

# Engaging Feminist Solidarity for Comparative Research, Design, and Practice

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Research in the fields of Computer Supported Cooperative Work (CSCW) and Human-Computer Interaction (HCI) is increasingly embracing and moving across borders. While universalism in such research is widely rejected, sole focus on the “particular” is also commonly critiqued. Kentaro Toyama unpacks this tension, calling for balance via “deliberate efforts to understand the interplay of human universals and cultural differences, and how it pertains to design.” In this paper, one such deliberate effort, we introduce the notion of feminist solidarity—as theorized by Chandra Mohanty—for drawing connections across borders in CSCW and HCI research, design, and practice. To enable contributions in these fields to cross cultures and geographies in productive ways, we draw attention to commonalities in the struggles and processes of resistance operating in different contexts of study. To do this, we present lessons learned from conducting three comparative studies in six contexts, which were located across various borders. The primary contribution of our analysis is to leverage a feminist solidarity-based approach towards extending conversations on comparative, transnational, and feminist CSCW and HCI research, design, and practice. Our focus remains on resource-constrained regions across the world, in both the Global North and South.

CCS Concepts: • **Human-centered computing** → **HCI theory, concepts and models**.

Additional Key Words and Phrases: Feminist Solidarity; Research; Design; Practice; HCI4D; ICTD

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## 1 INTRODUCTION

The fields of Computer Supported Cooperative Work (CSCW) and Human-Computer Interaction (HCI) are increasingly crossing borders in the context of technology research, design, and practice (e.g., [22, 53]). Universalism in these undertakings is widely rejected, as seen in Dourish and Mainwaring’s assertions in their essay on “Ubicomp’s colonial impulse” [20], and domains such as HCI for Development (HCI4D) have developed to examine understudied cultures and geographies [15, 37]. At the same time, a sole focus on the “particular” is also commonly critiqued, conveyed in

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Toyama’s call for “deliberate efforts to understand the interplay of human universals and cultural differences, and how it pertains to design” [93]. Understanding how lessons learned in one context might effectively translate across cultures and geographies requires us to develop comparative approaches that can both recognize and transcend difference, and even “different kinds of difference” that characterize intersectionally diverse contexts [108]. Proposing one such comparative approach for conducting research, design, and practice is the contribution this paper aims to make.

We engage Chandra Mohanty’s notion of *feminist solidarity* to draw connections across borders in research, design, and practice [70]. In proposing this notion, Mohanty aspires towards transnational feminist collaboration—going beyond the developed-developing or Global North-Global South dichotomies to arrive at a fuller theorization of feminism, a “feminism without borders.” Mohanty investigates contexts of globalization with a view to “decolonize theory” and argue that marginalized populations across the world have shared struggles or *common differences* that may be productively held alongside each other—in *solidarity*—to arrive at an enhanced understanding of both. She suggests that this scrutiny of experiences of oppression and resistance allows us to imagine how events unfolding in one context might inform possibilities in another. We draw and extend Mohanty’s theory to propose feminist solidarity as a mindset that might assist CSCW and HCI researchers, designers, and practitioners situated in locations across the world, in interfacing with variously diverse populations. By engaging feminist solidarity, and aligning on common differences, we believe these communities can learn to effectively leverage historical experiences of one context to illuminate research questions, design goals, and ideas for interventions in another.

The CSCW community has been increasingly concerned with issues of equity and inclusion, engaging with intersectionally diverse realities and theorizing around social justice (e.g., [22, 29, 54, 89, 94]). Conversations around feminist solidarity have thus surfaced, through scrutiny of shared struggles against the backdrop of such realities. For example, Dye et al.’s workshop at CSCW 2018 on *Solidarity Across Borders* [22] was aimed at fostering solidarity through brainstorming and discussing how we might demarginalize the research (as well as researchers) variously located on the “margins” of digital existence. Also in 2018, Ismail and Kumar investigated the feminist solidarity exercised among community health workers in urban India as they provide each other with continued support and encouragement to thrive in a routinely challenging environment [42]. In this paper, we deepen our engagement with the notion of feminist solidarity, and make recommendations for employing it in comparative research, design, and practice.

To demonstrate how researchers, designers, and practitioners might cross cultures and geographies in productive ways by engaging feminist solidarity, our paper offers three comparative studies across six disparate contexts. In each of these comparisons, we draw attention to commonalities in struggles and processes of resistance that we have studied, and present lessons that we learned. Taken together, these comparisons demonstrate how feminist solidarity reveals valuable and actionable lessons for research, design, and practice, without erasing the “particular.” Such an approach becomes relevant when we are able to identify commonalities in struggles and processes of resistance across contexts otherwise disparate, to understand and devise new ways in which technology might disrupt systems of oppression at play (e.g., struggles of women of color in the United States and of Ecuadorian women of color, on account of race/gender/class, may inform one another despite the cultural or geographic difference). Thus, feminist solidarity—as proposed by Mohanty—begins by first focusing on and understanding what is common between aligned forces of oppression and experiences of resistance across particular contexts, then engaging differences to abstract lessons and generate possibilities. Our paper demonstrates this via comparisons to highlight how feminist solidarity supports and prioritizes *transferability* of experiences over *generalizability* of outcomes.

Our paper is organized as follows. We begin by situating our contributions in the context of literature in the larger CSCW and HCI communities that aim to cross geographic and cultural

borders, and that which engages with feminist theory. We then explain our method for conducting comparative studies aimed at illustrating the value of feminist solidarity, as proposed by Mohanty. Next, we lay out three comparisons based on our prior work. In the first, we show how engaging with feminist solidarity to compare offline information networks in Cuba and India unearths pending *research* questions around digital inequities. Next, we demonstrate how an approach based on feminist solidarity in community health initiatives across rural and urban India illuminates opportunities for technology *design*. Last, we employ feminist solidarity to study possibilities for integrating virtual reality (VR) into classroom *practice* across underserved learning environments in Mumbai (India) and Atlanta (USA).

The primary contribution of our analysis is to demonstrate how a feminist solidarity-based approach (inspired by Mohanty [70]) can inform comparative research, design, and practice in intersectionally diverse, marginalized contexts across the Global North and South. With our analysis, we foreground marginalized individuals' and communities' struggles and processes of resistance, extending emergent conversations on assets-based approaches [46, 62, 78]. Further, we demonstrate that lessons may be learned and transferred bidirectionally across sites of more and less privilege. Finally, we discuss how feminist solidarity might be practiced throughout unfolding stages of research, design, and practice, not necessarily upon culmination alone.

## 2 RELATED WORK

The CSCW community is becoming increasingly global, inviting scholarship on under-represented contexts and variously marginalized populations around the world (e.g., [16, 21, 46, 94]). The *Solidarity Across Borders* workshop at CSCW 2018 brought together members of the community who have a shared commitment to conducting research with these variously marginalized, intersectionally diverse populations [22]. The larger HCI community has also been inviting collaborations “across borders” through the *HCI Across Borders* symposia since 2016 at CHI (e.g., [52, 53]). Collaborations and linkages between researchers located across culturally and geographically disparate contexts are indeed growing thanks to these channels, but there are few theoretical lenses that engage on the transfer of insights derived from research, design, and/or practice across borders.

