# Hustling Online: Understanding Consolidated Facebook Use in an Informal Settlement in Nairobi

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## ABSTRACT
Facebook is a global phenomenon, yet little is known about use of the site in urban parts of the developing world where the social network's users are increasingly located. We qualitatively studied Facebook use among 28 young adults living in Viwandani, an informal settlement, or slum, in Nairobi, Kenya. We find that to overcome the costs associated with Internet use, participants consolidated diverse online activities onto Facebook; here we focus on the most common practice—using Facebook to support income generation. Viwandani residents used the site to look for employment opportunities, market themselves, and seek remittances from friends and family abroad. We use our findings to motivate a design agenda for the urban poor built on an understanding that Facebook is used, with mixed-success, to support income generation. A key part of this agenda calls for developing ICT interventions grounded in users' existing practices rather than introducing new and unfamiliar ones.

### Author Keywords
ICTD; Facebook; social media; social computing; Kenya; Nairobi; informal settlements; youth

### ACM Classification Keywords
H.5.m

## INTRODUCTION
*In the ghetto, if you don't work hard you will end up in the graves.*

-Martin, a Viwandani resident

The number of people living in informal settlements, or slums, is expected to reach 500 million by 2015 [10]. Nairobi, Kenya's capital, exemplifies the rapid urbanization that characterizes African cities. It is estimated that more than half of the city's 3 million residents live in one of the 40+ slums there [2,27]. Slums in Nairobi are socioeconomically and demographically diverse, but poverty, overcrowding, inadequate housing structures, an absence of infrastructure including sanitation services and lack of employment opportunities are common to all [10].

Even in this poor setting Facebook is visible; for some, having an online presence is no longer a luxury but is rapidly becoming a necessity for people living in underdeveloped regions [17,26]. Between March and September 2012, the number of Facebook users in Kenya grew from about 1.3 million to nearly 1.6 million.[1] The numbers describing Facebook's explosive growth outside of industrialized countries have captured the attention of the media and local bloggers [25,29], but little qualitative data exists to help us understand why people in these diverse contexts are using the popular social networking site [23]. Despite not fully understanding how low-income users in underdeveloped regions use Information and Communication Technologies (ICT), HCI researchers continue to explore new ways of designing computer applications for these populations. Thus, a primary motivation of our study is to develop an on-the-ground understanding of the social and financial circumstances shaping ICT use before creating new applications for users in underdeveloped countries.

This study is the second in a long-term project focusing on Facebook use among consumers at the bottom of the pyramid, or the poorest individuals earning under $1.50 per day [33]. Findings from our initial study at sites in rural Kenya revealed how features of infrastructure, including limited access to computers and smartphones, unreliable electricity and persistent poverty, challenge the research community's understanding of online participation [42]. Here we remain focused on low-income populations, but shift our attention away from rural Kenya to Viwandani, an urban informal settlement in Nairobi. Compared to rural Kenya, access to the Internet and electricity are more widespread in the country's capital. The abundance of young adults who regularly use the Internet on their mobile phones or at cyber cafés made Viwandani an excellent site to understand social media use and it's perceived benefits among low-income populations. The question we


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[1] http://www.socialbakers.com/facebook-statistics/Kenya

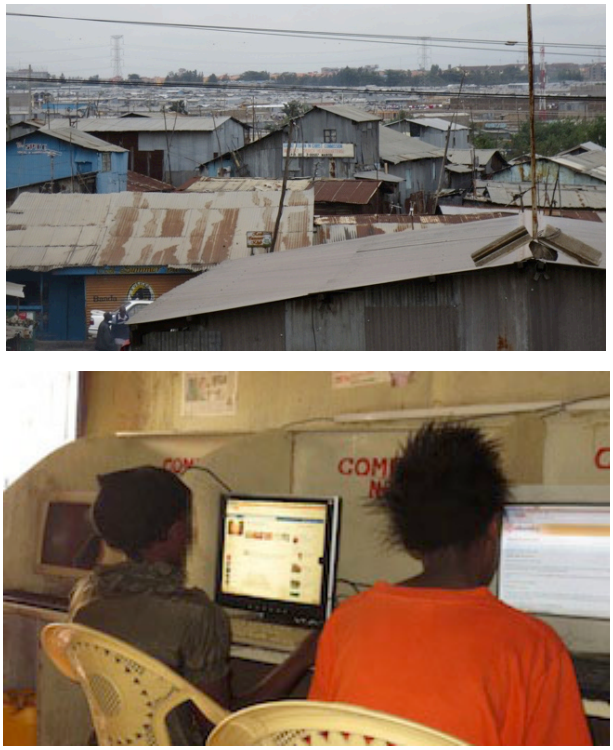

**Figure 1: View of Viwandani Nairobi, Kenya (top); interior of cyber café (bottom).**

investigate in this paper is, How do residents of a Nairobi slum use Facebook?

