Examining Localization Approaches for Community Health

Aditya Vashistha† Neha Kumar§ Anil Mishra‡ Richard Anderson†

†University of Washington {adityav, anderson}@cs.washington.edu §Georgia Institute of Technology neha.kumar@gatech.edu ‡PATH amishra@path.org

ABSTRACT
We present a mixed-methods study that compares and contrasts two distinct localization approaches for imparting video-based health education to rural Indian populations. Prior research efforts in the Human-Computer Interaction for Development (HCI4D) community have emphasized the value of localization of educational content. Our research uses a combination of focus groups, interviews, and knowledge retention tests to deconstruct what localization means and how it might be incorporated. Our findings highlight how characteristics of localized videos shape the participants’ viewing experiences. For development-focused organizations that leverage video-based learning, our study provides insights regarding the costs and benefits of distinct localization approaches, and offers design recommendations for producing videos that yield greater traction and higher information absorption.

Author Keywords
Health; Video-Based Education; Localization; HCI4D

ACM Classification Keywords
H.5.m. Information Interfaces and Presentation: Miscellaneous

INTRODUCTION
Rural, socioeconomically disadvantaged, and disconnected communities in developing regions face a complex array of socioeconomic barriers, literacy constraints, and infrastructural challenges that impede their access to physical, print, and online sources of information. In India alone, 58% of the population earns less than USD 3 a day [1], 26% of the adult population is illiterate [2], and over 72% of the population does not have smartphones and Internet access [3, 27]. The Human-Computer Interaction for Development (HCI4D) community attends, in large part, to the challenges in imparting new information and inculcating new practices in these resource-constrained communities, frequently in the domain of global health, but also in the realms of education, agriculture, financial literacy, and repair, among others [11]. Recently, many HCI4D researchers have explored video-based storytelling approaches for disseminating information and increasing audience engagement across communities with consistently low literacy rates [24, 25, 28, 32, 34].

Several video-based HCI4D interventions have variously prioritized the situating of language, content, characters, and spatial context [8, 17, 18, 23, 33, 34]. Similarly, there are also examples of large-scale interventions that have been administered across multiple geographic regions without particular emphasis on customization for language and content [4, 5, 6]. Our research aims to unpack the tradeoffs involved in employing these different localization approaches. For example, ‘hyper-localizing’ a video such that it features the neighborhood of individuals [18, 23] that it targets might lead to effective reception and information absorption, but scaling up this approach could prove expensive. On the other hand, approaches that target larger populations at once might be scalable, but they are frequently criticized for their one-size-fits-all approach [15].

In this paper, we aim to understand how two distinct localization processes operate, and break down the notable elements of these design processes for effective uptake of video-based learning. Our final research goal is to leverage this knowledge towards careful design of video-based HCI4D interventions.

To achieve these objectives, we examine the case of video-based maternal health education in rural India, a country with persistently high maternal and infant mortality rates. We identified and compared two public health videos: one was produced by Projecting Health (PH), a maternal and newborn health project running in rural Uttar Pradesh [23], while the second was produced by a UNICEF program for a much larger target audience [7]. PH promotes a ‘hyper-local’ approach to video production, where rural community-based organizations produce videos locally and feature community members discussing health messages in rural areas. UNICEF employs a different approach, where videos with high production aesthetics are produced with professional actors who discuss health information in a high-quality studio set mimicking rural areas. PH focuses on generating a sense of place with its videos, while UNICEF creates a setting that is at once nowhere and everywhere. PH uses the local dialect popular in the targeted villages (Awadhi), while UNICEF uses the dialect of Hindi spoken by higher-income households across several Indian states, also known as the prestige dialect. PH videos feature esteemed community members endorsing the key health messages, while UNICEF videos leverage the appeal of renowned Bollywood celebrities. Despite apparent differences in their approaches to localization, the projects have much in common; both employ frontline health workers to leverage these videos.
in facilitated group sessions with women and men, have common goals, and serve similar target populations. We examine the nature of these similarities and differences in our study.

Prior research in HCI4D literature has emphasized the value of localization [18, 23]. Our research questions how far we might go with this approach, as we consider the dimensions that make videos local. Our comparative study indicates that out of 168 rural participants, a significant majority of 74% chose UNICEF’s video over PH’s video. Deconstructing their responses revealed that high production quality, a well-formed story, use of demonstrations, the prestige dialect, ‘shareability’, and a focus on infotainment were all factors that drew participants to the UNICEF video. Those who preferred the PH video did so due to the presence of a local doctor, information on home remedies, and characters and context they could relate to. Our quantitative findings indicated, in addition, that the UNICEF video resulted in a statistically higher knowledge gain among targeted women. We discuss the lessons learned from our analysis, and offer design recommendations for global development initiatives that engage in localized approaches to video-based learning.

RELATED WORK

We now situate our research in a body of related work on HCI4D and public health, video-based approaches to maternal health education, and localization approaches in HCI4D.

