Infrastructuring Hope: Solidarity, Leadership, Negotiation, and ICT among the Rohingya Refugees in Bangladesh

Faheem Hussain
School for the Future of Innovation in
Society, Arizona State University
Tempe, USA
Faheem.Hussain@asu.edu

Abdullah Hasan Safir
Dept. of Computer Science,
University of Toronto
Toronto, Canada
safir@cs.toronto.edu

Dina Sabie
Dept. of Computer Science,
University of Toronto
Toronto, Canada
dsabie@cs.toronto.edu

Zulkarin Jahangir
North South University
Dhaka, Bangladesh
zulkarin.j@brac.net

Syed Ishtiaque Ahmed
Department of Computer Science,
University of Toronto
Toronto, Canada
ishtiaque@cs.toronto.edu

ABSTRACT

Migration, forced mobility, and refugee studies in ICTD and related disciplines have been predominantly focused on the victims' immediate needs, including shelter, food, healthcare, language, and information. This line of work has mostly been devoid of the political background of migration and the victims' future hopes and aspirations, and hence fails to address many pressing issues associated with their long-term settlement. We address this gap in ICTD literature by drawing on our two years long ethnography with the Rohingya refugees in Bangladesh. We build on a rich body of literature on development sociology and philosophy to demonstrate how the refugees infrastructure their hope through various artful practices of solidarity, leadership, and negotiation, and how ICT plays an important role in and around each of these practices. We discuss how our study further contributes to the ongoing discourse in ICTD around aspiration, hope, design, and empowerment.

CCS CONCEPTS

• **Human-centered computing → Human computer interaction (HCI)**; *Understanding People*.

KEYWORDS

Rohingya; refugees; Bangladesh; ethnography;hope; solidarity; infrastructuring

1 INTRODUCTION

Rohingyas are considered one of the most persecuted groups at present, and they constitute one of the largest portions of refugees in the world today [24]. For decades, Rohingyas have been consistently discriminated by the army-led administrations in Myanmar with very limited access to education, health, and other basic citizens' rights [36]. Despite this dire situation and their need for support, the case of Rohingya refugees has not received enough attention in Information and Communication Technologies for Development (ICTD), Human Computer Interaction (HCI), and related literature. However, we argue that the case of Rohingya refugees is interesting for ICTD not only because of its novelty in demography, but it also offers a unique geopolitical and historical lens to rethink the refugee crisis.

As these large numbers of Rohingya refugees continue to live in these camps, many of the initial humanitarian needs (for example, shelter, foods, psychological support, language translation, information, etc.) slowly convert to developmental challenges for the host country, Bangladesh. While the country has made significant progress in its development index in the last two decades, the policies associated with this growth cannot be applied on the Rohingya communities because they are not citizens, have their own and separate identity, and their hopes and aspirations are not often aligned with those of Bangladeshis. Thus, it has become important to understand how the hopes of Rohingyas that have been uprooted from their own geographical, social, and political context, can be understood and appreciate in a new country with several constraints.

To address this broad agenda, we present in this paper the findings from our 2 years long ethnographic study with the Rohingya refugees in Bangladesh. Based on our fieldwork, we make three distinct contributions to ICTD scholarship. First, our study reports the existing ICT practices among the Rohingya refugees in Bangladesh that reveal various social, economic, and political tensions around ICTD use in this context. Second, this paper advances the growing discourse around hope and aspiration in ICTD by connecting that to

Figure 1: Female Rohingya refugees are taking training on mobile phone fixing at Kutupalong refugee camp, Cox's Bazar. 2018

the concept of infrastructuring. Third, this paper presents a framework of understanding infrastructuring for refugee populations that involves solidarity, leadership, and negotiation. We explain how these three practices allow refugees to organize themselves to advance toward a community hope.

2 BACKGROUND AND RELATED WORK

2.1 Rohingya Crisis

Sketching a detailed history of Rohingya people and politics goes beyond the scope of the paper. However, it is important to mention that many experts believe the origin of Rohingyas in Myanmar can be traced back to as early as the 800 AD [55]. However, some other historians believe that Rohingyas migrated from Bengal and settled in Myanmar after the first Anglo-Burmese War in 1824 [58]. Since Myanmar's independence in 1945, this country's earlier constitutions and laws recognized Rohingyas as regular citizens. In 1961 census, Rohingya ethnicity was officially included alongside other ethnic minorities [46]. However, the situation changed after the military coup of 1962, which ushered in Bamar-supremacist ideology in the governance [4]. In 1982, a new citizenship law was passed which officially denied any Rohingyas from obtaining full citizenship of Myanmar, and practically made the majority of this ethnic minority as stateless [50].

Since the late '70s, persecuted Rohingyas have fled to the border areas between Myanmar and Bangladesh [9]. Before the latest influx of refugees that started in 2017, about 400,000 Rohingya refugees were already living in Bangladesh [36]. According to the latest estimate, about 750,000 Rohingyas have fled to Bangladesh since August 2017 to get away from the brutal oppression of Myanmar's army and the local militias, and 40,000 of them were children [8]. As of March 2019, over 909,000 stateless Rohingya refugees reside in Ukhiya and Teknaf Upazilas in Bangladesh [9]. The vast majority live in 34 extremely congested camps, including the largest single-site, the Kutupalong-Balukhali Expansion Site, which is host to approximately 626,500 Rohingya refugees. With Myanmar declining to accept them as their citizens [15, 29], this huge population has been living an uncertain, vulnerable, and low-quality life in various refugee camps in Bangladesh.

2.2 Forced Mobilities and ICT

While politics in forced mobilities and migration has long been discussed in developmental studies, contemporary research in ICTD, HCI, and related disciplines has mostly aimed at understanding and designing for the challenges refugees face at the initial stage of their migration. These studies include health and well being [20, 65, 66], collaboration with the host communities [16, 27], information access [23, 56], and privacy and security [22, 61]. Besides these, a few other studies focus on the communal and political aspects of immigrants that are attached to their use of ICT. For example, Xu et al. [69–72] remark on the refugees' innovative behavior who continuously seek to improve their conditions and the need to engage them in planning decisions. Aal et al. [10, 11] and Yerousis [73] discuss how employing intercultural computer clubs allow the displaced youth to reflect on their shared socio-political experiences in the Jalazone Palestinian refugee camp in the West Bank. Similarly, Fisher et al. [30] illustrate how the refugee community in the Zaatari refugee camp can come together to design the camp's cookbook for the purpose of shaping their identity. However, Sabie et al. [56] have lately pointed out that most of these studies have neither engaged fully with the broader politics that caused the forced mobility, nor gone deeper into the future that the refugees will have in the new country.

Indeed, the initial 'humanitarian' problem of the refugee crisis eventually turns to a 'developmental challenge' for the host country, where the education, employment, healthcare, and political rights of the migrants become important. Addressing these issues requires shifting the focus of ICT research from the immediate 'needs' to a future that the migrants aspire. However, while millions of refugees worldwide are transiting to a new life in a foreign land, there still remains a huge vacuum in understanding the existing and potential role of technology in this transition. Very recently, Sabie and her colleagues [57] have focused on the future of the migrants in a foreign land, and have designed technologies to connect the community's collective memory to their new homes. Such 'future-facing' turn of refugee research in ICTD and related disciplines aligns itself with the growing movement within ICTD to shift the focus of design from 'need' to 'aspiration' and from 'present' to 'future' [45, 49, 68]. This paper joins this discussion by documenting the ongoing practices of the Rohingya refugees to advance toward a communal hope.