Findings from our study suggest Viwandani residents use Facebook to the exclusion of other online services; resulting in a style of engagement we call *consolidated use*. Use of Facebook was diverse, with some participants engaging in activities reported in Facebook literature such as connecting with old friends [7,15,26]; however, we also found evidence of undocumented activities, such as using the site to support income generation. Viwandani residents used Facebook to look for formal and informal employment opportunities, to market themselves and to seek remittances from friends and family abroad. We use these findings to motivate a design agenda for the urban poor built on an understanding that Facebook is used (with mixed-success) to support income generation. A key part of our agenda calls for developing interventions grounded in low-income populations' existing ICT practices, rather than introducing new and unfamiliar ones.

## RELATED WORK

### ICT use in Informal Settlements

Public health, urban planning and development researchers have studied informal settlements for decades, but attention to ICT use is typically absent from this body of work (see [10] for overview). Recognizing this gap in the literature, HCI researchers are investigating ICT use in slums. Notable examples include Sambasivan et al.'s work in Mumbai and Bangalore [36]. Drawing on their observations of television, radio and mobile phone use, they developed recommendations such as designing ICT that are tolerant to the dust and heat found in Indian slums. Also in India, Rangaswamy and Cutrell studied how teenagers use the Internet to fulfill their entertainment needs and argued that by applying a development lens, or solely studying how ICT can support socio-economic change, designers miss the ingenious strategies marginalized populations use to make technologies fit into their everyday lives [34]. We are not exploring ICT use with the end goal of designing applications tied to traditional development goals such as poverty reduction or increasing literacy, though we hope our findings support others' efforts. Instead, our intention is to broaden the range of human experiences considered when researchers conceptualize who uses Facebook, where it is used, and how and why people use it.

### Social Media Use in the Developing World

To date there are few studies examining social media use outside of North America and Europe [26]. Bosch's content analysis of South African college students' Facebook pages is one example. Her findings highlight the potential benefits of using Facebook in teaching and learning, particularly to support the development of educational micro-communities at the University of Cape Town [6]. Peters and her colleagues compared Facebook use among Americans, Namibians, and expatriate Namibians; they found five areas of difference between the groups, including motivations for joining and attitudes towards photo sharing [31]. To the best of our knowledge, we present the first account of Facebook use in an informal settlement. Given that more than half of the world's population live in slums [10] and that ICT are becoming increasingly common in their residents' lives, this research is relevant and timely.

Miller's yearlong ethnographic study of Facebook in the island nation of Trinidad provides researchers with the most comprehensive account of social media use outside of an industrialized country [26]. He presents detailed portraits of the people he encountered that describe how they use Facebook to learn more about one another prior to asking each other out on dates and to organize offline events; findings reported elsewhere [16]. He also found that Trinidadians wanted Facebook to replace the Internet, writing, "One of the clearest distinctions between discussions of Facebook in Trinidad as against those encountered in the U.K. is that Trinis are far more explicit about their desire that Facebook should effectively replace the Internet itself" [6]. Findings from our fieldwork suggest that Viwandani residents similarly consolidate diverse activities into a single online platform—Facebook.

In addition to extending Miller's finding to a new context, we were also inspired by his methodological approach. A benefit of adopting an ethnographically informed approach to studying Facebook was that it allowed us to learn about

the economic and financial realities affecting use of the site, factors overlooked in prior studies of social media [42].

## METHODOLOGY

This was a qualitative study and we used in-depth interviews and participant observation for data collection. We recruited 28 Viwandani residents (18 male and 10 female) aged 19-33. Observations took place over a six-week period at two Internet cafés in the settlement. Through these interviews and observations, we obtained insight into participants' motivations for using Facebook and assembled a qualitative dataset derived from their experiences [38].

### Site: Viwandani and cyber cafés

The site where our fieldwork took place is located on the edge of Nairobi's industrial area and attracts a youthful population seeking job opportunities in the nearby factories. The view of Viwandani in Figure 1 shows the settlement that sits next to hazardous industrial waste, a polluted river, and underneath a canopy of high voltage power lines. This site recently received international media attention when more than 100 people were killed following a fuel pipeline explosion in September 2011 [40]. This incident speaks to the precarious nature of life in slums, a feeling voiced by study participants. Despite the ominous presence of danger in daily life, a strong sense of hope and aspiration pervades life in Viwandani.