HCI4D and Health

The field of HCI has increasingly begun to focus on understanding diverse, under-represented populations across the globe and designing technologies to improve their lives in meaningful ways, as discussed in Dell and Kumar’s account of HCI4D [11]. Research efforts in HCI4D have leveraged growing technology penetration in the developing world to design interventions in the health [21], agriculture [10], education [37, 20], governance [19], journalism [29], and social media [26, 35] domains, among others. In health alone, HCI4D research target various application areas, such as data collection, access to information, training, disease surveillance, and monitoring of health services [13]. For example, Perrier et al. studied the use of mobile messaging for maternal health in peri-urban Kenya [31]. DeRenzi et al. designed a mobile phone tool that guided Tanzanian health workers step-by-step through the IMCI treatment algorithm [14]. Kumar and Anderson explored the use of mobile phones for disseminating maternal health information [22]. This is a growing body of work that recognizes the importance of a situated, localized approach to design solutions for global health. HCI4D researchers working in other domains also grapple with when and how to localize their intervention.

Video-based Maternal Health Education

Prior research on video-based maternal health education has drawn on the wide penetration and usability of mobile technology. For example, Ramachandran et al. [32] experimented with the creation of short ad hoc videos by health workers using mobile phones to persuade village women to utilize state-provided health services. Fiore-Silfvest et al. [16] studied the use of mobile videos by midwives for patient education during postnatal care examinations. Molapo and Marsden [28] designed a tool to aid rural health trainers in creating instructional videos for training low-literate community health workers in Lesotho. Ladeira and Cutrell [24] highlighted the instructional value of digital storytelling that combines motivational content with narrative framing. Many of these works are motivated by the desire to reduce text dependence and increase audience engagement in communities with low literacy rates. Our work extends existing research by examining how two localization approaches to video-based maternal health education affect users’ engagement and knowledge gain.

Localization Approaches in HCI4D

Several research initiatives target low-resource environments for dissemination of locally relevant content. For example, Frohlich et al. [17], Reitmaier et al. [33], and Bidwell et al. [8] have studied local mobile audio and video content creation for digital storytelling in rural communities of South India, Kenya, and South Africa, respectively. Digital Green [18] — an agricultural non-profit operating in over 7000 villages in India — advocates leveraging locally-produced videos to improve adoption of agricultural best practices among farmers. Similarly, Projecting Health (PH) — a public health project deployed across five blocks in the state of Uttar Pradesh (India) — uses community-led video education model [23] to leverage community resources for local generation, dissemination, and assimilation of visual media. Patel et al. examined the influence of authority on agricultural information dissemination in India, and found that the farmers acted upon the information more when it was provided by locals than by scientists [30].

Several practitioners have also leveraged top-down approaches at scale to provide health information to beneficiaries. For example, Mobile Kunji [6] — a health system deployed by BBC Media Action across Bihar, India — provides well-illustrated cards with image- and text-based life saving information to frontline health workers. The government of Uttar Pradesh uses an Interactive Voice Response system to monitor its mid-day meal program in 75 districts covering 150,000 schools [4]. UNICEF also employs a top-down approach to produce high quality instructional videos for community health that feature the ‘Indian Village’ [7], but makes its decisions on content in collaboration with state and industry level actors instead of community actors.

For resource-constrained global development projects that leverage video-based learning, the costs and benefits of different approaches to video production naturally become of high relevance. We extend prior research by examining localization approaches employed by two video-based health education projects mentioned above: PH and UNICEF videos. A study of these projects affords us an enriched understanding of localization given that the projects have similar goals, target demographically similar populations, but employ different localization approaches. By reflecting on the tradeoffs involved and deconstructing the dimensions of localization, our research also allows us to make design recommendations for video-based HCI4D interventions that aim to use localized content. We outline the takeaways of our study so that these projects may take a more informed approach.
METHODOLOGY

We now present our methodology for conducting the comparison study. First, we describe how we selected the videos that formed the basis of our study. We then describe our qualitative and quantitative approaches.

Video Selection

UNICEF produced a video series titled *Kyunki Ammaji Kehti Hai*¹ to provide maternal and child health information to parents and caregivers in rural India. Our research team did a rigorous inspection of 42 UNICEF and 80 PH videos, and used several layers of filtering to identify two comparable videos. First, we discarded seventeen videos from the UNICEF repository that addressed topics not covered by PH videos. We then discarded two videos that were not relevant to both women and men in rural settings (e.g., menstrual hygiene) or included sensitive information (e.g., family planning). We then discarded sixteen videos that offered information that was commonplace in rural India (e.g., breastfeeding) so that it is easier for us to measure comparative knowledge gain for both approaches. We then matched the remaining seven UNICEF videos with an equivalent PH video. We discarded six video pairs where the number or content of key messages, or video length were different. The final two videos focused on treatment for diarrhea and were roughly 11 minutes long.

Qualitative Methods

Our primary instruments for this study were focus groups and interviews (see Table 1). The focus groups and interviews took place at eight locations, such as community health centers, homes, and school buildings, in an area of 205 square miles in rural Uttar Pradesh². In India, states are divided into multiple levels of hierarchy for administrative purposes: villages, Gram Panchayats (GP), blocks, and districts. For example, a GP in Uttar Pradesh includes roughly three villages, a block has 63 GPs, and a district has 11 blocks. We conducted research activities at each of these levels to examine the definition of local and the impact of localization on people’s perceptions.