Transnational HCI is one such lens that situates HCI work in the ever-present transfer of people, goods, and capital across borders [86]. Work in this domain might pay attention to “global processes, boundary crossings, frictions and hybrid practices” [96], such as struggles with the incompatibility of devices and service providers across nations and regulatory zones, or the appropriation of technology in specific sociocultural contexts [86, 102, 104]. Postcolonial Computing, another such lens, focuses on and problematizes the transnational flows from the Global North to the Global South, in particular. This lens draws from postcolonial studies, which have examined the legacy of colonialism and call for awareness of how this has impacted the Global South [80]. In proposing Postcolonial Computing as “a lens on design and development,” Irani et al. recommend that encounters among designers, users, and cultures be situated in the legacy of colonialism and its impacts on power, wealth, and political influence, challenging the universal transfer of western-centric HCI methods into diverse contexts [39].

Researchers have drawn on transnational or postcolonial lenses in efforts to propose an anti-universal design agenda (e.g., [39, 85, 86, 100]). Their focus has been on adopting a “politics of difference” [30] that ceases to view difference as deviation from a norm and, instead, casts it as cultural variations that can be preserved and used as sites of creativity for informing design (e.g., [7, 39, 40]). Although difference does lead us to problematize universal design, a focus solely on difference hinders attempts towards transferability. This is because the subsequent questions we ask as researchers, designers, and practitioners end up attending to the particularities of each context, rather than commonalities that might inform our work, bringing us back to Toyama's

call for balancing the universal and the particular, as mentioned earlier [93]. To answer this call, we turn to Mohanty's proposal for feminist solidarity, with the goal of facilitating transferability across borders [71].

Mohanty's vision for feminist solidarity is one where the lessons learned from one set of women's struggles might assist in another's quest for empowerment. She first situates her discussion in how globalization has resulted in the concentration of wealth and power in the "One-Third World" over the "Two-Thirds World", [70]. She argues that these power imbalances result in the current fragmentation of feminism globally, where women in the Two-Thirds World—located across the Global North and Global South—are constructed as one-dimensional, oppressed caricatures without an understanding of their real experiences, agency, and struggles [70]. In response to this fragmentation, Mohanty proposes an approach to feminist solidarity wherein we recognize universal women's concerns while also engaging with women's lived experiences across contexts. Namely, she argues that identifying mutuality in lived experiences of oppression, struggle, and resistance among marginalized women across the world can help us see how the histories of seemingly disjointed communities are interconnected through experiences of domination by colonialism, imperialism, and capitalism. For Mohanty, being attentive to both the local particularities amid global forces is key for the translation of perspectives across differences, and she elaborates on how uncovering and juxtaposing shared struggles and aligned processes of resistance across the Two-Thirds World can facilitate learning.

The notion of feminist solidarity is not Mohanty's alone. Several feminists studying western contexts have used it in reference to finding common ground while maintaining a recognition of differences among the experiences of multiple marginalized groups working together in feminist struggles (e.g., [14, 36, 38, 61, 63]). Scholarship from transnational and postcolonial feminists such as Mohanty, Spivak, Mendoza, Dhamoon, and Oyewumi [18, 65, 70, 77, 88], on the contrary, contextualize feminist solidarity in the specific inequities between the Global North and South. These feminist scholars emphasize the importance of diverse knowledges and theorizing within circles of feminist solidarity, and the dangers of taking a one-size-fits-all view of feminism. Ismail and Kumar brought these tensions to the CSCW community, highlighting that ideals of feminism in HCI may not seamlessly translate to contexts in the Global South [42]. Mohanty, however, productively proposes feminist solidarity as a way to validate different knowledges, and leverage them to establish relationships among diverse communities in an increasingly globalized world, inspiring a path forward for comparative work.

In addition to contributing an approach to comparative work, we extend and deepen feminist conversations in CSCW and the larger HCI community. These include the foundational Feminist HCI agenda proposed by Bardzell, as well as more recent enriching contributions by Schlesinger et al. and Wong-Villacres et al. towards developing intersectional sensibilities to conducting research and design [4, 85, 100]. Kumar and Karusala recently made a case for Intersectional Computing, issuing a call for computing as a discipline to turn its attention to intersectional realities [55]. Multiple workshops have been organized over the years at CSCW to engage deeply on topics of feminism and intersectionality, such as those by Steinhardt et al., Fox et al., and Dye et al. [22, 29, 89]. These have likely played a significant role towards advancing feminist scholarship at CSCW in particular, where many recent research contributions have employed feminist perspectives to inform analyses and design (e.g., [42, 46, 94]).

### 3 METHODOLOGY

To offer an analysis demonstrating how Mohanty's notion of feminist solidarity [71] can inform CSCW and HCI work, we conduct three distinct comparisons spanning contexts of research, design, and practice. For these comparisons, we identified six cases, each of which was represented by

a rich and significant body of qualitative data that we first gained access to in our collaborative work, as detailed below. We selected cases that were situated in intersectional contexts representing multiple dimensions of marginalization, cases for which we had an abundance of data, and which were directed towards one of research, design, or practice. We selected two cases each for research, design, and practice that represented shared struggles. That is, we made sure that each comparison took place across cases that revealed alignment along dimensions of marginalization and subsequent processes of resistance.

### 3.1 Data Collection

The selected cases below draw on research we have individually or collaboratively conducted and/or co-authored. Each of these cases has been previously published individually, not in comparison to each other. Given the rich data we had access to, we were later able to conduct in-depth comparisons. We now describe the nature of this data, before explaining our mode of analysis.

In section 4.1, we contrast fieldwork data collected in New Delhi, India, by Neha Kumar in 2011 [57], and Havana, Cuba by Michaelanne Dye from 2015 to 2017<sup>1</sup> (co-authored and co-advised by Neha and Amy Bruckman [23]). Both studies employed extensive (50+) interviews and multiple weeks of participant observation across sites to offer a multi-stakeholder analysis of the media ecosystems in the two cities. Neha's study (co-authored by Nimmi Rangaswamy) focused on a low-middle income demographic, while Michaelanne's research did not carry such a bias. Both studies used a combination of purposive and snowball sampling [34, 92] to recruit producers, distributors, and consumers of media, and data was collected until it reached the point of saturation. All data was collected in the local language (Hindi in New Delhi and Spanish in Havana), and audio-recorded, transcribed, and translated into English before analysis. In all fieldwork, we observed and asked participants about their experiences, motivations, and activities as consumers and distributors of media, also in relation to one another. We did not compensate participants at either site, but did purchase media to better understand the nature of such content.

In section 4.2, we draw on fieldwork data collected in rural Uttar Pradesh, India, by Neha in 2014-2015 [49, 56], and New Delhi, India, by Azra Ismail in 2016-2018 [41-43]. Each body of work represents long-term ethnographic engagements focused on community health workers' activities in their respective rural and urban communities. Again, the focus of fieldwork in both projects was on gaining a rich understanding of diverse stakeholder perspectives. The main instruments of data collection entailed one-on-one and one-on-many interviews as well as extensive participant observation. Both studies used a combination of purposive and snowball sampling [34, 92]. The research subjects included 20+ community health workers, 30-50 mothers and family members, 3-5 doctors, 3-10 NGO-workers at both sites. Fieldwork for both studies took place in Hindi—the native language for both Neha and Azra who collected all the data. Data was audio-recorded, transcribed, and translated into English before being subject to analysis.