Daily life there is harsh, residents live in cramped houses built in rows with an average of six rooms per structure. Our study participants, like most residents of slum settlements, lacked personal access to piped water. Poor drainage systems and deficient or nonexistent waste disposal systems result in highly unsanitary conditions with raw sewage lining most of the mud pathways or "chumes" throughout Viwandani.

Like other Nairobi slums, Viwandani grew as a result of urbanization, or large numbers of young people migrating from rural parts of Kenya to cities looking for employment [10]. Yet, finding formal employment is rare and most slum dwellers adopt *pluriactivity strategies*, or "hustle", to survive [35]. This strategy entails engaging in multiple, insecure, and low-paying jobs (e.g., selling vegetables or cutting hair) or entrepreneurial activities (e.g., selling artwork and garbage collection).

Living conditions are sub-standard and residents live on small sums of money in Viwandani. The average monthly household income ranges from 3,443 Kenyan Shillings (KSh) ($46) to KSh ($50) of which $11 must go to paying rent [20]. Saving money is improbable and spare cash is usually sent to older relatives living in rural areas outside of Nairobi. Less than half of Viwandani's residents have a secondary school education (48% of males and 36% of females). Most inhabitants speak English in addition to Swahili and their mother tongue or tribal language [1,30].

Interviews and observations took place at two recently opened Internet cafés in Viwandani. There are no systematic, large-scale studies of the prevalence of cyber cafés in Kenyan slums, but one recent, small-scale study in a larger Nairobi slum named *Kibera* reported five cafés there [22]. This finding paired with anecdotal evidence and observations at other Nairobi slums suggests cyber cafés are established entities in informal settlements.

#### *Data Collection and Analysis*

The first author had visited Viwandani during her prior trips to Kenya and had established relationships with residents there. She leveraged these existing connections when searching for a local research assistant to help her recruit participants and schedule interviews for the study. Fieldwork took place between May and July 2012 and during that time Wyche visited Viwandani five times to conduct observations and interviews. She recruited individuals with active Facebook accounts to interview. Finding female participants was more difficult than identifying males interested in being interviewed because women were less likely to be at cyber cafés, instead they were at home looking after children and maintaining their households.

Standard procedures for informed, voluntary consent were followed. Interviews were conducted in English and started with questions about how long participants had lived in the area and asking them to describe a typical day. Wyche then asked residents about their experiences using social media, what sites they visited and online communities they participated in. Once it became clear that Facebook was the most common, and in all but two cases the only site participants accessed, she focused questions on how participants used the site. Additional questions centered on frequency of accessing Facebook, whether participants accessed it on a mobile phone or on a desktop computer at a cyber café, how much using the site cost per week, and individuals' motivations for posting content online. The number of online friends each participant had was also documented. Interviews lasted 30-45 minutes and were digitally recorded and then transcribed. At the conclusion of each one she gave participants a modest amount, 50 KSh ($0.60), for their time commitment.

In industrialized countries, users typically spend a fixed fee each month for a package, a certain number of minutes or data, when accessing online content using their mobiles phones. In contrast, Viwandani residents, like most users in developing countries, use pre-paid airtime or credit to access the mobile Internet. Eight of the nine individuals who accessed Facebook on their smartphones did not have sufficient credit to connect to the Internet during interviews so we used *M-Pesa* to transfer money to them so that we could observe them using the mobile version of the site.

We complemented interviews with observations at two cyber cafés where the first author watched customers use computers. These observations lasted two to three hours and occurred when she visited Viwandani to conduct interviews. She wrote field notes following each visit and

took digital photographs of participants and their mobile phones. Data were collected until saturation regarding participants' motivations for using Facebook was achieved.

Each author carefully read the transcribed materials to understand the dataset. The constant comparative method guided our analysis, this process is characterized by reading and rereading interviews in order to recognize consistent themes and concepts [38]. After patterns were identified, Wyche catalogued them into categories and drew tentative categories that were then discussed with the other authors who are social media experts. Once this process was completed, we reread the related literature and formulated themes that resulted in the research findings presented here.

## FINDINGS

### Facebook Growth and Motivations for Consolidated Use

Online media reports describe the phenomenal growth of Facebook in Kenya [25,29], and our observations at cyber cafés and conversations with their owners support these accounts. David, the owner of a café in Viwandani, told us 80 percent of his business comes from customers paying to access Facebook and from creating accounts for new members, a service he charges 60 KSh ($0.71) to perform. He added that this surge in use began three years ago when the cost of Internet use dropped to 1 KSh or 1 U.S. cent per minute in urban parts of Kenya [41]. At the same time, the ubiquity of the Facebook logo increased in Nairobi.

