

Understanding the Use and Impact of the Zero-Rated Free Basics Platform in South Africa

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ABSTRACT

Companies are offering zero-rated, or data-charge free Internet services to help bring unconnected users online where Internet access is less affordable. However, it is unclear whether these services achieve this goal or how they shape Internet use. To inform evidence-based policy around and the design of zero-rated services, we show in this paper how mobile users are making use of Facebook's controversial *Free Basics* platform. We present findings from interviews of 35 *Free Basics* users in South Africa: current low-income users and non-regular student users. Our findings suggest that *Free Basics* does shape Internet usage, for instance, users spend more time online because of 'free' apps. Second, *Free Basics* saves users money but adoption of the platform depends on access to other 'free' Internet options. Finally, most users are confused about how zero-rated services work and what 'free' means. Based on our findings, we make recommendations for future work.

ACM Classification Keywords

H.5.m. Information Interfaces and Presentation (e.g. HCI): Miscellaneous

Author Keywords

Free Basics; South Africa, zero-rating, zero-rated, Internet.

INTRODUCTION

Many corporations such as Google and Facebook, governments in developed countries and developing countries, and institutions such as the World Bank are trying to connect the unconnected to the Internet using everything from drones [17] to weather balloons [54, 62]. Their goal is to improve the livelihood of low-income individuals by providing improved access to information [9] in places where Internet access is not affordable. One method of providing 'free' Internet access uses 'zero-rating' or the practice of not counting the use of certain online services towards a user's data cap on their personal device [20]. Already, around 45% of global mobile service providers offer some form of zero-rating services [9] but these services are not all well received. For instance, Facebook's

zero-rated *Free Basics* platform— now deployed in 61 countries worldwide, 40 of which are in Africa (e.g., South Africa) and other developing nations [20]—has been accused of creating access to the Internet akin to a walled garden because they control which apps users can access [7]. For this reason, the platform has even been banned in certain countries [10].

Yet, there is currently little evidence about the actual use and impact of zero-rated services on users' Internet behaviors. Therefore, we posed the following research questions: How do zero-rated services affect users' Internet behaviors?; How do users perceive zero-rated services?; What impact do these services have on users lives?; and finally, Do zero-rated services have more of an impact on users who are unable to afford expensive Internet access than those who are resource-constrained but have more means to get online? Our goals are to help the CHI community provide evidence to inform policies around and influence the design of zero-rated services for resource-constrained communities. In addition to studying use, we also wanted to study non-use (or non-regular use) of zero-rating services, an established technique to build a comprehensive understanding of how a technology is adopted [46]. In doing so, we are also able to comment on whether zero-rated services are of use to marginalized communities in places where Internet access is affordable but used mostly by higher income users. For our study, we chose to study the zero-rated platform *Free Basics*.

Free Basics was founded in 2013 by Facebook and called Internet.org with the goal of connecting rural and low-income populations to the Internet for the first time [10, 28]. Zambia was the first country to get *Free Basics* in 2014 [43]. While *Free Basics* appears as a single app, it is actually a platform for hosting a variety of zero-rated applications and the available content changes depending on the country and unpaid partnerships with local service providers [20], i.e., no two *Free Basics* offerings are the same. However, all provide access to Facebook Lite and other third party apps such as Bing and Wikipedia [57, 47]. Educational materials, news, weather reports dominate the application topics in *Free Basics* across countries [47]. Other apps cover health care, job listings, search engines, and classifieds [30].

Since its launch, *Free Basics*, has been plagued by controversy—initially this was because Facebook alone predetermined the apps included in the platform [7, 6, 43, 20, 1]. When protests erupted in countries like India [4], in May 2015, Facebook opened up their platform to any third party service that meets their technical requirements (such as being

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data efficient to optimize for use on feature phones) and which also encourages users to explore the larger Internet [10, 4]. Moreover, following protests about the misleading name Internet.org which could make first-time users mistake the service for the entire Internet [6, 16], the service name was changed to *Free Basics* in September 2015 [4]. Even after this name change, protests continued about the privacy and security issues with the service, since all browsing done through the platform goes through a Facebook proxy and Facebook can decrypt the content of any app on its servers [4, 45, 6, 48]. In 2016, India even went as far as banning differential pricing and effectively *Free Basics* [10, 20]. Despite these controversies, the initiative is still moving forward and expanding to other countries. Understanding use and non-use of this platform can help the CHI community provide qualitative evidence to drive policies around zero-rated services and learn how to improve the design and overall usability of these services.

Although there have been studies of Facebook in developing regions [61, 33, 60] and non-users of Facebook Zero and to a limited extent *Free Basics* [59, 21, 12], these have not focused on active *Free Basics* users or South Africa to date. Thus, prior work does not yet answer the questions we posed. To address this gap, we conducted a qualitative study of 35 *Free Basics* users in the city of Cape Town in South Africa: 22 current low-income users and 13 non-regular student users who used the service for two weeks. South Africa is a middle-income country [53] where the *Free Basics* platform has been offered because Internet costs are still relatively inaccessible to lower income users who are mostly on mobile phones [22, 38, 39]. Studying the use and non-use of zero-rated services in this country was therefore ideal.

Our findings show that, first, *Free Basics* does shape both current low-income and non-regular student users' Internet behaviors and their choices of which online services to use. For instance, current users were online more frequently and driven to use services they could access for free. Second, *Free Basics* did save current low-income users money, but the perceived value and impact of *Free Basics* on non-regular student users was affected by participants' access to free Internet options such as campus WiFi. Third, both current and non-regular student users found the concept of zero-rated services confusing to understand and manage. In particular, our participants struggled with knowing when a particular service in the platform would consume data and incur costs.