In section 4.3, we draw again on rich and immersive fieldwork data collected in Mumbai, India, in 2016 by Aditya Vishwanath [97], and in Atlanta, Georgia, in 2017 by Aditya as well as Naveena Karusala [98]. The fieldwork entailed an in-depth co-design process wherein Aditya (and Naveena in Atlanta) worked closely with teachers and staff to determine the best way of integrating 360-degree virtual reality (VR) into underserved learning environments. The after-school center in Mumbai was smaller than the summer camp setting in Atlanta, with fewer teachers (2 vs. 8), volunteers (4 vs. 8), and students (16 vs. 60). However, at both sites, Aditya was focused on first understanding the roles played by the different stakeholders in these environments, and then closely observing sessions

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<sup>1</sup>Michaelanne was unable to co-author this paper, but we wish to acknowledge the richness of her fieldwork and analysis that allowed us to appropriately compare and contrast two starkly different sites.

and conducting semi-structured interviews with students to see how and why they engaged with 360-degree VR, whether to consume or to create content. The two studies, though aligned in their aim to integrate 360-degree VR into the learning environment, were naturally different in terms of the actual content that was engaged. All data was collected in the local language, audio-recorded, transcribed, and translated into English (when necessary) before analysis.

Although the data was collected by a number of us, the methods of collecting data were aligned throughout. We consistently prioritized immersive fieldwork, studied diverse stakeholder perspectives, and engaged underrepresented groups. This holistic understanding across our sites undoubtedly shapes our capacity to conduct comparisons, as described next.

### 3.2 Data Analysis

The methodology we adopt in introducing Mohanty's version of feminist solidarity for comparative work draws inspiration from the approach of "situated comparisons". Situated comparisons have been proposed by Dhamoon, an intersectional feminist, for analyzing across intersectionally diverse contexts [19]. About such comparisons, Dhamoon says that they can entail comparing "how one kind of process interacts with others," "interactions at different levels of social life," and how particular distinctions or differences might "differentially operate" [19]. This concept was then used by Marisol Wong-Villacres in work co-authored with Aditya, Naveena, and Neha, among others [100]. This work engaged deeply with the theory of intersectionality, making sense of "different kinds of difference" [108] through analyzing data from an ethnographic study conducted across multiple low-resource learning environments in India, and aiming to uncover pathways for design. The authors conducted situated comparisons between sites to uncover processes of resistance, although not with a focus on commonalities [100].

In each of our comparisons in this paper, for which data had been collected prior to our selection of feminist solidarity for further analysis, we started by identifying and gaining a deep, situated understanding of commonalities in struggles and processes of resistance. Our approach to fieldwork aided extensively in this regard. Our identification of the struggles and processes to foreground was rooted in the related goals of the six studies that were all independently conducted by a subset of the authors<sup>2</sup>. With these commonalities as a foundation for the kinds of transfer that might happen, we then scrutinized points of difference and where they arose. We leveraged these points to generate new possibilities for research questions, opportunities for design, or approaches for practice in support of common struggles. Such comparisons allow "teaching and learning about points of connection and distance among and between [...] marginalized and privileged along numerous local and global dimensions" [70]. This is valuable for realizing transnational transferability of lessons that is respectful towards individuals' and communities' particularities.

To provide an example of how we conducted these comparisons, we take the case of access and connectedness in India and Cuba. In terms of research goals, we saw that both studies were focusing on sharing of information and media in offline settings. We also saw based on our understanding of participants' motives during fieldwork, that these activities arose in both cases due to a strong and widespread desire to access media despite lack of access to internet. From there, we analyzed the data for differences. We first noted that differences arose in the reasons for inaccessible internet, such as different economic and political landscapes, which led to the differences in the audience of each sharing network. We then noted that, amongst these audiences, there were different consumption patterns in terms of the content produced and disseminated. Thus, after laying the foundation of

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<sup>2</sup>Not all authors on the cases we examine here have authorship in this paper. To prevent confusion therefore, we refer to referenced work using the third person (e.g., Kumar and Rangaswamy [57]), unless all authors of the referenced work are included among this paper's authors (e.g., Ismail and Kumar [42]).

similar struggles for media access, we followed a line of difference, starting from the overarching context of each struggle, coming to the concrete implementation of each human network.

### 3.3 Positionality

As scholars at universities in the Global North, with active research pursuits situated in the Global South, we see ourselves in alignment with Mohanty's antiracist, anti-imperialist, and feminist stance. Our work—individual and collaborative, examples of which are laid out in this paper—brings us in regular and direct contact with grassroots struggles that we are ideologically aligned with yet distanced from in many ways, including geographically and socioeconomically. In Mohanty's words then [70], we are “for the Two-Thirds World, but with the privileges of the One-Third World.” We speak—like Mohanty—as individuals “situated in the One-Third World, but from the space and vision of, and in solidarity with, communities in struggle in the Two-Thirds World.”

## 4 COMPARATIVE STUDIES

Below we present our three comparative studies, each considering two similar-and-different contexts. First, we discuss offline information networks serving otherwise under-resourced communities in New Delhi, India and Havana, Cuba, identifying how research directions might be informed by comparing the response of research participants to variously limited information access. Next, we consider public health interventions in rural and urban India, gleaning lessons for design across both by examining the agencies exercised by the local community health workers. Finally, we consider the introduction of 360-degree VR in classrooms of children from underserved settings in Mumbai, India, and Atlanta, USA. In this comparison, we discuss how lessons learned from the teachers and students in adopting VR might transfer. Each of our comparative analyses is shaped by our goal of demonstrating how feminist solidarity might reveal a path forward. We emphasize that these are—by no means—the only examples that can make our case for feminist solidarity. However, we chose examples we are intimately familiar with, and we conducted the analyses to fulfill the criteria conveyed above.

### 4.1 Researching Access and Connectedness in India & Cuba

A significant body of research in CSCW and related disciplines has focused on information- and media-sharing activities in largely offline settings, as well as modes of internet access, across under-resourced environments [11, 76, 79, 87]. In India, online access to information and media has been a challenge for many, although this is rapidly changing with increasingly affordable access to internet [57]. In Cuba, sociopolitical conditions introduce an additional constraint [24]. This led to the emergence of extensive offline information networks in both places. In Cuba, there is El Paquete, a one terabyte (TB) collection of digital content that is distributed across the country on external hard drives, USBs, and CDs [23]. In India, similar but different “download markets” developed over the years to facilitate access to (largely pirated forms of) media in rural, small town, and urban India [57]. Both phenomena foreground the desire and (individual and collective) agencies of citizens to adopt and engage with technology, procure entertainment media, and acquire new media literacies in the process [45]. We next discuss both cases to highlight how a feminist solidarity mindset might help us attend to the commonality across struggles against denial of information access, transcending obvious differences between New Delhi and Havana to advance research on offline information infrastructures.

*4.1.1 Download Markets in New Delhi, India.* Download Markets were rows of mobile shops that spread rapidly in rural, small town, and urban India when mobile penetration skyrocketed in the mid-to-late 2000s [57]. The growth in overall demand for entertainment media created space

for these markets to flourish. These were actively studied by HCI scholars, such as Kumar and Rangaswamy who conducted a field study of download markets in New Delhi (and other cities) to research the formation, evolution, and dissolution of networks of media consumers and distributors [57]. The authors used Actor-Network Theory to analyze these markets—to draw attention to the actors ties in the media network, to recognize the agency of human and non-human entities, and to highlight changes in sourcing mechanisms for media needs [9, 59]. Their analysis highlighted how the mobile phone and a flourishing ecology of media piracy could bring media to marginal populations, historically excluded from accessing original, expensive, versions of this media.

Kumar and Rangaswamy identified and categorized the actors in their offline network, studying the media suppliers—business owners who distributed this media mainly for monetary gain, and technology experts, who distributed it primarily for social recognition. They also studied the consumers—those who engaged passively with the media, as well as those who made an active effort to start learning new literacies so they could source their own media. Finally, they recognized the role of the law-enforcers, who were notably absent throughout, allowing for rampant media distribution and piracy to take place. The use of ANT also enabled them to recognize the technology actors—the mobile phones and desktop computers that enabled supply and consumption of media. We share a few illustrative examples next.