The first author (male, 30 years, native Hindi speaker) conducted focus groups and interviews in Hindi. Since people in the study area also speak Awadhi (a local dialect of Hindi), a three-member support team fluent in the local dialect accompanied the first author. We selected participants who were previously unaware of the existence of PH- and UNICEF-produced videos in an effort to mitigate bias. To ensure that participants do not associate us with one of the two videos and give biased feedback [12], we explicitly stated that we produced both videos and wanted feedback to understand which one is better and why. We framed our questions to compare the videos with each other than to elicit individual feedback on any. This mitigated the response bias even when participants associated us with both videos. We randomized the order in which participants viewed the videos and requested them to observe differences between the videos. We asked them to report their preferences verbally during interviews and by show of hands during focus groups. We used a set of pre-defined questions and followed-up with specific questions on topics that emerged during the discussion.

Focus groups: We conducted 16 focus group discussions: eight with low-income women in remote rural areas, two with low-income men, two with community health workers, two with mobile shop owners (MSOs) in rural areas, and two with staff of video production agencies. The number of participants in these focus groups varied. Since low-income women are the direct beneficiaries of videos produced by PH and UNICEF, we conducted focus groups with 97 women (see Figure 1) who were 30 years old, on average. Ninety of them were married, 32 were new mothers, and seven were pregnant. Almost half of them were completely illiterate. We also conducted focus groups with 25 low-income men since prior works have identified men as key decision makers for family health [32, 33]. A majority of them were farmers and laborers. Twenty men were married, and ten had a pregnant woman or a new mother in their family. The mobile phone penetration among women and men was 50% and 80%, respectively. Almost a quarter of them watched videos on their phone.

Because both projects distribute these videos through a network of community health workers, we conducted focus groups with 10 Accredited Social Health Activists (ASHAs) — local women trained to disseminate health information — who were also 30 years old, on average. All of them owned a phone and seven watched videos on their phone. We conducted focus groups with 12 MSOs to understand which video could be more appealing for the target beneficiaries since previous research has identified them as experts with a deep understanding of media needs of rural communities [22, 36]. All of them were male (24 years old, on average) and tech-savvy; they

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¹“Kyunki ammaji kehti hain” is a Hindi phrase meaning “because the elderly woman says so”

²See [http://bitly.com/studyarea](http://bitly.com/studyarea)
owned a smartphone and laptop, and used the Internet. We conducted focus groups with 12 staff members of PH’s video production team to examine how they perceive the benefits and limitations of the two localization approaches. All of them lived in villages or small towns in our study area, had completed their bachelor’s degree, and used the Internet. Each focus group lasted around 75 minutes.

**Interviews:** After we completed all focus groups, we conducted 12 interviews with low-income women in rural areas to investigate the high-level themes that emerged during the focus groups. All women participants (38 years old, on average) were married. Two women were illiterate, three had completed primary school, four had completed middle school, one had completed high school, and another had a bachelor’s degree. Two women worked as laborers, one in a private job, and the remaining were homemakers. They came from families of laborers, farmers, shop owners, and auto drivers with an average family size of 5.7 people and average monthly family income of USD 110. One woman was pregnant while four were new mothers. Eight women owned a mobile phone and five watched videos on their phone. Each interview lasted around 45 minutes.

**Analysis:** To analyze the data collected during our focus groups and interviews, we engaged in regular discussions to make sense of findings and iterate on our questions. Interview transcripts were translated to English and analyzed along with our field notes. We subjected our data to thematic analysis as outlined in [9]. All authors analyzed the data and iterated through the findings as a group.

**Quantitative Methods**

To measure the effect of localization approaches on knowledge retention, we used a pretest-posttest-retention test control group design. We designed the experiment with two balanced groups – the first group was shown the PH video and the second was shown the UNICEF video. At each focus group session with women, we requested attendees to (voluntarily) take a pretest and posttest. The first five volunteers were assigned to one of the two experiment groups randomly. We worked with three veteran health experts to design a knowledge pretest to include 12 objective questions that could be answered by watching either video. For the posttest, we randomized the order of questions and responses in the pretest. Each experiment group took the pretest, watched the video assigned to it with all focus group participants, and then took a posttest. Literate participants completed the test on paper while our support team conducted an oral test for illiterate participants. Once the five participants finished the posttest, we showed the second video to all focus group participants and conducted the session.

We recruited 40 women to participate in the pretest-posttest-retention test control group design. We controlled for age, family size, and education. Table 2 shows participants’ demographics. The majority of women who volunteered to participate in our knowledge retention test had studied at least until middle school. They were thus more likely to understand the prestige dialect than less literate women, which may have biased our findings in favor of the UNICEF video.

**FINDINGS**

Among 168 participants of 16 focus groups and 12 interviews, a high majority of 74% (N=124) preferred the UNICEF video while only 26% (N=44) found the PH video more appealing. Table 3 presents the number of participants at each geographic level, and their preference between the two videos conveyed during the focus groups and interviews. The UNICEF video was preferred by all stakeholders at each geographic level except the GP where the PH video was produced. We now present video characteristics that were considered salient in our participants’ responses, how they were localized, and how they affected participants’ perception, preferences, and knowledge.