2.3 Hope, Aspiration, and ICTD

Now we turn to the literature of philosophy, social science, and design around future, hope, and aspirations. It is important to note that 'hope' connects two of the biggest questions in philosophy: *"what is truth?"* and *"how to live our life?"* [38]. Western metaphysics has predominantly looked for the objective truth - the essence of nature, without asking of its necessity in our life [39]. However, as Nietzsche convincingly rejected the possibility of objectivity, he necessitated 'hope' for defining a truth [48]. A long line of thinkers in the last century, inter alia, Heidegger, Kierkegaard, Camus, Satre, Kuhn, Foucault, Dewey, Derrida, and Rorty, followed Nietzsche, and emphasized on how meaning is created by an epistemological position, or hope (see [53] for a summary). This group of anti-essentialist philosophers has seen hope in two ways. Heidegger,

Kierkegaard, and their followers believed in a 'hope' that is rooted in religious faith [33, 43]. This hope is often called 'vertical hope' (as coming from the God who is in the sky). On the other hand, Dewey, Rorty, and the group of American pragmatists proposed a 'horizontal' version of hope that they called 'social hope' [26, 53]. This hope is rooted in the everyday reality of humans and advances through experiential meaning-making [26]. The latter group argues that a social hope rejects the idea of an undefined future and imagined realities (as often described in various forms of Utopian literature), and focuses on a practical and feasible future that is rooted in the morality of a community. Thus, social hope both resists the risk of neoliberal dreams and supplies with actionable directions for a community to move toward their communal hope.

The discussion around action, aspiration, and hope also took place in various genres of design scholarship including architecture, engineering, and computer science (see [28], for example). In HCI, the proponents of 'activity-centered design' advance the idea of creating a new future while 'user-centered design' researchers focus more on solving existing problems [31]. While some recent advancements of HCI and design research have taken 'future' more seriously through the creative and critical work of speculation [28], ICTD researcher, Kentaro Toyama has criticized HCI for focusing too much on needs and differentiated that from ICTD that he considered as a future-facing discipline [68]. ICTD has a long history of focusing on hope and aspirations that transcends the current needs of people [49]. Development scholar, Arjun Appadurai considers such aspiration essential for development to happen. His argument centers on the idea that a person needs to be hopeful to make a change in his/her life [17]. Noble Laureate economist, Amartya Sen, in a similar tone, focused on 'freedom' that emphasized on developing individual's capabilities through instrumental and constitutive means [59, 60]. Heeks and Krishna [32] have also explored 'hope' both from individual and collective perspectives, and explained how stakeholders' perspectives are reflected on the delivery of ICT services.

Kumar et al. [45] have very recently addressed this issue through their work on 'aspiration based design' that has challenged the dichotomy between 'needs' and 'aspiration' showing how both are shaped by the social reality. Their work shows how a local initiative in India goes beyond its immediate needs for education, and acts toward achieving the aspiration of marginalized women. While this body of work brings to the fore the need for placing the hope at the center of ICT study and design, it also leaves two questions unaddressed: (a) what kind of infrastructural arrangements make such an aspiration-based design work?, and (b) how do various competing and conflicting aspirations in a community co-exist and sustain? These questions are important to understand the aspiration-based initiatives taken by marginalized communities amid a myriad of adversities. To address these questions, this paper builds on the idea of *'infrastructuring'* from social science, Science and technology, and HCI literature.

2.4 Infrastructuring, Participation, and Sustainability

Infrastructure is usually defined by a coordinated combination or assemblage of humans and objects that are organized for accomplishing a certain task. Common examples of such infrastructure may include the water supply system of many urban cities that is comprised of pipes, tanks, motors, engineers, cleaners, repairers, laws, police, etc. The concept of 'information infrastructure' builds on a similar idea and incorporates a wide range of humans and material and non-material objects that are orchestrated in a particular way to provide certain information services. Neumann and Star [47], in their seminal work on infrastructure, emphasized on the situated nature of the making of infrastructure. Star and Ruhleder [64] have argued that a large infrastructure is confronted by individuals only through a small component of it and their interaction with the infrastructure is shaped by how that component is situated within their social context. This idea allows us to think about a large infrastructure in a very nuanced level considering various perspectives as experienced by individuals. Star and Bowker [63] have shown how these experiences are often invisible on the surface level, and hence the art, craft, and labor associated with them remain undervalued. This body of work moves the pragmatic future-facing discourse within ICT literature from the design of an artifact (inscribing knowledge and activities in new material forms) to an infrastructure (juxtapositions and connections with existing forms) [40].

Now, as the pragmatic vision with ICT moves from an exotic undefined future through design, to a practical experience-based infrastructure, the making of such an infrastructure also becomes important. Karasti and Syrjänen [40] have argued that infrastructuring is essentially artful integration, co-ordination, and meaning-making of the objects and processes around us to achieve a certain communal goal. Core to their argument lies the notion of 'everydayness' of the objects (as opposed to building a totally new artifact) that people use for a different purpose. This notion explains how mundane objects, for example: roads, papers, pens, mobile phones, social media, etc., are often tied together in a particular way to produce the infrastructure of a social movement by a community. Similarly, Karasti et al. [41] argue that infrastructuring emerged as a way to advance the overarching community interests. It integrated with the communities' ongoing activities and was embedded in multiple contexts relevant for the communities over extended periods. They have also argued how, unlike most design, infrastructuring is a continuous process that changes its mode with the change of social context. Ahmed et al. [14] have shown how people who are victims of forced migration experience residual treatment from the already built infrastructure and then practice various art and craft-based collaborative activities to make room in an adversarial condition. Le Dantec and DiSalvo [25] have proposed how an information base can make people aware of the temporal and situated motivations and needs for participating in infrastructuring. This body of work demonstrates how infrastructuring is an ongoing process led by the members of a community toward reaching a tangible future through the artful and creative use, manipulation, and organization of the people and objects around them. This conceptualization allows us to understand thousands of instances of alternative uses,

improvisations, repairs, recycles, and many other practices with and beyond a technology among various communities that have often emerged at ICTD and related literature. In this paper, we build on this concept to explain how Rohingya refugees, instead of designing any new technology, are infrastructuring their hope around the opportunities and obstacles that they have before them.

3 METHODS

This paper draws on a long-term ethnography conducted between November 2017 to August 2019, at refugee camps within the Kutupalong, Balukhali, Leda, and Teknaf areas of Cox's Bazar district in Bangladesh. The primary objective of this study was to get a deeper understanding of the role of ICT in the lives of Rohingya refugees in Bangladesh. During this period of time, we worked with the Rohingya refugees living in six different refugee camps. Our field-visits and data collection were facilitated by two NGOs active in this area, Building Resources Across Communities (BRAC) and Young Power in Social Action (YPSA), with permissions from Refugee Relief and Repatriation Commissioner (RRRC) of the Bangladesh Government. These NGOs introduced us to the refugees and their leaders, and explained to us the projects that they were conducting with them. After the primary introduction, we developed a rapport with the community and deployed various ethnographic methods to collect our data, as mentioned below.

We divide the whole study into three main phases. In the first phase, we focused on familiarizing ourselves with the geographical organization of the refugee camps, local politics and social hierarchy, the provided facilities and the associated challenges, the initiatives of the government and non-government agencies, and the main economic activities of the refugees. Most of our fieldwork in 2017 focused on collecting data to develop a clear understanding of these topics. In this phase, we conducted participatory observations at several local marketplaces, clinics, learning centers, mosques, and safe spaces. We also interviewed more than 20 NGO workers, 30 refugees, and 20 local Bangladeshi people. We also made biographical sketches of 10 refugees (5 males and 5 females) to better understand their journey from Myanmar to Bangladesh. This wide range of methods allowed us to develop a deeper understanding of their lives, struggles, values, and aspirations from various perspectives.

In the second phase, we focused more on the use of ICT by the refugees. Most of our fieldwork in 2018 focused on this topic. In this phase, we visited several 'mobile charging and repair' shops located in the camps. We conducted participatory observations there to understand what kind of digital information they consume and how. We also interviewed the shopkeepers and the other people who sell digital contents in 'memory cards'. We bought and checked the contents of some of these memory cards. Later, we also visited more than 20 families and interviewed their members on their use of computers, mobile phones, the internet, and online social media. These families were chosen by convenience and snowball sampling [6, 19]. We also studied four projects by local NGOs involving ICT training. Finally, we conducted three focus group discussions (FGDs) with the senior citizens and religious leaders, young and adult men and women (with 30 refugees, age ranging from 18 to 55

years) to get a deeper understanding of their experience with ICT usage.