Deepak, who ran a shop in a download market in New Delhi, distributed media to the migrant workers who lived nearby: “... *migrant laborers—they don’t have any [television] sets. They have nothing else [but the mobile]. They figure out everything. They know one can copy from CDs. No one takes songs from the internet. We copy from CDs, convert to 3GP format, and then download onto their phones. In music, we have Hindi, Bhojpuri, Punjabi—we have everything.*” Deepak charged a fee for every mobile media transfer, and for him, maintaining a steady customer base for his shop was of highest priority. He did not teach his clients how to procure their own media, but there were others who did. Technology experts, like Mohan, took pride in showing off and sharing their literacies with regards to engaging with mobile media, and the internet in general: “*The smile on their faces when I give them what they’re looking for... that is what drives me to do this. I show them how... and slowly they start to learn*” [57].

Kumar and Rangaswamy’s study also drew attention to the mobile phone as an agent for consuming and disseminating media at low cost, enabling participants to acquire digital literacies and sourcing skills. The businesses focused on engaging their customers with varieties of media in their language, of their taste, and through good customer service, but the technology experts were motivated by reputation and social gain. For them, showing others “how it’s done” was more valuable than making money out of them. They pulled consumers away from commercial channels and gave them media for free. They also taught active consumers to source their own. Highlighting this steady transition from outsourcing media content to self-sourcing it was a key contribution of the research [57].

The use of ANT allowed Kumar and Rangaswamy to highlight that their participants were not passive recipients of technological advancements, though they operated within socioeconomic constraint. Their individual and collective agencies allowed them to create and realize their goals—as suppliers or consumers, even when these did not align with traditional notions of personal or economic well-being.

**4.1.2 El Paquete in Havana, Cuba.** The El Paquete (EP) offline information network emerged in response to historic, widespread scarcity of online information in Cuba [23]. EP is ultimately an offline “internet” of digital files, USB drives, external hard drives, connected by a human network across Cuba. Every week, approximately three million Cubans curate, distribute, and consume “the week’s internet,” which has led to thriving media-sharing practices in Havana. These were studied



in depth by Dye et al. using qualitative inquiry [23], and analyzed through a “human infrastructure” lens [60, 84], which highlighted the following interconnected, human components of EP—Los Maestros (or the Masters) who compile content every week from external sources, Los Paqueteros (or the Packagers) who curate this content for consumption by La Gente (or the People).

Juanito, a Maestro, has several people working for him and bringing him content for EP [23]. One downloads movies, another takes care of music, and yet another finds television shows. Juanito then organizes this content, ensures there is no pornography or anti-government content, and compiles EP. To gain access to more content, Juanito has installed a satellite dish in a fake water tower on his roof. Los Maestros do not just compile content from diverse global sources, they also create new content such as news articles and promotions for local artists. Once prepared, EP is sold and delivered by hand to Los Paqueteros, who distribute it further [23]. As Dye et al. describe [23], the Paqueteros take pride in their curation skills, as well as ownership of the content they curate, to ensure the quality of disseminated media. They also work with their customers’ constraints to offer quality, personalized service, even if this takes more time and effort from them.

Dye et al. also present the perspective of the people—La Gente—who are content with their “partial” but “personalized” internet, because they know whose taste to trust [23]. As one participant reported, *“I downloaded this software from EP and I also learned how to use it through a YouTube tutorial that also came in EP. I learn how to do things [with EP]...”* La Gente’s engagement with EP, like this participant’s, goes beyond entertainment alone, to include activities such as watching Discovery Channel documentaries, YouTube tutorials, and learning how to “do things” [23]. Over time, EP has become a more locally relevant and participatory medium. For example, authors present the example of a journalist for an online magazine that used to be read mainly outside Cuba due to lack of internet access in Cuba, but now Cubans can also read the magazine [23]: *“This is the most efficient and cost-effective way for us to publish our content. It affords new paths and opportunities for those who work with journalism. Before, the only opportunity was to work for the government... now EP provides a different venue.”*

To see EP through feminist solidarity [70], we might draw our attention to the struggles of these Cuban people who have developed ingenious approaches (like Juanito’s) of bringing access to information from across borders, within their country and across all people. Here we see examples of individuals resisting the oppressive controls around information flows through the design of their own information infrastructure. Similar to struggles Mohanty describes [70], these individuals come together against structures that they feel have excluded them from the global flows of information.

**4.1.3 Solidarity in Research.** A feminist solidarity mindset made visible how groups of actors in both New Delhi and Havana consumed and shared media, specifically through pirate activity and in response to scarcity, exercising individual and collective agencies to establish, operate, access, and sustain offline information dissemination infrastructures. Examining this shared struggle, we noted glaring differences across these contexts as well. While EP is pervasive and caters to Cubans across socioeconomic strata, the download markets were specifically set up to address the information needs of marginalized groups in India. We also saw that analogous pirate activity arose as a result of very different political and economic contexts. Taken together, these differences highlighted to us how national or socioeconomic borders did not always mean a separation of struggles. However, we needed to maintain a recognition of two key differences on the consumption front. While the content consumption in New Delhi was primarily entertainment-driven, Dye et al. acknowledged the role of EP in facilitating access to learning content as well. Components of EP were also contributed by Cuban people, whereas in New Delhi, the focus remained on consuming professionally produced media.

When we turn Mohanty’s lens of feminist solidarity [70] to the cases above, we can see—across both contexts—individuals and groups struggle against marginalization and forms of oppression (albeit of different kinds), as they move forward to transform their particular material conditions of scarcity. Here, we view researchers’ exercising solidarity as being explicitly non-interventionist, while working to highlight these struggles against information scarcity and the enactment of individual and collective agencies in the process. As part of this endeavor, we view it as a responsibility of researchers to draw parallels across these struggles, enabling each to inform the other, in addition to informing other similar but different struggles as well. To illustrate how researchers might approach these struggles with feminist solidarity, we now examine how the case in Cuba might lead to an enhanced understanding of the case in India, and vice versa. We also look at how these cases might lead us to probe deeper into other struggles—across borders.

Both cases highlighted for us that an important factor driving these infrastructures into existence is entertainment that people care to have, and wish to use limited resources towards. This leisure-driven use was widespread in both contexts, and motivated greater technology adoption and use. Looking for the specificities of the Cuban case, however, where participants also prioritized educational content, led us to ask what drives consumers of the download markets in New Delhi to engage with media solely for leisure purposes and not other kinds of engagement—what Katz and Gonzalez might label “meaningful connectivity” [47]. It could be because EP was more pervasive and established than download markets whose clientele was limited to marginalized urban groups. It could also be because EP was seen as an alternative to the world wide web, while download markets existed as an additional service peripheral to the expensive, but available internet. In addition, Cuba’s literacy rates are generally higher, and the population more homogeneous. Moreover, while Spanish content could be sourced through EP from a number of other regions around the world, this was not true for languages spoken by migrant workers in New Delhi. Regardless of underlying reasons, digging deeper into this question, motivated by the Cuban example, could lead us to a stronger understanding of the processes at play among marginalized urban Indians.

The Indian example, that explicitly examines the emergence of pirate media actor-networks, raises curiosity around the role piracy plays in countries like Cuba, where the state may be viewed as being more heavy-handed. Is piracy recognized or overlooked, and what is the role of the law-enforcement authorities who were silent actors in New Delhi? Here, the Cuban case would foreground the role of external actors, including the United States, in prohibiting American companies from conducting business with Cuba [2] and making the legal purchase of copyrighted content impossible.