**Local Dialect vs. Prestige Dialect**

PH used Awadhi, a local dialect of Hindi popular in the study area, with the intent that these videos would be relatable for as many in the target blocks as possible. UNICEF, on the other hand, used the prestige dialect of Hindi, generally used by literate people in middle- and high-income households across several states in India. Over 80% of participants found dialect to be the key difference between the videos. Though a majority of them could understand both dialects, we found a significant preference for the prestige dialect (N=93) over the local dialect (N=39). Table 4 shows that all stakeholders preferred to watch videos in the prestige dialect.

Women who preferred the prestige dialect did so because they found it clear and easy to understand. They believed that everyone, including “city dwellers as well as village dwellers, the literate as well as the illiterate,” understood the prestige dialect, and attributed this to the popularity of Hindi soap operas. Several MSOs stated that a majority of their customers demand movies and songs in the prestige dialect. A few women considered themselves to be “city people who are misfits in a rural community” and found it natural to use the prestige dialect. Others felt that the local dialect used in the PH video is spoken by “unsophisticated and uneducated people”. One of them stated:

“It appeared that literate people like us are having a conversation with each other in the UNICEF video. Anyone can easily understand Hindi. But women in the PH video were speaking like illiterates and villagers.”

P1 (Women interviewee, different block)

Several participants recommended us to produce new PH videos in the prestige dialect. They believed that produc-
<table>
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<tr>
<th>Activities</th>
<th>Location</th>
<th>Summary</th>
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<tbody>
<tr>
<td></td>
<td>Same GP</td>
<td>Different GP</td>
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<tr>
<td>Women focus groups</td>
<td>2 sessions</td>
<td>2 sessions</td>
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<td>2 sessions</td>
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<td></td>
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<td>8 sessions</td>
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<td>Men focus groups</td>
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<td>MSOs focus groups</td>
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<td>ASHAs focus groups</td>
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<td>Video prod. team focus groups</td>
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<td>12 interviews</td>
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</table>

Table 3. Number of participants who preferred the PH video and the UNICEF video during focus groups and interviews conducted at different geographic levels. *Same GP* column refers to the focus groups and interviews conducted in the Gram Panchayat (GP) where the PH video was produced, *Different GP* column refers to the activities conducted in another GP in the same block where the PH video was produced, and *Different block* and *Different district* columns presents the activities conducted in a different block and district, respectively, in relation to where the PH video was produced.

<table>
<thead>
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<th>Stakeholders</th>
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<th>Prestige Dialect</th>
<th>No preference</th>
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<td>23</td>
<td>41</td>
<td>33</td>
</tr>
<tr>
<td>Men FGs</td>
<td>5</td>
<td>18</td>
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<td>4</td>
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<td>1</td>
<td>9</td>
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<td>1</td>
</tr>
<tr>
<td>Women interviews</td>
<td>3</td>
<td>9</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 4. Preferences of participants for the local and prestige dialect indicated during focus groups (FGs) and interviews.

“People in villages want their children to speak the prestige dialect. Several women speak Hindi while conversing with their children so that the children don’t get into the habit of speaking Awadhi. Some women learn Hindi from their kids. Prestige dialect speakers are idolized.”

P2 (Male, project coordinator, different GP)

Several staff members preferred the prestige dialect since they believed that its use would motivate people to watch health videos more carefully.

We also found some support for the local dialect. Though many illiterate and old women could understand both dialects, assimilating information in the local dialect was effortless for them. They found the local dialect more relatable and entertaining. They believed that their neighbors would find it difficult to understand the prestige dialect, primarily because of their limited education. In a focus group session, the first author was unable to understand an old woman speaking in the local dialect. When the author requested help from the support team, the woman exclaimed: “When you are unable to understand what I am saying in a dialect unfamiliar to
you, how would I be able to understand what women in the [UNICEF] video are saying.” Three staff members concurred that older people enjoy watching PH videos predominantly because of the use of local dialect in them. Other reasons also contributed to the preference for the local dialect. Some participants associated the local dialect with their culture and history, and felt an obligation to conserve and promote it. Others believed that designing videos in the prestige dialect defeats the purpose of the intervention. An ASHA stated:

“If I speak in Hindi with women who speak Awadhi, they say ‘From where has this madam come? Does she not live in the village?’ Old women and low-literate women still like to converse in the local dialect. Literate people already go to a hospital. That’s why the local dialect should be used to increase awareness of illiterate people.”

P3 (ASHA, different GP)

Four MSOs and a staff member suggested using a combination of the local and prestige dialects. They wanted videos to mimic the real world where the illiterate use the local dialect, and doctors, nurses, and literates speak the prestige dialect.

Aspirations vs. Association
Both PH and UNICEF aspired that their beneficiaries feel an association with their videos. Since both projects use different localization approaches, the videos inherited distinct properties which influenced participants’ perception and preferences.

