# Questioning Feedback: Improving Public Health Messaging

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## ABSTRACT

This note explores methods of analyzing questions asked during public health video showings. The goal is to provide feedback to content creators and session facilitators based a limited subset of the audience's questions. We analyze five videos produced in the first year of Digital Public Health focused on maternal health issues in rural India. We demonstrate a prototype web based tool to collaborate on the qualitative analysis of questions and propose mechanisms for systematically improving future videos based on this analysis. Initial results show that it is possible to extract useful information on how the target audience perceives the messaging in a video exclusively from questions asked. Based on these results we explain how Digital Public Health can integrate this feedback into an iterative review process for quality assurance of messaging.

## Categories and Subject Descriptors

K.3.1 [**Computing Milieux**]: Computer Uses in Education-*distance learning*.

## General Terms

Human Factors

## Keywords

mHealth, community video-based instruction, health education, community health workers, mediated instruction

## 1    INTRODUCTION

In this note we investigate a process for getting feedback from community group video disseminations. We propose several methods of using questions recorded at the disseminations to assist facilitators to understand current videos, improve the quality of future videos, and identify topics of concern for the community. This work is was done in the Digital Public Health (DPH) project, - a video based health education project in the Indian state of Uttar Pradesh promoting maternal health through locally produced videos. DPH is a collaborative project between

PATH and University of Washington in partnership with Digital Green that extends the work of Digital Study Hall [4] and Digital Green [3] to the health domain.

DPH adapts a model that was developed by Digital Green for agricultural education. The main components of the Digital Green model are:

- Community created video content where messaging features members of the community.

- Disseminations where a facilitator leads a discussion around the video in a community group.

- Integrated data reporting, where feedback from the community, and data on attendance and adoption of practices is reported back to the implementing organization.

This paper looks at the information that is collected by the facilitator at the video disseminations. The facilitator writes down the questions that are asked by participants, and records them using a data reporting tool. Each video has a collection of questions that have been asked. (For Digital Green, these questions are accessible from the video search page on their website[1]. In this paper, we study the questions that have been asked at the screenings of the DPH videos, and examine how the questions can be used to enhance the program.

DPH began in July 2012 and by September 2012 had conducted initial trainings for a three member video production team  and fifty-five Accredited Social Health Activists (ASHAs) who would act as facilitators for video disseminations. By July of 2013 eleven videos had been produced with three more in production. Once a month since October 2012 each of 55 ASHAs has shown a video at a local Mothers' Group meeting and a Village Health and Nutrition Day. Eleven videos have been shown at 917 different events with a total of 15,533 people in attendance through July 2013.

DPH is in the process of rapid expansion moving from 55 Mothers' Groups in July 2013 to 130 Mothers' Groups by September 2013. An important design aspect of DPH is that video content is filmed and produced locally so with the planned expansion two new video production teams are being trained. These teams will not only create films on new topics but will recreate films on existing topics set in the local community. One motivating factor behind this work is to find a systematic method of improving the messaging of videos as more are created. DPH does not have the resources to conduct a comprehensive interview study on what the target audience thinks of each video, however,

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[1] http://www.digitalgreen.org/analytics/video_search/

they already track statistics such as attendance and even record a selection of questions that were asked during showings. Our goal is to explore what types of information can be extracted from this set of questions and to then see how we can use this information to improve either the videos or the use of the materials.

The design of DPH is motivated by community engagement and ownership. The process of creating a video for DPH begins with identifying a topic, and then defining the key messages. Key messages are developed by health experts working with the local medical establishment. The video production team then storyboards ideas around the key messages and identifies local community members to act in the film. After editing, the film is approved by a board of local health officials and prominent community members, and then it is scheduled for community showings.

Although this process puts control of content generation and approval in the hands of local community members, there is little opportunity for feedback from the target audience. The video team has made eleven videos proving that they have the technical competence to keep up with the monthly release cycle and from a videography perspective the quality is good; but judging the quality of the messaging and how the community reacts to it is more difficult.