We might—as CSCW researchers—pay more attention to multiple stakeholders’ roles in the movement of digital content and how definitions of legality vary across cultures and states. When researchers from the Global North label media piracy as a deviant act, what might they be ignoring about the role of piracy and their own (perhaps myopic) views regarding legality? Another question that arises from a comparative perspective across similarities and differences is what are the motivations and mechanisms for setting up offline information infrastructures? Our cases highlight examples of thriving offline information infrastructures that were designed without external intervention, as suggested by authors. However, cases with external intervention may also be compared and/or informed, such as in the case of Venezuelan refugee settlements in Latin America [1] or community networks such as Gram Vaani [32] in rural India, among others [72]. Finally, HCI research has been making a case for considering leisure and its role in motivating technological engagements amid underserved contexts (e.g. [48]). This case may be further strengthened by uncovering more such cases as the ones we compare.

For researchers exploring cases like the above, a solidarity mindset requires that we not only align with the struggles of the marginalized in Havana or in New Delhi, but also make visible and better understand other such struggles in the “Two-Thirds World” of Mohanty [70]. As illustrated

through our proposed research questions, a mindset of feminist solidarity is possible when we compare such struggles so that learning might occur, leveraging one to better understand the other and vice versa. Seeing such struggles (particularly in the Cuban example) also brings to light another important question for the CSCW community to address through solidarity—when is it better for us as researchers, designers, and practitioners to not intervene? This is a challenging question, but we can only begin to answer it if we, as interpretivists or interventionists, are willing to also recognize our target populations' abilities to exercise agency in the first place, and the values they bring into their own designs.

## 4.2 Designing Health Interventions in Rural & Urban India

Disparities in health and healthcare access based on place, socioeconomic status, gender, and race, among other factors, have spurred widespread organizational and governmental efforts to address such inequities across more and less resourced regions of the world (e.g., [41, 56, 105]). The HCI community has long engaged with this realm to explore the role that technology might play in addressing these inequities, particularly in the Global South [17, 56, 73, 82, 105]. However, health and health behaviors are highly dependent on culture, social dynamics, and economic factors, rendering the transfer of lessons learned across contexts a challenge. Through a comparative analysis of two healthcare interventions located within the Global South, we consider an engagement with feminist solidarity to inform future design of such interventions. Here, solidarity helps explore how differences and similarities in information practices across interventions can inform future iterations of both and other (new and existing) interventions.

We compare two public health interventions—Projecting Health and Mohalla (neighborhood) Clinics. Discussing these, we examine information-centric challenges in healthcare, with a focus on maternal and child health in underserved communities. Specifically, we compare the roles of frontline health workers or ASHAs (short for Accredited Social Health Activists) who play a critical role in both interventions, across rural and urban settings. ASHAs were introduced by the Indian government in 2005 to tackle high maternal and child mortality rates, an ongoing challenge [68]. They tend to reproductive, maternal, newborn, and child health in communities where they live and work. In our discussion of both interventions, we foreground the roles of the ASHAs as infomediaries (intermediaries who facilitate information transfer) within the communities in which they operate.

*4.2.1 Projecting Health in Rural India.* Projecting Health (PH) was a public health project that was designed and implemented by researchers in collaboration with a non-profit organization [56]. It was aimed at disseminating information regarding maternal and child health to new and expecting mothers in rural Uttar Pradesh (UP), where the maternal and infant mortality rates are among the highest in the country [99]. In this project, short, high-quality films with rich storylines on topics relevant to maternal health were created and screened by community-based organizations for members of the community. PH's goal was to target behavior change at the household level, leveraging low-cost camcorders, portable video projectors, and free video-editing software [56].

PH was deployed in two UP districts (Raebareli and Fatehpur) and 150 villages, targeting a population of about 200,000 people. In over six years, 110 short films were produced and at least 15,210 group disseminations were organized. Many different stakeholders—including researchers, global health organizations, community-based organizations, ASHAs and other community members, among others—were involved throughout. PH took a Participatory Action Research approach [64], where volumes of data were collected using numerous methods (interviews, focus groups, surveys, participant observations), and across multiple studies [49, 50, 56, 95].

PH aims to foster “participation” [8], stressing the importance of members of a community working together. Senior members of the community craft health messages, using guidelines set by the World Health Organization (WHO), and factoring in the advice of experts and other voices from the community. The video production team then works with the community to storyboard, film, and produce videos. Once produced, the videos are disseminated in mothers’ group meetings organized by ASHAs. Here, women get together in a public space such as the local school, and an ASHA sets up a projector, screens the video, and leads a discussion. These sessions, attended by new and expecting mothers, but also other female members of their households, are typically organized once a month [56].

A key finding in the early days of PH—reported by Kumar and Anderson [49]—was that some ASHAs were taking the initiative to organize unofficial disseminations. On some occasions, it was because it was inappropriate for daughters-in-law from conservative households to leave the house. At others, it was on account of disputes between households in the same neighborhood, which could prevent attendance of some invited mothers. Many of these disseminations took place without the knowledge of the community-based organizations that maintained the projectors, and were responsible for creating the videos and scheduling the dissemination sessions.

Kumar and Anderson also uncovered that men in these communities often assumed that women would not know how to use multimedia features on their phones, while women had a different story to tell [49]. First, ASHAs were fairly savvy mobile users, using multimedia mobile devices on a daily basis. Second, although the women in PH’s targeted households did not have much free time, it was sufficient to find a window of time to watch videos on their phones, while they cooked or rested during the day. This flexibility allowed them to engage with the videos repeatedly instead of once a month. Third, children were valuable intermediaries, adept at conducting mobile media transfers and generally able and willing to help women who were not mobile-savvy enough. Fourth, group sessions were closed to men, but mobile videos could make the information more easily accessible to those who wished to be informed. And finally, many mobile shop owners offered to distribute PH videos free of cost.

Kumar and Anderson’s findings regarding the ASHAs’ proactive and unofficial disseminations, and the women’s perspectives, helped iterate on the design of PH to also include dissemination of maternal health education through mobile media transfers. Knowledge around mobile and media practices was thus key in reshaping PH as an intervention that targeted the distribution of community health videos through mobile transfers, which took place due to different intermediaries. In follow-on research on PH, Vashistha et al. conducted a quantitative investigation of the distribution channels that could be leveraged to distribute mobile videos on offline information networks, and determined that ASHAs were the most consistent and reliable infomediaries among those studied [95]. The multi-faceted struggles of the women in PH for improved access to healthcare in the context of a dysfunctional state-run healthcare infrastructure also show up in the case of the Mohalla Clinics in New Delhi, as we examine below.

**4.2.2 Mohalla Clinics in Urban India.** Mohalla (or neighborhood) Clinics (MC) were introduced by the Delhi state government in 2015 to support the existing overburdened government hospitals and primary healthcare centers (PHCs). Along with PHCs, they provide free consultation, medicines, and around 200 tests. So far, 164 clinics have been set up around the city [5]. The Delhi government claimed that the clinics were targeting the “weakest sections of society”, however, research has shown that the needs of the target population remain unmet [41]. The study we (Azra, Naveena, and Neha) conducted revealed several disconnects between various stakeholders in the MC ecology [41]. These disconnects included conflicts and power differentials between the doctors, staff, government,

ASHAs, and the patient community. The design of the MC overlooked and exacerbated the disconnects, leading to poor collaboration and information-sharing between stakeholders. The patients' perspectives were particularly sidelined due to the power dynamic between doctors and patients in a healthcare system that has traditionally favored medical expertise over situated knowledges and provision of healthcare [41].