The blue rounded square with a white lower-case "f" appears on billboards advertising the latest mobile phones, in newspapers, and is even painted on *matatus* or mini buses offering public transport throughout Nairobi. Appadurai notes how ideas and images from around the world become integrated into peoples' aspirations and can fuel marginalized groups' *imaginations* of life elsewhere [4]. The growing public presence of the company's logo likely contributed to increased awareness of the site among Viwandani's residents. Nearly all study participants recognized the global nature of the site, evidenced by them repeatedly telling us membership meant being a part of a "global village."

#### *Access: Smartphone or Cyber café?*

Facebook was popular and finding male Viwandani residents with accounts was not difficult, but where study participants accessed the Internet varied between smartphones and desktop computers at cyber cafés. Seven of the 28 participants interviewed owned smartphones, or Internet enabled feature phones, such as the Nokia E66, Samsung C6220 and in two instances "China-makes" or inexpensive, smartphone knock-offs. Five of these individuals were men and they accessed Facebook multiple times per day, with one young man telling us he checks the site more than "20 times per day." Limited mobile phone credit and the inefficiency of entering text meant visits to the site were brief (five to ten minutes) and involved scanning friends' status updates.

Simple, non-Internet-enabled Nokia 1100 or 1280 models were the most common handsets participants owned and remain the most popular mobile phones in the developing world. In response to the ubiquity of these phones, Facebook introduced a text-only mobile version of the site called *0.facebook.com* [5]. We asked participants if they used this version of the site—none did. They were unaware of its existence and repeatedly told us that one must own an Internet-enabled phone to access the mobile version of Facebook.

Rather than using a mobile phone, it was more common for participants to access Facebook on a desktop computer at a cyber café. The cafés we observed were housed in plywood and sheet metal structures, with concrete floors. One establishment had eight computers and had been open for nearly two years. The second café was larger, had twelve computers, and had been operating for nearly six months at the time of our study. Computers were secondhand and typically connected to bulky monitors. Internet speeds are slow compared to what the researchers are accustomed to in the U.S.; consequently, Facebook pictures took minutes rather than seconds to upload. Fluctuations in participants' incomes affected when and for how long they used the Internet at these establishments. For example, Joseph, a 23-year-old unemployed barber, told us:

*Now because of my financial status I usually check once per week. You know without airtime, without anything in the pocket, you can't browse… if you have something you go to a cyber café. It is not easy.*

Samuel similarly described how accessing Facebook is tied to income:

*I find myself not visiting Facebook, because I am broke, but when I am visiting Facebook I can be there for more than half an hour, half an hour, minimum 20 minutes.*

Although prices to browse the Internet are low, 1 KSh or 1 U.S. penny per minute, cyber café owners typically require customers commit to using their computers for 20 minutes. For individuals earning approximately $1.50 a day, accessing the Internet at cyber cafés represents a significant expense and meant they visited Facebook weekly or monthly.

#### *Consolidated Use*

Regardless of where participants accessed Facebook, a primary reason for using it was to chat. *Facebook Chat* is an instant message function incorporated into the site. We learned that it is a more cost-effective way to communicate compared to the mobile phone [42]. Anthony's reasoning for using the application was similar to other participants' motivations:

*When you have a phone you can spend more money calling. So I chat on Facebook because it is easier and less expensive.*

On a typical morning it was common to see the same activities on desktop monitors in cyber cafés, young men and a few women logged onto Facebook. Patrons were chatting, sending and responding to messages, and monitoring friends' status updates as they slowly emerged on their screens. Equally telling was what we did not see on their desktop monitors. If a customer was using the Internet, they were accessing Facebook rather than other sites, such as Google, YouTube, or local news site.

Slow connection speeds at cafés encouraged multiple and simultaneous tasks on Facebook. We watched café customers fill the minutes required for content to load by multitasking: entering text into one chat window, entering text into another chat window, commenting on a friends status update, and then returning to the original task. Costs also hampered use and participants wanted to maximize their time online. Facebook provided a platform where individuals could simultaneously chat with relatives abroad, stay abreast of local news, look for romantic partners, and what we observed most frequently—engage in activities that might result in earning money. The following response from a participant describes this behavior that we call *consolidated use*:

*You know many people have different ways of using Facebook, some are there for dating, some are there for making friends, and some are there… many other activities, you market your business online and stuff like that, you see?*

Next we describe the most common form of consolidated use observed, using Facebook to support income generation.