## 2    TOOLS FOR QUESTION ANALYSIS

The true measure of a video's effectiveness is the number of people in the target audience who adopt the key messages; however, recording the adoption of new practices for DPH is done at follow-up visits and can have a time lag of six to nine months. In addition, there are challenges in attributing behavior change to a specific intervention. This project was undertaken to evaluate how well an existing data source – questions asked during video screenings – could be used to evaluate the quality of messaging. ASHA's were asked to report the questions asked by the audience along with the attendance. We do not know the exact instructions given to ASHAs for data reporting, but many seemed to interpret this as 'report one question from each showing'. A total of 533 questions were reported for the 917 screenings of the first 10 videos. The number of questions per video ranged from 30 to 110, with an average of 53.

By translating the dialogue we can demonstrate that key messages for each video are included; in fact even song interludes have relevant lyrics. However, understanding the script does not help understand how the videos are understood by the mothers watching. Our hypothesis was that translating and coding the questions asked by the mothers after showings would help us understand how the videos were perceived or accepted by the community. Additionally this data would allow us to provide useful feedback to the video production team and dissemination facilitators. For example if many questions involved a particular topic and the topic was discussed in the video that would be a clear indication that the information was not clear or raised concerns in the target population. If many questions involved a topic that was not mentioned in the video maybe that topic should be included in the future or possibly a new video on that topic could be produced.

Tagging video content is an effective means of creating a semantic hierarchy [2] so a web based tool was created that allowed everyone on the project to collaboratively tag questions. The workflow began with translation of the transliterated Hindi versions of each question into English. Once this was done free-form tags could be associated with each question using an autocomplete feature to enhance tag convergence. Additional metadata for each question, such as, if the topic was included in the video, relevant time stamps, and translation notes could be recorded.

The tool we used to analyze the questions evolved substantially during the course of this work as we began to understand the type of information contained in the questions and how to provide useful feedback to all project members with the information available. From the initial prototype we could identify common questions the community had by the frequency of tags for each video. But a tag cloud representation quickly loses structure becoming highly interconnected. This made it difficult to understand the context of an individual question and quickly identify its meaning. A second issue we identified with this initial prototype was that many questions meant exactly the same thing. For example in the Birth Preparedness video 17 question were "Why should the thread be boiled?" and most of these were exactly identical. Treating each of these questions as a distinct entity rather than a group of questions made complicated analysis.

A new version of our classification tool was developed to address these issues. In this version after translation questions could still be tagged, except now the focus of the tool shifted to grouping and categorizing questions into a hierarchy. By first grouping identical questions we simplified the process of further sorting as well as the final analysis. Once grouped each set of questions could then be sorted into a multilevel hierarchy of subjects. This process is very similar to open card sorting where categories are created for objects to belong to as a method to determine relationships within a dataset.

Our tool represents this hierarchical clustering of question groups as a dendrogram where each question appears exactly once. This eliminates the problem of unraveling meaning and structure from a tag cloud which was the primary goal of the revised prototype, however, for any set of data there is no single canonical dendrogram and people may disagree on the correct order. We wanted to be able to preserve these alternate hierarchical structures for each question set and so the tool is designed with the ability to clone dendrograms and quickly alternate between views.
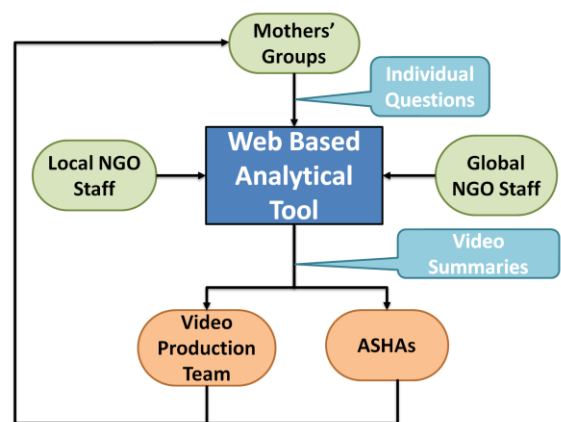