Based on our findings which provide evidence for the positive and negative impacts of the platform on users and non-users, we discuss policy and design implications for the CHI community to build on our work. Doing so will help to inform regulations around zero-rating, increase the impact of these services, and ultimately help create a more connected world. First, we suggest that zero-rated services incorporate ways for users to influence what services are offered to them and to provide feedback on the impact of these services on our lives. Second, we suggest the CHI community explore alternative options for providing access to those who cannot afford a paid Internet in ways that are less restrictive. Finally, we suggest that the CHI community investigate better ways to help users

understand when they are moving between 'free' and paid online services and how these transitions affect data costs. In the remainder of the paper we present our related work and findings followed by a discussion of our results and how governments and corporations can play a role in shaping the future of zero-rated services for the user. We conclude with suggestions for future work and reflect on study limitations.

BACKGROUND

An Overview of Zero-Rating

Zero-rated services are 'free to use services' which do not count towards a user's data cap [10]. These services can range from basic access to sites for news, educational tools, and social media to data-intensive activities such as video and music streaming [3]. Both developed and developing countries offer these services, and they can be implemented in different ways, depending on the goal of the service. First, third party content providers may subsidize the cost of users' data when they access their service. For instance, insurance companies may fund the zero-rating of various wellness sites to help promote healthy lifestyles by providing information on wellness-related behaviors such as how to have a healthy pregnancy. The short-term costs of subsidizing user data as such may result in more educated customers with fewer health complications and reduced expenses for the company [42].

Second, Internet Service Providers (ISPs) can provide select third party services for 'free' at no cost to those parties. For example, a US mobile ISP such as Verizon could choose to zero-rate users' streaming on Netflix, a video streaming site, without charging Netflix for being zero-rated and without zero-rating other video streaming services. This mechanism has been used to provide 'free' access to Wikipedia Zero, Google Free Zone, and Facebook Zero. [10, 31, 4, 43]. Wikipedia Zero offers access to all parts of Wikipedia at no cost to the user or Wikipedia. Google Free Zone was introduced in 2012 to offer access to Google search, Google Plus, and Gmail for 'free' with some features such as downloading email attachments requiring a data plan. In 2010, Facebook Zero was introduced as a text only streamlined version of the site. To see photos or access external links, Facebook Zero users see notifications that they will be incurring data charges by doing so [20]. Additionally, some carriers have bundled access to WhatsApp for 'free' [31].

Third, third party content providers may pay ISPs to provide their services to users for 'free'. For instance, AirTel, an ISP in India, offered AirTel Zero in 2016 [10, 20]. In this service, selected applications were provided for use with no corresponding data charges, but the service was controversial since application providers paid AirTel to be included in the platform. Fourth, ISPs can provide a set of their own services to users for 'free'. For example, T-Mobile, a US mobile ISP, offers the Music Freedom plan, which allows users to stream music from many different service providers such as Pandora, Spotify, or Apple Music, without it counting towards their allotted data and BingeOn for video streaming [41, 10, 4, 18, 56]. Finally, another form of zero-rating is when users get limited amounts of data in exchange for viewing an advertisement or completing a survey [10]. Zero-rating overall has been met

with controversy for providing Internet access to first-time Internet users, particularly in developing countries.

Zero-Rated Services For Increasing Internet Connectivity

Many proponents of using zero-rating to increase the percentage of Internet-connected users argue that it can bring first-time Internet users online in developing nations [22, 19, 28]. These supporters, such as Facebook founder Mark Zuckerberg [64] and researchers [63], argue that providing access to a set of curated services is better than providing no access to the Internet at all. ISPs also see zero-rating services as a way to attract customers to their networks, since first time users will likely become paying customers [42]. For example, Facebook claims that 50% of first time Internet users on their zero-rated platform become paying customers within a month [15, 4].

The main argument by researchers [63], policy-makers, and others against allowing zero-rated services revolves around user choice and understanding. Opponents argue that a pre-determined set of services controlled by service providers or other entities can limit consumer choice by directing them to ‘free’ services over paid ones, and leave first time Internet users with a misguided understanding of what the Internet is [10, 7, 9, 55]. Many governments and regulatory bodies also feel that offering certain services for ‘free’ violates net neutrality regulations by not providing a platform where consumers can access all sites in the same manner. India, Brazil, and Chile have banned or restricted zero-rating services because they are considered a direct violation to net neutrality [10, 2]. Additionally, opponents to using zero-rating for increasing connectivity argue that smaller companies may not be able to afford to enter the market which would result in fewer service offerings for users [19]. Finally, as Van Schewick argues, zero-rated services may not actually benefit low-income populations because the cost of the ‘free’ services end up being rolled into the cost of voice plans [55]. Yet, there is little real-world evidence of how zero-rated services impact users or what affects the adoption of these services which our work addresses.

Use and Usability of Free Internet Approaches

Researchers have recently studied the impact of *Free Basics* on launching a service using the platform and on the different services offered in the platform across various countries [47]. Yet, despite controversies, few studies have been conducted on the usability and impact of zero-rated Internet services that aim to improve connectivity to the Internet. One study investigated how mobile users in Ghana who are not active users of *Free Basics* and Wikipedia Zero perceive these services [21]. This work suggested that Ghanaian non-users did not equate zero-rated services with the Internet at large and most often felt that these services served only as a mobile provider’s promotion to attract customers. In this work, only five out of 25 total participants interviewed had used Wikipedia Zero or *Free Basics* in the past. Further, out of those five users, only three were active current users of either application. The remaining 20 had never used any zero-rated services. In contrast, our study focused on both current and non-regular users of the *Free Basics* platform, comparing the experiences of those who

were less able to afford Internet access to those who could in a different African country, South Africa.

In another closely related study, the Alliance for Affordable Internet [3] surveyed 1,000 people, in eight developing countries—Bangladesh, Colombia, Ghana, India, Kenya, Nigeria, Peru, and the Philippines—to evaluate the user experience of 181 various subsidized mobile data offerings. The study suggested that zero-rated services are not the only avenue people use to get online (4% reported zero-rating was only method of getting online) and that zero-rated services do more to allow users to stay online than gain access for the first time (88% had used the Internet before using any zero-rating service). Our study builds on this work focusing on how a zero-rated platform, *Free Basics*, impacts Internet use in one country.