Our thematic analysis revealed that 42 women, nine men, nine ASHAs, and two MSOs labeled the PH video “rural video” and the UNICEF video “urban video.” They could discern that the PH video was shot in an actual village, while the UNICEF video was shot in a studio. Several participants felt a sense of association with the women, surroundings, and story in the PH video. They found the UNICEF video too manicured and reported never seeing “such a clean bowl, spoon, and water jug” or “fancy pots and chairs” in their community. A woman stated:

“I could see cows and farms in the PH video. The health center in the UNICEF video is so different from ours. It looks like a set used in TV serials.”

P4 (Women focus group session, different GP)

Several participants also perceived differences in actors’ appearances (see Figure 2). They noted that women in the PH video were from villages and women in the UNICEF video were from urban areas — a clear effect of the localization approach. Others noticed differences in age and education. They found women in the UNICEF video to be young and educated, and women in the PH video to be low-literate and middle-aged. Some participants termed the PH video “rural” because it prescribed home remedies and used the local dialect. Other participants attributed differences in storylines to the rural-urban distinction. A woman stated:

“Women in a village take their sick children first to neighbors and ASHAs. But children are taken to a hospital in the cities. This is what is shown in the two videos.”

P5 (Women focus group session, different block)

Nine participants observed differences in production quality and labeled the two videos as “hi-tech vs. lo-tech.” The PH video was seen as a workable solution, inferior to the UNICEF video in quality, resources, and final outcome. Six participants distinguished between the two videos in terms of “old vs. young.” They found the PH video to be more suitable for older people and the UNICEF video for the young. Five participants termed the videos as “illiterate vs. literate” because of the dialects used in the videos.

Though the participants could relate more to the surroundings, actors, and storyline in the PH video, we did not find a strong correlation between association and video preference. The “state-of-the-art” understanding regarding localization in the HCI4D domain claims that information from community members is valued more than information from experts due to the association factor [18, 23, 30]. Despite high association with the PH video, many participants still preferred the UNICEF video because they found it unique, entertaining, and aspirational. Several (women) participants found the women in the UNICEF video to be “educated and sophisticated,” and aspired to appear and speak like them. An MSO stated:

“My customers will prefer the UNICEF video. It is more entertaining, just like a movie or TV show. People in the villages feel jealous when their friends come back from a city and start speaking the prestige dialect. They want to see and share content in the prestige dialect.”

P6 (MSO, different block)

Aspirations and drive to access entertainment trumped association to play a key role in affecting video preferences, but not always. Some participants preferred the PH video because they could relate to women featured in it due to the similarity in their dressing style and mannerisms. A woman stated:

“You in the PH video were dressed like me. The way they called the meeting, how they were sitting and talking, the place it was conducted, all seemed familiar. Women in the UNICEF video wore heavy make-up and looked like actors. They were wearing a salwar kameez. That’s weird. No married women wear such attire here.”

P7 (Women focus group session, same block)

Locally Sourced vs. High Production Quality
Participants found stark differences in the technical production quality of the two videos. They strongly preferred the UNICEF video because of its high production aesthetics. Thirty-nine participants found the audio and video quality of the UNICEF video far superior, almost akin to a Bollywood film. The staff members considered video quality to be the key factor that affected people’s preferences in rural regions. They believed that
people would willingly replay the aesthetically shot UNICEF video and thus, would hear the key messages repeatedly. Some participants reported sound mixing issues in the PH video that worsened their experience with it. MSOs were concerned that the low-quality PH video would be pixelated on smaller form factor feature phones, which are ubiquitous in rural areas.

Participants also found differences in the acting skills of artists. While UNICEF had the resources to hire trained actors, the PH video featured unexperienced local residents-turned-actors. Forty-seven participants explicitly expressed their admiration for actors in the UNICEF video and found them engaging. Compared to the UNICEF video, several participants found the dialogue delivery of the PH video’s actors to be fast, monotonous, and unclear. A staff member reported:

“The expression and body language of actors is fantastic in the UNICEF video. They are confident, expressive, act naturally, and know what they are doing. They are well-dressed and have also put on make-up. The PH video has a straight dialogue delivery.”

P8 (Female, video production team, different block)

The high production aesthetics also impacted the story and entertainment value of the UNICEF video. UNICEF hired professionals to produce videos that were informative, engaging, and entertaining. PH, on the other hand, hired local talent with a solid understanding of the rural context but limited exposure to screenwriting skills. Though the PH video’s storyline was more grounded in the local culture, it was replete with health information. For this reason, 13 participants found the PH video to be overwhelming, and preferred the UNICEF video that found a balance in offering useful information and entertainment. Fifty-two participants preferred the story of the UNICEF video, while 21 participants preferred the PH video’s storyline. The PH video showed an enterprising ASHA conducting a mothers’ group meeting. Several participants saw a reflection of their ASHA in her, and thus could relate to the story. They appreciated that women in the PH video assembled for a group discussion with ASHA and were taking preemptive actions to prevent diarrhea. An elderly woman who liked the story stated that showing such group discussions will set a precedence and awareness for women’s group meetings.

Ninety-four participants found the UNICEF video more entertaining because of effective use of drama, facial expressions, and variations in dialogue delivery and background score. Many described the UNICEF video as a “television serial with important health messages.” On the other hand, 27 participants found the PH video more entertaining because it was shot in a village similar to theirs and had people speaking the local dialect. Nineteen of them were locals in the GP where the PH video was produced.

