"This is How We Do it in My Country": A Study of Computer-Mediated Family Communication Among Kenyan Migrants in the United States

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ABSTRACT

Although computer-mediated family communication remains a longstanding focus of study in Computer Supported Cooperative Work (CSCW), families who face challenges in communication due to differences in technology infrastructures remain understudied. To address this gap in the literature, we interviewed 39 Kenyan migrants living in Atlanta, Georgia, U.S. who regularly communicate with friends and family members living in their homeland. The contributions of this work are primarily empirical. Findings from our study reveal how high costs, identity management, and infrastructural differences between rural and urban areas in Kenya, impact decisions families and their extended members make when using information and communication technology (ICT). We present design implications and reflect on how understanding Kenyan migrants' ICT practices can positively influence design for the broader population.

Author Keywords

Family; Kenya; Connectedness; Transnational Communication; and Photosharing.

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

General Terms

Design and Human Factors

INTRODUCTION

A significant transnational practice affecting migrants' lives in the U.S. is their ability to use technology to connect with family members living in different countries. Not too long ago migrants made do with exorbitantly expensive calls, slow-paced post, or no contact at all. Today many rely on

Information and Communication Technology (ICT) to regularly communicate with extended family members. Unfortunately, the benefits accompanying high-bandwidth Internet access and low costs phone calls are unevenly distributed and maintaining transnational ties remains difficult for individuals living in parts of the developing world. In rural parts of Kenya, the infrastructure necessary to support digital photo exchange and video-mediated communication (VMC) are scarce, consequently Kenyans living abroad can not use some ICT to connect with family members in their country of origin [11,42]. Further, despite the arrival of an undersea fiber-optic cable in Sub-Saharan Africa, lack of electricity and high costs suggest infrastructural differences and barriers to ICT access are likely to persist in parts of the developing world [1,18,28,42].

These obstacles pose challenges for African migrants wanting to communicate with friends and family living abroad, particularly those with members living rural parts of the continent. Yet, designers of collaborative systems often assume that communication occurs between families with similar Internet speeds and connectivity, thus overlooking ways families with extended members living in developing countries stay connected [13,42]. In this paper we argue that studying African migrants' ICT practices contributes to CSCW in two ways. First, studying these users highlights new factors to consider when developing ICT to support family communication. Second, our research reveals how studying computer-mediated communication between users in developed and developing countries challenges themes underlying domestic technology design.

We focus on Kenya because migrants from this East African country are part of a growing demographic in the U.S. and regularly communicate with people living in a country with a technology infrastructure that is less developed than those typically examined in CSCW studies (e.g., [20,23]). Over the last two decades, economic difficulties, increased poverty, and political instability have resulted in large-scale migration of Africans to the U.S. [25]. Census data indicate there are 1.4 million foreign-born Africans residing in the U.S. and that number is growing. More than two-thirds of these immigrants come from

countries in sub-Saharan Africa, with the majority coming from Nigeria, Ghana, and Kenya [40].

We make two contributions with this work. First, we present findings from 39 (27 men and 12 women) Kenyan migrants residing in the metropolitan Atlanta-area, that reveal how they use ICT to stay connected with family members in their country of origin. Our research demonstrates how lack of Internet connectivity, infrastructural differences between rural and urban regions, and high costs affect decisions about communication in this transnational context. Second, we discuss how learning from Kenyan migrants' communication practices highlights alternative ways of imagining future computing design for families. We suggest designing systems that account for constraints users like those we studied encounter when communicating. For example, rather than developing applications that heighten expectations about communication, we imagine designing ones that encourage fewer exchanges. Systems that support occasional solitude, rather than constant connectivity, can make family communication less of an obligation for users in developed countries.

RELATED WORK: COMMUNICATION BETWEEN REMOTE FAMILY MEMBERS

Communication between remote family members continues to attract research interest within CSCW and related fields. Work in this area tends to focus on how ICT supports "connectedness," or the positive emotional sense that comes from feelings of staying in touch [33]. Researchers' early efforts explored how media space concepts could provide families with new computer-mediated ways to communicate. Hindus et al. [16] foreshadowed the increased pervasiveness of computing in North American and European domestic life. CSCW/HCI researchers have kept pace with these changes and empirically investigated computing and its changing role in family communication.