In the third and final phase, we focused more on the communal structure, collective hope, and other political issues. Most of our fieldwork in 2019 focused on this. We tried to understand how these refugees are organizing themselves around their communal hope and how they are using ICT as a tool to help them. In this phase, we conducted interviews with 15 local leaders, 20 high-level NGO officials, 30 local businessmen, and 20 refugees to understand their social hierarchy and leadership models. This phase also included interviews with all these participants and two separate focus group discussions with more than 15 female refugees in each.

Taken together, we have interviewed around 150 people in the camps including more than 90 refugees. We also conducted more than 10 focus group discussions. Furthermore, we conducted more than 60 hours of participatory observations and contextual inquiries. All the interviews were voluntary, semi-formal and those lasted for 15 minutes on average. The focus group discussions were also voluntary and were one-hour long on average. Both the interviews and FGDs were conducted in 'Rohingya' language and audio recorded. Later, we transcribed and translated the interviews. All the members of our team (except one) were born and brought up in Bangladesh, are fluent speakers of Bangla, and have working knowledge of Rohingya language. We recruited two local people who accompanied us (during data collection and analysis) and helped us understand the language if we were stuck. The protocol of this study was approved by one North American university and two major research institutions in Bangladesh. We also want to mention that there were significant challenges in collecting data with this vulnerable population. The access to the camps, building rapport with the participants, and listening to their severe struggles often involved significant amount of physical and emotional challenge. The team used their experience, patience, care, respect, and honesty to attend the contextual needs to overcome those challenges. We also were very careful that no confidential, private, and sensitive data is communicated through our study. As is common in focused ethnographic studies [34], we started with broad research questions about the hopes and aspirations of the Rohingya refugee community and their relationship with ICT. The coding was an iterative, cyclic, and self-reflective process by the primary researcher. It involved an inductive approach to come up with a set of themes to develop a framework of infrastructuring hope that we present in the following sections.

4 LIFE IN ROHINGYA REFUGEE CAMPS

Before presenting our findings particularly pertinent to the infrastructuring of hope, we present here a general picture of the life of the Rohingya refugees in the camps that we have visited. While a comprehensive description of each of the facets of their life would be impossible within the capacity of this paper, we highlight a few important aspects of their life that will allow us to get a deeper insight into their hope and infrastructuring initiatives.

4.1 Basic Facilities

Rohingya refugees, over the last several decades, have been settling in both formal and non-formal camps in the Cox's Bazar district of

Bangladesh, which borders Myanmar. Since August 2017, the majority of the Rohingya refugees are living in and around the Ukhiya region of Cox's Bazar. Approximately, 1.3 million Rohingyas are now living in this mega-refugee camp, making it the world's biggest refugee community [44]. Bangladesh Government, with the advice of UNHCR and others, has divided this huge camp into several neighborhoods or sub-camps to ensure better aid and administrative management. For each camp, there is a government-assigned Camp-in-Charge officer, who coordinates with the humanitarian organizations and law enforcement agencies for managing the day-to-day affairs of any particular camp.

Rohingyas are not allowed to build any permanent shelters in a typical refugee camp. The majority of the family huts are made with plastic tarpaulin, bamboo, and clay, thus making such structures vulnerable from the outside elements and extreme weather. The toilet and related sanitation facilities have improved over time. Each camp has a network of 'Safe Spaces', run by different local and international NGOs. These establishments provide different levels of training and support on multiple issues (e.g., healthcare, education, reproductive rights, mental counseling, vocational education, etc.) for different groups of refugees: women (young and old), children, and senior citizens. Economic activities are booming all across the different refugee camps, with bustling bazaars, where local and Rohingya traders are selling food items, clothing, phones, watches, jewelry, and even solar panels. The Government has strictly enforced a curfew policy to restrict mobilization inside and outside the camp areas after 5 PM daily. Under this rule, no non-Rohingya personnel (except the Bangladeshi law-enforcement agencies and Camp-in-Charge officials) are allowed to be inside any Rohingya camps after 5 PM, neither can any Rohingya be outside the camp.

4.2 Linguistic Barriers and Challenges in Education

The Rohingyas speak 'Rohingya', an Eastern Indo-Aryan language, connected to the Bengali–Assamese branch. It also has some similarities with the local Chittagonian dialect of Bangladesh [51]. Until now, there is no officially recognized written form of this language. The low rate of literacy among the Rohingya population in Myanmar and in the refugee camps of Bangladesh made this situation even more challenging. As there is no official Rohingya alphabets, the learning centers do not offer any lessons in Rohingya language. Rohingyas are not allowed by the Government of Bangladesh to read and learn Bangla either. The only languages they are allowed to be taught are Burmese and English. According to our research participants, the existing temporary learning centers do not offer any age-appropriate and customized content for different groups of school-attending children. Especially no specific curriculum was designed to teach and intellectually engage the Rohingya children who studied beyond the primary education or grade 5 [42]. According to one of the parents:

> "Our children, who studied in school in Myanmar, have forgotten everything here because they do not have those books or resources to learn those topics again." (female, 30 years, homemaker)

Figure 2: One of the mobile phone servicing and digital content sharing centers of Kutupalong refugee camp. The shopkeeper is a naturalized Rohingya who helps the Rohingya refugees to use ICT services. 2018. (Face covered for anonymity)

The failure of modern education services strengthened the popularity of religious education within the camp areas. Since the latest migration from Myanmar in 2017, we have observed a steady growth in the number of madrassahs, mosques, and their student enrollments. This branch of the education system and the related curriculum are often disconnected from the mainstream education services provided by the international organizations and the Bangladesh Government.

4.3 Access to ICT: Before and After

In Myanmar, ICT usage has always been restricted for Rohingyas. Before the exodus of 2017, the majority of the Rohingyas in the Rakhine province of Myanmar were under the strict rules of Myanmar government. It forced the Rohingyas to not carry or use smartphones or mobile internet. According to our interview respondents, the primary mode of communication for the majority of the Rohingyas in Rakhine was the non-smart phones or feature phones. Moreover, most of the time, male members of the Rohingya families were in possession of such devices, as women in the Rohingya society of Myanmar were not expected to have primary ownership of any communication devices.

In Bangladesh, it is legally required to provide official identification documents as well as biometric information to buy any mobile SIM card [3, 13]. However, most Rohingyas do not have any officially recognized and biometric information-enabled documents, which eventually resulted in their exclusion from the legal SIM market in Bangladesh. During the late 2017 and early 2018, in order to address this situation, the Government of Bangladesh provided free phone booths for the Rohingyas in the camp areas. However, hardly anyone used those facilities [5]. In addition, to make things worse, both mobile and internet service quality in and around the majority of the refugee camps have been very poor, adversely affecting the ICT access for Rohingyas as well as the humanitarian service providers. Illegal mobile phone service is the most popular mode of communication. The majority of the Rohingyas have procured

Bangladeshi SIM cards through the black market. In most cases, according to our research, they pay more than legal users and cannot shop around for affordable packages [35]. In the border areas, Burmese telecom companies' mobile service signals are relatively stronger. It prompted many refugees either to use dual-SIM-enabled phone sets or to keep both Bangladeshi and Burmese SIMs.

4.4 Gender Disparity

Gender disparity among the Rohingya refugees is significant. Rohingya women's access to outside resources is significantly dependent on their close male family members. When it comes to their adaptation of basic health practices, vaccination, and family planning, Rohingya women are not in their full liberty, and are required to make choices based on the opinions of their male partners, the male head of their joint families, or those of their religious leaders. When it comes to education, Rohingya girls are worse off. According to our study, young women are only allowed to go to the makeshift learning centers of the camps until their menstrual cycle starts. Women are primarily responsible for all the household chores in a typical Rohingya family, restricting their external mobility further. There had been some conversation among the humanitarian service providers about using ICTs and digital content for educating Rohingya children, especially the girl children, who are dropped out of the system. However, due to government restrictions on using Internet and mobile phones, such initiatives are yet to be implemented.