**Looking for Employment on Facebook**

Livelihoods are important to people's material wellbeing and societal identities. When these are threatened in periods of crisis, people adopt various strategies in the pursuit of viable livelihoods in response to their constraints [18]. The crisis facing more than two-thirds of our participants was chronic unemployment or underemployment. Consequently, they hustled, or looked for various jobs in Viwandani's informal economy as a way to generate income. Participants who had friends in their social networks that extended beyond Viwandani appeared to have more success in using Facebook to find employment. Daniel, our hired guide, used Facebook to consistently find short-term employment. He has been a member of the online community for four years and explained to us that looking for jobs is what Facebook is for:

*You can find jobs on Facebook, maybe if you are linked with someone who works in a certain organization and you chat . . .and you tell them this is my level of education this is what I have done . . .but I don't have a job, you just make a polite request, he might consider you.*

His network of friends included people working for these certain organizations such as international NGO's, church mission groups and western universities.

Dida was another participant who understood Facebook was a place to find employment. He was 24 -years old, a new graduate of Moi University, and had recently returned to Nairobi from western Kenya. He described life in the settlement as "not so nice" due to "lack of security and poor living standards." Because he was unemployed, Viwandani provided him with an affordable, and temporary, living option. He told us that once he found a job he would move to a safer and more expensive neighborhood in Nairobi. While attending college (and not looking for employment) he told us he had become "not very much into the Facebook thing," but now that his efforts were focused on finding a job he was checking the site daily. He told us:

*For me, one thing I am focused on in my life right now is finding a job, so you realize recent jobs updates, guys update them on Facebook, so that is I why I keep in touch with them on Facebook.*

Dida was convinced that by regularly monitoring job information on Facebook and keeping in touch with friends in his online network—who were also college educated and employed—he would soon find employment. Interestingly, like other participants who accessed Facebook on smartphones, Dida expressed frustration about being unable to apply for jobs using his device. Facebook was useful for informing people about opportunities, but the process of applying for a job (i.e., filling out an online application or uploading a resume) required access to a desktop computer at a cyber café. Despite the limitations of the site, we followed up with Dida three months after our initial interview and learned that he found employment at a bank with the help of his online friends. Success stories like this were few among our participants, but all remained committed to the idea that Facebook could help them find a job.

Within slums, differences in individuals' access to resources and education level vary and affect their livelihood opportunities [10]. One participant described this situation in Viwandani:

*You see there are people who have five children and they are not employed and life becomes very hard for them, so I can say this is 90% [of the population] and life for them is very hard, but for 10% they are, not very good, but they are average.*

Daniel, Dida, and two other interviewees represented the 10 percent she describes. Their status was reflected in their clothing, each had polished shoes and wore jeans and shirts that appeared new and fitted whereas most of our participants wore tattered clothes and worn out flip-flops. These four participants used their profiles to project a professional appearance, choosing "presentable" or "smart" profile pictures. They avoided engaging in "funny funny"—

or activities related to pornography—on the site. Each was able to access Facebook on their smartphones and two also accessed it on personal laptops computers. Not only did they have access to ICTs, they had the financial resources to pay for Internet access.

Most importantly, their online networks were comprised of people who provided them with opportunities most slum residents lacked. Dida had more than 500 friends on Facebook, and many were affiliated with universities, or employed at schools, hospitals, banks and (non-governmental organization) NGOs. His network was largely concentrated in Nairobi, but some friends lived in other parts of the country and two were in the U.S. Daniel had 112 friends, three affiliated with U.S. research universities, four with NGO's, and three others appeared to be affiliated with U.S. religious organizations. Daniel's Facebook profile included pictures of himself posing with western visitors to Viwandani.

These accounts represent a minority of those interviewed. Twenty of our participants lacked formal employment and eight engaged in entrepreneurial activities. Although they had been unsuccessful in securing employment on Facebook, unemployed participants recognized the site as a potential avenue for findings updates about short-term work. Their social networks consisted largely of Viwandani residents rather than people abroad, and connected them with social support rather than job opportunities. David, a 22-year-old unemployed barber describes reading friends' posts:

*Most inspire or give you hope in life, they can encourage. You see somebody gives you some verse, so when you are hopeless you can regain your hope. There is my friend who always posts some Bible verses of some encouraging verses, so seeing it—it can rebuild you.*

These less-connected individuals remained hopeful about the possibility of using the site to find work. This hope appeared to be fueled by the occasional success story they saw posted on Facebook. Samuel's story was similar to others we heard; here he describes Alex, an online friend and fellow garbage collector, who opened a business and no longer lives in Viwandani:

*Like you see the way we live here in the ghetto, now you see there are guys out of the ghetto who will pick themselves up, then they find themselves, like you work hard, they own a business, they work hard, they find themselves out of the ghetto. You live in a better life in the estates.*

Slater and Kwami write about the role of ICTs in supporting urban Ghanaians' livelihood strategies [37]. They conclude that mobile phones are used to negotiate local relationships, such as receiving and sending money to relatives in rural parts of the country; in contrast Internet use is conducted within a fantasy mode or oriented to realizing "advantageous relationships with largely random foreigners" [37]. Our findings suggest that for a few of our participants, using Facebook to maintain relationships with foreigners provided very real opportunities. However, for most Viwandani residents, translating their online relationships into offline opportunities remained a fantasy fueled by the rare success stories and hopes of acquiring more international friends.

#### Entrepreneurial Efforts and Facebook

For some Viwandani residents, income generation meant devoting their energy to entrepreneurial activities. We interviewed artists, a photographer, an actor, and a hip-hop musician who had some success in using Facebook to generate income. When explaining why they joined and used Facebook, these individuals used terms such as "marketing" and "advertising," or word choices that reflected their understanding that Facebook is a platform that supports their entrepreneurial efforts. Here we describe how some participants used Facebook for such efforts.

Love-e, a rap-artist, used Facebook to successfully support his music career. We watched the 27-year who had lived in Viwandani his entire life use the site's chat feature to communicate with fans. He had 3,000 friends on Facebook and updated his status to let them know when he would release a new song or appear in a concert.

*I can introduce my music to people and get their comments about it. And I just want to know how it is going, what people think about my music. So you find people organize concerts and they call me on Facebook.*

In addition to helping him organize paid concerts, his efforts to market himself on Facebook helped him secure a record contract with *Calif Records*, a record label based in Nairobi. Musicians have long used MySpace to market themselves [3] and this activity appears to also be taking place on Facebook.

Although Love-e owned a smartphone he accessed Facebook at a cyber café so he could upload photographs from his concerts and music videos—activities that are more cumbersome to perform on a mobile device. Further evidence of him using Facebook to earn a living was indicated by his plan to use it to connect with people who would support his efforts to create a documentary about his life. He told us that he hoped to upload and distribute the film on the social networking site.

There were other examples of Viwandani residents using Facebook for marketing purposes. When describing his first encounter with Facebook, Martin told us he "knew it was something good because you can advertise on it." He created a page on the site to promote a bar his uncle owned in Viwandani. The profile picture on the webpage featured the logo of a popular Kenyan beer brand called *Tusker Lager*. Below this image is this description of the *Cool Summer* bar:

*Very good rooms, good service, clean environment. dstv channels, payable bills with m-pesa.*

The Facebook page currently has 25 "likes" indicating some residents' support for the Viwandani establishment (or at least support from the bar owners' friends). The "Like button" lets users share pages and or recommend content to others. When we asked Martin if the Facebook page attracted new customers to the bar he enthusiastically replied "yes" and added:

*I created a page about Cool Summer bar, for my uncle, it made a difference because now when he is walking around people know he is a rich man, because he has two bars, people tell him 'I saw your bar on Facebook,' it is good.*

From Martin's perspective, the page appears to have been useful in generating income for his uncle indirectly, by raising awareness about the bar and his status in the community, which in turn attracts new customers.

Other participants used Facebook to market themselves as artists (like Love-E) rather than marketing a business (like Martin). Within Viwandani, a group of young adults formed an artist collective and built a center where residents can paint, draw, and create woodprints. A young man explained to us how Facebook helped him sell artwork:

*If you bought a picture from me, then the person who got the picture maybe they show it to another friend and they say 'oh these pictures are good, can you give me a contact to this guy?' Then you say 'okay yes I will give you.' Then I get a message on Facebook from someone who says they are a friend and you are an artist.*

Like participants using Facebook to look for employment, local artists recognized using the site could potentially broaden their social networks beyond Viwandani and doing this could provide them with new avenues for selling their artwork. Two participants reported success in selling their artwork abroad. Yet, the process of exchanging their artwork for money was difficult and precarious. It entailed giving a painting or drawing to someone who happened to be travelling outside of the country, then waiting for them to return with cash. Observations from our earlier visits to Viwandani echoed the frustration felt among these participants in being unable to easily sell their artwork online. The leader of the art collective told us the biggest challenge his group encountered was an inability to secure a *PayPal* account. PayPal is a global e-commerce business that facilitates Internet payments; however government regulations require that the site verify users' identity. Participants lacked a formal address and a bank account, so securing a PayPal account was impossible.