Tee and her colleagues explored how families living in the U.S. used ICT to stay connected with extended family members, or people who are related but do not live in the same household [36]. Findings from their research provide a detailed picture of how families use phone and email to communicate and share photos with distributed members. Results from these studies also suggest that families want additional ways to communicate with each other. Growing domestic Internet access and high-bandwidth connectivity provide families with these additional ways and have spurred research examining how families use VMC technologies to maintain feelings of connectedness. Commercial examples of these technologies include Google Talk, Skype and iChat.

Kirk, Sellen, and Cao, studied VMC in 12 British homes. Their findings reveal how these technologies make families "feel closer" with extended members, more than phone and email allow. VMC technologies enable family members to virtually share routines, feel involved, and for young children to interact with grandparents in ways that are difficult to achieve without video [23]. Judge and Neustaedter also found that families used video-conferencing to share immediate moments with extended members [20]. Ames and her colleagues uncovered additional ways extended families benefit from using VMC technologies to stay connected. These benefits include providing an engaging experience for young children and allowing families to communicate as a group [3].

In addition to providing rich descriptions of ICT use and family life this research also motivated novel systems such as the "The Family Window" [21] and "HomeNote" [34], that take advantage of the Internet's increased presence in some families' homes. These systems provide families with additional computer-mediated ways to stay connected with remote members such as exchanging images, notes, and written messages.

Our study extends this prior work in two ways. First, with some notable exceptions [2,6,7,39], there remain few detailed studies examining families with extended members living in developed and developing countries. In contrast, prior work tends to examine families living in developed countries (e.g., U.S. and U.K) who communicate with extended members in their countries or in other developed countries [20,23,36]. Yet, innovations in technology and globalization have resulted in new family structures with members living in developed and developing countries [6,25,38].

In terms of our methodological approach and topic of study our work is similar to Burrell and Anderson's research examining how Ghanaians living in London use ICT to support activities other than maintaining connections with their homeland [6]. Unlike their study, we focused on how Kenyans in the U.S. maintain associations with home because prior research suggests they may benefit from improved ways to connect with family members far away [29]. Kenyan migrants face challenges participants in prior CSCW studies are less likely to encounter. These include adapting to a new culture, locating affordable housing, and finding a job. Individuals like those we studied would likely welcome more computer-mediated opportunities to connect with family members abroad during this period of transition.

While CSCW researchers continue to explore geographically distributed work teams collaborating across countries with different infrastructures (e.g., [19,37]), families living in countries with low levels of personal computer ownership and limited Internet access receive less attention. Lack of electricity and high costs keep domestic Internet access out of reach for many in the Kenya and other developing countries [1,18,28,42]. Consequently, not all families rely on Internet and VMC technologies, but other forms of technology to stay connected. The second way our work contributes to CSCW studies of family communication is by broadening the community's understanding of how families with extended members

living in countries with different technology infrastructures maintain feelings of connectedness.

OUR STUDY

We conducted semi-structured interviews with 39 individuals (27 men and 12 women) to understand how Kenyan migrants communicate with friends and family in their homeland. These interviews occurred over a three-month period during summer 2009 and took place at an "immigrant church" in Marietta, a suburb outside of Atlanta. Unlike prior experimental studies of individuals communicating between different countries [37], we wanted to learn from people who communicate with acquaintances living 8,000 miles away in a country with a less developed infrastructure than what exists in the metro-Atlanta area.

In the rest of this section we describe why our interviews took place in a church, provide details about our methods and participants. We also describe how the first author's race, gender, and national identity affected participant recruitment.

Site: The metro-Atlanta area provided us an excellent opportunity for studying Kenyan migrants because of the large number of native Kenyans living there. The city ranks in the top five metropolitan areas in terms of its African-born population and a significant number of those individuals are from Kenya [14,35]. Atlanta, GA, also has a high level of racial diversity and lower cost of living compared to other major U.S. cities; these factors make it an attractive location for African migrants to settle [5].