The content and presentation style were also affected by the choice of localization approach. The high-skilled UNICEF production team used demonstrations to make the key messages more salient. Thirty-five participants preferred the UNICEF video because it demonstrated how to give ORS solution and zinc tablet, while the PH video merely offered a theoretical discussion. Several participants reported that the demonstration not only increased their understanding of the treatment, but also boosted their confidence that they could do it themselves if and when necessary. The staff concurred that people adopt health practices when they see it rather than when they hear or read about it. A woman participant stated:

“After watching the PH video, no one knows how a zinc tablet should be given. However, the demonstration in the UNICEF video leaves nothing to imagination.”

P9 (Woman interviewee, different district)

The localization approach used by the PH video leveraged information on home remedies that use ingredients available in the region. Thirteen participants preferred the PH video for this reason. The access to information for use in the local context made the video more appealing to them. Four women stated that the treatment using home remedies seemed more achievable in rural areas. Five staff members considered the information on home remedies as a key strength of the PH video.

Local Experts vs. Famous Celebrities

While the UNICEF video chose the endorsement of a famous Bollywood actress, the PH video leveraged the popularity and expertise of a local male doctor to engage a wider audience. The differences between the two endorsers were noticed by several participants. Over a hundred participants recognized Raveena Tandon but only 38 participants recognized the doctor. Despite the high popularity of the actress, 91% of participants preferred the doctor to repeat key health messages. Many participants understood the information from the doctor better because he shared home remedies in the local vernacular. Unlike the actress, he was perceived as a trustworthy resident health expert. A woman reasoned:

“If I want any information, if I need consultation, if I need medicine, I can always go to a doctor. How will I go to Raveena Tandon if I have any questions?”

P10 (Women focus group session, same GP)

Many participants felt that the actress lacked expertise to deliver health information and was repeating what was asked by the director. They saw her as an outsider and could not connect with her at a personal level. They also believed that she would be unable to empathize with them and understand their problems. A woman stated:

“What Raveena Tandon is saying is not wrong. But we don’t know her. She does not live here. We haven’t met her in person and that is why I trust her opinion less.”

P11 (Women focus group session, different GP)

A few male participants preferred the actress because they were her fans. They believed that any health information shared by the actress has to be accurate. Others preferred her delivery style to the doctor’s. Two participants initially thought that the actress was a doctor and preferred her over the doctor in the PH video because of her speaking skills. However, they changed their vote soon after realizing that she was an actress. Three women participants preferred the actress
because they wanted a woman to share maternal and child health information with them.

Given the strong preference for the doctor, we explored whether participants saw any benefits of featuring celebrities in health videos? MSOs believed that several people would watch the videos repeatedly only to see their favorite celebrities and thus, would indirectly get exposed to important health information. A staff member concurred that people in rural India are greatly influenced by celebrities and may adopt new health behaviors if a celebrity says so:

“If a celebrity endorses hair gel, then people will use it even if they lose hairs. New generation believes in celebrities more than doctors.”

P12 (Female, project coordinator, different block)

We asked participants who they would trust more: Raveena Tandon or a doctor they have never seen before? Though some people voted for the actress, the majority still preferred an unknown doctor. On several occasions, we heard sentiments like “a doctor is the one who saves lives and an actress is the one who acts.” A staff member expressed:

“People associate comedy, dancing, and acting with an actress rather than health expertise. A person wearing white coat, even if s/he is not a real doctor, is taken more seriously than anyone else when it comes to health.”

P13 (Male, project coordinator, different GP)

An MSO and three staff members highlighted the importance of endorsements from local celebrities rather than local people known only in their village or mainstream celebrities known all across India. A staff member stated:

“The best is to feature people who are popular even in nearby villages and are approachable. People should be able to make a personal connection with them unlike the Bollywood actors. Such local celebrities can be a village head or local doctor or social activist.”

P14 (Male, project manager, different block)

**Shareability**

We asked participants to select one of the two videos they would like to share with their friends and family. We then compared it with their preference for themselves. Surprisingly, more participants preferred to share the UNICEF video with their social connections (N=133) than those who preferred it for themselves (N=124). This further attests that participants found the UNICEF video more engaging.

The comparison revealed that 25 participants selected a different video to share with their friends and family than the one they preferred for themselves. Fifteen of them changed their vote to share the UNICEF video since they wanted to share content that has high ‘infotainment’ value and demonstrations, and is new and relatively difficult to access. A woman stated:

“We can always see the PH video or go to meetings. However, we will not get access to the UNICEF video, produced outside the village. The content in it is not what people normally see so they will like it more.”

P15 (Women focus group session, different district)

Two participants opted to share the UNICEF video, since they wished to augment their social reputation by sharing a high quality video in the prestige dialect. They wanted to project themselves as more knowledgeable and sophisticated in their community. A woman expressed:

“I would like to share the UNICEF video with my friends so that they will easily understand it and also because they like to watch videos that are in Hindi.”