When we asked different male respondents about their perceptions of women using ICTs, the reactions were almost unanimous. Rohingya males, let them be community leaders or majhis (explained later), Imams, young, senior, literate, or illiterate, everyone agreed on the fact that women should not have a lot of access to phones or the internet. We kept hearing the stories of young Rohingya women eloping with strangers after interacting over mobile phones or the WhatsApp chats. However, we found no concrete evidence for these stories.

4.5 Hopes

In our study, we asked the Rohingya refugees about their hope. We asked them about the life they want to live and how can they reach there. These questions were asked both in the interviews and FGDs. We found a wide range of answers from our participants ranging from earning a lot of money to become highly educated, and from getting social fame to become purely religious. When we asked them how they might reach that goal, they gradually shared with us how they saw those happen. The vast majority of the refugees wanted to go back to Myanmar, get the full citizenship status there, and build a safe, peaceful, and prosperous life in their home country. Some of the refugees, while still desiring to obtain a legit Myanmar citizenship, preferred to migrate to some third countries including Malaysia, Saudi Arabia, Canada, USA, and some countries in Europe. Few of the refugees wished to stay in Bangladesh because they had been living there for sometime now and run their own businesses.

We further asked the refugees how they might be able to go back to Myanmar with full citizenship. The refugees were more concrete in their answers and shared with us various political and social policies that might help them. All of them emphasized on

upholding and sticking to their Rohingya identity during their time in Bangladesh. They mentioned how that might be threatened with the current situation with no adequate facilities to practice their culture in a proper way. They also emphasized on a harmony in their community and not being divided. Most of them, at this point, also mentioned the role of leadership. They explained how they might become a strong unit under the leadership of an honest and powerful leader. Finally, they also highlighted various challenges they see toward achieving their what they hope for. While the challenges differed for individuals, we found a common theme in the way they suggested to overcome those. The refugees agreed that they did not have much power to challenge the authorities that are imposing various stipulations upon them and believed that the best way they could overcome these challenges is by negotiating and compromising.

5 INFRASTRUCTURING HOPE

Now we turn to our findings that highlight how Rohingya refugees are infrastructuring their hope through various kinds of manipulations of human and non-human objects and relationships. As described above, we build on the Karasti et al.'s definition of infrastructuring that focuses on the situated practices of artful integration of common objects in order to achieve a goal [40]. In this light, we highlight how Rohingya refugees in the camps that we have visited have demonstrated evidence of solidarity, leadership, and negotiation to infrastructure their hope. We describe each of these practices in detail in the following subsections and also mention their relationship with ICT to explain how technology plays an important role in their infrastructuring process.

5.1 Solidarity

The first communal activity that we have observed and documented during our fieldwork was the solidarity among the Rohingya refugees. The usual definition of solidarity implies an awareness of shared interests, objectives, standards, and sympathies creating a psychological sense of unity of groups or classes [1]. It refers to the ties in a society that bind people together as one [2]. However, social scientists have two different opinions about solidarity [52]. One group of social scientists have defined solidarity by a strong feeling of identity and devotion [67]. This kind of solidarity is known as mechanical and organic solidarity. For example, people of the same religion, ethnicity, or country may develop a bond among themselves. However, the second group of social scientists has argued that solidarity is less organic and past-centric but more future-oriented. For example, Rorty [54] has defined solidarity as a tool that bonds people together with a 'shared hope'. This pragmatic definition of solidarity is particularly important for us to understand various social movements. For example, the feminist solidarity movement has brought together women (and men) from all around the world for a common objective of women emancipation. We will build on this pragmatic definition of solidarity to explain our findings in Rohingya refugee camps in Bangladesh.

5.1.1 Solidarity among the fellow campers. We observed a strong bonding among the Rohingya refugees in the camp. This bonding was demonstrated through their mutual care and collaboration. In various occasions, we have seen Rohingyas help each other, without

any monetary or other exchanges of favors. One senior Rohingya women shared:

> "I lost my husband and sons in Burma. All I am left with are my young grandchildren. I don't have any strength left in my body to carry the food relief from the center to our hut in the hill. My kind neighbors help me to carry these bags, always. I have not met them before in my life. I believe the God had sent them to help me and my family!" (Female, 44 years, homemaker)

This type of fellowship and community building have been quite common around the camp areas. Even in the education sector, we found young Rohingyas, who used to be high school students in Myanmar, aiding primary-school kids with their basic Math and English education. One relieved Rohingya mother mentioned:

> "The learning centers are not teaching our kids anything. I am happy that our older Rohingya kids are kind enough to share their knowledge with their younger brothers and sisters. Education is very important for us and our kids need to have education inside or even outside any temporary schools." (Female, 28 years, NGO volunteer)

5.1.2 Solidarity with naturalized Rohingyas in Bangladesh. Apart from the humanitarian agencies and Bangladesh Government personnel, we found naturalized Rohingyas in Bangladesh (who came earlier and are now living there as legal residents, not refugees) to be the most actively engaged groups in the Rohingya refugee camps. The majority of the ad hoc commercial establishments in the camp bazaar areas are owned and at least partially managed by these groups. A middle-aged Rohingya-Bangladeshi businessman briefly explained about the commercial advantage they enjoy:

> "We know the Bangladeshi market very well. And most importantly, we know what the newly arrived Rohingyas want and need. We are here to help." (Male, 43 years, businessman)

5.1.3 Solidarity with local Bangladeshis. Similar to other refugee populations, Rohingyas are heavily dependent on the local Bangladeshis for a wide variety of things, with fresh food (e.g. vegetables, fruits, fish), local mobile SIM cards, and ready-made garments to be the items in high demand in any Rohingya camp:

> "Our Burmese SIM hardly works in Bangladesh. So we need local SIM cards to talk. Legally we are not allowed to have access to Bangladeshi mobile service. But thanks to these local people, we can now have our Bangladeshi phones and talk freely." (Male, 30 years, Majhi)

For many Rohingyas, relocating to countries like Malaysia or Saudi Arabia for better work opportunities critically important. These people, in general, are exploited by a syndicate of local forgers, who have access to fake Bangladeshi passports and/or National IDs. One aspiring young Rohingya refugee shared:

> "I know this is wrong. I know the local people providing us the official documents are also breaking the laws. But need to leave the camp for a better life.

Hence using the illegal service provided by one of my Bangladeshi family friends. Soon, I will get a new Bangladeshi passport." (Male, 19 years, unemployed)

5.1.4 Solidarity with expatriate Rohingyas in other countries. Expat Rohingyas are involved with the Rohingya refugees in Bangladesh in multiple ways. The major concentrations of expatriate (expat) Rohingyas are in Malaysia, Middle East, and Europe. Rohingyas in these regions are organized under different political belief systems. Such expats primarily raise money for the relief of the refugees and try to raise awareness among the international communities. We observed an active involvement of some of the expats in providing humanitarian services using ICT options. In addition to in-person, individual one-to-one conversations, we witnessed that different WhatsApp groups are used by the Rohingyas to regularly communicate with the expat population. During one of the focus group discussions, a Rohingya teacher mentioned:

> "We need to reach out to our Rohingya brothers and sisters from all over the world. They have the knowledge and resources. We need their help to improve our lives, to get back our stolen rights." (female, 24 years, teacher)

5.1.5 Solidarity and ICT. Inside the camps in Cox's Bazar, Rohingyas frequently share short instructional videos, mainly designed and developed by some expat communities in original Rohingya language, covering topics related to: 1) Spoken English, 2) FAQs about opening WhatsApp or Facebook account, and 3) Health care tips etc. There are many YouTube channels (entertainment and news services) managed by the Rohingya expats and frequented by the Rohingya refugees in Bangladesh. According to our research, some of the most popular YouTube channels among the Rohingyas are Rohingya Vision, Arakan TV, Myanmar Muslim, Myanmar 24H, Voice of Rohingya, and Radio Free Arakan. Facebook is also very popular, especially among young Rohingyas. It is a reliable source of news, shared information, community building, and networking.