We conducted interviews in the church because our project was part of a long-term, multi-sited research project examining technology use in Christian churches [41]. Christianity has a remarkable strength in Kenyans' lives and churches tend to be "institutional isomorphic," or comprised of individuals who are similar to one another. It was unsurprising to find three predominately Kenyan congregations in the Atlanta area [30]. Our study took place at a mid-sized church (~500 attendees) because its minister was open to assisting us with our project. In addition to leading the church, he also taught Anthropology at an area college. His personal interest in our study helped us gain access to this site and its members. After meeting the church's minister (to obtain approval for our study) we made an announcement during a Sunday worship service and asked interested people to contact the first author to schedule an interview.

In addition to being accessible there were other reasons the immigrant church was an attractive site. First, there are few places in metro-Atlanta where we could readily find Kenyan migrants meeting on a weekly basis. Second, parishioners often stayed at the church for 1-4 hours following the morning worship service to engage in "fellowship," or informal conversations with other parishioners. This time provided us with opportunities to approach potential participants and ask them to engage in a 30-minute interview. Thirdly, prior studies suggest that immigrant churches remind migrants of their home country because they are settings where they can engage in familiar activities, such as communal worship [26]. This suggested the church was a place where participants felt comfortable reflecting on and discussing life in Kenya.

Participants: There were other reasons we focused on Kenyan-born individuals. The first author had prior experience conducting fieldwork in Kenya and believed this familiarity would help her build rapport and gain participants' trust during interviews. Further, unlike some African-migrants, Kenyans' migration to the U.S. is not typically driven by acute crisis (i.e., they were not forced to leave their country) [14]. This understanding paired with mainstream media reports indicating that technology use is on a significant upward trend throughout Kenya (e.g., [43]) motivated our choice. These factors meant our participants were likely to have friends and family members they wanted to communicate with and who were able to communicate with them. Thus, studying Kenyan migrants provided us with the most opportunities to study phenomena central to our research.

Study participants migrated to the U.S. for various reasons. Twenty-eight came to pursue educational and employment opportunities, while the remaining came to the country to attend family members' graduations or weddings and never returned home. Although the migration of most Kenyans comes from a desire to pursue a "better life," it is rarely the poorest who migrate. Instead it is those with a high socioeconomic status and with considerable financial resources who tend leave their country [14,29]. Our sample reflected this larger trend.

Interviewees differed along dimensions such as length of time in the U.S., educational background, and employment. Some individuals had lived in the U.S. for more than 40 years, while others had been in Atlanta for a few months. The average length of time in the U.S. within our sample was 9-10 years. All participants were adults and ranged in age from 18 to 57. Thirty-one interviewees reported having a college degree, or were working towards one, and five had advanced degrees (4 MBA's, 1 PhD). Participants held a variety of occupations, such as truck-drivers, nurses, accountants, teachers, employees at big-box retailers, and executives in multi-national corporations.

Despite this heterogeneity within our sample, there were characteristics shared among all participants. First, all were born in Kenya and had friends and relatives they regularly communicated with in the country. Second, in addition to speaking English, all but two participants spoke Swahili and their "mother tongue," which was typically Kikuyu. Kenya is comprised of at least forty-two different ethnic or tribal groups, each with a distinct cultural heritage. The majority of these we interviewed (n=28) identified as Kikuyu, Kenya's most populous ethnic group [25]. Finally, all but two participants expressed a desire to permanently

return to Kenya in the future. Kenya remained "home" for these individuals.

Methods: We began interviews with questions about how long participants had lived in the U.S., about their motivations for coming to the country and to describe home. Following these initial questions we asked them about the technologies they regularly used. We intentionally used the term "technology" to understand how participants defined it, rather than us defining it for them. Then we shifted our focus to inquiring about how often participants communicated with friends, family members, and in some cases co-workers in Kenya. We asked them to describe the last time they communicated with someone in Kenya and to tell us what ICT they used and why. Interviews concluded with a series of questions about specific activities (e.g., photosharing) and specific practices (e.g., emailing and using Facebook).

We complemented our interviews with observations at 11 weekly worship services and social events at the church. These events included Mother's and Father's Day celebrations, Easter lunch and the church's annual "Cultural Show." Digital photographs were taken to document our observations. These occasions provided us with informal times to learn about how participants use ICT and talking about the events helped us build rapport with them during interviews. The first author generated field notes following each Sunday service to document her observations.