There is also a growing body of studies of Facebook in developing countries, notably studies of Facebook in Kenyan slums and Kenyan rural Internet cafes [61, 60] as well as Miller’s year-long study of Facebook use in Trinidad [33]. These studies illuminate use of Facebook and Facebook Zero to some extent, but they were conducted before *Free Basics* and Internet.org were launched in many of these countries. A more recent study of non-users of Facebook in Zambia [59] shed some light on user perceptions of Facebook Zero, but all aside from two of the 117 users interviewed had even seen this site or Facebook itself. Our work builds on our understanding of Facebook-related social media use in developing and middle income countries by presenting a more recent examination of the *Free Basics* platform which includes many more applications than Facebook Zero alone. Further, our work shows how the platform is used by current mobile low-income urban users and non-regular student users with more access to resources in South Africa. Our study can therefore help the CHI community understand how to improve the design and adoption of zero-rated services for resource-constrained populations.

METHODOLOGY

Research Context

Our study took place in Cape Town, South Africa, a country we selected because *Free Basics* (since August 2015) and other zero-rated services such as Wikipedia Zero, Facebook Zero, and zero-rated WhatsApp have been offered there since 2010 [29, 19, 40]. We opted to study *Free Basics* since it is a platform rather than a single service and therefore more likely to shape Internet use. We chose South Africa because it is a middle-income nation with a significant number of individuals who have never been online and where Internet access is relatively expensive [39]. Only about 52% of South Africans were connected to the Internet by 2015 [26], and the majority of these connections were on mobile phones [25, 24]. At the time of the study, South Africa had no legislative rulings in favor or against zero-rated services, creating an opportunity to evaluate the impact of zero-rating in an unbiased environment [19]. Although there are four main cellular service providers in the country, *Free Basics* is only offered on Cell C [19, 37], one of the smallest mobile networks at 23% market share. Cell C’s target market is lower income users, and it is widely considered to be the cheapest network [39].

At the time of the study, there were 36 featured applications on *Free Basics* in South Africa [11] including services based around news and information, platforms for buying and selling goods, health care information, finance, career services, and entertainment apps in addition to communication-based services such as Facebook and Messenger. About 20% of the most popular content in South Africa at the time was offered on the platform, with the remaining services being content that fell below the top 500 nationally popular online services [20].

Globally known applications such as British Broadcasting Corporation News (BBC), Wikipedia, and Facebook were included at the time of our study but there were also offerings tailored to local communities as well, such as OLX and Gumtree, sites which host forum-style seller listings of used goods or jobs [19, 22]. There was also demographically targeted content such as Girl Effect which provides relevant content to young women about health, fitness, and well being [30].

Study Overview

To answer our research questions, we conducted a two part study of resource-constrained zero-rating users. In Study One, we interviewed current low-income *Free Basics* users to see whether the platform is connecting the unconnected and the impact of the service on users who have little means for getting online otherwise. In Study Two, we recruited users who were non-regular *Free Basics* users to understand why non-use of the platform occurs with individuals who have more means to get online. We chose to interview college students since they are resource-constrained, likely to be connected users, and have a high need for remaining connected for their studies. Including both groups in our study allowed us to form a more comprehensive understanding of the impact of zero-rated services, the factors that affect the adoption of these services, and the possible use of these services in more developed countries than if we studied users or non-users alone or those who were unconnected and low-income only [46].

Our study was conducted with approval of the University of Maryland, College Park's review board as well as that of the University of Cape Town (UCT), where Study Two was conducted. We used a local research assistant and frequent collaborator from prior studies (e.g., [32]) to help recruit potential participants and also help conduct interviews. The research assistant was able to conduct interviews in participant's first language if it was not English, an important consideration as there are 11 official languages in the country [51]. In the remainder of the paper, we will refer to the participants in Study One as current low-income users and denote these participants with the prefix 'C' and the participants in Study Two as non-regular student users and denote these users with the prefix 'S'.

Study One Procedures

To understand current use of the platform, we conducted semi-structured interviews with 22 low-income users in urban Cape Town. We only recruited Cell C mobile phone users who were current *Free Basics* users and who were 15 years old or older, obtaining consent from adults and assent and parental permission from participating minors. We selected this age range because this group is likely to have access to or own their

own mobile device and needs to get online for educational and other purposes. We only recruited Android users for our study for two reasons. First, Android phones make up at least 60% of the mobile market share in South Africa [13] and just over a third of South Africans report that their device is a smartphone [36]. Second, we wanted to reduce the amount of variation in users equipment and operating system when evaluating their experience using the *Free Basics* platform.

To prescreen participants, we created a demographic survey to identify users based on factors we identified as indicators of low-income status from the South Africa census including: employment, current housing type, monthly income, and ability to pay for groceries or utility bills. For housing type, we asked if users were living in reconstruction and development program (RDP) communities which were established as government housing for the poorest of South African citizens earning less than ZAR 3500 (261 USD) per month [52, 50]. We continuously recruited participants until we reached data saturation for this demographic.

Interviews for Study One covered the following topics: Mobile Phone Details and Data Costs to determine what phones users had, how they used them, and their monthly phone costs; Awareness of and Steps to Reduce Costs to determine whether participants were aware of and actively managed their phone costs in any way; Internet Use to see how participants were getting online on their mobiles, if at all, to set the context for usage; and finally *Free Basics* to ask participants about how they found out about the platform, why they started using it, how they used it, the strengths and weaknesses of the platform, and the impact of the platform on their lives. Interviews lasted for 30 to 40 minutes and participants were compensated with a ZAR 150 (11 USD) airtime voucher.

Study Two Procedures

In our second study, we recruited 13 students from UCT, in South Africa to participate in a two week long interview study. We recruited users who had never used *Free Basics* regularly before to see how these non-users' impressions differed from current users and how being connected affects the impact of zero-rated services. Study Two was split into three parts. In part one, we sent out a demographic survey via UCT mailing lists, campus online and physical message boards, and social media such as Twitter. This survey asked users about their general Internet habits, mobile data habits, phones and awareness of zero-rated services. Additionally, we asked users about the dwelling they lived in, their commute time, if they any income sources, and what major and degree they were pursuing. The recruiting call was targeted only towards Cell C users who had Android phones for the same reasons mentioned in Study One.