5.2 Leadership

Our fieldwork reveals a strong presence of leadership among Rohingya communities and the influence of various leaders is evident in their communal life. To understand the nature and role of leadership, we first turn to the definition of leadership. In usual terms, leadership is often defined as a practical skill encompassing the ability of an individual or organization to 'lead' or guide other individuals, teams, or entire organizations [21]. However, scholars have defined it in multiple ways. One major theory on leadership is known as 'trait leadership' that defines leadership as an intrinsic human quality that is comprised of intelligence, adjustments, extraversion, conscientiousness, etc [12, 18]. Nevertheless, many social scientists have argued that a leader in one context may not be a leader in another context. They opine that leadership is not an intrinsic human quality, but "the times produce the person and not the other way around" [62]. This argument defines leadership as a process of responding to the needs of the context and being aligned with the shared hope of the community. We build on this social theory of leadership to explain the leadership practices that we have found in the Rohingya refugee camps in Bangladesh.

5.2.1 Majhis: Connection to the Power. The collective nature of a traditional Rohingya community somewhat fundamentally changed after their enforced migration to Bangladesh. In the camp areas, under the direct supervision of the Bangladesh Government, Rohingyas are organized under the leadership of a cadre of community leaders, known as 'Majhis'. Majhis are primarily selected by each micro-communities, comprising 50 to 250 families. In a larger community, several Majhis are responsible to manage and to represent the people, under the leadership of a Head Majhi. Majority of these Majhis are male, with a handful exception of women Majhis. However, our research found no female head Majhi in any of the Rohingya camps in Bangladesh. The army and the Government of Bangladesh recognize this leadership and works closely with them to reach out to the rest of the Rohingya refugee communities.

The primary responsibilities of the Majhis are to ensure proper distribution of humanitarian aids, to regularly update the number of people and family under their direct supervision, and to disseminate important information received from the government, army, or any humanitarian agencies among the Rohingya refugees. A major part of Majhis' work comprises access to the right information and communication with communities. Hence, Majhis are heavily dependent on the use of mobile phones. Given the Bangladesh Government's decision against the refugees using ICTs, the insistence on Majhis for using mobile network for their work seems like a conflicting and contradictory governance approach.

5.2.2 Imams and Religious Leaders: Holding traditional values. Imams or religious leaders have been an integral part of Rohingya lives for many decades. In Myanmar, where Rohingyas were forced to live in open-air prisons and their mobility was severely restricted, this religious leadership played a very important role in the daily lives of any regular Rohingyas. In Bangladesh, the situation has been a bit different. According to our observations and inquiries, the relevance and importance of Imams over the Rohingya community in the refugee camps changed, mainly due to the change in socio-economic needs and support structures for any regular Rohingyas. Imams collectively manage the numerous mosques within the greater camp areas, along with some resident religious schools. Each of these establishments also has public service announcement systems, which are used for community-level announcements with better acceptability. Our field observations show that majority of the Imams use mobile phones and perceive ICT as a platform to be in touch with their old connections as well as making new ones. One Imam mentioned:

> "We need a good mobile network inside the camp area. Mobile phones help us remain connected to our friends all over the world. This is very important. We can easily connect to our Bangladeshi brothers outside the camp, if we get a good phone signal." (Male, 49 years, religious leader)

Religious sermons and Quran recitations from famous preachers and reciters turned out to be very popular among the Imams, who are also using some of the content for their regular works inside the camp. In order to access these digital audio-visual contents, the Rohingya religious leaders primarily rely on the local mobile repair shops and younger Rohingya males. While the Rohingya clergy is formally against women's use of ICTs, their perception about young

Rohingya males accessing offline/online digital content remained quite positive. Another Imam shared:

> "Kids are our future. They need to educate themselves about technology. That should help our nation and religion to grow further." (Male, 35 years, religious leader)

5.2.3 Political Leadership: A new phenomenon. Slowly but surely, a group of leaders is emerging out of the Rohingya refugee population, who are outside both: the administrative functionalities of Majhi based network and the theological structures of Imams. These leaders are quite popular among the general Rohingyas in the camp areas. For some of these leaders, the popularity is well beyond the borders of Myanmar and Bangladesh, as they are loved by the expat Rohingyas living in Malaysia, the Middle East, some parts of Europe, and USA. A few of these popular leaders are also widely accepted among the international communities, who are sympathetic towards the cause of the Rohingya population.

Our research team met with one of the leaders (to be remained anonymous) in person and explored in details the ways he has organized his followers and political workforce. We observed a significantly different workforce at play. The political leader who provided us with insights of the political communication mechanism adopted by his team, a mix of offline-online collaboration. We found this political leader and his team to be active in the social media space (mainly WhatsApp and Facebook).

In addition to people mobilization, this political leader and his group have been using social media to create short audio-visual content for Rohingyas, covering issues affecting the daily lives as refugees. These contents are also used to spread the socio-political agenda of this group. One other major thing we observed about this Rohingya political leadership is the successful use of social networks, both physical and online, to remain connected with the general population. According to the main leader we interviewed:

> "It is very important for us to include everyone, both Rohingya men and women, in our community building activities. Of course we would love to return to Myanmar. That is our ultimate hope. However, we need equal rights, citizenship, and the guarantee of our safe returns. We are sharing this very message using multiple channels of communications. We all need to have a better understanding about our rights and community aspirations." (Male, 45 years, political leader)

Right after we completed our latest field mission in the summer of 2019, the socio-political group we studied helped organize one of the biggest gatherings of Rohingyas to commemorate the second anniversary of the Burmese military crackdown that initiated the latest exodus of Rohingyas from Myanmar to Bangladesh [7].

5.3 Negotiation

Our field study demonstrated a sustained practice of negotiation among the Rohingya refugees. We extend this notion of negotiation as studied intensively in economics, organizational study, psychology, and many such disciplines to define it for our study as a social process to work with the imposed constraints. In other

words, we see negotiation as a constant artful interaction with the system to move toward a communal hope. These negotiations are often coming in the form of finding workarounds, compromises, and improvisations.

One of the most prominent examples of negotiation is around their innovative workarounds for ICT. Facing a complete ban on the use of mobile phones and internet access did not deter Rohingyas from using different digital platforms completely. The general refugee populace ended up negotiating with the local communities to have illegal access to Bangladeshi mobile SIM cards. We found that people from the host community and naturalized Rohingyas in Bangladesh invested consistently since the last quarter of 2017 to establish mobile repair and battery charging shops all over the camp areas. These installations are primarily very popular destinations for Rohingya men, especially the younger generations. Constant demands of connectivity and localized content, alongside the persistent marginalization, have created these underground markets of digital communication solutions [37]. Besides the challenges with the mobile phone ban, the refugees also suffer from a lack of proper supply of electricity. However, for charging phones, at home they are using solar lamps, which do not work properly during the rainy season. Rohingyas also use collective and commercial installations of solar panels and care batteries in different recharging shops, and thus circumventing the constraints imposed upon them to restrict their use of ICT.

The second mode of negotiation comes in the form of compromise. One such example is that the community is allowing women to take jobs outside their homes to earn money. As mentioned above, in the conservative Rohingya community, women are not usually allowed to work with men. Many of them believe that it is against their religious values that women earn money for the family. One of our participants said:

> "It is forbidden in our religion to be fed by the earning of the women. So we do not want them to work or go outside. And our women are not allowed to use any phones too." (Male, 40 years, day laborer)

However, with the pressure of various NGOs and due to their need for money, they are forced to allow their women to take these jobs. Many Rohingya women are working with the NGOs as community workers to help others in healthcare and education. These NGOs are often giving these women phones to make communication easier. While the community is allowing women to use these phones, they are also imposing very hard restrictions on how the women are using them. For example, all such women whom we interviewed told us how their husbands regularly check their phones and make sure that they did not make any phone calls to someone not related to their job. Their husbands also check the duration of conversations and question them if any conversation is longer than usual. When we asked the husbands about this, they told us how they try to sustain their community values by negotiating the current needs. They explained to us how, according to their communal values, on one hand, it is important to make sure that women are not being approached by any other men. On the other hand, they could not refuse the support that the NGOs would offer. So, they had to make a negotiation by compromising with the demands of

these NGOs and by imposing surveillance on their wives' use of mobile phones and .