Reflexive Analysis: Recently, Rode has called for more "reflexivity" in CSCW/HCI research employing ethnographic methods [32]. In the context of social research, reflexivity refers to the ways in which the products of research are affected by the process of doing research [8]. It becomes more pressing for CSCW/HCI scholars to reflect on their relationships with individuals under study, particularly now that they are investigating users who are not necessarily members of these research communities. We briefly examine how the first author's presence as a non-Kenyan, white, and female researcher, affected participant recruitment. Given that she was often the only white-skinned and non-Kenyan individual at many of the services she attended, her presence drew attention. The first author asked a trusted informant to comment on her presence at the services and she replied:

> We spend Monday through Saturday in *your world* and Sunday is the only day of the week for us to be in *our world.*

"Your world" referred to settings where the majority of people were like the first author in terms of their nationality and skin color. Our informant implied that Sunday was different because it was the only day of the week when she was in an environment with other people "like her," or other native Kenyans. She added that members of the church were skeptical of "outsiders" and what they might want. This skepticism reflected a tension the first author felt when recruiting participants. On one hand, people

welcomed her; indeed, churches are places where anyone can join in fellowship and worship with others. On the other hand, she was an outsider and her presence appeared to cause suspicion among some members. For example, some individuals appeared uneasy when she approached them to be interviewed. Thus, she decided to not interview them and instead focused her attention on those who were interested in the research.

Men were more willing than women to participate in our study. This difference is reflected in our skewed sample (27 men and 12 women) and could be attributed to the nature of our research. Participants often told us technology was a topic men knew more about than women.

Analysis: Our findings are based on 39 transcribed interviews, 58 photographs and 80 pages of field notes. We supplemented these data with memos documenting our thoughts and reflections about the themes emerging in our transcriptions. The constant comparative method guided our data analysis in conjunction with reading literature from CSCW, Human-Computer Interaction for Development (HCI4D) and transnational studies [15]. We also consulted with the minister of the church where our study took place on three occasions to discuss and verify themes appearing in our data. He recently completed a dissertation examining Kenyan immigrants in the U.S. [14]. Given that he was an insider and expert on Kenyans living in Atlanta his insights were invaluable during our data analysis process.

FINDINGS

The interviews with participants and our observations at the church revealed consistent patterns about Kenyan migrants ICT practices. In this section we describe these patterns and detail why participants preferred mobile phones to other technologies when communicating with people in Kenya. Then we shift our attention to specific ICT practices: photosharing, social networking and help-seeking (i.e., family members looking for assistance with how to use computer applications).

Our findings reveal how infrastructural differences between the U.S. and Kenya and high costs affect decisions families and their extended members make when using ICT. Further, as we elaborate on in our discussion, we contend that examining this transnational context reveals how some assumptions in CSCW work are not universal and highlights new design opportunities.

Overview of Participants' ICT Practices

All interviewees told us they used a variety of methods, such as mobile phone calls, email, social networking sites (SNS), mobile text messages, and sending packages to connect with friends and family in Kenya. Some forms of communication were more common than others and whether or not participants' family members lived in a rural or urban area affected their choices. Those with friends and family living in Kenya's capital, Nairobi, were more likely to use email and SNS, compared to those with family members living in rural "villages," where Internet access and electricity were often limited. There was significant

diversity in terms of how often people communicated, how satisfied they were with their communications and how long or detailed each communication tended to be.

Communication Patterns: Despite these variations a typical routine of communication emerged among participants in which the migrant made weekly telephone calls to people in Kenya. Like prior studies indicate, due to the significant cost differences, calls nearly always originated from the U.S. [7,38]. At the time of our study, it was less expensive for migrants to call Kenya, than for their family members to call the U.S. Participants told us family members would "flash" them if they wanted them to call them in Kenya. Flashing is identical to "beeping," and it is when a person calls a mobile telephone number and then hangs up before the mobile's owner can pick up the call [9]. It is a free way to alert someone that you would like him or her to call you.

Participants most often described calling their mothers; indeed, in many cases it was the mother's responsibility to relay information from the family member living abroad to other family members in Kenya. If participants were not calling their mothers, they were likely calling their wives, siblings, friends from primary school, or in some cases business partners who oversaw participants' projects overseas. Examples of these projects include building a home or running a charitable organization. Participants' conversations typically centered on individual updates, changes in the weather, agriculture, politics, marriages, newborn babies and people who passed away.