From the 124 completed responses, we filtered out users who had used *Free Basics* regularly before. We only recruited those who had not used the service at all or those who may have used the service for less than one month at some point in the past but who were not using it currently. During participant selection we made sure to be mindful of gender balancing and technical background, and invited 19 users to participate in our interview study. In part two, participants came in to the laboratory for a face to face interview where we asked them

in-depth questions about their Internet usage and current data usage habits. We also asked users to install *Free Basics* at this point and to use it as they saw fit for two weeks at minimum so that they could become familiarized with the platform and speak about non-use in an informed manner.

In part three, approximately two weeks after the first interview, we scheduled a follow-up interview to talk to participants about their impressions. In total, 13 non-regular users participated in all three parts of the study, six had to drop out owing to student protests which shut down the university towards the tail end of our study [5]. We also adjusted the study parameters in response to the emergent situation, e.g., participants could not use the platform as long as we intended.

Each interview was conducted by one member of our research team or our local research assistant in a room at a laboratory in the university. Interviews lasted between 45-60 minutes and were audio-taped. Participants were compensated with a ZAR 150 (11 USD) airtime gift card for completing part two of the study and a ZAR 200 gift card (15 USD) for completing part three of the study. After completing both parts of the study, participants were randomly entered into a drawing for a chance to win a Samsung Galaxy S7 smartphone.

Data Analysis

All the interviews for both studies were transcribed and analyzed, along with field notes, by the research team. One researcher open-coded all the transcripts using Atlas.ti in keeping with standard qualitative analysis techniques [49] and collated these codes into themes. 62 codes were created such as “*Free Basics* Activities”, “Phone Activities”, “Data Costs”, and “*Free Basics* Impact”. The codes were then distilled into four groups: participant information and background, mobile phone and data usage, using *Free Basics*, and the impact of *Free Basics*. Regular research meetings were held to discuss the codes and achieve consensus on the major themes emerging from the data such as impact on time spent online and online activities. When we reached data saturation, we finalized the main themes discussed in the paper.

Participant Demographics

Study One Participants

Six of our 22 current users reported that they lived in informal dwellings or ‘shacks’ while the remaining 16 lived in RDP communities. All 22 current users reported that in the past six months they had been concerned about paying for groceries or bills, and 20/22 participants actually had experienced utility services being cut off at their place of residence owing to unpaid bills in the past. Additionally, 21/22 current users reported that they could not afford their groceries. Participants in our Study One sample could be classified as among the lowest tier of low-income users, many of whom reported that they often struggled to make ends meet.

The current users’ age range was 15 to 42 years with a median age of 20 years. We had more female participants (14/22) than males (8/22). Despite being unable to manage household costs, all our participants had been using the Internet for at least two years (median = 5.5). Five participants were in high school and five were students attending university. Ten were

unemployed and looking for work and two were employed; one sold clothes for a living and one was a skilled worker.

17/22 participants had smartphones and one participant had a tablet that they used. The remaining four participants did not report if their phone was a smartphone or not. All our participants were on a prepaid plan because this was more affordable for them and because most did not qualify for a contract plan, echoing findings from previous work on mobile phone costs [32]. 20/22 participants reported on the length of time they had been Cell C customers, with a median time of 27 months. When we asked users why they were on the Cell C network, participants gave us varied reasons but most of these related to the costs of using the network. For many, the draw of Cell C was that they offered zero-rated popular applications including WhatsApp and Facebook as well as being less expensive than competing networks.

Study Two Participants

All participants in Study Two were non-users and college students, with an age range of 18 to 31 years old. 7/13 participants were male and 6/13 were female. All 13 students were full time, and 7/13 reported working at least part time during the school year. Students came from a variety of income backgrounds and were not all considered low-income by the same criteria used for filtering in Study One. All 13 participants reported using the Internet for at least four years. Four participants lived on campus or nearby, and the rest lived more than 15 minutes off campus.

Eight of our participants were on a prepaid mobile phone plan and five had a contract plan, with the latter often being part of a family member’s plan or paid for by a family member. 6/13 participants had used *Free Basics* or ‘free’ Facebook previously, six had not used either service previously, and one user was unsure. In total, 11/13 were aware of at least one recent zero-rated service such as zero-rated WhatsApp before joining our study but all were non-users of *Free Basics*.

FINDINGS

Three main themes emerged in our study. First, *Free Basics* did shape both current and non-regular users’ Internet use and their choices of which online services to use. Second, *Free Basics* saved current low-income users money but the perceived value of *Free Basics* of non-regular users was affected by access to free Internet options such as campus WiFi. Third, both current and non-regular users found the concept of zero-rated services confusing to understand and manage.

Zero-Rating Shapes User Behavior and Choice

Free Basics Increases Time Spent Online

In our study, for both current users who had little means to get online regularly and non-regular users who were more connected, *Free Basics* was more than just getting access to Facebook. The platform, despite drawbacks, provided users with limited access to the Internet resulting in more time spent online and exploration of sites that were included in the platform. We asked both user groups about their Internet usage on their mobile devices before using *Free Basics* and all reported using the Internet daily, particularly for social media and staying in touch with friends and family. What was clear,

particularly for the current low-income users, was that even before encountering *Free Basics*, these participants were already online. This finding echoes those from a cross-country survey of zero-rated service users [3] and others by Mozilla [34] in other countries, that the service is not necessarily bringing unconnected users online for the first time.

The non-regular student users reported using their phones mostly for a combination of entertainment (e.g. playing games), productivity (e.g. checking emails), and connecting socially (e.g. through WhatsApp, Facebook, and Instagram). Examples of what participants told us about the importance of being online for them included C2: *“It’s an every day thing. I’m addicted I can’t sleep without being online”*. Similarly, S10 talked about losing out if she was not online: *“I feel like if am not on [the internet] and not checking often, I would feel I am out of the world, and not in tune of what’s happening”*.

