, affordability and fitment into the community ecosystem. The deployment highlights the potential of combining feature-phones, smart-phones, and available internet and mobile networks for delivering content in constrained environments for critical applications.