We reported that even with limited power, ASHAs played an important role by serving as conduit between government services and underserved communities [41]. They have been the go-to source of information on government healthcare provisions in their target communities. As infomediaries, ASHAs regularly interfaced with doctors at clinics to inform them and get advice regarding the medical problems prevalent in their areas. They also provided women in the target communities medical, emotional, and practical support—empathizing with them when they faced domestic violence and motivating them to use family planning methods. Due to their physical and social proximity to the concerns of local communities, they understood the situated nature of disease. They also worked hard to address religious and other superstitions and misconceptions to promote improved healthcare practices.

In follow-on work [42], we (Azra and Neha) highlight how the ASHAs above are in a unique position to surface patient perspectives and deliver knowledge from and to doctors. Although ASHAs are required to conduct surveys in their areas, the existing data collection system and processes prioritize data considered less important by ASHAs and fail to capture their situated knowledge. We noted that this can demotivate the ASHAs and encourage poor and inaccurate data collection practices [42]. Lack of transparency on the purpose of data collection further exacerbates this situation.

To support the ASHAs' workflows and struggles, we recommended supporting the ASHAs' affinities or solidarities with various groups [42]. These solidarities play an important role in directing their work activities, also resulting in activist behavior against the state government due to perceived injustices. ASHAs can identify and empathize with other ASHAs, understand and address the struggles faced by marginalized populations in their area, and demonstrate a strong commitment to furthering their own needs and aspirations. However, in the absence of support and recognition of these activities from the government through monetary or social incentives, the motivation to conduct them is impacted, despite their crucial role in improving the physical and mental well-being of target communities and ASHAs.

*4.2.3 Solidarity in Design.* We (all authors) now discuss how each intervention might inform the other, demonstrating how a solidarity-focused approach can illuminate pathways for iterating on design. We also illustrate how a consolidated understanding of PH and MC might inform future designs. When we turn Mohanty's notion of feminist solidarity [69] to the cases of PH and MC, we see the struggles of communities facing the shared problem of constrained access to healthcare, with women particularly impacted due to various restricted mobilities. We also see the ASHAs moving forward in a show of solidarity towards the women in both communities. Both interventions—PH and MC—exacerbate inequities and address others. Although they share common goals in their desire to address healthcare needs of the marginalized, particularly marginalized women, and leverage ASHAs as their primary means of outreach, we saw key differences when we asked why each intervention played out differently in its deployment. For example, MC were state-run, without an explicit agenda to take inputs and feedback from target patient communities. On the other hand, PH was run by a non-profit cooperating with the state government, but only so far as its support was necessary for the intervention. The contexts where they were situated were also naturally different—MC catered to diverse urban, migrant communities, while PH catered to rural communities that were relatively more homogeneous and spoke similar vernaculars. In both

contexts, ASHAs molded their activities to account for local cultural norms. In PH, this behavior was acknowledged and supported so that (some of) their situated knowledges could be harnessed, but it remained overlooked in MC.

With a focus on participation, PH aims to foster significant community involvement. However, we see that MC's urban and less homogenous context, where participation was even further complicated, reveals relevant lessons for PH, which became apparent through a feminist solidarity mindset. We (Azra, Naveena, and Neha) engage Haraway's lens of "situated knowledges" to highlight that there are multiple disconnected knowledges that need bridging before healthcare even in PH-like settings can truly be participatory [35, 41]. Although PH investigated and later incorporated knowledge on mobile practices from the ASHAs' and women's points of view as well as their mobility restrictions, it begs the question whether maternal health education being disseminated by the PH ASHAs can be aligned with local, indigenous practices around healthcare, or if these must be rejected to align with WHO standards. How might they be aligned in ways that are cognizant of these distinct, coexisting knowledges? A re-design of PH could consider re-evaluating situated knowledges about common medical concerns, existing misconceptions, prevalent taboos, and ASHAs' current approaches to assuaging concerns and motivating residents to adopt healthy behaviors. This knowledge could inform the videos recorded.

The organizational structures in PH and MC also reflect inequities and power differentials between ASHAs and those managing the interventions. In PH, ASHAs' close ties with their community members were recognized and leveraged. However, MC had a clear hierarchical structure and ASHAs believed that their work was not valued due to lack of transparency around the purpose of their data collection activities and poor incentives. This was despite the fact that ASHAs went beyond role definitions and expectations to support their communities, demonstrating solidarity with local women—explicitly identified in MC but also present in PH as clear from instances of ASHAs disseminating videos unofficially, under the radar of project officers. A feminist solidarity mindset allowed us to ask about and learn what the particularities of this extra work in both contexts are—compared to MC, PH's ASHAs were still recognized for the work they were actually asked to do, even if they took initiative to do extra. Like in PH, MC could ensure long-term involvement of ASHAs by recognizing their efforts and offering appropriate compensations.

What we learn from MC and PH is that ASHAs are not only important infomediaries, their connection with the community is strong and valuable, and their activities could be leveraged to better connect with the situated nature of health overall. This could involve understanding use and non-use in the context of interventions, attending to the restricted mobilities of women in general, or ascribing greater value to the knowledge that the ASHAs already have. A feminist solidarity-based approach to design might involve interventionists, such as those driving PH and MC (and others like them), and support them in learning from each other to leverage unexplored assets like the various roles and commitments of the ASHAs (or other frontline workers). This could identify what elements of a design might transfer successfully. We point out here that (technology) design may never fully address the ASHAs' and their communities' struggles for improved healthcare, but feminist solidarity can help make design more appropriate, relevant, and robust.

### 4.3 From India to USA: Being a VR Practitioner

VR has increasingly been shown to support learning through factors such as improved outcomes [33, 66, 83], confidence-building [106, 107], and positive behavior change [3]. VR is also widely conjectured to have the potential to support empathy-building through the viewing and sharing of new perspectives [67]. Combined with the recent falling costs of VR hardware [10, 13] and content viewing/creation support (such as YouTubeVR, Google Poly [81], and 360-degree cameras [91]), VR might become suitable for diverse everyday contexts and begin to lose its thus far hyped

status. Considering that VR is yet to find its place among the masses, struggles to adopt and appropriate VR offer the opportunity to understand how we might foster feminist solidarity in practice, whether in the Global North or South. Kumar and Dell have emphasized the value of design-based implementation research (DBIR) as a methodology for bridging research and practice in HCI [51], especially given its bias towards sustaining design interventions in real world ecologies [27]. Our comparative analysis below views two targeted VR interventions through the lens of DBIR, as we aspire towards long-term, everyday appropriation of VR. This analysis also seeks to understand how solidarity might be practiced across Global North and Global South contexts.

In Mumbai, India, Vishwanath et al. conducted a study that looked at students' engagement with VR to consume content [97]. Drawing on the lessons learned in this study, Vishwanath et al. then conducted an intervention in Atlanta, USA, to look at students' creation and sharing of content as a way of bringing VR into the classroom [98]. Both interventions engaged children from underserved backgrounds and introduced VR as an educational technology to these learning environments for the first time. We compare these two cases to suggest how practice in one context might inform practice in the other.

*4.3.1 VR Content Consumption in Mumbai.* In their 2017 paper, Vishwanath et al. explored the affordances of low-cost immersive VR content and how it might be leveraged for learning [97]. They focused on the integration of VR into co-designed lessons at Vikas, an after-school learning center in Mumbai catering to students from low-income migrant families. VR was introduced to the classroom via Google Expeditions [26], standard Cardboard headsets, and recycled Nexus 4 phones. Expeditions offers a repository of 360-degree 'field-trips' to landforms, natural ecosystems, and landmarks. Teachers use their tablet/phone to select content, which is rendered on students' devices, as long as they are all connected on the same local area network. Students then insert their device into the Cardboard and experience the tour immersively. In order to integrate this technology into classrooms in Vikas, Vishwanath et al. conducted observations, interviews, and focus groups to understand existing learning activities at Vikas. They also worked with Meera, a teacher at Vikas who was open to using new technologies for teaching, to co-design lessons plans that would integrate Expeditions into existing curricula [97].