Calls usually lasted no more than half an hour due to the cost of calling Kenya from the U.S. As one participant told us, it is "important not to get carried away when talking on the phone," because "the next thing you know $10 is gone." Pre-paid telephone cards and online services such as "VIP communications"[1] were significant parts of participants' strategies for maintaining contact while also monitoring the amount of money spent calling home.

ICT Preferences: Prior CSCW research examining communication between remote family members suggests VMC is "ubiquitous" and "mundane" [23]. We asked participants about their experiences with VMC technologies such as Skype. Three participants told us they used Skype to communicate with friends and family in Kenya. These individuals used the software application to talk with individuals who had access to higher bandwidth Internet. These exchanges often took place in their relatives' workplaces in Nairobi, rather than their homes. Domestic Internet access remains uncommon throughout Kenya [42]. Most people we interviewed did not use VMC technologies and many were unfamiliar with this ICT.

Like prior studies indicate, time zone differences and knowledge about peoples' daily routines abroad affected when participants called home [7,38]. It was cause for

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[1] http://www.joinvip.com/

concern if these patterns were violated, or if participants called home at inappropriate times. For example:

> You have to know don't call them too late and don't expect them to call you, unless it is an emergency. So we have that understanding. When you get like a 3 o'clock call, you know it is a death and you really don't want that. When they call during the day you know things are good.

As noted earlier mobile telephone calls were the most common method participants used to connect with friends and family in Kenya. There were various reasons individuals preferred the mobile phone to email and SNS, but the real-time "direct" contact phones offered was the most common reason. A father and professional photographer told us about using his phone to supervise the construction of a house he was building in his home village:

> *Interviewer:* Do you go back to Kenya to supervise the construction?

> *Participant:* No, I have some dependable people doing the work. Email takes time for me, I don't like that, I would rather talk to you direct, so they call me during every step.

More than two-thirds of our participants preferred the phone because it was a more efficient way to communicate compared to email:

> I prefer the phone because some people might take some time before they go to check their emails. Like myself I take two to three days before I check the email so if it is something urgent then I wouldn't have been of any help to send email.

The "access, anywhere and anytime" usage style that shapes ICT use in the U.S. is not as widespread in Kenya where high-speed, easily accessible Internet access is not less common [42]. Many participants knew sending an email to someone in Kenya might mean waiting weeks for a response. Nearly every interviewee shared instances of sending emails and never receiving a reply. Reasons participants gave for slow response times centered on some family members' lack of domestic Internet access.

Others told us "email was not that important" to some of their friends and family abroad. When we asked them to elaborate on this, they consistently told us the urgency surrounding sending and replying to emails that many had become accustomed to in the U.S. was less common in Kenya. There were also fewer barriers for using the mobile phone compared to email. Sending and receiving email requires general computer literacy skills that some participants' friends and family members lacked.

We were struck by how our findings offered a counter narrative to some prevailing thinking in CSCW. Like Johri's research, our results suggest that email is not irreplaceable in communication and collaboration [19]. Our participants effectively maintained relationships with family members abroad without relying on email or VMC technologies. Some interviewees oversaw complex projects

such as building a home or managing a charitable organization, solely relying on the mobile phone.

Cost is a significant factor for Kenyan migrants and their families. It affected the frequency and length of their conversations with family members. Further, costs indirectly affected other forms of communication, such as VMC, because high prices make domestic Internet access, personal computers, and "smartphones" out of reach for many Kenyans [42].

ICT Practices: Photosharing, Identity Management, and Transnational Help-Seeking

Here we elaborate on our previous findings by examining participants' specific ICT practices. In the process of uncovering how Kenya migrants used and *did not* use ICT to share photos, we learned how "living between" Kenya and the U.S. affected the content they shared with family members abroad.

Photosharing: Prior research examining communication between extended family members suggests that sharing photographs is useful for maintaining feelings of connectedness among extended family members [24,36]. We asked our participants about their media sharing practices and found that 28 exchanged photos and other forms of media with friends and family abroad. However, they did not always rely on ICT to support these interactions.