Negotiations take place within the Rohingya communities, too. In our separate FGD with women, we also came to know how they came up with different techniques to circumvent this surveillance imposed by their men, and use mobile phones when needed. They did this without fighting their men. Their techniques involved taking help from their friends and families, deleting entries, and saving contact numbers with fake names. At the same time, those women also supported the rationales for the surveillance that their men imposed on them by emphasizing on the community values. They also mentioned how it was important for them to find a 'balance' between community values and external pressure by finding different ways of negotiation in their daily life.

6 DISCUSSION AND CONCLUSION

In the sections above, we have presented the situation of Rohingya refugees in Bangladesh both from various historical and contemporary points of view. We have demonstrated how their ICT use is restricted by various political and cultural factors. Then we have reported how the Rohingya refugees develop and maintain solidarity with people within and outside their community. We further explained the leadership dynamics in their community. Finally, we showed how they negotiate on different issues and yet hold their communal hope. We described how in all these practices - solidarity, leadership, and hope, ICT plays an important role. Our description generates several important implications for ICTD research.

First, our study shows how solidarity plays an important role in the life of Rohingyas. As mentioned above and as demonstrated in our data, their solidarity is not defined and bounded by any ethnicity or historical root. Instead, as we have presented above, the Rohingya community is building solidarity with local Bangladeshis, NGOs, International developmental organizations, naturalized Rohingyas, other Rohingyas living in Western countries, and many of their supporters in the Middle East. Despite having different ethnic roots, these communities often share various hopes of the Rohingyas that make such a solidarity possible. We argue that this shared hope is a often apparent and immediate goal that both parties can see and agree upon. For example, the local Bangladeshis and the Rohingyas might have two different hopes about the future of the latter. However, exchanging a mobile SIM card is beneficial for both of them for their immediate needs of money and communication, respectively. We argue that the bonds that are formed by this kind of immediate hope, as opposed to the ideological similarity, help form solidarity among various groups. Thus our study contributes to the ICTD, HCI, and related literature on participation, collaboration, movement, and similar activities by showing how solidarity forms going beyond a single goal that is tied to the participants' historical sameness or ideological agreement. This helps the ICT designers to better create technology-mediated community or peer-support group based by focusing on immediate needs.

Second, our study reveals important and interesting aspects of leadership that are integral in the life of Rohingya refugees. As we have seen in our data, Rohingyas organize their social and communal activities under the leadership of majhis, Imams, and other political leaders. These leaders do not only work as a unity point

to bind them together and dissolve any disputes, but they also tie the whole community to a shared hope. As we have argues before, leadership in these communities emerge from the societal needs, and not from any intrinsic charisma of an individual. For example, the majhis have always been justifying their activities by associating that with the communal hope of Rohingyas. Similarly, the person who is being able to get the most political benefits for the community is becoming their political leader. Leadership is still an understudied topic in ICTD and related discipline. Although in neo-liberal social settings, leadership often emerges as an organizational or other systematic response to work hierarchy, we have shown how the role of the leaders goes beyond executing a set of predefined goals or setting a few for the community. Instead, leadership involves a continuous effort to identify challenges and find solutions and workarounds in order to move the community toward social hope. With the wide prevalence of political, religious, and other kinds of leaders in the Global South, we believe that ICTD researchers should focus more on understanding leadership from various contexts and their role in development. ICT design may help in helping the leaders in listening to the community needs and find solutions.

Third, our study demonstrates how negotiation is essential in the life of Rohingya refugees. We argue that such negotiation is integral in the life of many other vulnerable populations around the world. As we have seen in our data, the refugees are often compromising with their long-held beliefs in order to move toward their hope through negotiation. We argue that such negotiation is often ignored in design-centring discourse in ICTD and related discipline. In a political context, some ICT designers often take the path of 'persuasion' to sway the adversaries toward themselves. Other ICTD designers take an adversarial position and combat. We argue that neither of these methods is practical for many vulnerable populations, and they need to find a middle path. For example, for the Rohingya refugees, it does not make much sense to try to convince the authority to bend the law to allow them to use mobile phones. At the same time, with very few support with them in a foreign land, it is not wise for them to fight either. Hence, as we have seen in our data, the Rohingyas are coming up with a negotiation where they are using ICTs with the help of locals when possible. We argue that such 'middle ground' has been an under-appreciated domain for design and policy-making in ICTD and related disciplines. Based on our study, we encourage future ICTD researchers to find more creative and effective ways to help people to find paths for peaceful negotiation in any adversarial context.

Now, beyond these three aspects, our study also produces some broad lessons for ICTD community. First, we want to emphasize on use of the idea of infrastructuring in ICTD to better capture the ongoing struggles, improvisations, movements, and activities of marginalized populations. We put forth two arguments to advance this position. First of all, infrastructuring moves the focus from design to the community. As we know, design is a specialized field that often comes with specialized education and thus often becomes difficult to achieve for many vulnerable populations. On the other hand, infrastructuring is more of a situated practice of local people without any specialized education. While working with a marginalized community, if we move the concentration from design to infrastructuring, in many cases, we may find it easier to

develop more participatory and sustainable solutions. Second, in most ICTD design interventions, the designer is from outside the community. While methods like Participatory Design (PD) do allow such methods to come closer to the community, in most practical context, the design is still dominated by the expert designer's belief and expertise. At the same time, design often introduces new artifacts and practices in a community that are disruptive. On the other hand, infrastructuring relies on local resources and local knowledge, and thus reduces the chance of value intrusion.

Finally, our paper brings to the fore the idea of social hope in ICTD literature. We have argued throughout this paper how social hope can better capture the local initiatives in vulnerable and marginalized communities. Our study shows that how the struggles of Rohingyas and their communal resistance are not shaped by any religious of ideological agenda, but are developed around the social hope of survival and respect. We have also shown how such social hope is infrastructured through solidarity, leadership, and negotiation. We argue that this framework of infrastructuring hope will help us better understand and attend to the needs of many refugee communities all around the world. Instead of orienting the ICT services toward the immediate troubles that the community is struggling with, we suggest them to be oriented toward the immediate social hopes - a call also advanced by ICTD scholars like Toyama, Pal, and Kumar. We argue that such infrastructuring is a continuous process of interacting with the odds and coming up with workarounds that will require the community to have a strong solidarity, leadership, and negotiation. We believe that this framework can also be extended for supporting and empowering other marginalized groups beyond the refugees and migrants. We hope that future ICTD researchers will build on this and discover innovative ways to integrate ICT with the local initiatives of development.

7 ACKNOWLEDGEMENT

REFERENCES

[1] 1841. Solidarity. (1841). https://www.merriam-webster.com/dictionary/solidarity
[2] 1991. solidarity. (1991). https://www.thefreedictionary.com/solidarity
[3] 2016. Mandatory registration of prepaid SIM cards. (2016). https://www.gsma.com/publicpolicy/wp-content/uploads/2016/04/GSMA2016_Report_MandatoryRegistrationOfPrepaidSIMCards.pdf
[4] 2017. A brief history of the word "Rohingya" at the heart of a humanitarian crisis. (2017). https://qz.com/1092313/a-brief-history-of-the-word-rohingya-at-the-heart-of-a-humanitarian-crisis/
[5] 2017. Free phone booths for Rohingya refugees to speak between camps. (2017). https://www.dhakatribune.com/bangladesh/nation/2017/10/05/free-phone-booths-rohingya-refugees-speak-camps
[6] 2019. Convenience sampling. (2019). https://research-methodology.net/sampling-in-primary-data-collection/convenience-sampling/
[7] 2019a. In Bangladesh camps, 200,000 Rohingya rally to mark Myanmar 'Genocide Day'. (2019). https://www.france24.com/en/20190825-bangladesh-rohingya-protest-myanmar-genocide-refugees

[8] 2019b. Joint Response Plan for Rohingya Humanitarian Crisis 2018. (2019). https://www.humanitarianresponse.info/en/operations/bangladesh/document/joint-response-plan-rohingyahumanitarian-crisis-2018

[9] 2019. Rohingya Refugee Crisis. (Apr 2019). https://www.unocha.org/rohingya-refugee-crisis

[10] Konstantin Aal, Marios Mouratidis, Anne Weibert, and Volker Wulf. 2016. Challenges of CI Initiatives in a Political Unstable Situation - Case Study of a Computer Club in a Refugee Camp. In *Proceedings of the 19th International Conference on Supporting Group Work - GROUP '16* (2016). ACM Press, 409–412. DOI: http://dx.doi.org/10.1145/2957276.2996281

[11] Konstantin Aal, Thomas von Rekowski, George Yerousis, Volker Wulf, and Anne Weibert. 2015. Bridging (Gender-Related) Barriers: A Comparative Study of Intercultural Computer Clubs. In *Proceedings of the Third Conference on GenderIT* (2015) *(GenderIT '15)*. ACM, 17–23. DOI: http://dx.doi.org/10.1145/2807565.2807708 event-place: Philadelphia, PA, USA.