Vishwanath et al. noted that it was the representational fidelity (which prior work has shown to be a unique affordance of VR [12]) of the places and objects that led to students' engagement. Students were comfortable taking ownership of the VR equipment by making sure that devices were charged and viewers were ready before each class session. Authors also noted, however, that participants unanimously conveyed the desire to create their own content, which Expeditions did not allow.

*4.3.2 VR Content Creation in Atlanta.* Building on previous work [97], four of us (Aditya, Naveena, Marisol, and Neha) were then motivated to better understand reasons for the public hype around VR, and to increase access to and use of this medium [98], and decided to study content generation mechanisms and venture into new ecologies. To explore the feasibility of mainstreaming relatively low-cost VR in everyday contexts, we co-designed a VR content creation research project in a summer program with a charter school in Atlanta, Georgia (USA). The school itself was intent on using VR for content creation to fit their project-based learning practices, and ensuring the flexibility to make VR relevant to the goals of their program.

Sixty students participated in this 2019 study, coming from lower middle-class homes located in a neighborhood with a history of high crime rates. We studied how different stakeholders worked together to support these students in storytelling with VR to engage with the "economic, social, and cultural specificity" [44] of their surroundings. The teachers and volunteers who helped run the summer program engaged in multiple co-design and capacity-building exercises to design

a contextually appropriate theme for content creation. Teachers in Atlanta chose the theme of “hunger and homelessness” to educate students on the challenges facing and support available to individuals experiencing homelessness in their city. As part of the content creation aspect, students participated in a series of workshops to learn VR storyboarding, use the VR cameras we provided, and engage in filming and post-production.

Stakeholders received the VR experience with overall optimism, we noted. Teachers initially had their doubts—some questioned its instructional value and wondered if VR would be another skill the students would learn, like PowerPoint. Others were concerned about students getting distracted or confused due to too much excitement or too little training, respectively. Teachers seemed pragmatic and measured in their enthusiasm, possibly due to prior exposure to VR. They questioned the true value of introducing VR versus using existing digital technology and were keen on ensuring that this experience aligned with learning goals for their class. Students, in general, had prior exposure to VR and this reflected in their self-reported engagement and enjoyment levels during VR content creation. Their excitement to share their VR movies was also limited.

We were keen to study the impact of content creation on students’ meaning-making of their selected communities, and the consequence of this meaning-making on their empathy [98]. Students shared that their perceptions and emotions about the communities whose stories they relayed through VR had changed. They also conveyed that they recognized their implicit stereotypes and biases about homelessness in Atlanta, having engaged deeply with the theme, and constructed an enriched understanding of their contexts through reflective thinking. Teachers also reported their satisfaction, as we documented.

*4.3.3 Solidarity in Practice.* We (authors of this paper) noted that in both studies, students in informal and underserved learning environments made meaning out of and used VR technologies to successfully meet their goals, as ascertained through co-design in both cases. Then, thinking about the specificities of each study, there were differences in how VR ended up being used, as a tool for consumption in Mumbai versus creation in Atlanta. Those arose partly out of Vishwanath et al.’s own desire (in 2019 [98]) in working with practitioners to iterate on the use of VR in Mumbai in 2017, but also out of differences in teaching approaches between Mumbai and Atlanta (as mentioned). Both contexts used new VR-related technologies (Expeditions and Cardboard in Mumbai and 360-degree cameras and storyboarding in Atlanta). However, there were differences in prior exposure to new technologies and immersive VR that affected comfort with and excitement about VR, pointing to the higher availability of material resources in Atlanta not just within schools but also in students’ everyday contexts.

A feminist solidarity mindset [70] could bring to scrutiny the shared struggles of the practitioners and the students, as they aimed to make meaning out of (relatively) low-cost VR for their everyday contexts. They did this by exploring affordances of VR, such as expanding worldviews and perspective-taking. Participants in both contexts overcame challenges in integrating VR into existing workflows and working with students’ digital literacies. As for feminist solidarity, we can see that as practitioners, and as noted by Kumar and Dell [51], it is important for the deployment of interventions to be tied to appropriate research methods and inquiry, like DBIR advocates—to understand why technology works the way it does in different contexts [27]. In comparing these studies to pursue DBIR as an approach for integrating VR, solidarity might help formulate best practices around supporting agency in teaching and learning for future interventions.

The projects in Mumbai and Atlanta involved the introduction of new technology into an everyday context. VR was new for Mumbai in general, and new for Atlanta as a learning and content-creation tool but not as a technology. In Mumbai, the novelty of VR increased students’ excitement about VR and their willingness to actively engage with it even as “passive” consumers.



In Atlanta, the lack of novelty around VR contributed to the lack of excitement around sharing VR content that students created, while the introduction of 360-degree cameras also required a learning curve with regards to use and care. This comparison might lead us to ask what are the ways in which we can better scaffold the use and exploration of new technologies in technology-rich contexts like the school in Atlanta? This might require a better understanding of students' motivations for and attitudes around engaging with technology. It would also be important to understand the relationship between the topic they are learning about and the affordances of the technology through which they are learning.

An obvious difference between the Mumbai and Atlanta contexts was in how they used VR—for content consumption versus content creation. Both types of use helped students engage with new perspectives, but content creation required the effort of figuring out how to communicate what students learned and saw during the summer camp to others. We could ask then how might we support VR content creation activities in Mumbai and what different goals might teachers and students have for such activities? Asking this question recognizes the efforts that content consumption required in the first place—the agency that Meera exercised in fitting VR into lesson plans as well as Mumbai students' excitement and willingness to engage with new environments and VR. More broadly, this question indicates how solidarity can be multi-directional, iterating back and forth between different contexts (North to South, but also vice versa) to learn different lessons.

Finally, looking at both contexts together, we can see the importance of co-design in studying the sustained integration of technology in the classroom. The success of both projects required practitioners to engage with teachers' and students' motivations and educational goals and throughout the studies, and consider how VR could meet them. Practitioners seeking to deploy sustainable interventions in new contexts might ask what meanings might different learning environments attribute to VR and why? Asking this question provides guidance in looking at deployment of VR technologies in diverse configurations, such as more and less formal classroom settings than the ones we studied, or in healthcare contexts. Basing the deployment of technology on stakeholders' goals as well as practitioners' expertise on the affordances of technology can support deployments that are more likely to sustainably engage both educators and learners and offer opportunities to use VR in diverse ways.

## 5 DISCUSSION

Each of our comparisons demonstrates how a focus on feminist solidarity across different types of borders can assist researchers, designers, and practitioners in advancing their various agendas around investigating and furthering technology's impact on globally dispersed populations. By engaging solidarity in research, we might shed light on new struggles—those that emerge as being most aligned with our topics of inquiry, and arrive at new questions to be explored, in order to co-construct larger bodies of work, as we saw in the case of offline information infrastructures. In design, solidarity can help in shaping iterations of design in one context by drawing on lessons from another, as we saw in the case of community health workers performing their roles as infomediaries. In the case of practice, lessons learned from interventions in one practitioner context may well lead to new opportunities to explore in another, or several others, to fulfill the DBIR ideology. Throughout, we might align with Mohanty's emphasis on forging alliances among researchers, designers, and practitioners in ways that can lead to "productive curricular, pedagogical, and institutional projects" [71]. We now outline key takeaways of this comparative approach.