During our observations at worship services we repeatedly saw parishioners taking photographs with digital cameras. When special events, such as a guest singer or baptism took place, the sanctuary was full of flashing lights. We asked participants about what we saw and these responses were representative of many:

> It is important to send pictures home so they can see how you are changing, because it will be a long time before you go home, sometimes two years, three years.

Or

> I love taking pictures because a picture, that is a memory. I can track back my past and my progress.

Participants often used the term "progress" when talking about photographs. We learned that photos were used to document and communicate how migrants were acclimating to life in a new country. Photographs of significant events (e.g., weddings, baptisms, graduations and birthdays) were common and appeared especially useful for communicating that one was becoming "adjusted" to life in the U.S.

> That is the kind of pictures they would like to see. So, celebrations, weddings, and maybe if, for example, if I bought a new car, I would send them a picture of the new car. So all those that are celebration related are sent.

Studies examining digital photo sharing reveal that families exchange images through email because it is accessible and offers ongoing text conversation around shared photos [24].

Figure 1. Participant showing us pictures she is sending home. Note the "airmail envelope" in her left hand.

We asked participants if they used the Internet to send digital pictures to Kenya. Those with family members living in Nairobi told us they used email and in some cases Facebook to share pictures. It was more common for participants to rely on non-digital forms of exchange (Fig. 1). For example, many interviewees asked a member of their church to carry paper photos or a CD with them when returning to Kenya:

> Mostly I give them to people who are going home, every time there is someone going home I give them photographs.

The church's minister estimated that during any given week at least one member of his congregation travelled to Kenya. Participants told us their family members would typically meet the person delivering the pictures in the Nairobi airport. Recipients would hold a sign indicating they were to receive the package coming from the U.S. Others relied on courier services to send packages to their relatives living outside of the capital. When we probed to understand why this form of exchange was used instead of email, we were consistently told it was "easier."

> This is how we do it—I can put those in the envelope and send. I find it much easier. You know why? In my country, the Internet is so expensive, even to receive and to send they pay.

Again cost was a factor that affected participants' interactions with friends and family abroad. Sending photo attachments via email often meant the recipient had to visit a cyber café and pay for using a computer with limited bandwidth. Downloading and uploading digital photos could take hours and result in the recipient spending more money.

Tee et al.'s research suggests the overhead associated with sharing photos is too high for some families [36]. In other words, the process of organizing, downloading, and uploading photos to send family members creates new demands on individuals' time. This did not appear to be a concern with our participants who engaged in additional forms of digital "photowork" such as packing pictures and determining who will transport them to Kenya [24].

Our findings reveal how the Internet has not completely displaced communication by exchanging material artifacts. They also highlight how non-digital forms of technology are used to maintain feelings of connectedness between extended families. There are daily flights between Atlanta and Nairobi and tese played an important role in facilitating photosharing among our participants.

Identity Management: Processes of immigration and globalization lead to new "third identities" that represent complex and shifting hybridizations of earlier cultures [10]. Our participants noted how living between two countries, or as one participant described it as "being a child of two worlds," affected their daily lives. It is now commonplace in the literature on globalization to observe that in a context of increasing cultural intermixing, individuals and cultures tend to hybridize, but it is less clear how this hybridization shapes ICT use [10]. When asking participants about photosharing we discovered how this hybridization affected their ICT practices.

During interviews we asked participants who used social networking sites to tell us about their experiences with them. Facebook was the most commonly mentioned site; indeed, as one young woman excitedly told us, "Facebook is becoming very big in Kenya!" Members of this online community reported having friends in the U.S. and in Kenya and that where their friends lived affected what information they shared online. For example:

> *Participant*: Like if it is my family photos, there are some photos that I can send to some people, and there are some photos that I can't send to some people.
>
> *Interviewer*: Can you give me an example?
>
> *Participant*: An example is like, you know, like when I take my family for swimming and they're in their swimming suit, we don't send those things back home.

This participant continued to tell us "things are more explicit in the U.S. than in Kenya," explaining that his parents would find pictures of his children in swimsuits "inappropriate."