Love-e, Martin, and members of the artist collectives' use of Facebook demonstrates how they creatively appropriated an existing and familiar ICT to make money. Our findings point to opportunities to learn from users' existing creative practices prior to developing new applications for their use and speak to low-income populations' ability to innovate on their own behalf.

**Facebook and Remittances: Early Evidence**

Looking for information about employment and using Facebook to support entrepreneurial efforts were the most common consolidated activities observed. Rather than using sites designed for these activities, such as the employment website *Monster*, or the shopping website *eBay*, costs, limited time online, and an inability to establish an e-commerce profile meant Viwandani residents were using Facebook to meet all of their online needs. A less common approach to income generation involved using Facebook to seek remittances, or small sums of cash, from friends and family members abroad. Cash remittances are linked to themes of economic exchange and livelihood [24]. Some participants used Facebook to broaden their networks by searching for people living abroad who have ties to Viwandani, such as former residents, in order to increase the number of people they could potentially ask for money, what some interviewees described as a "boost."

*Mostly I add friends who I know and who can help me. I don't add a friend who I don't know well. I add a friend I can tell my problem and they can boost me.*

Problems that motivated Anthony and others to contact a Facebook friend for money typically involved needing resources to care for a sick family member. Living conditions are substandard, consequently residents are often sick, especially children [39].

Viwandani residents valued friends and family overseas because they were perceived as having more financial resources than locals. Migration, especially to the U.S. or Europe, is seen as the golden road to success because it provides those able to leave with access to opportunities that are out of reach to residents of Nairobi's slums [18]. Further, those who migrate often feel obligated to send money back to friends and relatives in Kenya. Thus, contacting members of the Kenyan diaspora was an effective way to obtain money during emergencies. Using Facebook's chat feature to contact someone living abroad was also less expensive than calling overseas.

The focus on remittances and their impact in developing countries is not a new phenomenon, but little is known about the role of social media in supporting this practice. Our findings suggest Facebook offers members new ways to engage in this existing practice. During their fieldwork observing cyber cafés in Ghana, Slater and Kwami similarly found that low-income Ghanaians used chat programs, such as MSN or AOL to seek remittances from friends and family abroad [37]. They use the term "random" to describe the process some young Ghanaians employed to connect with people abroad. For example, they saw people use search engines to find chat partners overseas, an activity Burrell also witnessed during her fieldwork in Ghana [9]. Viwandani residents consolidated these approaches in their Facebook use, where they searched for potential friends rather than using Google or another search engine. Using this approach, participants felt that they were able to find

contacts by building on social ties, even if the ties were weak.

## DISCUSSION

Prior research examining mobile phone use in Ghana and South Africa suggests that low-income consumers are adept at maximizing mobile phone use [32]. For example, users simultaneously use their phones for reasons tied to communication and banking. SMS messages, or beeping (calling a mobile phone number and then hanging up before the mobile's owner can pick up the call [11]) are excellent ways to keep in touch when funds for airtime are limited and can be used to request a phone call from someone with airtime. Our findings suggest Viwandani residents use another ICT, Facebook, as a cost-effective way to perform multiple tasks, including income generation. This finding has implications for HCI4D/ICTD research.

### Supporting Existing Practices in HCI4D/ICTD

Findings from our fieldwork point to new opportunities for developing applications that can potentially support income generation among users living on roughly $1.50 a day. Prior studies focus on the design and evaluation of novel mobile phone aimed at addressing problems persistent poverty in developing countries, such as *mClerk* [21] or *txteagle* [14]. Dourish and Mainwaring recently criticized the rhetoric underlying such efforts, by arguing that western researchers' efforts to create innovative solutions for those living in less technology developed countries implies a "deficit of imagination and agency" exists among users in these regions [12]. We not only agree with their critique but can extend it, pointing out another limitation of these studies: they do not build on the existing ways users are using ICT to generate income.

What emerged from our fieldwork was that Viwandani residents wanted to use Facebook to generate income. This finding is significant because questions remain regarding the effectiveness of mobile phones for income generation [32]. Prior studies of mobile phone use among the poorest users in sub-Saharan Africa suggest the devices are used for maintaining contact with kin and exchanging money [28]. Participants do not necessarily need novel applications meant to help them generate income; they need an improved version of Facebook that accounts for their context. Details such as not being able to upload a resume onto the site, lack of adequate payment and monetary exchange mechanism hindered their attempts to apply for jobs and sell their artwork. This suggests opportunities such as allowing individuals to use their Facebook accounts to develop a reliable e-commerce profile. To achieve this Facebook would need to support mechanisms for international money exchange. The process of receiving money from overseas remains cumbersome and requires recipients to spend money travelling to a *Western Union* or *MoneyGram* office to collect funds. We encourage HCI4D/ICTD researchers to broaden their attention to include modifying existing applications that support money transfers, in addition to developing new ones.