## 5.1 Expanding and Enriching our View of Assets

A significant focus of CSCW and HCI research has been on highlighting the marginal conditions of technology users in the Global South, with a focus on deficits such as infrastructural instability, information poverty, limited access to state-of-the-art technologies [15]. However, recent research has been emphasizing the importance of examining assets as well, such as an ethics of care or the value of social ties in leading to empowerment [46, 75, 78]. These works also highlight that assets may not be material alone. There is a challenge, however, in the labeling of assets, because this also requires us to make assumptions around how an asset may manifest. Leveraging Dhamoon's approach to mainstreaming intersectionality [19], Wong-Villacres et al. proposed that an analysis of the various "penalties and privileges" individuals and communities experience can help reveal assets for informing design [100]. Inspired by Mohanty, we extend work on identifying assets to also encompass shared struggles, precisely on account of their shared nature [70]. While the struggles of the marginalized populations that Mohanty draws attention to may not appeal to our sensibilities as assets, the resistance enacted as a result of these struggles might. A focus on solidarity allows us to better identify these struggles; it allows us to go beyond experiences of oppression to see how these experiences of oppression are interconnected and how individuals and communities respond to them in similar or different ways, and how we can learn from these responses. For example, we see restricted access to healthcare as a form of oppression that marginalizes large populations, and uncover the common differences in how ASHAs across urban and rural India struggle against such oppression. From there, we identify forms of assets that might be leveraged to generate new pathways for design. We view commonalities as sites of opportunity, leveraging them to transcend the differences characterizing the particularities of the local. We argue this is critical not only for designers and practitioners who aim to intervene, but also for researchers and non-interventionists who seek to bring awareness to acts and processes of resistance, with the goal of shifting dominant discourses. Here we also reiterate the message of Baumer and Silberman [6] that the decision to intervene (or not) must be taken with great care.

## 5.2 Learning Across Sites of More and Less Privilege

The global development project, when it was first initiated in 1949, was aimed at bringing the wealth of knowledge around technological advancements that the North had to the Global South [25]. Much of the research in the field of HCI that engages with the Global South has been thus motivated and duly critiqued (e.g., [50]). Many scholars such as Taylor, Wyche et al., and others (e.g., [90, 101, 103]) have tried to challenge this dominant view, pushing for us to highlight the richness in the different ways of living in the South. As Mohanty points out, this approach, which sees difference as a "benign variation", can sometimes manifest as searching for the "exotic" [71] that Mohanty—and we—advocate against. She says, "difference seen as benign variation (diversity), for instance, rather than as conflict, struggle, or the threat of disruption, bypasses power as well as history to suggest a harmonious, empty pluralism." For us, adopting a solidarity mindset implies going beyond a search for the "exotic" to being open to learning from sites of more *and* less privilege. Here we align, in particular, with Freire's support [31] for co-creating knowledge through dialog across sites of privilege and marginalization, instead of purely relying on knowledge transfer from sites of greater privilege overall to sites of less.

As the VR case highlighted, it was possible to draw lessons from an intervention in Mumbai that informed one in Atlanta. Certainly, the reverse is common, as the dominant development discourse has amply shown [25]. With Google Expeditions in Mumbai, researchers found that VR's representational fidelity could generate valuable exposure for students and motivate inquiry-based learning. Vishwanath et al.'s work in Atlanta [98] found that empathy-building was also

possible through content generation affordances of VR. The struggles that surfaced in both locations indicated a desire to engage and make meaning of a technology that has thus far been attractive but inaccessible, seen as meant for a privileged few. While focusing on the differences can lead to one understanding of the inequities across these environments, a focus on commonality (for example, in the agencies of teachers and school coordinators) can inform ways in which practitioners might align towards uncovering the value of this technology for (differently) underserved contexts. This also becomes relevant with increasing affordability of computing technologies, as the gap between available technological infrastructures in the North and South continues to narrow. This is a case that Neha and Aditya also make in the case of VR-based computing, arguing that as the above gap narrows, it makes more and more sense for us to pursue technology research in less-resourced parts of the world [58].

### 5.3 Enacting Solidarity Across Research, Design, and Practice

Our paper highlights multiple ways in which Mohanty's idea of feminist solidarity [70] might find its place in comparative CSCW and HCI. At the grassroots level, we might take on a feminist solidarity mindset to engage with struggles of the marginalized, with or without the goal of intervening, like the several examples covered by Mohanty [71]. We might also show solidarity towards other individuals doing the same in different circumstances. Our paper then goes a level further to show how solidarity might play a role to further comparative research, design, and practice by analyzing across three such comparisons (in the domains of access and connectedness, global health, and learning environments). We also emphasize Mohanty's advocacy for making "commonalities across differences" a focus, so that we might come together as individuals and groups in academia, industry, and non-profits to erect (and strengthen) bodies of work that seek to align even as they aim to differentiate.

It is worth noting that research, design, and practice are lengthy endeavors that may take several stages to complete, due to methods that take time to pursue, but also iterations of designs and interventions that aim to learn from prior ones. Instead of examining one context after a research, design, or practice project is completed in another, lessons might be shared partway through these stages as well. This ensures that we not only learn and iterate on our own work, but simultaneously enrich these iterations with others' lessons. It also requires us to be in solidarity with each other before our work is completed, while it is ongoing. This brings us back to drawing inspiration from the ideology underlying DBIR, as Kumar and Dell introduce for bridging research and practice in HCI4D [28, 51]. If we view the globe as one extended site—for a *feminism without borders* that Mohanty calls for [71]—where research, design, and practice are concurrently in motion, we might consider ongoing projects as iterations of DBIR, each iteration informing the next one at a different site. Instead of targeting a globalized, generalized approach towards comparative research, design, and practice, we propose a validation of the local and its power to have impact at a global level, contributing with differences and similarities to how future technologies might be understood, designed, and deployed. However, this would be impossible without recognizing that the work we do at one site is bound to impact research, design, and practice across others, elsewhere around the globe, and taking responsibility for our actions.

## 6 CONCLUSIONS AND DIRECTIONS FOR FUTURE WORK

In this paper, we demonstrated through three comparative studies how the CSCW, HCI, and HCI4D communities might engage in comparative research, design, and practice, when working across regions and populations subjected to marginalizations in various forms. Mohanty's construct of *feminist solidarity* [71] provides the glue with which to conduct such comparisons, drawing attention to the commonalities in the struggles within different contexts, and the processes of

resistance that surface and offer lessons to be learned. We witnessed these commonalities as well as differences in the struggles and resistance enacted in erecting information infrastructures in Cuba and India, designing community health interventions in rural and urban India, and offering VR-based experiences in classrooms across the Global South and North.

Despite the criticisms that universalist approaches have received (e.g., [20]), particularism has its own recognized disadvantages. Our goal through this paper was to showcase an approach that might attempt the “best of both worlds” by offering a method of transferring lessons across contexts, while still honoring the differences that exist. We assert that care must be taken, however, in drawing attention to certain struggles and processes of resistance, ensuring that these are grounded in the data collected and recognizing that data collection itself is oriented around particular questions. Specifically, we recognize that the way we view and interpret feminist solidarity, and therefore the commonalities and differences we note, may be different when we engage with different strands of feminist thought. Thus we stress the importance for future scholarship in CSCW and HCI to build on recent work in this regard (e.g., [43, 74]), and more deeply examine and recognize the diverse strands of feminism that are emergent across geographic, sociocultural, and other boundaries.

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