We asked our current users how long they had been using *Free Basics* and what they were doing with it once they started using it. 16/22 current low-income users reported the length of time they had been using the service. On average, these 16 users had been using the service for a median of 4.5 months with the range of time extending from two to 14 months. Our non-regular students users used *Free Basics* for a median time of 13 days during Study Two. All of our current *Free Basics* participants reported actively using Facebook, and many had used several but not all of the other applications that *Free Basics* offered before signing up for the service. For the current *Free Basics* users the most accessed services in *Free Basics* were Facebook (22/22), Gumtree (12/22), Wikipedia (10/22), News24 (10/22), and Careers24 (10/22). Thus, the most popular types of services current users reported accessing in the platform were ones focused around social aspects, information, news, and jobs. This supports previous findings about the most popular types of zero-rated services from a survey of users in various developing countries [3]. Applications that the non-regular student group used during study included Facebook (9/13) and News24 (6/13) with 5/13 reported using Girl Effect, Gumtree, and Wikipedia each.

Despite already being online, a result of using *Free Basics* for both user groups was an increase in the amount of time spent online. Accessing ‘free’ services in *Free Basics* also made Internet access less of a burden on other activities. In a telling quote about the benefits of *Free Basics*, C6 expressed: *“I even use the Internet more than before I had the app. Because at that time, I could be going on the Internet and it would tell me my data bundles are depleting. And once you don’t have data, it takes a lot of your airtime. Now I am stress-free, I relax because I know I use the Internet for free”*.

In another example, C12 explained how the platform helped him complete assignments and be more accessible to friends and classmates: *“I was missing out on a lot of important things, personal stuff, and events...I would miss out on homeworks things like that. [Free Basics] is working it’s actually made my life much more easy. I am available to most people and most of the things now I don’t miss out”*. Non-regular users felt that the platform’s main impact was making Internet access available even when WiFi was not, as captured by S10: *“Outside Free*

Basics I would not use [the Internet] as much because I am using my data. I would be very quick when I am on there and look for what I need. As soon as I am done, I will leave. When I am [on] Free Basics, I would stay for quite a long time and just read extra things the whole day I won’t even be that interested in. But just because it’s not using my data”.

Not only were both current users and non-regular users spending more time online because of the platform, they were able to explore content and services they would not have otherwise known about since these services were included in the *Free Basics* platform (e.g., Girl Effect and SuperSport) for ‘free’. For example, seven out of the 14 female current low-income users and four out of six women in the non-regular student group tried the Girl Effect application for the first time through *Free Basics*. For some, accessibility to women’s health information had a big impact, such as with C4 who told us: *“Girl Effect was something completely new to me...I had a lump on my breast so I liked going to the clinic. And at the clinic they would give me a letter and send me to Khayelitsha. And then there they said I should wait for some time, it will just go away. Last year [I had the same problem], then I went to the clinic and they sent me to Khayelitsha again. Then I heard of this Free Basics...and then I went on this Girls Effect and it told me that no, [there was no problem]”*. This participant actually felt less of a need to go to the clinic after using *Free Basics*. However, this could be a potentially risky behavior if the condition was not benign. In another typical example, C11 reported finding new services: *“I saw you could read news and sport entertainment—sports from overseas and golf I never use to follow, but I saw it in there, then I thought I should read it”*. To summarize, most of our current users and non-regular student users used Facebook more than any other app in the platform. For current users, the platform helped them to spend more time online in general, and both users and non-users were exposed to apps they would not have known about because they used the platform.

Content Differences Between Paid and Free

Participants valued the free services in the platform. However, both current and non-regular users’ biggest overall complaint was that the stripped down ‘free’ versions of applications in the platform did not offer all of the functionality of the paid versions, and they knew this since they were not first-time Internet users. This finding echoes non-users of Facebook in Zambia who imagined what they would want to use even though only Facebook Zero, the text based version was affordable to them at the time [59]. For example, 17/22 current users and 5/13 non-regular student users who actively used Facebook expressed dismay about being unable to see images in Facebook on *Free Basics*. Participants also complained about not seeing images when searching on Wikipedia and Bing, or when looking to purchase goods on OLX or Gumtree. For instance, C10 said: *“The social media part as in Facebook is ‘free’ but when you want to look at your pictures, they don’t show so it’s kind of a bit useless”*. For some, the lack of this key feature of a social media service ultimately led to using the full paid version of Facebook as expressed by S3: *“If you want to see images you have to start using data, so sometimes I would end up only using the data one instead of using the*

Free Basic one because I like seeing the pictures, because if I want to like or comment on something, I want to know what I'm liking and commenting on".

Even though participants could not see all images and video content on a user's Facebook feed without paying for data costs, 5/22 current low-income users mentioned that they still engaged in "liking" or commenting on a friend's image that was posted without being able to actually see the image, as described by C5: "No, I buy it [image downloads] when I have money. If I don't have airtime, then I don't have it. I just click "like" on everything because then I just assume it's all nice". These current users felt that commenting or liking despite not seeing the images was a necessary behavior in order to stay connected and relevant in friends' lives. In another example, C18 described how they were trying to avoid embarrassment from others knowing they were using the 'free' version of Facebook: "When you use 'free' Facebook, you don't see the pictures. Sometimes network is slow, and the new images you can't see. You get noted very easy when using the 'free' Facebook and people will laugh at you. Like if someone posts a picture, your comment determines whether you can see the picture". Additionally, C22 said: "Really Free Basics is not being fair on Facebook. Someone will load a picture and people will comment "WOW it's beautiful" then we can't see the picture and videos we can't play. We need to have [media] then it will go back to it's name Free Basics".

In addition to viewing images, our current users also felt limited in their ability to upload pictures to sites like Facebook, Gumtree, or OLX, as uploading media incurred data costs. Our finding here confirms others about users in Myanmar that users would prefer the paid version of Facebook with the images and videos [20]. However, our participants made do with what they could afford to keep their social relationships in tact.