**Figure 1: Information flow for feedback from mother's questions**

**Table 1: Number of questions asked by audience answered and unanswered for four of the DPH videos.**

|  | Questions | Answered | Not Answered | Unknown | Groups |
|---|---|---|---|---|---|
| Immunization | 79 | 23 (63.29%) | 13 (36.71%) | 0 (0%) | 49 |
| Maternal Nutrition | 37 | 19 (51.35%) | 17 (45.95%) | 1 (2.70%) | 20 |
| Permanent Methods of Family Planning | 73 | 32 (43.84%) | 41 (56.16%) | 0 (0%) | 33 |
| Temporary Methods of Family Planning | 51 | 25 (49.02%) | 25 (49.02%) | 1 (1.96%) | 41 |
| Birth Preparedness | 90 | 53(58.89%) | 37 (41.11%) | 0 (0%) | 33 |

An additional design consideration in creating prototype analysis tools was to have it accessible through a web browser. Like many global health projects Digital Public Health is a collaborative effort with individuals working from across the globe and it was essential for all members of the team to be able to integrate into any aspect of the workflow. An important reason for this was because as a multicultural team we want all individuals to contribute towards the analysis and incorporate as many viewpoints as possible. Figure 1 shows the planned workflow for question gathering, analysis and feedback.

## 3    ANALYSIS OF THE DATA

As of July 2013 ten videos had been presented by DPH with a total of 533 questions being recorded. For the purposes of this paper we focused on the five videos listed in Table 1. These videos were selected based on the needs of the project and input from community members. There were a total of 330 questions (62% of all questions) in the sample set. The average number of questions per video for the five videos analyzed was 66 which is above the average of 53 questions per video for all ten videos. When duplicate questions were grouped the total number of questions in the sample dropped from 330 to 176 with an average of 35 groups per video.

Initially we thought that the frequency a question was asked would highlight important topics from the video; but, it turned out that frequency alone was not a good indicator of relevance. Frequent questions tended to be the most general and distinguishing between important and general questions could not be done automatically. For example the most common questions on the Maternal Nutrition video both appear six times and are "What are the advantages of eating more food?" and "Is eating egg required?". The first of these is not very specific and one of the key messages so both the ASHA and video answer it. The second question about eggs would not be very interesting if it only appeared once, but since it is one of the
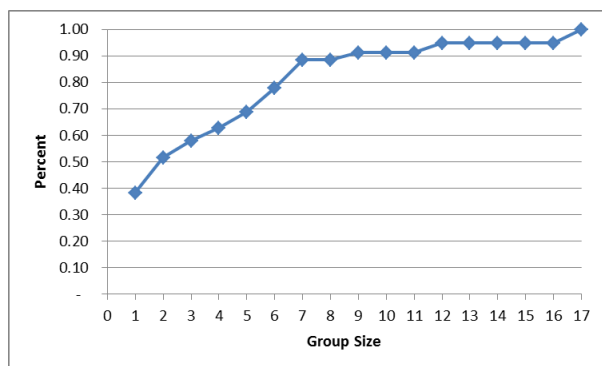
most frequent questions it indicates that there is a potential problem with the key message about eating eggs and follow up questions with the community need to take place.

Similarly the second most common question for the Permanent Methods of Family Planning video is: "Does one get fat after undergoing the operation?" This question appears seven times and weight gain is never mentioned in the video. This indicates a potential concern or misconception of the community and a topic that might be included in future videos. Often the most interesting questions are the not at the extremes. Questions that appear between four and seven times represent 25% of the total. These questions are specific enough to involve interesting content but not so unusual or off topic that they provide little relevant feedback. One example of such a question from the Immunization video is: "When should the vaccine be administered if one misses it?", which was asked four times. It is only by categorizing the question groups into a dendrogram that potential interesting and important questions filter out. Figure 3 shows one fully collapsed dendrogram for the 90 questions in the Birth Preparedness videos. By expanding out the subjects it becomes very easy to understand what issues were of the most concern for the community.