[12] Phillip L Ackerman and Lloyd G Humphreys. 1990. Individual differences theory in industrial and organizational psychology. *Handbook of industrial and organizational psychology* 1 (1990), 223–282.

[13] Syed Ishtiaque Ahmed, Md Romael Haque, Shion Guha, Md Rashidujjaman Rifat, and Nicola Dell. 2017. Privacy, security, and surveillance in the Global South: A study of biometric mobile SIM registration in Bangladesh. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems*. ACM, 906–918.

[14] Syed Ishtiaque Ahmed, Nusrat Jahan Mim, and Steven J. Jackson. Residual Mobilities: Infrastructural Displacement and Post-Colonial Computing in Bangladesh. In *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems* (2015) *(CHI '15)*. ACM, 437–446. DOI: http://dx.doi.org/10.1145/2702123.2702573

[15] Eleanor Albert and Lindsay Maizland. 2019. What Forces Are Fueling Myanmar's Rohingya Crisis? (Dec 2019). https://www.cfr.org/backgrounder/rohingya-crisis

[16] Asam Almohamed and Dhaval Vyas. 2016. Vulnerability of Displacement: Challenges for Integrating Refugees and Asylum Seekers in Host Communities. In *Proceedings of the 28th Australian Conference on Computer-Human Interaction* (2016) *(OzCHI '16)*. ACM, 125–134. DOI: http://dx.doi.org/10.1145/3010915.3010948 event-place: Launceston, Tasmania, Australia.

[17] Arjun Appadurai. 2007. Hope and democracy. *Public Culture* 19, 1 (2007), 29–34.

[18] Richard D Arvey, Maria Rotundo, Wendy Johnson, Zhen Zhang, and Matt McGue. 2006. The determinants of leadership role occupancy: Genetic and personality factors. *The Leadership Quarterly* 17, 1 (2006), 1–20.

[19] Alice Bloch. 1999. Carrying out a survey of refugees: some methodological considerations and guidelines. *Journal of refugee studies* 12, 4 (1999), 367–383.

[20] Alice V. Brown and Jaz Hee-jeong Choi. 2018. Refugee and the Post-trauma Journeys in the Fuzzy Front End of Co-creative Practices. In *Proceedings of the 15th Participatory Design Conference: Full Papers - Volume 1* (2018) *(PDC '18)*. ACM, 15:1–15:11. DOI: http://dx.doi.org/10.1145/3210586.3210598 event-place: Hasselt and Genk, Belgium.

[21] MM Chemers. 1997. An integrative theory of leadership, Lawrence Elrbaum Associates. *Inc., Publishers, Mahwah* (1997).

[22] Lizzie Coles-Kemp and Rikke Bjerg Jensen. 2019. Accessing a New Land: Designing for a Social Conceptualisation of Access. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems* (2019) *(CHI '19)*. ACM, 181:1–181:12. DOI: http://dx.doi.org/10.1145/3290605.3300411 event-place: Glasgow, Scotland Uk.

[23] Lizzie Coles-Kemp, Rikke Bjerg Jensen, and Reem Talhouk. 2018. In a New Land: Mobile Phones, Amplified Pressures and Reduced Capabilities. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems* (2018) *(CHI '18)*. ACM, 584:1–584:13. DOI: http://dx.doi.org/10.1145/3173574.3174158

[24] Human Rights Council. 2017. Human Rights Council opens special session on the situation of human rights of the Rohingya and other minorities in Rakhine State in Myanmar. (Dec 2017). https://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=22491&LangID=E

[25] Christopher A Le Dantec and Carl DiSalvo. 2013. Infrastructuring and the formation of publics in participatory design. *Social Studies of Science* 43, 2 (2013), 241–264.

[26] John Dewey. 1998. *The essential Dewey: Pragmatism, education, democracy*. Vol. 1. Indiana University Press.

[27] Ana Maria Bustamante Duarte, Nina Brendel, Auriol Degbelo, and Christian Kray. 2018. Participatory design and participatory research: an HCI case study with young forced migrants. *ACM Transactions on Computer-Human Interaction (TOCHI)* 25, 1 (2018), 3. DOI: http://dx.doi.org/10.1145/3145472

[28] Anthony Dunne and Fiona Raby. 2013. *Speculative everything: design, fiction, and social dreaming*. MIT press.

[29] Hannah Ellis-Petersen and Shaikh Azizur Rahman. 2019. Rohingya refugees refuse to return to Myanmar without rights guarantee. (Aug 2019). https://www.theguardian.com/world/2019/aug/21/not-without-our-rights-rohingya-refugees-refuse-to-return-to-myanmar

[30] Karen E. Fisher, Reem Talhouk, Katya Yefimova, Dalya Al-Shahrabi, Eiad Yafi, Sam Ewald, and Rob Comber. Za'atari Refugee Cookbook: Relevance, Challenges and Design Considerations. In *Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems - CHI EA '17* (2017). ACM Press, 2576–2583. DOI: http://dx.doi.org/10.1145/3027063.3053235

[31] Geraldine Gay and Helene Hembrooke. 2004. *Activity-centered design: An ecological approach to designing smart tools and usable systems*. Mit Press.

[32] Richard Heeks and Shyam Krishna. 2016. ICTs and hope for development: A theoretical framework. *The Electronic Journal of Information Systems in Developing Countries* 77, 1 (2016), 1–19. DOI: http://dx.doi.org/10.1002/j.1681-4835.2016.tb00563.x

[33] Martin Heidegger. 1988. *The basic problems of phenomenology*. Vol. 478. Indiana University Press.

[34] Gina Higginbottom, Jennifer J Pillay, and Nana Y Boadu. 2013. Guidance on performing focused ethnographies with an emphasis on healthcare research. *The Qualitative Report* 18, 9 (2013), 1–6.

[35] Faheem Hussain. 2018a. Bangladesh Should Legalize SIM Cards for Rohingya Refugees. (2018). https://freedomhouse.org/blog/bangladesh-should-legalize-sim-cards-rohingya-refugees

[36] Faheem Hussain. 2018b. Digital Access Isn't a Luxury for Refugees. (2018). https://slate.com/technology/2018/06/digital-access-isnt-a-luxury-for-refugees-its-a-necessity.html

[37] Faheem Hussain. 2019. Network shutdowns in Rohingya camps: how they're damaging the fragile information ecosystem of refugees from Myanmar. (2019). https://www.accessnow.org/network-shutdowns-in-rohingya-camps-how-theyre-damaging-the-fragile-information-ecosystem-of-refugees-from-myanmar/

[38] William James and Frederick Burkhardt. 1975. *Pragmatism*. Vol. 1. Harvard University Press.

[39] Immanuel Kant and Mary Gregor. 1996. The metaphysics of morals. (1996).

[40] Helena Karasti. 2014. Infrastructuring in participatory design. In *Proceedings of the 13th Participatory Design Conference: Research Papers-Volume 1*. ACM, 141–150.

[41] Helena Karasti, Karen S Baker, and Eija Halkola. 2006. Enriching the notion of data curation in e-science: data managing and information infrastructuring in the long term ecological research (LTER) network. *Computer Supported Cooperative Work (CSCW)* 15, 4 (2006), 321–358.