Since all our users had been online prior to using *Free Basics*, they also preferred using the paid version over the free version of apps other than Facebook too. For instance, S6 and S8, non-regular student users were used to using Google search instead of searching for a topic using Wikipedia or Bing which are included in *Free Basics*. To sum up, across current or non-regular users, participants clearly felt the differences between 'free' versus paid services. Current low-income users tried to hide the fact they were using 'free' services from their peers and non-regular student users were often dismayed that their service of choice was not included in the platform.

Limiting Choice Affects Usage

Many of our users expressed that having many applications available on *Free Basics* was good because they covered many content areas; as captured in a sentiment expressed by S5: "I mean for your average person they have everything you know from your sports, news, advice sites and things like that. They can't really offer free data for every single app you use, so for what they are offering now I think it's impressive and it's good". However, participants also felt that not all the apps were particularly useful and frequently participants felt that many of services they used were not included in *Free Basics*.

Both current and non-regular users expressed frustrations around understanding why some apps were included in the platform and not others. For instance, a non-regular student user told us: "Why is Whatsapp not there, really who came up with the list? This list is really useless besides Facebook and BBC even Wikipedia" (S9). In addition to WhatsApp, participants also made suggestions for other apps to be included in *Free Basics* such as personal finance management apps, email services, and other social media sites such as Instagram. Two current users also wished *Free Basics* included more free educational tools to help students learn especially if they do not have textbooks, a feeling best represented by C10: "Like the ABC apps where you can teach children more of educational apps for Geography and Science stuff. My wish is for Free Basics to activate those so that children can access them even if they don't have textbooks". Participant C17 best explained that the more applications that could be included the better and that overall *Free Basics* was seen as providing a positive influence on user's lives: "They not enough they can add more because these things helps us and they help the growing kids".

Understanding Platform Creators

We also asked participants who made the *Free Basics* service and most current users had no clue. 5/22 thought the service was made by Cell C and only one of 22 identified the creator as being associated with Facebook. Despite not knowing who created *Free Basics*, all current users had praise for the creator and 5/22 wished to 'thank' the people who made the service. For example, C6 said: "What I see too is that people who use Cell C aren't rich people—it is people who are hustlers, who sell things to get by, who don't have proper jobs, so this person sat down and thought about making Free Basics to help us". One of the stronger summaries of this theme is related by C17's quote: "Is it not Mandela or maybe God who saw that we were suffering?". Only a few of our current user participants wondered about corporate gain for the creators of the service, like C21: "I was curious before on how it was done and what benefit does that person get? Since it's free what do they gain?"

By contrast, most non-users understood that Facebook and Cell C had some relationship to the platform. At least three also had strong opinions on who provided the platform and why certain applications were included while others were not. Non-users noticed including Facebook definitely helped the company. S13 noted that the Daily Quote app within *Free Basics* allowed her to share the quote via paid SMS through Cell C. While it was clear this feature generated revenue for Cell C, S13 was not bothered by it: "Cell C selling themselves there, I mean why not, it's your app". The most compelling thought was expressed by S8: "Essentially you are giving Facebook a lot of power because [the services are] essential. For people who are reliant on this and they can only view what Facebook decides to make free. Facebook gets a lot of control over what they can look at on the Internet and I think that's somewhat dangerous. It could be fine but it could be misused". Current users who were less connected were not aware of who controlled and created the platform, while several non-regular student users expressed greater concern about corporate stakes in providing free Internet access.

Zero-Rating Impact Differs Across Users

Free Basics Reduces Current Users' Internet Costs

The current users found out about *Free Basics* because they were trying to find ways to reduce their monthly phone costs. Word of mouth about the service was being passed on by users in the know to help others save money but most could not believe that such a service would be offered for 'free'.

We asked our current *Free Basics* participants about monthly mobile spending costs and 16/22 participants reported these costs in detail both before and after using *Free Basics*. Of these 16, the median spending was ZAR 110 (about 8.00 USD a month). *Free Basics* was reported to save these users ZAR 58 a month, dropping the average monthly cell phone cost by almost half. All our current users spoke of the high costs of maintaining their phone which often forced some to choose between feeding themselves or their families and being able to have phone service, as evidenced in this quote from C8 who said, "[*Free Basics has impacted me*] in a very good way, I can now buy a loaf of bread with that ZAR 10". This finding echoes similar work on mobile phone use by Kenyan women [58] and our own previous study on the sacrifices low-income users make to manage mobile data costs [32].

Participants in the current user group spoke of how they appreciated that *Free Basics* allowed them to connect with friends and family without having to pay expensive data costs. For instance, C13 said "*If I access Free Basic[s], whatever I am searching, I would get immediately get more information without using data and airtime*". For the current users who did not have a source of income, they liked the service being 'free' since they could not work and did not have money of their own to spend, as explained by C21: "*Good service because it is a great help, especially to the youth because we use it and since we don't work, [so] it helps us a lot*". *Free Basics* also allowed current users to continue using services which once required data charges to access, C6 illustrated this point when they said: "*OLX used to charge me a lot because it's on the Internet. Now I'm very happy when it's on Free Basics because now it's 'free' for me. CareerTimes and Career24 was expensive, Wikihow too. All the sites I used were still there nothing had changed but they had cost me a lot*".

The majority of current users explained to stop using the service would mean adding an expense to their lives that they could not afford, leading to more financial stress and impacting how often they are able to go online. In response to what she would do if *Free Basics* was no longer offered, C6 said, for instance: "*My life would also end!*". In summary, there was no question that current users valued *Free Basics* and the impact it was having on their lives to reduce Internet costs. Every one of our current users told us that *Free Basics* is a good service and that they planned to continue to use it. These overwhelmingly positive sentiments about the service stand in contrast to anecdotal suggestions that *Free Basics* is perceived negatively in South African townships [35].

Convenience is Key For Connected Non-Users

The non-regular student users, however, had a different experience when it came to saving money using the platform. None of our non-users provided detailed information on their mobile

phone spending both before and after being introduced to *Free Basics*. They did however discuss methods they used to spend more time online without spending more money. Students mostly saved on data costs by taking advantage of campus WiFi, a behavior to reduce mobile data costs also reported our previous work [32].