Individuals acquire different cultural attitudes as they migrate, retaining parts of their culture of origin and adapting to their culture of adoption [10]. On one hand, this participant's decision to photograph his children swimming suggests he has adopted some aspects of the U.S.'s "more explicit" culture. On the other hand, his decision not to share the pictures with his family in Kenya reveals how he respects his parents' more conservative attitudes. These negotiations regarding photosharing manifested in other ways, for example:

> If I buy a new house I don't want to tell all my friends in Kenya I just got into my dream house. I would send a picture of it to my friends here, but not my friends in Kenya. Because you just want to be humble.

This 46-year old librarian, like other participants who experienced financial success in the U.S. was reluctant to discuss her prosperity with some family members in Kenya. This reluctance centered on two reasons. First, participants consistently described themselves as the "lucky ones," because they were able to come to the U.S. Many were able to achieve an income level that was out of reach to most people in Kenya. In turn, they did not want to appear boastful or not "humble." Second, many migrants were expected to send remittances to family members "back home. Although, participants described themselves as financially comfortable there were limits to the amount of support they could provide. Thus, they were guarded about displays of wealth because they might create unrealistic expectations about how much money they could send to family members in Kenya.

Within CSCW identity management remains a popular research topic [27]. Our findings point to opportunities to explore cultural norms affects computer-mediated communication within migrant communities, because it reveals additional negotiations users encounter online. Examining individuals whose social networks are comprised of people in the developed and developing worlds will also provide the CSCW researchers with a more holistic understanding of Facebook use. To date, prior studies tends take place with individuals who do not regularly communicate with friends and family in Africa.

Transnational Help-Seeking: Another finding from our research suggests that Kenyan migrants' interactions with family members in their home country include educating them about software applications and new ICT. Whether introducing them to SNS, or sending them money to purchase a mobile phone, participants introduced their family members in Kenya to technologies that are an integral part of their lives in U.S.

> I have a friend of mine, I talk to her on Facebook, I had to register her on Facebook and then, right now I am trying to get her to get Skype, but she is like 'oh, I can not do it, can you do it for me?'

Further, there were multiple instances of interviewees describing how they managed overseas family members' online accounts. This meant participants knew their family members' passwords. For example:

> Sometimes they will call me and ask, 'go to my inbox, and tell what is in my inbox,' so you have to go and check for them, and when you are talking to them on the phone you have to tell them.

American families frequently rely on extended member to help them with resolve domestic computer problems [31]. Our findings indicate this activity also occurs among families with members living overseas. In contrast to findings from other studies that suggest developing online applications for desktop or laptop computers, we propose the mobile phone as a platform for creating applications to

assist computer support activities among families like those we studied. Exploring and developing such applications has the potential to broaden online participation among users in developing countries. Our finding also supports those from other studies suggesting attitudes about sharing passwords may be culturally specific and reveals the limitations of contemporary password policies [2].

DISCUSSION: SUPPORTING AND LEARNING FROM KENYAN MIGRANTS' ICT PRACTICES

Our findings point to factors designers should consider when developing computing applications that support communication between families. High-speed Internet access is not always available, digital forms of exchange have not replaced material forms, infrastructural differences between rural and urban parts of developing countries, and cost must be considered when designing systems for families in some transnational contexts. Here we elaborate on how these factors can shape design and the discourse surrounding technology development for family communication. We suggest ways to design (and not to design) for this context. Our discussion also describes what families living in countries where Internet access is easily available, fast, and relatively inexpensive can learn from Kenyan migrants.

Prior research examining communication between extended family members offers new ways for them to communicate that take advantage of the high bandwidth and faster Internet speeds available to many in North America and Europe [20,23].This research motivates new systems that allow distributed families to experience always-on video connection between their households [21,34]. In contrast, to these high-tech forms of exchange we found low-tech ways families maintained feelings of connectedness with family members who sometimes lacked electricity, personal computers, and Internet access. Participants in our study viewed keeping in touch with their family members as worthy of their time and money. It was an activity that required a level of dedication that becomes less necessary with the easily accessibly tools that some North American and European users increasingly rely on to communicate with extended family members.

It will be some time before a technology infrastructure exists throughout Kenya that supports effective VMC [1,18,28]. Large-scale formal rural electrification is unlikely to extend into the interior parts of Kenya, personal computers, and smart phones remain too costly for many [18]. Thus, migrants are likely to continue to rely on mobile phones, courier services, and in some cases use computers to connect with relatives. Many of these computers will be located in cyber cafés rather their relatives' homes. These constraints mean systems like the Family Window [21] are impossible for some of our participants to use with their family members.