[42] Azmina Karim and Faheem Hussain. 2019. 'When Will You Start Teaching the REAL Curriculum?': Challenges and Innovations in Education for Rohingya Refugees. In *Information and Communication Technologies for Development. Strengthening Southern-Driven Cooperation as a Catalyst for ICT4D*, Petter Nielsen and Honest Christopher Kimaro (Eds.). Vol. 551. Springer International Publishing, 675–686. DOI: http://dx.doi.org/10.1007/978-3-030-18400-1_55

[43] Sören Kierkegaard. 1998. *The Cambridge Companion to Kierkegaard*. Cambridge University Press.

[44] Kristine Kolstad. 2018. Cox's Bazar: The world's largest refugee settlement. (Aug 2018). https://www.nrc.no/news/2018/august/coxs-bazar-the-worlds-largest-refugee-settlement/

[45] Neha Kumar, Marisol Wong-Villacres, Naveena Karusala, Aditya Vishwanath, Arkadeep Kumar, and Azra Ismail. 2019. Aspirations-based design. In *Proceedings of the Tenth International Conference on Information and Communication Technologies and Development - ICTDX '19* (2019). ACM Press, 1–11. DOI: http://dx.doi.org/10.1145/3287098.3287117

[46] Aamna Mohdin. 2017. A brief history of the word "Rohingya" at the heart of a humanitarian crisis. (2017). https://qz.com/1092313/a-brief-history-of-the-word-rohingya-at-the-heart-of-a-humanitarian-crisis/

[47] Laura J Neumann and Susan Leigh Star. 1996. Making infrastructure: The dream of a common language. In *PDC*. 231–240.

[48] Friedrich Nietzsche. 2008. *Thus spoke Zarathustra: A book for everyone and nobody*. Oxford University Press.

[49] Joyojeet Pal, Meera Lakshmanan, and Kentaro Toyama. 2007. "My Child will be Respected": Parental perspectives on computers in rural India. In *2007 International Conference on Information and Communication Technologies and Development*. IEEE, 1–9.

[50] Archana Parashar and Jobair Alam. 2019. The National Laws of Myanmar: Making of Statelessness for the Rohingya. 57, 1 (2019), 94–108. DOI: http://dx.doi.org/10.1111/imig.12532

[51] Christine Ro. 2019. The Linguistic Innovation Emerging From Rohingya Refugees. (Sep 2019). https://www.forbes.com/sites/christinero/2019/09/13/the-linguistic-innovation-emerging-from-rohingya-refugees/#3e0c70d85e42

[52] Richard Rorty. 1985. Solidarity or objectivity. *Post-analytic philosophy* 3 (1985), 5–6.

[53] Richard McKay Rorty and Richard Rorty. 1999. *Philosophy and social hope*. Penguin UK.

[54] Richard M Rorty, Richard Rorty, and Rorty Richard. 1989. *Contingency, irony, and solidarity*. Cambridge University Press.

[55] Anchalee Rüland. 2017. Myanmar's Rohingya Problem in Context. (2017).

[56] Dina Sabie and Syed Ishtiaque Ahmed. 2019. Moving into a Technology Land: Exploring the challenges for the Refugees in Canada in Accessing its Computerized Infrastructures. *(COMPASS '19)*. ACM. DOI: http://dx.doi.org/10.1145/3314344.3332481

[57] Dina Sabie, Samar Sabie, and Syed Ishtiaque Ahmed. 2020. Memory through Design: Supporting Cultural Identity for Immigrants through a Paper-Based Home Drafting Tool. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems - CHI '20* (2020). ACM Press. DOI : http://dx.doi.org/10.1145/3313831.3376636

[58] Donald M. Seekins. 2017. *Historical dictionary of Burma (Myanmar)* (second edition ed.). Rowman & Littlefield.

[59] Amartya Sen. 2014. Development as freedom (1999). *Roberts, JT, Hite, AB & Chorev, N. The Globalization and Development Reader: Perspectives on Development and Global Change* 2 (2014), 525–547.

[60] Amartya Kumar Sen. 2009. *The idea of justice.* Harvard University Press.

[61] Emrys Shoemaker, Gudrun Svava Kristinsdottir, Tanuj Ahuja, Dina Baslan, Bryan Pon, Paul Currion, Pius Gumisizira, and Nicola Dell. 2019. Identity at the margins: examining refugee experiences with digital identity systems in Lebanon, Jordan, and Uganda. In *Proceedings of the Conference on Computing & Sustainable Societies - COMPASS 19* (2019). ACM Press, 206–217. DOI : http://dx.doi.org/10.1145/3314344.3332486

[62] Herbert Spencer. 1892. *The study of sociology.* Vol. 5. Kegan Paul, Trench, Trübner.

[63] SL Star and GC Bowker. 2002. How to Infrastructure in The Handbook of New Media. LA Lievrouw & SL Livingstone. (2002).

[64] Susan Leigh Star and Karen Ruhleder. 1996. Steps Toward an Ecology of Infrastructure: Design and Access for Large Information Spaces. *Information Systems Research* 7 (1996), 111–134.

[65] R. Talhouk, M. Balaam, T. Bartindale, K. Montague, S. Mesmar, C. Akik, A. Ghassani, M. Najem, H. Ghatas, and P. Olivier. 2017. Implications of Synchronous IVR Radio on Syrian Refugee Health and Community Dynamics. In *Proceedings of the 8th International Conference on Communities and Technologies - C&T '17* (2017). ACM Press, 193–202. DOI : http://dx.doi.org/10.1145/3083671.3083690

[66] Reem Talhouk, Sandra Mesmar, Anja Thieme, Madeline Balaam, Patrick Olivier, Chaza Akik, and Hala Ghattas. 2016 , langid = english. Syrian Refugees and Digital Health in Lebanon: Opportunities for Improving Antenatal Health. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems - CHI '16* (2016). ACM Press, 331–342. DOI : http://dx.doi.org/10.1145/2858036.2858331

[67] Peter Thijssen. 2012. From mechanical to organic solidarity, and back: With Honneth beyond Durkheim. *European Journal of Social Theory* 15, 4 (2012), 454–470.

[68] Kentaro Toyama. 2018. From needs to aspirations in information technology for development. 24, 1 (2018), 15–36. DOI : http://dx.doi.org/10.1080/02681102.2017.1310713

[69] Ying Xu, Adrian Holzer, Carleen Maitland, and Denis Gillet. 2017. Community Building with Co-located Social Media: A Field Experiment with Syrian Refugees. In *Proceedings of the Ninth International Conference on Information and Communication Technologies and Development - ICTD '17* (2017). ACM Press, 1–11. DOI : http://dx.doi.org/10.1145/3136560.3136580

[70] Ying Xu and Carleen Maitland. 2017. Mobilizing Assets: Data-Driven Community Development with Refugees. In *Proceedings of the Ninth International Conference on Information and Communication Technologies and Development - ICTD '17* (2017). ACM Press, 1–12. DOI : http://dx.doi.org/10.1145/3136560.3136579

[71] Ying Xu and Carleen Maitland. 2019. Participatory data collection and management in low-resource contexts: a field trial with urban refugees. In *Proceedings of the Tenth International Conference on Information and Communication Technologies and Development - ICTDX '19* (2019). ACM Press, 1–12. DOI : http://dx.doi.org/10.1145/3287098.3287104

[72] Ying Xu, Carleen Maitland, and Brian Tomaszewski. 2015. Promoting participatory community building in refugee camps with mapping technology. In *Proceedings of the Seventh International Conference on Information and Communication Technologies and Development - ICTD '15* (2015). ACM Press, 1–4. DOI : http://dx.doi.org/10.1145/2737856.2737883

[73] George Yerousis, Konstantin Aal, Thomas von Rekowski, David W. Randall, Markus Rohde, and Volker Wulf. 2015. Computer-Enabled Project Spaces: Connecting with Palestinian Refugees across Camp Boundaries. In *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems - CHI '15* (2015). ACM Press, 3749–3758. DOI : http://dx.doi.org/10.1145/2702123.2702283