The majority of our non-regular students users who had WiFi access during the day on campus and in their place of residence felt there was less of a need for *Free Basics* to save on mobile phone costs. For example S8 elaborated: "*Overall like I think it is a good idea, I don't think it's something I would use a lot because for me it's not a massive deal that I'm saving that amount of data...I'm almost always on WiFi through UCT, so it doesn't really make a difference*". However, for those who had WiFi during the day on campus but did not have WiFi at home, *Free Basics* was seen as playing an important role in making the data they did pay for last longer, such as for S6: "*When you not on campus and you home, you use data because you don't have WiFi and you want it to last as long as possible*". Our participants valued *Free Basics* differently depending on their resources but the platform was considered more of a "back up" or last resort option for getting online.

Even though some of the non-regular student users did not see any immediate benefit on cost, these users did recognize that *Free Basics* could be beneficial to others who, as S8 explained, were "*struggling for money*". By contrast, our current users reported that seeking out 'free' Internet through public WiFi access was too inconvenient for them as others have noted [14]. Current *Free Basics* users reported that 'free' WiFi access was often available at public spaces, such as at libraries, but these places tended to be further away and less frequented locations for our users. Additionally, WiFi access at these locations typically came with time restrictions on how long our participants could stay online. In summary, for the current low-income users who had fewer options for 'free' Internet access, *Free Basics* was crucial for cutting down Internet costs. However, for non-regular student users with access to 'free' WiFi, the service was non-essential for managing phone costs.

Users Find Zero-Rating Confusing

Both the current users and the non-regular student users were confused about what it means for a service to be zero-rated or 'free' and how that affected their Internet costs.

User Understanding of 'Free' and 'Zero-Rating'

We asked participants about what it meant for the *Free Basics* platform to be 'free' and responses varied. Some thought that the service did not require data, or that it did not cost them anything while they were using it, as in the case of C20 who said: "*You don't need to use data to actually be on that app you want to use*", and similarly, S12 who explained: "*It means certain websites or places where you can visible your phone and you actually don't get charged for Internet, no need for data*". Other participants thought a zero-rated service was free to use but with limitations such as having to be a long term customer or requiring some amount of data/airtime in one's mobile account to use the zero-rated platform. Some participants reported not knowing what zero-rating meant and one participant, S7, remarked that if could be free but you are

still paying for the service in other ways: “*Something that’s free, in inverted commas like you are paying for it but not that specific thing, it will be included in the costs of other things*”. Similar doubts about the service being ‘free’ were reported by non-users of zero-rated services in Ghana [21].

Current users were also confused over whether there was a cost to pay for the app in the app store and if there was a cost to download the app to the phone. 7/22 current users believed that the app did not cost them money to access it the first time, regardless if they downloaded *Free Basics* to their phone or accessed the service through a mobile browser. However, at least 3/22 current users who downloaded the app to their phones thought they had used at least some data to download the app at a cost to themselves. For example, despite C9 saying it did not cost her to download the service she talks about the amount of data that was depleted to get the app onto her phone “*No it didn’t cost me. I had to have airtime and convert it to megabytes, I bought 20MB but then after the download I had about 17MB left so it doesn’t take much*”. The remaining 12/22 current users were unsure if the app cost anything for its initial download or to access through a mobile browser, like C14 told us: “*I don’t think there was any cost because I didn’t have airtime when it was downloaded on my phone, but I don’t know*”. None of the non-regular student users expressed any misunderstanding of the costs of downloading the service.

Understanding Zero-Rating and Mobile Data Connections

Both current and non-regular users also had trouble understanding how mobile data works with zero-rated services. All participants mentioned switching off their data to save on mobile data costs, to stop the phone from accessing the Internet when they did not want it to do so. However, there was uncertainty about how this worked when it came to ‘free’ services. One participant, C18, was confused about why *Free Basics* did not work when she turned off data access to her phone. Her logic was that if turning off data saves money and prevents unnecessary data consumption and that if *Free Basics* is ‘free’, it must not use data and therefore it should be able to be used despite data service being switched off, “[*Data*] *has to be on, I don’t know maybe it’s because for the Internet to recognize you, you have to be on that, you are using Cell C*”.

Similarly, those in the non-regular user group wondered how connecting to the service worked not only through a mobile data connection, but also over a WiFi only connection as well. For example, S6’s quote typifies what we heard: “*I thought it was a little bit misleading because you would assume that you get the basics for free like Facebook, Messenger and so on and at least stay connected somehow. It shows free data at the top, but why must I connect with airtime?*”. In another telling quote, S7 expressed: “*If my data is on, I’m assuming that something is using my data. So like if I was to use this app and tell you whether its free or not I’d assume that when my data is switched off the app will still work*”. This confusion over connecting to *Free Basics* is best summarized in this question posed by C18: “*My question is, why for Free Basics in order to access your Internet, data should be on, but it’s ‘free’?*”. Clearly to our participants turning on cellular data represented Internet access and also the concept of incurring data charges.

Moving From Free To Paid Content

Although understanding how mobile data and zero-rating worked was confusing, all participants did understand that multimedia such as videos or images consumed more data than text based web pages. Additionally, despite not understanding how the service works on a technical level, most of our participants felt they understood when they were in ‘free’ content as opposed to ‘paid’ content. This was due to several key indicators including: additional icons or color changes, text or banners alerting the user they were browsing for free, or from what content was shown or rather was not shown as captured by C2’s response about how he could tell if the content was ‘free’: “*Just the lack of pictures*”. Participant C7 also told us: “*It tells you, for example on Facebook when you want to see a picture. It tells you, you need data*”. Indicators were also identified by the non-regular students, such as S6: “*I just saw a little purple icon that I’m using Facebook through free basic*”. Another indicator users were on the Internet for ‘free’ was identifying text, like what S3 saw: “*When you [access] Facebook it goes on to your own Chrome browser it just says Free on top of Facebook.com*”. A quote by S10 explains the importance of these indicators: “*I liked that it prompted you before. Like it will tell you, you need to switch on your data instead of switching automatically using your data without you knowing. I did not know it was like that. I was glad it told me you need to switch data before you can go further. For me it’s like a warning sign I don’t want to say warn me from wasting my data but prevented me from finishing my data*”.