P16 (Woman interviewee, different block)

Among the participants who changed their vote, eight opted to share the PH video with their friends and family. Three of them believed that the local dialect would make it easier for their social connections to understand the information. One participant wanted to share information on home remedies. Another participant wanted to show the acting skills of familiar local doctor to her family members. Since the PH video showcased rural women discussing health issues in a public space, a woman wanted her family to realize that she should go out and have discussions with others. Two ASHAs opted the PH video because it featured an enterprising ASHA dispensing her responsibilities. The ASHAs wanted their family to appreciate the importance of their work.

**Knowledge Retention**

Since both videos had identical key health messages, we conducted a pretest-posttest-retention test control group design to measure the effect of both localization approaches on short-term knowledge retention. To evaluate if videos were effective in increasing participants’ knowledge, we treated the pretest score and posttest score for both groups as a within-subjects design intervention with video as the factor with two levels — before watching the video and after watching the video — and score as the dependent variable. We used a paired samples t-test to analyze the result and found a significant difference in the pretest score (M = 6.65, SD = 1.95) and the posttest score (M = 9.1, SD = 1.89) for women who saw PH video; t (19) = -4.71, p <0.001. We also found a significant difference in the pretest score (M = 6.4, SD = 2.87) and the posttest score (M = 10.5, SD = 1.88) of women who saw the UNICEF video; t(19) = -6.952, p <0.001. These results suggest that both videos were individually effective in increasing participants’ short-term knowledge.

To understand which video is more effective in increasing knowledge, we compared the difference in the pretest score and the posttest score (i.e., gain score) for both groups. We used an independent samples t-test for analysis where video was the factor with two levels — PH video and UNICEF video — and the gain score was the dependent variable. We found a statistical difference in the gain scores for the PH video (M = 2.45, SD = 2.33) and the UNICEF video (M = 4.05, SD = 2.60), t (38) = -2.048, p = 0.0475 (p <0.05). These results suggest that the UNICEF video resulted in higher knowledge gains than the PH video.
DISCUSSION
Our work compares and contrasts two video-based education approaches that prioritize localization along different dimensions, as emphasized in our findings. Almost 74% of all participants preferred the UNICEF video, 78% found the UNICEF video more entertaining, 71% preferred the prestige dialect of Hindi over the local dialect, and 91% preferred endorsements from the local celebrity rather than the Bollywood celebrity. We examine these preferences below, discuss the challenges with local approaches, and present recommendations for localization of video-based HCI4D interventions.

Local is Relative
Local approaches for video production focus on adapting features, including content, actors, characters, language, surroundings, and culture, to a community or region. However, the definition of local is nebulous and continually evolving, depending on what it is being compared with. To some participants in our study, local meant their village, while to others it meant their block, district, state, and some perceived anything they were familiar with as local.

Since a majority of the participants preferred the UNICEF video, we narrowed the definition of local to understand the effects of hyperlocality. We asked participants which video they would prefer: the UNICEF video or a hyperlocal video that is shot in their village with familiar people sharing health information in their dialect? Sixty-five participants (49%) preferred the hyperlocal video because they valued the ability to seek clarifications on key health messages anytime, especially when people from their village were part of the video production process. They placed more trust in health information coming from neighbors and wanted to see them in videos. They believed that the hyperlocal video would increase their social status in the village, and thus people would take her advice more seriously:

“When I share information with people in my village, they don’t always listen carefully. But now when they will see me in a video, they will know that ASHAs are doing important work and are featured in the videos to give information. This will increase our motivation.”

P17 (ASHA, different block)

Fifty-one participants (38%) reported that it did not matter to them where the video is produced and what local attributes it has as long as the video is entertaining, easy to follow, uses familiar dialect, and offers useful information. Seventeen participants (13%) stated that the hyperlocal video would still be less appealing than the UNICEF video because it would be impossible for it to match the quality of the UNICEF video. They preferred the UNICEF video because it was divergent from their daily lives. They believed that the excitement of seeing familiar faces from their village in a video would wear off easily. A participant stated:

“If familiar faces are there in the video, people might see it a couple of times. However, I think, the excitement to see familiar faces will wear off easily and then all that would matter is the quality and content of video, in which the UNICEF video is a clear winner.”

P18 (MSO, different block)

To assess the meaning of localization for both videos, we analyzed three attributes of the PH video — video preference, participants who knew any local actor, and participants who knew the local doctor — across all geographic levels where we conducted our activities. Figure 3 plots the attributes spatially based on the shortest distance (in Kilometers) of study locations from the village where the PH video was locally produced. The percentage of participants who preferred the PH video and participants who could recognize an actor dropped drastically as we moved farther away from the Gram Panchayat (GP) where the PH video was produced. Similarly, the percentage of people who knew the local doctor also dropped as we moved away from the block where the PH video was produced. This indicates that the effect of localization is the most within the radius of a GP.

We also found qualitative evidence for the scope of locality to be defined as a GP. Seven staff members and three ASHAs concurred that hyperlocal videos are very popular even among other villages in the vicinity, since people often know others in their GP through interactions in local elections and social functions. They believed that once a video crosses the boundary of a GP, it doesn’t matter where it is made, provided people can understand the language. We call on the analogy of wedding videos here — while these are valuable for those in the wedding party, the local nature loses its value beyond this group. We acknowledge that this definition of local may only be relevant in the Indian context, but encourage researchers working in alternate geographies to assess for themselves what local means, as they embark on projects that uses video-based education.