Opportunities Not to Design: Our investigation prompted us to consider less tech-centric ways to address issues uncovered in our research [4]. Novel interfaces that provide

users with greater privacy control or systems that require greater bandwidth were not applicable for participants with family members in rural Kenya. Instead, increasing family communication could be achieved through changing tariffs, subsidies for poor communities, special energy projects, improved access to computers and educating users about existing applications [22]. For example, we identified an opportunity to increase awareness among our participants and their family members in Kenya about the availability of VMC technologies such as Skype.

Cost was a consistent factor participants discussed. This finding suggests imagining systems that build on and improve users' current money exchange practices so those living in Kenya could have the resources to access the Internet at cyber cafés. To date, the popular mobile phone based money transfer service M-Pesa can not be used to exchange money between migrants living in the U.S. and their family members in Kenya [17]. Rather than designing new domestic communication technologies researchers may want to consider ways to make existing ones available to a wider number of users. In turn, this may promote more balanced development between developed and developing countries rather that continuing to perpetuate inequities between them [22].

Designing Within Constraints: Designing for constrained environments is more challenging than designing for ones where Internet access is always on and always accessible. Constraints force designers to think beyond developing applications and features that simply require more bandwidth and faster Internet connections.

An audio enhanced paper photograph is a simple and straightforward design example illustrating how technology can respond to participants with family members living in places with a technology infrastructure that differs from what exists in Atlanta [12]. One could imagine recording a message using a device embedded in a paper photograph or postcard to accompany a photo from a birthday or graduation and then sending it to Kenya. Listening to a family members' voices was another reason participants preferred mobile phone calls to email. These artifacts could also easily be included in packages and hand delivered home.

ICT for Other Families: Findings from our study also prompted us to reflect on what the families studied in prior CSCW/HCI research could learn from our participants. For example, Judge et al.'s work suggests families want more computer-mediated way to connect with extended family members [21]. In contrast, we imagine providing these families with less ways to use computing to connect. The introduction of more computing into families' lives brings with it new concerns and obligations families must negotiate. Examples include, demands on parents' time, concerns regarding privacy and anxieties around children having too much "screen time" [3,36].

Our participants appeared to be less concerned about these issues because costs and infrastructural issues sometimes restricted their interactions with family members they valued them in ways that have been overlooked in prior CSCW/HCI studies. Those we interviewed looked forward to their weekly conversations with family members in Kenya. Rather than developing new ways for families to communicate that rely on increased bandwidth, it may be worthwhile to understand how to make families' existing interactions with extended family members more valued.

For example, instead of developing applications that alert extended family members about each other's availability, we imagine creating systems that encourage chats on a weekly basis in hopes that doing so would make the activity seem like a special occasion. VMC could take place during ritualized family events such as Sunday dinners. This would mean communication would occur during a dedicated and scheduled time. Like those we interviewed, we hope this would appease family members' desires to stay connected and eliminate the need for always-on systems that support sharing impromptu moments. Thus, by making communication a weekly event rather than something that happens continually we hope to lessen the sense of obligations some families report having [3,36].

FUTURE WORK AND CONCLUSION
In this paper we describe how Kenyan migrants communicate with family members living in a country with a technology infrastructure that is less developed than those in the U.S. and U.K. Our findings reveal how inconsistent Internet access, limited bandwidth, high costs, and identity management affect transnational communication. We use these findings to suggest new research opportunities for the CSCW community, such as studying Facebook use within a transnational context. Such research would broaden the community's understanding of how SNS facilitate communication between users in developed and developing countries. We also propose alternative ways for technology developers to imagine systems designed to support family communication that do not require faster Internet connections and more bandwidth.

In our future work we will elaborate on another important issues noted in our paper—reflexivity in CSCW research using. The scope of this paper prevents us from providing more details about how our race, religious identity, and other factors affected our data collection and analysis. We conclude that reflexivity is a topic that merits further disussion in CSCW research. Our future research plans also include conducting fieldwork in urban and rural Kenya with the family members of those we interviewed in Atlanta to understand ICT use from their perspectives.

ACKNOWLEDGMENTS

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