One surprising aspect of this analysis was that 53% of the distinct questions were addressed in the video. The vast majority of these questions appear only once or twice and usually fall into three categories: questions that are tangentially related ("Which are all the deadly diseases?"), questions that are too specific to include in the video ("If the baby is born prematurely, then when should the BCG be administered?"), and questions that are very pertinent and probably should be in future videos ("Can the vaccine be given even if the child is sick?"). Providing a sorted hierarchy of all these less frequent questions allows on site domain experts to plan for future videos and better manage the dissemination of current ones.



**Figure 2: Cumulative percent of questions by group size**
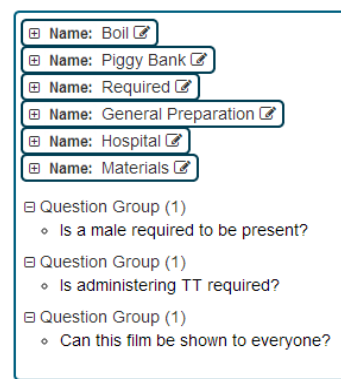


**Figure 3: Collapsed Dendrogram for Birth Preparedness**

# 4 PROPOSALS FOR GIVING FEEDBACK

The preliminary results from analyzing five DPH videos have revealed a complex hierarchy with several interesting trends. In this section we explore potential uses for this data to improve DPH messaging. We see the primary mechanism for feedback as an iterative process of improving the videos as new videos are being created. If a large percentage of questions indicate uncertainty about a central key message in the video than that is an indication that the messaging needs to be improved.

One type of feedback is to clarify topics already in the video that lead to confusion. For example the Birth Preparedness video is currently being reproduced at a new site. One of the key messages of this video is that a piece of thread should be saved and boiled to tie the umbilical cord. The most frequent question in all five videos was "Why is it required to boil the thread?", which was asked 17 times. These seems like a very basic question and going back to the transcript of the Birth Preparedness video we find that nowhere in the video does it explain that boiling is to disinfect the thread. Including this information in the new videos being produced may help clarify this issue.

A second type of feedback to improve future videos is to identify questions about topics that do not appear in the video at all. Examples of this type of questions are those about iron pills inducing vomiting or gaining weight when using certain methods of family planning. These questions indicate that the audience has prior assumptions about the health behavior that are not addressed in the video. If the new topic is very prevalent future videos may want to address it. Or in some cases question topics that are not included in the video may lead to videos on completely new topics.

Another avenue for feedback is to build tools that directly help the ASHAs as they facilitate group video sessions. Typically ASHAs see each video only once before their monthly Mothers' Group meeting. Supervisors can use a list of frequent questions from past showings of the video to better prepare the ASHAs based on predicted concerns. The model for DPH is to focus on a single video each month and this type of feedback can even be used immediately incorporating feedback from earlier showings into the presentation of later showings. An important secondary outcome of DPH is enabling ASHAs to better support their community and creating training materials from the feedback in these collected questions will equip them with answers to questions their community has.

The last major method of using this data for feedback is use the frequently asked and answered questions to produce a video based FAQ on a tablet. This was a primary motivating factor for recording the timestamp in the video where the question was answered or referenced. Such a tool could be used to train ASHAs or in smaller group settings to personalize a viewing sessions to the concerns and needs of the individual mothers watching.

# 5 CONCLUSION

We demonstrate a prototype web based tool to collaborate on the qualitative analysis of questions and propose analysis mechanisms for systematically improving future videos. The design of DPH was motivated by encouraging community engagement and ownership, however, tools are need to provide metric that identify which videos are most effective at disseminating information. We focused on the questions asked during video showings, which was a preexisting data source. Our initial investigation demonstrates that grouping and hierarchy categorization to identify patterns in questions asked can become part of a feedback process for the creation of future videos, dissemination of current videos, and training of video facilitators.

# 6 ACKNOWLEDGEMENT

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