Challenges with Local Approaches
We found wide disparity in the resources available to both projects. Several PH staff members complained about the lack of resources. They found it challenging to get local people to act and get approval from their family. They reported that community members had no prior training and limited time for rehearsals. Though initially rural residents are keen to act, their enthusiasm wanes as the shoot proceeds. The staff members expressed interest in experimenting with monetary incentives, make-up, and finer costumes to improve the production quality and motivation of local actors rather than relying on their enthusiasm or pro bono actions. They believed that access to...
more resources will allow them to produce videos of quality comparable to the UNICEF video.

Scalability is an important consideration when the resources are scarce. The hyperlocal approach requires tremendously more resources to build and maintain grassroots setup, and to replicate video production efforts in multiple geographic locations. Therefore, it is important for local approaches to not only improve their production aesthetics, but also maintain the balance between scalability and localization.

**Implications for Community Health Video Design**

Our study has several implications for video production approaches seeking to provide community health in rural settings. We found that presentation style and content, driven by the localization, plays an important role in increasing the appeal of health videos. In addition to providing standard medical advice, the videos could feature home remedies and demonstrations. To yield higher information absorption, a ten-minute video should include no more than three key health messages.

Several participants did not want only information akin to the PH video or entertainment akin to a television soap opera. They wanted infotainment — a mix of information and entertainment — which the UNICEF video offered. Since local approaches may have limited production skills, training workshops for local scriptwriters could be organized by street theater artists to improve storytelling skills. The screenplay could be made more engaging by seeking feedback from community members. Our study revealed that people preferred videos that have high production aesthetics. Though the constrained availability of high quality video production equipment and skilled talent might make it difficult for local approaches to improve technical production quality, they could provide monetary compensation, certificates and finer costumes to motivate people from villages to act well. We encourage researchers to examine intrinsic and extrinsic motivations that could improve participation of rural residents in community-led video education interventions.

We observed that PH videos feature people who are generally unknown outside their village and UNICEF videos feature television actors and Bollywood celebrities. Several participants highlighted the importance of featuring local celebrities — local people who are approachable, popular in nearby villages, and with whom people can associate — rather than either local people less known outside their village or mainstream celebrities. For future video production employing local approaches, we suggest identifying local celebrities to act in these videos to make the videos more appealing across several villages. Though endorsements by Bollywood actors certainly attract a larger audience, participants exhibited a deep trust in local celebrities and strongly preferred endorsements from a medical practitioner. Thus, we recommend that local doctors and/or nurses must be included in future videos. We also encourage researchers to examine how the popularity of local and global celebrities could be leveraged together to increase the appeal and adoption of health practices.

Hindi is spoken by more than 422 million people in India. However, this includes tens of millions of people who consider their language to be a dialect of Hindi. The region of our study speaks Awadhi (a local Hindi dialect) that has an estimated 35 million speakers throughout India. Even for Awadhi, there are variations in the dialect within blocks and districts, making it difficult to truly localize the dialect without seriously sacrificing scalability. We found Awadhi to be more inclusive of people who are old and/or less literate. However, several participants preferred Hindi because of its association with higher social status, knowledge and education. The use of local dialect may reap more benefits when it is significantly different from the mainstream dialect. For future video productions, we recommend a careful assessment of whether using the local dialect would truly be beneficial, given the value attached to the prestige dialect by many among the target population.

**Limitations of Our Work**

We were able to examine various elements of localization but for the role played by community engagement in both cases. It is likely that PH has greater enrollment among the rural residents because it is a project several in the community have participated. In selecting participants who were unfamiliar with PH, we might have unintentionally introduced bias, for it is likely that those familiar with PH’s history would feel a greater sense of ownership towards PH, which is not a factor we assessed. Additionally, identifying equivalent videos for our study was a non-trivial exercise. We were constrained to carefully select existing videos from PH and UNICEF repositories that focused on the same health topic and had identical key messages. We also needed to avoid videos on topics that the community was overly familiar with or sensitive topics. Our results are therefore based on a comparative analysis of two videos. Future work could bring additional localization approaches to the fray.

**Conclusion**

For resource-constrained global development organizations that leverage video-based learning, our study provides insights regarding the costs and benefits of diverse aspects of localization approaches for imparting knowledge. By examining audience response to two videos targeting identical population groups but utilizing disparate approaches to locali-

zation, we were able to analyze receptivity to a host of video-making decisions, including choice of settings, actors, language, pedagogical tools, and more, also highlighting the difference in resultant learning gains. We believe that the enriched understanding our study provides will aid the choices that future approaches make, modulo budget constraints.

Our qualitative findings indicated that most of our rural Indian participants preferred high production quality, a well-formed storyline, the use of the prestige dialect, pedagogical techniques, ability to share content, and a high infotainment quotient. Those who liked PH’s localization approach appreciated the presence of a local trusted authority (the doctor), information on home remedies, and characters and set-up they could relate to. Our quantitative results indicated that the UNICEF video led to statistically significant knowledge gain among participants.
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