In summary, *Free Basics* provides little information to users on how it works on a more technical scale but does provide several indicators as to when a user is accessing ‘free’ content. However, few indicators communicate to users how much downloading or uploading a picture costs, or how much it costs to access other types of additional content such as web pages not included within the *Free Basics* suite.

DISCUSSION

Our findings contribute evidence for both positive and negative impacts of *Free Basics* on users and non-users. We discuss the implications of our work for various stakeholders next.

Democratizing Zero-rated Services

Our findings demonstrate that zero-rating platforms such as *Free Basics* are shaping users’ online behaviors and their choices of online services. Moreover, users are often not aware of who controls the availability of apps in these platforms. Zero-rated service providers can play a role in democratizing their offerings by providing users with a voice in shaping what services are included or not. This could be done by providing mechanisms for users to review, vote, or submit suggestions on services to include in the platform. By involving and giving users agency in shaping the service, zero-rated platforms can become more democratic in terms of how they offer Internet access instead of relying on governments, content providers, and service providers to dictate which apps can be included alone. To protect user interests, governments could conduct further research within their respective countries on how different forms of zero-rating services affect the Internet practices. This research could help to inform policy and determine which

forms of zero-rating provide the best type of access for low-resourced individuals. Our findings also suggest that regulators and policy-makers need to provide oversight to ensure that zero-rated service creators do not exploit users or place them in ‘walled gardens’.

Exploring Alternative Forms of Zero-rating

Our findings suggest that *Free Basics* is not bringing only first-time Internet users online. Instead *Free Basics* helped participants spend more time online without increasing mobile costs, and in some cases, reduced their monthly spending. Although they saved money while browsing a subset of Internet services, paid versions of apps were perceived as superior. We suggest that the CHI community can first conduct research on designing free apps in ways that do not feel, or operate, as second rate services (e.g. by including image captions), while still being data-lite, to enhance zero-rated user experiences.

Second, we suggest that the CHI community evaluate and design alternative ways to help the unconnected get online in a more unrestricted manner. For instance, free WiFi access can provide Internet access at optimal locations for users. Facebook is already exploring this option; in May 2017, the company began piloting a free WiFi program in Kenya and India [27, 8], to provide users with unbounded access to the Internet. ‘Free’ Internet access can also be provided by offering a certain duration such as 30 minutes, an hour, or a day of free unlimited data for consumers. Opera, the software development company, already uses this approach; Opera and OperaMini browser users agree to targeted “interstitials, offers and messages to consumers” in exchange for a limited time period of Internet access. While this approach provides the entire Internet to consumers for ‘free’, it comes with advertisements and forces consumers to use the Opera browser.

To increase connectivity, low-income groups could similarly be provided with a quantity of data for free, which can be used to access anything on the Internet, as Carrillo suggests [10]; with data vouchers subsidized by local governments or non-profit organizations. Suggesting which online sites users could visit rather than limiting choice entirely could also provide users with more freedom to experience the full Internet. However, this approach could also impact users negatively since the amount of time they could spend online for ‘free’ would depend on the type of content and number of services accessed. The CHI community can conduct further studies of use and non-use of ‘free’ Internet services so we can better compare which services provide the least restrictions and the most benefits to consumers.

Increasing Understanding of Zero-rating and Data Costs

Our findings suggest that zero-rating further clouds users perceptions of mobile phone costs and what paid versus free services are, in addition to interfering with typical data saving strategies such as turning off mobile data to save money. Therefore, our third suggestion for the CHI community is to investigate how to provide users with scaffolding to understand and manage ‘free’ versus paid Internet usage using different interfaces. Future research could investigate how to create better indicators of the transition from ‘free’ to paid Internet,

in the vein of Sambasivan et al.’s [44] work on browsers to inform users of Internet content costs. This will help users form mental models of ‘free’ versus paid services and make use of the Internet in ways that align with their needs.

Features to better communicate the potential costs of Internet use or control what content is accessed, such as only loading plain text from a website and blocking any images, videos, or data intensive advertisements could help users avoid over-spending on data when using the Internet. Future design work could also focus on creating improved on-boarding experiences for zero-rated services, particularly for novice Internet and mobile device users [23], to address misunderstandings and confusion around how these services work and when the user does and does not incur data charges while on the service.

Study Limitations

We had a small sample of users of differing demographics with similar needs in a city in South Africa. Our sample was therefore biased towards urban South African users and only reflects the experience and impact for two specific groups: current low-income users and non-regular student *Free Basics* users. Our sample was restricted to Android phone users so our results may not account for users with feature phones or phones with other operating systems. This study would have to be repeated in other places where the platform is offered to see if these findings hold true in marginalized communities across other cultures, countries, and environments. Future studies could also try to log usage data to have a broader picture of use. A larger scale survey may also more systematically examine the impact of zero-rating on users in both rural and urban areas. Lastly, our findings did not reveal many negative consequences of using zero-rated services, such as privacy and security concerns; open topics for future work.

CONCLUSION

Zero-rated services are increasingly being used to connect low-income and unconnected users around the globe to the Internet. Our findings suggest that first, *Free Basics* does shape users’ Internet use and their choices of which online services to use. Users can get online more frequently and are driven to use ‘free’ services especially when they have fewer resources to get online. Second, the impact of zero-rated services is highest on the lowest income users but can be a supplemental help to more well resourced users who need to get online. Finally, users find the concept of zero-rating confusing which complicates the process of managing mobile Internet costs. We suggest that zero-rated platforms give users agency to influence what is included in these platforms and a voice about the impact of these services on them. We also suggest that alternative models of zero-rating be examined for comparative impact assessment. Lastly, we suggest more interface design work is needed to help users form an improved mental model of zero-rated services.

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