Prior research in Kenya suggests developers create "low bandwidth" versions of their sites to account for slow Internet speeds in parts of the country [43]. Such versions of Facebook may be useful, but our observations reveal the ingenious ways low-income populations make technology work in their constrained settings [34]. The company could support entrepreneurial users in the developing world with free or subsidized advertising to market their artwork or music. Rather than creating versions of Facebook that assume slow Internet speeds and lack of smart phones, efforts to more effectively connect low-income entrepreneurs with Facebook users in developed countries would be useful for our participants.

#### *Designing for Desktop Crowdsourcing Applications*

It may be shortsighted to abandon designing for desktop environments in favor of mobile platforms in HCI4D/ICTD. All participants knew how to use computers, spoke English, and participation on Facebook was widespread. Despite having computer skills and being a member of a global social network, most were underemployed or unemployed. These factors suggest an opportunity for using crowdsourcing platforms for income generation in Viwandani. Amazon's Mechanical Turk (MTurk) was an early example of using the Internet to earn small amounts of money by doing microtasks such as data entry or audio transcriptions. Txteagle and mClerk are recent efforts that use crowdsourcing platforms to offer employment opportunities to low-income workers in developing countries [14,21] and both are developed for mobile phones. In Viwandani, smartphones are scarce and owners of the devices recognized that using them for typing tasks was cumbersome. Because participants are familiar with Facebook and the possibility of using it to generate income, there could be an opportunity to thoughtfully integrate crowdsourcing applications into the social networking site.

### Future Research: Rethinking the Digital Divide

Our findings also suggest new research opportunities, such as rethinking the *digital divide* framework used in HCI4D/ICTD. The term was originally used as a simple measure of who had access to the Internet and who did not, and was correlated with demographic categories, such as gender, race, age, income, and education level [8]. Within HCI and related fields the term is used to describe different to ICT access between more and less technology-developed countries (see [13]). In our research, we see how this divide exists within low-income communities, between more and less connected slum dwellers and men and women.

Facebook supported *some* slum dwellers livelihood strategies by connecting them to formal employment, but this finding raises more questions than it answers. What role does self-presentation play in connecting slum dwellers with potential employees? Daniel and Dida crafted online profiles that reflected their aspirations. Their profiles

pictures looked professional, Dida uses his passport photo. Both tend to post in English, rather than Swahili or their mother tongue, because the language is most associated with education and authority. Granovetter's theories about the strength of weak ties suggest that Facebook may indeed provide an opportunity for Viwandani residents to reach beyond their local strong ties to find sources of employment, but more research is needed [19].

Slum life is not easy for anyone, but women remain at a disadvantage in terms of equitable access to work, good living conditions, health care, education and access to ICTs. From our observations, it was clear that men moved in groups and made space for themselves at cyber cafés to a larger extent than women—this skewed our sample. HCI researchers developing platforms to support income generation have overlooked gender disparities in the developing world. Continuing to do this will likely increase the digital divide between men and women. To address this gap in the literature we will return to Viwandani and focus on women's experiences using Facebook. Rather than studying use in cyber cafés we will conduct interviews and focus groups in female residents' homes. We speculate that their marginalized status restricts women's Internet access in ways that did not affect our largely male sample.

## SUMMARY AND CONCLUSION

Opening different webpages and logging onto to multiple online accounts takes time. Costs of accessing Facebook at cyber cafés and on mobile devices limited the amount of time Viwandani residents spent online. This restriction resulted in them consolidating multiple online activities onto Facebook, or essentially treating the site as an entry point for accessing all types of online content. While simultaneously chatting with friends, monitoring status updates, and answering messages, participants also engaged in income generating activities, such as looking for employment, marketing themselves, and seeking remittances. We use this understanding of consolidated use to motivate a design agenda that calls for improving the understanding of bottom of the pyramid populations' contexts before designing ICTs for them.

This is the first study of Facebook use in a Nairobi slum. Our results are based on a particular sample of users in one settlement, and although our work only scratches the surface in terms of understanding social media use in underdeveloped regions, our findings increase the range of human experiences considered when the HCI community imagines who uses Facebook and challenge assumptions embedded in HCI4D/ICTD research. We hope this work pushes the community to recognize that slums are far from hopeless places, but rather sites where people want to realize the potential ways technology can make a positive difference in their lives.

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